EDUCATION, EMPLOYMENT AND EARNINGS : A STUDY OF THE SOUTH AFRICAN MANUFACTURING SECTOR

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University of Cape Town

STATE EMPLOYMENT IN SOUTH AFRICA

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Thesis submitted in fulfilment of the requirements for the degree of Master of Arts in the Faculty of Social Science and Humanities, University of Cape Town

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School of Economics

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Naturally opinions expressed or conclusions reached are those of the author and are not to be regarded as necessarily a reflection of the opinions and conclusions of the above.

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A B S T R A C T

The thesis has two objectives: First to establish what has happened to employment by the State and the causes behind changes. And second, to establish the role the State has adopted as a labour market operator for white labour and the effects of this role. The work is divided into three parts:

PART I: This establishes some of the economic foundations of the factors affecting State employment. The factors which affect total demand for State employment are those factors which determine the total demand and supply of public output. There are four interested parties who are affected by the supply of public output: Consumers who demand public output through voting and non-voting pressure; the government which designs public output to suit the median voter and to some extent overcomes the political uncertaintly problem through the implementation of ideology; producers who affect public output through non-voting pressures; and the bureaucracy which produces public output under the criteria of: (i) when a pure public good is produced this is to the full extent of the bureau budget without regard for average and marginal cost conditions and (ii) in the production of a pure private good the bureau produces efficiency only if the trading surplus accrues to the bureau

PART II: This presents the collected data and discusses problems

encountered in the establishment of the data. Employment is presented by race for the various sectors of the State (for example the Central Authorities or the Railways) and for the various types of activity undertaken by the State (for example the provision of Economic Services or Educational Services).

PART III: This tackles the two objectives of the work and emerges with four findings.

The most surprising result of the study was while State employment has grown, the growth in black employment was proportionately far greater than the growth in white employment. This growth is largely centred around the growth of black bureaucrats and teaching services in the employ of the Central Authorities in the 1950s and Homeland governments since the 1960s.

Second , State employment by activity shows the interesting result that half of all State employment is involved in providing economic services. In 1980, education employment ranked as the second most important type of employment having constituted twenty per cent of State employment.

Third , the State views its role as a white labour market operator as that of an 'employer of last resort' for white labour which it achieves by means of always having posts vacant for whites, especially at lower skilled white positions. The results of this are first , to set a

minimum wage for whites and second , is likely to cause the State to operate inefficiently.

Fourth , it appears that certain sectors of the State were constrained by fixed factor proportions. In the public service, the Railways and the Provincial Administrations, the ratio of black to white employed rarely exceeded 1:1 until very recently. The effect of this has been to limit the growth in employment of some of the sectors as a result of the State's difficulties in attracting white labour.

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I N T R O D U C T I O N

At the time that this thesis was started there existed a number of important issues which were related to employment by the State and in need of rigorous investigation. These issues can be divided into two categories:

First, it was necessary to establish what had happened under State employment in terms of growth and size and to explain how the present picture had evolved. This is discussed in terms of growth by sector and by activity. Second, it was important to establish the role that the State has adopted for itself with regard to white labour and what the effects of this have been on the State and on the economy.

Naturally, the problems which were encountered in the investigation were out of proportion to those which had been expected: The first problem which presented itself was that there existed no complete set of data for employment by the State; this necessitated many months of work in collecting and collating data in order to render a complete data set which was both comparable over time, and which enumerated employment by sector and by activity. Second, in order to interpret the picture behind the data, recourse was needed to the theoretical aspects of the factors which

might affect employment by the State; unfortunately no such body of theory existed, so it became necessary to develop a general theory of State employment. Finally, only after the theoretical part of this work was established and the data was sifted, could any progress be made with the real issue of the thesis: the interpretation.

In order to present the thesis as simply as possible it has been divided into three distinct parts: Part I attempts to establish the theoretical economic foundations against which changes in employment can be discussed. Part II presents the data which became available and discusses the difficulties encountered with data. In Part III the two issues which initially presented themselves are discussed: State employment by sector and by activity, and secondly, the role the State plays with regard to white labour.

P A R T I

ECONOMIC FACTORS AFFECTING STATE EMPLOYMENT

Any work which attempts to examine economic data must be preceded by some theoretical model to assist the researcher in his compilation and give direction to his interpretations. The area and spread of the data being examined will dictate the extent to which the macro economic overview and the relevant micro economic foundations of the model must be extended.

As the ultimate intention of this thesis is to examine State employment in South Africa, an economic theory is needed that explains the role of the State as a demander of labour. This part of the thesis is an attempt to develop a model which might have some relevance in the final interpretation of the South African scenario.

As State labour is utilized in the production of all State output, a necessary part of the theory underlying State employment must be an examination of the demand for and supply of State output. While State output is often discussed theoretically as the production of public goods it is realised that this output is rarely confined to pure public goods. State output consists both of goods and services, and of public and private goods. Pure public goods are traditionally refered to as those goods to which the exclusion principle cannot be applied. Possibly the only pure public good which exists is the provision of defence as all other so-called public goods can at some time be subjected/ ...

subjected to the exclusion principle. The traditional example of a lighthouse acting as a (public) beacon becomes subject to the exclusion principle when the shipping lanes become congested. The services of the police force cannot be seen as a pure public good because the use by one person of this service prevents some other person from using it for however briefly. In that sense the exclusion principle applies and the price paid for using the police force is the queing time while waiting for the congested services to become available. The other tradional example of roads, highways and bridges as pure public goods again falls away when the exclusion principle occurs with growing congestion or the erection of toll gates. State output also comprises those goods and services which fall in the traditional domain of the State such as law courts, prisons and education (these could be called semi-public goods) and pure private goods and services. The extent to which a State produces pure private goods and services is determined by a multitude of social, economic and political factors. A discussion lies outside the realm of this study. That a State should provide a mix of public, semi-public and private goods is largely irrelevant to this study. State output is refered to below as public output and this must be read to include all State output. When the production of pure public goods is discussed below these are refered to as public goods.

The development of a theory of State employment realises that State labour is used in the production of public output. Consequently the first section of this work attempts to develop a model of the macro economic foundations of the demand for and supply of public output. With the /...

the model developed the second section examines the micro economic foundations of public output to determine whether State production might exhibit behaviour different from that of private sector production. With the macro and micro theory of public output examined the third section examines the micro economic theory of the inputs into the production of public output, specifically the labour component of that input. Finally, based on the above, the theoretical expectations about the growth of State employment are summarised.

1-1 : A MACRO ECONOMIC THEORY OF THE PRODUCTION OF PUBLIC OUTPUT

Introduction

The level of State employment is directly affected by the level of public output. If the production technique of public output is held constant, it can be said that the greater the level of output the greater the level of all productive inputs and the lower the output is the less will be the use of productive inputs. It is therefore important in the analysis of State employment to have a definite model which explains the demand for and supply of public output. An important area of this work is the development of a model which usefully analyses the variables affecting public output as a stepping stone to a better understanding of State employment/ ...

employment.

Traditionally, many economists still regard public output in the framework of Pigovian Welfare Economics. This is the model in which the State acts as an omnipotent modifier of those factors which might cause a Pareto non-optimal situation. It attempts to place a country in a situation such that any further change can make some person better off only at the expense of making some other person worse off. (This is further discussed in Section 1-1-1 below.) That this model is a poor description of the real world and leaves little scope for useful analysis has brought it under considerable critisism. Over the past thirty years many writers on Public Finance and Public Choice Theory have critised the model on various grounds and in some cases have offered alternative theories of public output. (This is further discussed in Section 1-1-2 below.) However, apart from a few surveys of the Public Choice literature, there appears to be no model which consolidates all the critisisms of the original Pigovian work and offers an acceptable alternative model of public output based on these critisisms.[1] This section of the work is an attempt to do exactly that.

The development of the model which might usefully explain public output is done in three stages. Section 1-1-1 discusses the Traditional model of public output. Section 1-1-2 discusses the criticisms of the Traditional model. And, Section 1-1-3 is an attempt to use the criticisms of the Traditional model in order to develop a working model of public output.

1-1-1 : THE TRADITIONAL APPROACH TO PUBLIC OUTPUT - A SUMMARY

This is the model which was, until recently, taught at undergraduate level as the place of the public sector within a market economy.

"Positive analysis was restricted almost exclusively to theories of tax shifting and incidence. ... Comparative statics offered a plausible predictive framework for analysing tax alternatives. ... For this strictly positive analysis, which could also yield empirically refutable propositions, the economist had no reason to inquire about the political purpose of taxation, no reason to introduce external evaluation of alternative tax instruments."[2]

The model views the economy as three distinct sections viz. Consumers, Producers and the Government. Consumers are utility maximisers who purchase goods and services within a budget constraint so that the marginal rate of substitution of all goods and services is equal. Producers are profit maximisers who utilize available factors of production in a profit maximising combination to produce the commodities which are purchased by the consumer. Maximum social welfare in the model is achieved at the point of Pareto optimality and is attainable through the voluntary market interactions of individuals. The position of Pareto optimality is defined as the state where no individual's welfare can be increased without decreasing the welfare of some other individual(s).[3]

The Government plays a two part role in this model. Firstly, the government is responsible for the provision of public goods i.e. goods to which the exclusion principle cannot be applied. These goods are produced using a combination of factor inputs which are technically efficient. The amount of public goods produced is such that the mix of public and private sector output is Pareto optimal. The efficient mix of private and public good output was first studied in Samuelson's seminal paper of 1954.[4] " ... , in which he laid down the necessary marginal conditions for allocative efficiency in the provision of public or collective goods to a defined community of persons. Samuelson extended the accepted norms of theoretical welfare economics from the private to the public sector of the economy, using individual evaluations as the building blocks."[5] While the defined marginal conditions can be seen as positive theory, Samuelson's resorting to the use of a Social Welfare function to determine tax shares is in principle a normative approach and emphasises his misgivings that public output can be determined through some kind of exchange process akin to exchange in the private sector. Buchanan succeeds in overcoming this normative area but only subject to the assumption of revealed preference for public goods.[6]

The second role the government plays in this model is the correction of any private sector market imperfections which cause a Pareto non-optimal situation. The market imperfections which might occur are imperfect competition where the selling price is not equal to the marginal cost of production, externalities in the production process and production which exhibits increasing returns to scale.

During the 1940's the restrictiveness of the Pareto optimal objective determining the role of government involvement in the economy led to Kaldor - Hicks - Scitovsky debate on optimal Social Welfare conditions. The Pareto conditions are highly restrictive on government ouput as even the most flexible project (output) taxation schemes are sure to leave some minority worse off than before. Kaldor suggests that policies should be analysed using the principle that if losses occur to some people as a result of some policy implementation it is possible to pay the loosers compensation to the value of their loss, even though the compensation need not actually be paid.[7] Obviously then if the losses outweigh the benefits the project will not be undertaken. The alternative approach, as proposed by Hicks, is that a policy should be implemented if it is impossible to compensate for the potential losses should the policy not be implemented.[8] However, as pointed out by Scitovsky, hypothetical compensation introduces great uncertainty in matters of income distribution so that inequitable redistributions of income could occur leading to a situation where a policy is desirable in that initial gains outweigh the losses but subsequent redistribution losses outweigh the gains.[9] Baumol argues that the entire debate has avoided the basic problem of the interpersonal comparison of the subjective value of gains and losses.[10] Equal monetary losses and gains by two individuals are very likely to be valued differently by the two individuals. The only way he sees out of this problem is the formulation of explicit value judgements in order to evaluate a situation which is the equivalent of developing a social welfare function.

Given the above two areas for government in the economy, it has also been argued that there is place for merit goods in government output.[11]

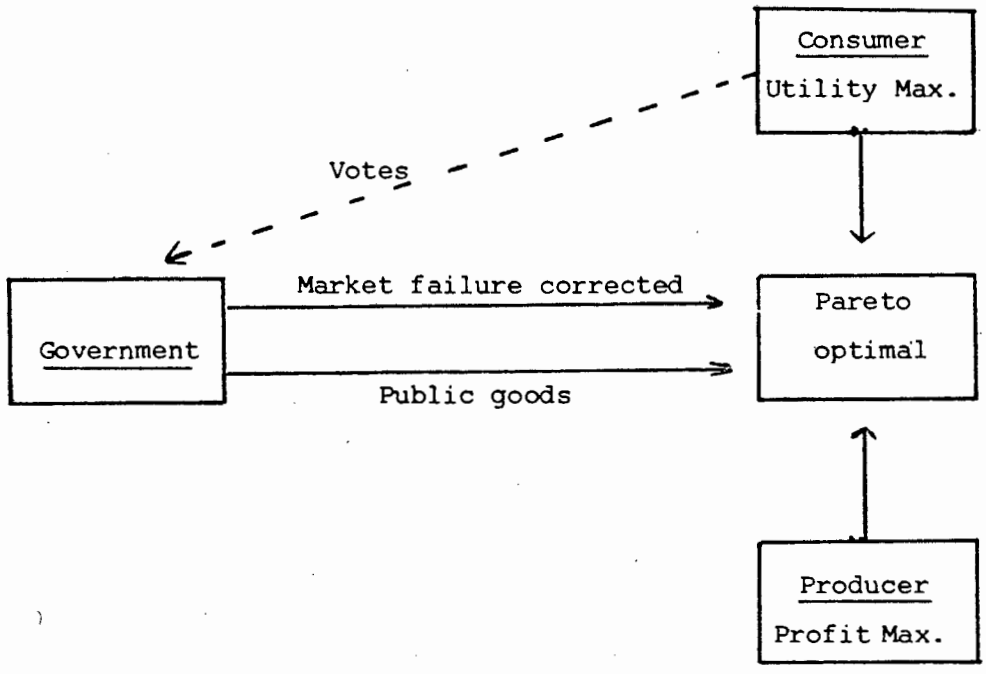
Merit goods are goods which can be subject to the exclusion principle but which are considered so meritorious that their production is funded by the government budget. Even in the Traditional approach the public production of merit goods is a normative issue and need not be discussed further here.

The final section that we deal with in the Traditional model, and the area of its greatest shortcoming, is in the supply of public goods i.e. in the supply of government intervention in the economy. The all powerful insight by which the government is able to supply exactly the correct amount of public goods, and appropriate taxes and subsidies, and correct every market failure is allegedly supplied through the voting procedure. The government is seen as nothing more than a consumer utility maximiser. Voting is such that the politician mix, i.e. those politicians voted to office, is such as to give Pareto optimal decisions. Buchanan:

"The State has no ends other than those of its individual members and is not a separate decision making unit. State decisions are, in the final analysis, the collective decisions of individuals".[12]

The entire decision implementing process through the bureaucracy is ignored. Laws which are enacted and the policies which are implemented pass undistorted through the decision implementing body i.e. the bureaucracy and change the economy in such a way as to be exactly Pareto optimal. The Traditional model takes no account that bureaucracy as an entity could possibly be at odds with the aims of government.

The Traditional approach views the government in the economy as in the diagram on page 9.



Consumers are utility maximisers, producers are profit maximisers and the government, through the voting procedure, produces exactly that public output so that social welfare is maximised.

1-1-2 : PROBLEMS WITH THE TRADITIONAL MODEL - A SYNTHESIS OF THE LITERATURE.

The Traditional model of the governments involvement in the economy is so far removed from the real world as regards public output, that it is little more than a philosophical fantasy. It leaves one with little analytical latitude and an inaccurate base from which to predict what might occur given some real world disturbance. The factor which obviously accounts for these problems is the serious limitations in the assumptions on which the model is developed.

Over the past thirty years the Traditional model has been extensively criticised and modified in many areas. In order to present an integrated model incorporating these criticisims it is necessary to examine the limitations of the Traditional model in some detail. These criticisms have been grouped below as problems concerning : 1-1-2-1. Voting and voting rules, 1-1-2-2. The Politicians role in public output, 1-1-2-3. Bureaucracy's role in determining public output and 1-1-2-4. The effects of Uncertainty and Influence.

1-1-2-1 : VOTING AND VOTING RULES.

In the Traditional model, consumers' needs for market correction and the correct mix of public and private goods for a Pareto optimum, float down on the government like manna from heaven. Action is then immediately taken to correct any situation which does not accord with maximum social welfare.

"The Wicksellian paradigm for fiscal exchange, ideally operating under a decision rule of unanimity without prior constraints on tax-share distribution, places the "public economy" methodologically, on all fours with the "private economy" ...

... But the world is not characterized by zero transactions costs, and these/ ...

these loom especially large when many persons must agree on single outcomes. The two-party dimensionality of private-goods trading, especially as constrained by the presence of numerous alternatives on both sides of exchange, allows the cost of reaching agreement to be minimized, and, because of this, to be largely neglected in analysis. No such neglect is possible for the complex trading process that politics embodies."[13]

With hindsight it seems strange that American and British writers only began studying the problems of information and transactions costs in the early 1950's. This had been studied much earlier by such European writers as J.C. de Borda (1781), M. de Condorcet (1785) and C.L. Dodgson (1875), and were "discovered" and incorporated into the works of, particularly, Duncan Black and also Kenneth Arrow.[14] From this point the literature flows in two related courses with theory of voting being studied on the one hand and the theory of constitutions on the other. These are discussed below.

The theory of voting

The theory of voting, by definition, covers all types of voting viz. unanimity, specified majority (eg. seventy five percent), simple majority and point voting, and covers all areas of voting viz. democratic, parliamentary, committees and clubs. As the emphasis here is on public choice and public output it is voting solely in these areas that is examined.

A : THE MAJORITY RULE

The most popular of all voting rules, majority voting, exhibits definite disadvantages in the attainment of a Pareto optimum for public output. Even in a situation where all enfranchized persons participate directly in every government decision i.e. where there is no representative body determining governmental decision, the majority rule can be less than optimum.

Under majority voting a situation can occur where the losses being sustained as a result of a particular decision outweigh the benefits to the population as a whole. This can be illustrated by an example of five voters who would each pay a tax of R500 extra should a decision be made eg. to repair a particular road. The benefits to each voter are shown in the table below. The decision to repair the road would be taken even

			Vote	
Voter	Benefits by	Taxed	For	Against
A	R620	R500	X	
B	R510	R500	X	
C	R505	R500	X	
D	R100	R500		X
E	R20	R500		X
	R1755	R2500	Vote passed	

though the total social cost (R2500) outweighs the social gain (R1755).

One of the more difficult problems involved with the majority rule is that of issue cycling where it can be shown that with more than two issues a situation can occur where no equilibrium exists. The most formal proof of/ ...

of this is Arrow's so-called "Impossibility Theorem" and was shown while Arrow was attempting to establish the existence or non-existence of the Social Welfare functions.[15]

Arrow's approach is stated briefly here:

Arrow establishes five postulates which, he feels, any Social Welfare function should conform to. These are:

1) All orderings of individual preferances must be allowed.
2) The Pareto optimal criteria.
3) Any ordering of feasible alternatives is allowed.
4) Non-dictatorship. This, in it's weakest form can read that a minority cannot force decisions on a majority.
5) Independence of alternatives so that the choice between any two alternatives shall not be affected by preferences relating to other alternatives.

A simple proof of the theorum can be shown using three individuals 1, 2 and 3 and three alternative choices A, B and C. The individuals choices are such that

Individual 1 : A P B P C (read as individual 1 prefers A to B and prefers B to C therefore individual 1 prefers A to C.

Individual 2 : B P C P A $\therefore$ B P A

Individual 3 : C P A P B $\therefore$ C P B

therefore as individuals 1 and 3 prefer A to B and individuals 1 and 2 prefer/ ...

prefer B to C. A rational community prefers A to C but a majority of the community prefers C to A (i.e. individuals 2 and 3). The result of this is that there can be a constant cycling of issues between the voters.[16] The only way this can be solved with the Arrow paradigm is by the relaxation of the non-dictatorship postulate which is unlikely to appeal to a democratically minded body of theorists. However, it is felt by some that:

"This problem is almost universally acknowledged by authors working in the area of public finance, but it is generally regarded as a technical difficulty to be overcome rather than as a serious defect".[17]

B : LOGROLLING

The term logrolling is the American description of vote-trading within decision making bodies. "When voter preferences intensities on each issue are not the same, the gains of a winning majority may be less than the minority's losses. To avoid this "intense minorities" may engage in logrolling or vote trading."[18] It has been argued by Buchanan and Tullock that if the voting population includes vote trading (logrolling) as part of its political procedure, majority voting can become a more reliable method of achieving Pareto optimality.[19] (The work by Buchanan and Tullock is the most comprehensive work on logrolling produced to date.)[20] It is argued that the "tyranny" of majorities can lead to positions where an issue is passed which benefits the majority but discriminates against an "intense" minority to the extent that the losses/ ...

losses suffered by the minority outweigh the gains to the majority. In simple majority voting without logrolling the issue will pass and total social welfare will decrease. Should logrolling occur, implicitly or explicitly, there is a possibility that the minority can triumph against the majority vote rule by trading votes with other minority groups. This situation can be illustrated by the example below. The table shows three voters' value preferences over two separate issues P and Q. The values assigned can be pecuniary or subjective.

Voters	Issues		Issues*	
	P	Q	P*	Q*
A	-2	-4	-8	-10
B	10	-5	10	-6
C	-5	12	-6	12

For issue P voter B is the minority and for issue Q and C is the minority. Should simple majority voting take place none of the issues will be passed and a net social loss of six units will occur. However, should logrolling occur between B and C (who then vote insincerely on issues Q and P respectively) then both issues will be passed with a net social gain.

Logrolling can also cause a decrease in social welfare. This will occur obviously when the benefit to the logrolling minorities is less than the cost to the majority. In the above table, if issues P and Q had their values altered as reflected by P* and Q*, again both issues will be passed with logrolling but this will lead to a net social welfare decrease of eight units.

It should be noted that logrolling can occur only under certain conditions. The ballot must be an open and not a secret vote otherwise there can be no/ ...

no enforcement of vote trading. Secondly, the vote must be an issue vote and not a vote on a package of issues. If the vote is a package of issues, as would occur eg. at general elections, no logrolling can occur. One either accepts or rejects the package. (However, strategic voting might occur - this is discussed under the theory of the constitution.) Finally, the number of voters must be limited if any explicit vote trading is to occur.

C : OTHER VOTING SYSTEMS

Two other systems of voting other than majority voting are possible. Both overcome some of the limitations of simple majority voting but neither are "perfect" in their own sense. These are the unanimity vote and point voting. Unanimity, while usually unworkable as full unanimity, exhibits itself as a voting rule requiring a majority of fifty percent or more. Constitutional changes, for example, often require a vote of more than simple majority for any issue to pass. "The transaction costs barrier to general agreement may be fully acknowledged at the stage of reaching collective decisions ... But this need not imply that persons cannot agree generally on the rules or institutions under which subsequent decisions will be made, whether these be majority rule or otherwise.[21]

The system of point voting, on the other hand, allocates to each voter equal voter points. Ideally, voters would allocate their voting points to/ ...

to reflect the intensity of their preferences. The system has two major drawbacks:

Firstly it is unlikely to succeed in large communities due to voter apathy with information costs exceeding expected benefits.[22]

Secondly, point voters may attempt to use their vote insincerely by strategic voting. Voters will not use any voting points on issues which are expected to be foregone conclusions. Rather, they will use all their points on issues which are expected to be closely contested and the final result will not be Pareto optimal.[23]

Theory of constitutions

Buchanan and Tullock:

"Direct democracy, under almost any decision-making rule, becomes too costly in other than very small political units when more than a few isolated issues must be considered. The costs of decision-making become too large relative to the possible reductions in expected external costs that collective action might produce. If direct democracy were required, the individual, in his personal role as constitutional choice-maker, would leave many traditional activities of the State to be organised in the private sector, and, for those few activities that he chose to collectivize, he would tend to adopt the less inclusive decision-making rules ... , one means of reducing the interdependence costs generally is through the introduction of representative government."[24]

Except for very small communities it is impossible for every enfranchised person to participate directly in every governmental decision. As a result/ ...

result a constitutional system of representatives (politicians) must emerge with each representative being elected by a given (normally equal) proportion of the enfranchised population. The theory of Constitutions is the study of voting under a system of representative government.

Once representatives are elected all the problems associated with voting rules and logrolling become evident in the same way as in direct voting.[25] However, in the actual general election in which representatives are chosen other problems occur which make the voting process even less Pareto optimal than previously shown. Unlike private sector purchases where one can make graduations in the combination of goods and services consumed, in the public sector one must accept a candidate's entire set of electoral objectives or reject them. Voting, unlike the price system, gives each voter exactly the same "spending power" irrespective of their respective wants or the intensity of these wants. It was shown in the theory of voting how majority voting can bring about a net decrease in social welfare. In general election voting this could be especially aggrevated by having to vote on a specific "basket" of issues only. That logrolling is, by definiton, excluded from general election voting because of the "basket" vote and because the ballot is secret (and therefore logrolling cannot be enforced) any social benefits which might have accrued are also excluded.

Should voters use their vote strategically a position even further from Pareto optimum might be arrived at. The existence of majority voting in/ ...

in large democratic societies can lead to strategic voting. Within the total "bundle" of policies offered by candidates (or the political parties to which they are affiliated) many of the issues will be foregone conclusions. A rational voter might then use his vote strategically and support a candidate with whose main policies he disagrees but with whose minor policies he agrees. eg. Should a particular important issue be that of an increased defence budget with which the voter strongly disagrees but which, in this case, will be a foregone conclusion and a minor policy issue be the preservation of wildlife in war torn zones with which the voter agrees, he might vote for the candidate even if he suffers a net social loss as regards increased defence budget vis-à-vis preserved wildlife.

1-1-2-2 : THE POLITICIAN'S ROLE IN PUBLIC OUTPUT

In the Traditional model the government corrects market imperfections and responds to the demand for public goods so as to achieve maximum social welfare. As the government is concerned solely with maximising consumer utility it must be seen in this model as nothing more than an extension of the consumer body.[26] The government exists only for the consumer.

There does, however, appear to be a logical inconsistancy in viewing government in this way. In viewing the free-market system, rational self interest lies at the very heart of the system and is the driving force behind the strength and continual growth of the system.[27] Certain members/ ...

members of the community actively campaign to be chosen as representatives in the government where they are empowered with the right to make collective decisions. One must conclude that these individuals are either rational ascetics who are acting to maximise consumer utility or they are rational beings acting in their own self interest. If one accepts the first proposition we undermine the entire rational self interest foundation of the market and if one accepts the second proposition we further tarnish the image of the role of government in the Traditional model. With both consumers and producers motivated by rational self interest, it is inconsistent to assume that politicians will be motivated by anything different. "From the self-interest axiom springs our view of what motivates the political actions of party members. We assume that they act solely in order to attain the income, prestige, and power which come from being in office. Thus politicians in our model never seek office as a means of carrying out particular policies; their only goal is to reap the rewards of holding office per se. They treat policies purely as means to the attainment of their private ends, which they reach only by being elected ... parties formulate policies in order to win elections, rather than win elections in order to formulate policies."[28]

The politician's self interest is served by attaining office as an elected representative. During the course of the attempt to attain office the politician must become a gatherer of votes. He gains office by gathering more votes than his next best rival i.e. he is elected by achieving a simple majority of the votes. Some difficulty exists in deciding on the proportion of votes a politician aims at capturing : a politician achieves his/ ...

his objective of being elected to office by capturing a simple majority of the votes. However, Downs feels that it would be a more realistic assumption that the politician aims at capturing a maximum of all votes cast i.e. the politician is not satisfied with simply gathering more votes than his nearest rival but he attempts to gather as many votes as possible.[29]

Three reasons have been extended by Bartlett in support of this assumption[30] viz. 1) Governments do not have perfect knowledge of voter opinion and must leave some margin of safety. 2) The greater is the margin by which a government wins an election the greater is it's prestige and power. 3) Many voters continue to support the same party as a matter of habit (or due to information costs). Hence voters identify themselves with a party and it is important for government to establish and reinforce this identity.

Alternatively a theory proposed by Riker maintains that political parties (or in Riker's terms: political coalitions) select policies which permit a minimum winning number of votes.[31] In this theory a politician's maximand is the minimum winning number of votes, not vote maximisation. It follows from this that single and multiparty systems under democracy will converge to two parties of equal size.[32] (This equal size conclusion breaks down when the maximand is risk adjusted for uncertainty.)

Constraints on Politician Behaviour

There are constraints on both of the above maximands, determined largely by

the distribution of votes regarding various preferences/policies. Downs has used the idea of distribution of voter preferences to show:

i) If the distribution is normal the two parties will tend over time to become equal in size with policies virtually indistinguishable from each other;

ii) If the distribution is skewed equally to both sides the two parties will be of equal size with diametrically opposed policies;

iii) Multiparty systems will have policies each distinct from each other.

The distribution of voters' preferences will fundamentally constrain both vote maximising and victory minimising objectives.

There is a further constraint on the actions of political parties in power. It is possible, when the distribution of votes is sufficiently skewed, for the party in power to discriminate against minority groups. This discrimination can be taken so far as to fully exploit minorities to benefit a political party's electorate. This can occur, for example, where taxation falls solely on a minority group for expenditure to benefit the majority group. The constraint working against this is the constitution.

> 'Constitutions come in all manner and forms and the interpretation given them varies a great deal so that governments will be able to reduce the coercion to which members of the majority are subjected by exploiting the minority, but the extent of their freedom to do so will depend on the degree to which the constitution is explicit in defining the rights of individual citizens, on the interpretation given these clauses by the courts,...., and on the cost of suing the government if it is judged to have breached the articles of the constitution.'[33]

1-1-2-3 : THE BUREAUCRACY'S ROLE IN DETERMINING PUBLIC OUTPUT

The main issue regarding the effect of the bureaucracy on public output is determining which factor best serves the bureaucrats self interest, i.e. what is the bureaucrat attempting to maximise? Any person's decision to enter the bureaucracy must be seen as that person's rational choice that the bureaucracy serves his own self interest best. Should private business offer a better position the person will then (by the self interest assumption) leave the bureaucracy. The continued presence of these conflicting numbers needed for centralised decision-making (the legislative) and decision-implementing (the bureaucracy) creates the need for a bureaucracy. An efficient decision-making body must be reasonably small while the body supplying information for decision-making and subsequently implementing decisions taken must be reasonably large. This is similar to administration-worker relationship in a privately owned factory. Each of the bureaucrat's activity variables except the last, or all of these variables except the last, are [illegible] by the bureaucrat's activity function. The bureaucrat's activity function is [illegible] preferences, the bureaucrat's activity function is [illegible] of the bureaucrat's ability of making changes, and [illegible] within the bureaucracy i.e. he maximises the security of his position.

In the Traditional model the bureaucracy is seen as an unbaised body having as its objective the interpretation and implementation of government policies in such a way as to maintain the desired Pareto optimal objective of the policies. This traditional view of the bureaucracy is naive in the extreme. In the rational world on which this pure theory is based consumers, producers and politicians are all motivated by their own self interest. If we are to be consistent in our own self interest objective the bureaucrat must also attempt to maximise his own self interest. The motivation of the bureaucracy cannot be seen as the implementor of government policies in such a way as to be Pareto optimum. Nor can it be seen as the governments willing instrument in implementing vote maximising or coalition maximising policies. It must be seen as implementing policies in a way which will serve its own self interest best.[34] The bureaucrat will attempt to maximise the budget of his bureau but it can also be taken to mean the numbers employed by the bureau

relative to other bureaus in the bureaucracy. Which one of these two the bureau will attempt to maximise (if it does not attempt both) is likely to depend upon the relative ease with which one or the other objective is likely to be achieved. The department of Co-operation and Development is likely to attempt employment maximisation because a small percentage employment increase would mean a large absolute employment increase. The now defunct department of Information would have been more likely to attempt relative budget maximisation for the same reason (and with the same success). That the department of Information now no longer exists does not mean it was not successful in it's budget maximisation objective. It no longer exists because it threatened the vote-maximand of government.

One of the major ways by which a bureau can increase in size is by taking advantage of the uncertain knowledge of government and offering biased information favourable to the bureau's growth. Bureaucrats at every level of the bureaucracy are likely to withhold and/or change information being passed up the bureaucratic hierachy so that it is to their advantage and benefit. As this will occur at all levels of the bureaucracy and from the bureaucracy to the government it could lead to a situation Tullock has called "control-loss".[36] As Breton writes:

> "...control-loss arises when bureaucrats receiving information from a lower hierarchical level distort that information when passing it to their superiors because by so doing they can maximise the relative size of their budget or their share in their bureau's budget and hence their personal incomes and status. In more general terms, one can say that officials at a given hierarchical level will discover that by

> altering the messages received (and to be transmitted) even slightly - that is, by withholding all or part of the information that is detrimental to them and forwarding only what their superiors would most like to learn - they can achieve their objectives. Since officials at all hierarchical levels in the organisation must be assumed to be doing the same thing, the information that finally reaches the ultimate decision-makers would normally be incomplete, biased, and unreliable. Control-loss is thus the natural result of the facts that budgets are approved by higher bureaus and by politicians that are higher in the hierarchical structure and that the income and prestige of bureaucrats in all bureaus depend on the relative size of bureaus."[37]

With the existence of "control-loss" and voter control at least two steps away from the bureaucracy another area of bureaucratic influence becomes possible. Bureaucrats will have their own scale of preference over proposed government policies and the output of public goods. Not only will the bureaucrat attempt to increase the size of the bureau but he will pass information back to the government, and interpret government policies in accordance with his own political convictions. While this is not dangerous in itself as bureaucrats will usually comprise most of the political spectrum (possibly not anarchists) it can induce further control loss when the bureaucracy consists mostly of members of one political doctrine or party.[38]

Constraints on Bureaucrat Behaviour

There are, of course, limits on the bureau's ability to be able to increase its size regardless. The attempt to maximise bureau size must be tempered by the possibility of such action drawing the bureau to the attention of the government or the public. The government remains responsible to the

voting public and if necessary must act against any bureau which is likely to hamper government's vote-gathering. However, except in very rare cases, the system relies only on bureaucratic appraisal of bureaucratic requests and actions.

1-1-2-4 : THE EFFECTS OF UNCERTAINTY AND INFLUENCE [39]

"Uncertainty is any lack of sure knowledge about the course of events. It may be present in any part of the political decision-making process, and usually affects both political parties and voters by controlling the level of confidence with which they make decisions." [40]

In a world of absolute certainty there would be no need for political parties or even for voting. The needs and preferences of the population would be known. Policies would be implemented in a form designed to achieve maximum social welfare. That there is complete certainty, these policies would be exactly known.

In a world of uncertainty a person is faced with determining the confidence he has in a decision and the cost which can be incurred should he make an incorrect decision. There is likely to be some relationship between the stock of information any person is likely to collect before making a decision and the expected losses incurred should he make an incorrect decision by not collecting sufficient information. Should any other person stand to benefit from the first person making a particular decision he is likely to supply the first person favourable information concerning the decision. There is likely to be some relationship between

the amount of information the second person supplies and his expected benefit from the appropriate decision being made. These two relationships are examined briefly:

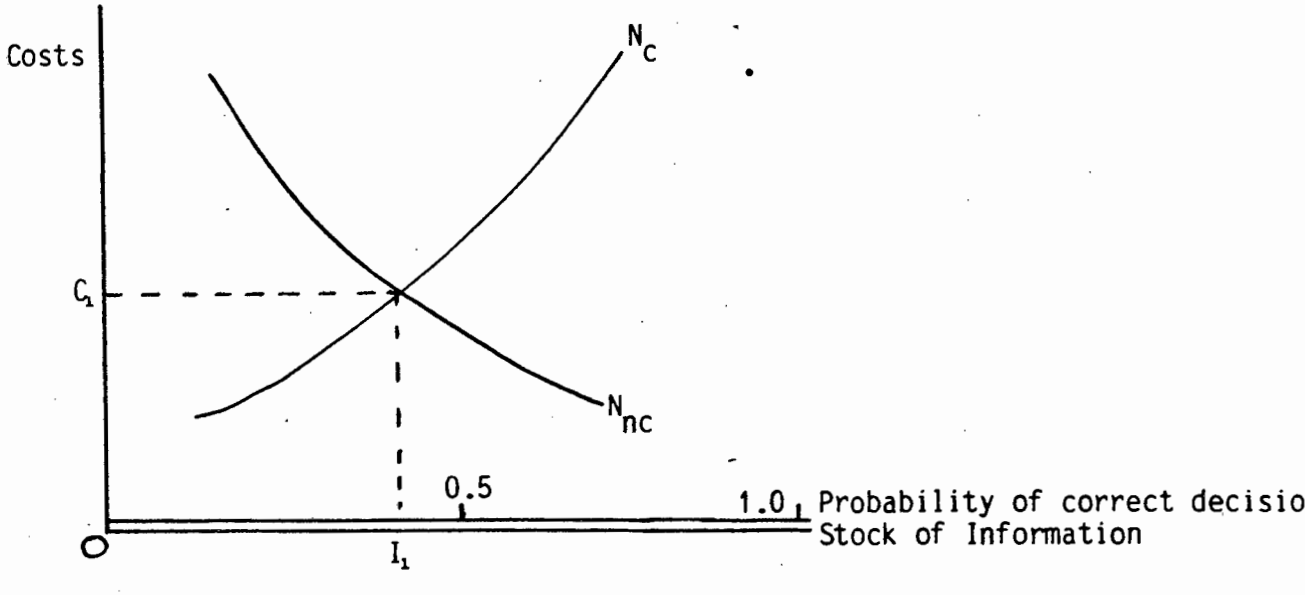
The model is based on the following assumptions:[41]

1) There exists individual A who is to decide on decision X. He is uncertain of his position regarding X.
2) Should he not choose X (not-X) he can choose from a myriad of other alternatives.
3) The probability of A choosing X depends on his stock of favourable information (N_F) outweighing his stock of unfavourable information (N_{UF}) i.e. X if $N_F - N_{UF} > 0$.
4) There are real costs incurred by A in collecting information (N_C) and in not collecting information (N_{NC}).
5) Some other individual, B, stands to benefit from A choosing X. B receives no benefit if A chooses not X and full benefit if A chooses X.
6) B expects benefit from X to the extent of the probability of X being chosen.
7) B has a normal U-shaped marginal cost curve in supplying information.

In the decision making process individual A collects information. The information he collects is likely to contain both favourable and unfavourable information concerning the decision. The probability of X being chosen is positively related to favourable information collected and inversely related to unfavourable information collected. The probability of A making a correct decision (i.e. either X or not-X) is positively related to the stock of information he collects.

The equilibrium stock of information A collects is shown in Figure 1-1 below. The marginal cost of information collection is shown as N_C. It is assumed that initial information is easy to obtain but as further information is collected the collection of additional information becomes progressively more difficult. Therefore, the marginal cost curve slopes upwards. The marginal cost of error is a decreasing function of information collected and is shown as N_{NC} below. These are A's expected risks of loss, should he make an incorrect decision. They can be viewed as the risk factor applied to A's expected utility, should he make an incorrect decision. The less information A collects, the greater will be the discount applied to future utility. (Conversely N_{NC} can be viewed as the expected marginal benefit from collecting information.) It is assumed that the initial information that A collects will decrease the risk of an incorrect decision more than will successive information collection. N_{NC} (the expected marginal cost of not collecting information) is therefore expected to decrease as more information is collected.

Figure 1-1

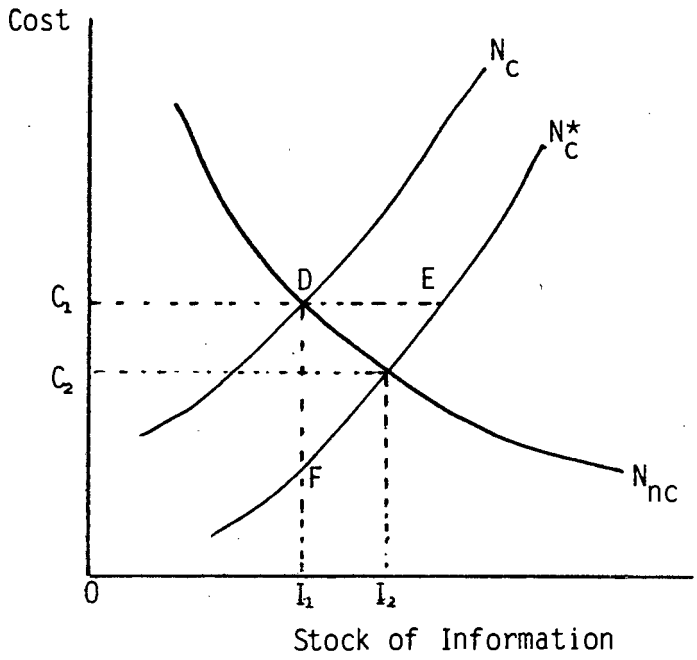


A will collect information to the point where the marginal cost of information collection is equal to the expected marginal cost of not collecting information. Collection beyond this point means the cost of additional information outweighs the expected benefits of collecting that information.

It can also be seen that the factors determining the probability of a correct decision being made are the costs shown in figure 1 and not some other factor. In Figure 1-1 A will make his decision with less than a 0.5 probability that he will be correct. It can therefore be said that the probability of any person making a correct decision depends not on the importance of the decision but on the relative cost structures of information collection.

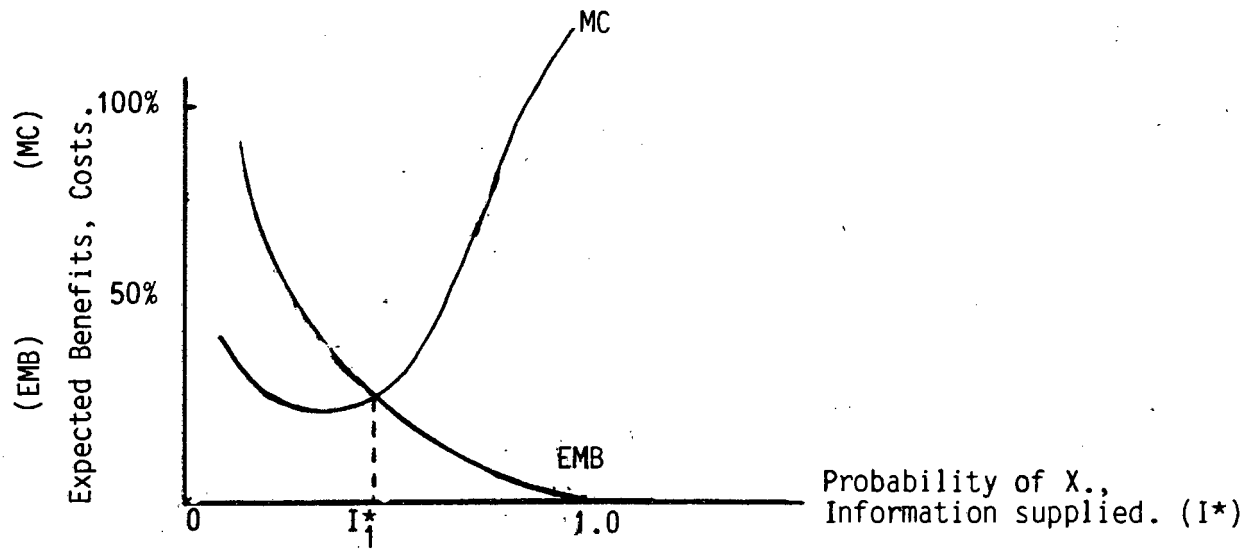
As a result of A's information collection being determined by the relative costs of collecting and not collecting information, there exists the opportunity for individual B to influence A's decision more in favour of X than it would previously have been. Figure 1-2 below shows the effect of such an influence. B offers to A subsidised information favourable to X and therefore decreases the marginal cost of information collection. N_C moves down by the amount of the subsidy (DF) to N_C^*. The additional amount of information offered which is all favourable to X is DE. A will now continue his information collection and increases his stock of information I_1 I_2.

Figure 1-2



The extent to which B is prepared to offer subsidised information is determined by his own relative cost structures. Figure 1-3 below has as its vertical axis B's expected benefits as a result of decision X being made. The horizontal axis shows the amount of information being supplied. Also on the horizontal axis is shown the probability of X as more and more information favourable to X is supplied. (I*)

Figure 1-3



The relationship between B's expected benefits from decision X and the probability of X is derived from assumption 6. It is expected that the initial amounts of information supplied will affect the recipients' decision to a larger extent than further amounts of supplied information. As such, the expected marginal benefit of information supplied (EMB) shown in Figure 1-3, is downward sloping and reaches zero when the probability of the decision being favourable is 1.0.

The marginal cost curve of information supplied is derived from assumption 7. It can be seen that a rational B will supply information to A until the marginal cost of supplying this information becomes equal to the expected benefit of decision X. The information supplied by B (OI_1*) is equal to the distance DE in Figure 1-2.

The effects of Uncertainty and Influence on Public Output

Any government's position with a democratic economy leaves it at such a distance from the consumer electorate that it is always uncertain of the future effects of public output on voting patterns. No government can ever be certain of the preferences of the people or of the effects of its policies on vote maximisation. "The decisions which a government makes will be based upon the government's view of consumers' preferences functions. It will be attempting to maximise its vote position, and hence will undertake those projects which it thinks will yield a net increase in votes and will reject all others. The use of this principle in practice is made extremely difficult because of the presence, once again, of gross uncertainty."[42]

It can be expected, that in the presence of uncertainty, a government will collect information to determine the effects of present and future policies on voter utility. Where information is collected on any specific issue it can be expected that any rational government will continue this collection to the point where the perceived marginal benefit from the information is equal to the marginal cost of the collection. As this cost of collection leaves opportunities for affecting public output by information subsidisation, it can be expected that the rational information subsidiser will continue subsidisation until the marginal cost of supplying information becomes equal to the expected benefits of supplying the information.

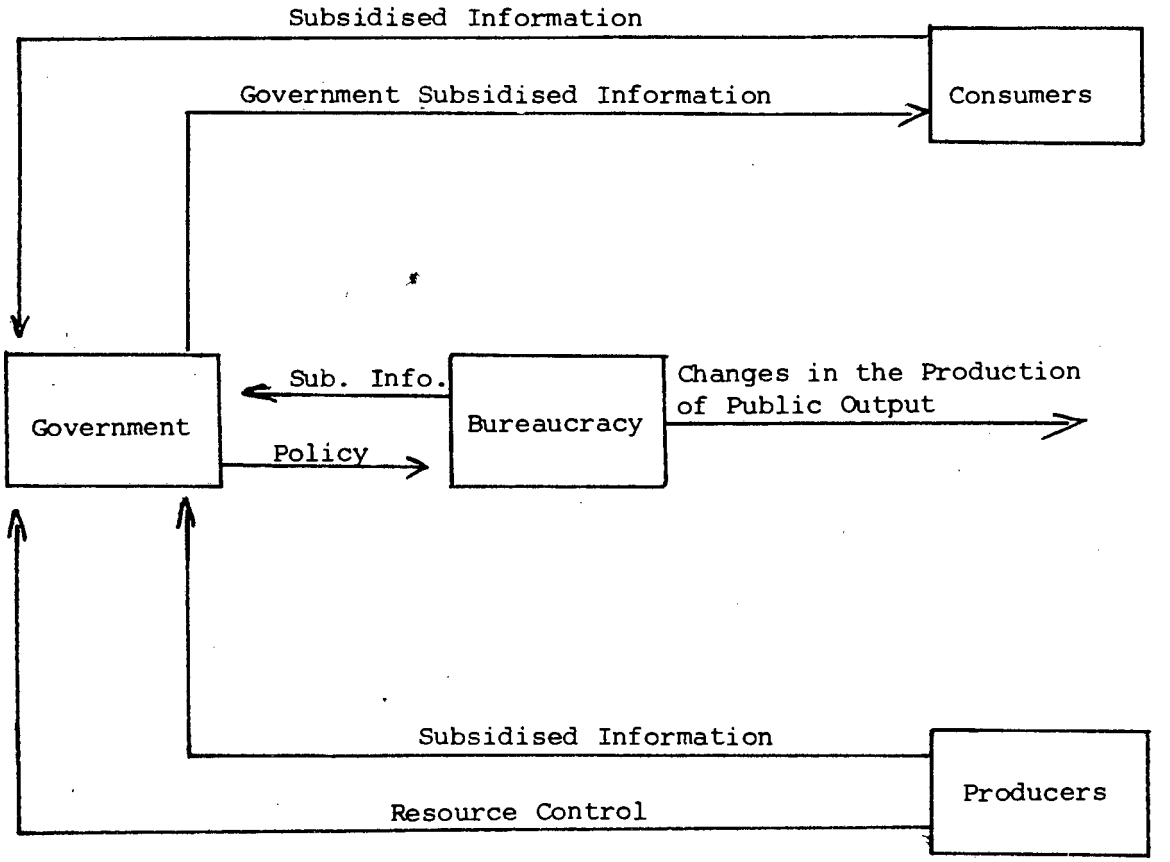
The cost of voting for an individual voter and his perceived benefit from voting makes information collecting regarding government beyond some minimal level economically irrational. The introduction of national and party ideology is a rational response to these high informative costs. The role of ideology and the rational voters' response to ideology has been discussed extensively by Downs, Bartlett and Tullock.[43]

The essential conclusion of these works is that it does not benefit the rational voter to be a collector of information beyond some minimum stock of information. In consequence, the rational voter will vote on the basis of ideology, not issues, as this has a lower collection cost. Once an ideology is selected, it is unusual for voters to move between ideologies in the short or medium term. The only voter who does move between ideologies is the so-called "median voter".[44] The median voter is a rational

voter who falls in the margin between two ideologies, i.e. he stands to benefit (or lose) to largely the same extent from either ideology. The party for which he eventually does vote, will promise him benefits marginally greater than the party for which he did not vote. This voter, because he is on margin, has no ideological loyalty and can vote for the other party on a different occasion, should his perception of future benefits change. The consequence of this is that political parties will construct policies which are directed at capturing the median voter. This action is, of course, moderated by the party not being able to move too far right or left of its ideological mean and thereby losing votes in the newly created ideological vacuum, or allowing another party into the ideological vacuum.

Sources of Influence

In the production of public output there are many areas from which influence emanates in the form of subsidised information. An attempt has been made to illustrate these areas of information subsidisation using the diagram below. The sources which are shown are those of consumers, producers, government and bureaucracy. The only interaction shown is the non-voting influence of subsidised information, changes in resource control and the effects of these on government policy and subsequent changes in the production of public output.



Consumer groups offer subsidised information. This can take the form of coordinated and uncoordinated public correspondence campaigns, public opinion polls sponsored by consumers, public assemblies and demonstrations and information lobbying.[45] There are three other forms of influence used to change future policy to benefit consumer groups which do not use subsidised information techniques. These are, firstly, an explicit trade of resources for political favours. The resources can be used to influence voters or can go directly to the politician as a bribe. Secondly, resources can be transferred to support political campaigns over elections for favours should that party attain office, and at least some influence if it does not. And thirdly, public / ...

figures and opinion leaders will often openly support a political party or issue. While this is often done through political convictions it can occur through promised political favours upon political victory.

Just as the consumer offers the government subsidised information, so does the government offer the consumer subsidised information. This information attempts to show the voter just how he stands to benefit, and how he is already benefiting by government policies. The form of the information can be in e.g. government press releases and public propaganda campaigns. To the extent that a government has control over media one can expect a greater proportion of reports favouring government and a smaller proportion of reports criticising government.

Producer groups also offer subsidised information to the government. They are also able to use these same influence techniques as consumers, viz. public opinion polls, information lobbying, trading of resources, for direct favours, contributions to party political campaigns and opinion leader support.

Producer groups are able to exert more influence than consumer groups to the extent that the organisational costs of supplying influence is likely to be lower for producer groups. Producer groups are able to use part or all of their production infrastructure in disipating influence. In many cases a consumer group is formed purely with the intention of directing influence in a particular direction. As a result of this consumer groups incur far higher setting up and organisational costs than/ ...

than their producer couterparts. Therefore it can be said that producer groups achieve a greater amount of influence per rand spent than do consumer groups. It also follows that if the influence return per rand spent is higher for producer groups more funds will be invested by producer groups in influence production given the same expected future benefits from influence deriving from consumer and producer groups.

The bureaucracy is the last area from which government influencing subsidised information is likely to emerge. The form of this subsidy has been discussed above (Section 1-1-2-3).

Bureaucrats are responsible for passing information up through the hierarchy until it reaches the political decision-making unit. To the extent that only information favourable to the bureaucrats maximand is passed back the distortion in this information can range from minor to that of "control-loss". The bureaucrat will select information so that the expected marginal benfit of the informational change equals the marginal cost of the change. The only real cost that a bureaucrat incurs in his information selection is the wrath of his superiors in the unlikely event that he should be discovered. Should this occur the penalty for discovery ranges from mild censure to (an unlikely) dismissal. All of this means the marginal cost of information subsidisation by the bureaucrat is very low and one can therefore expect that the amount of subsidised information being passed on is very high.

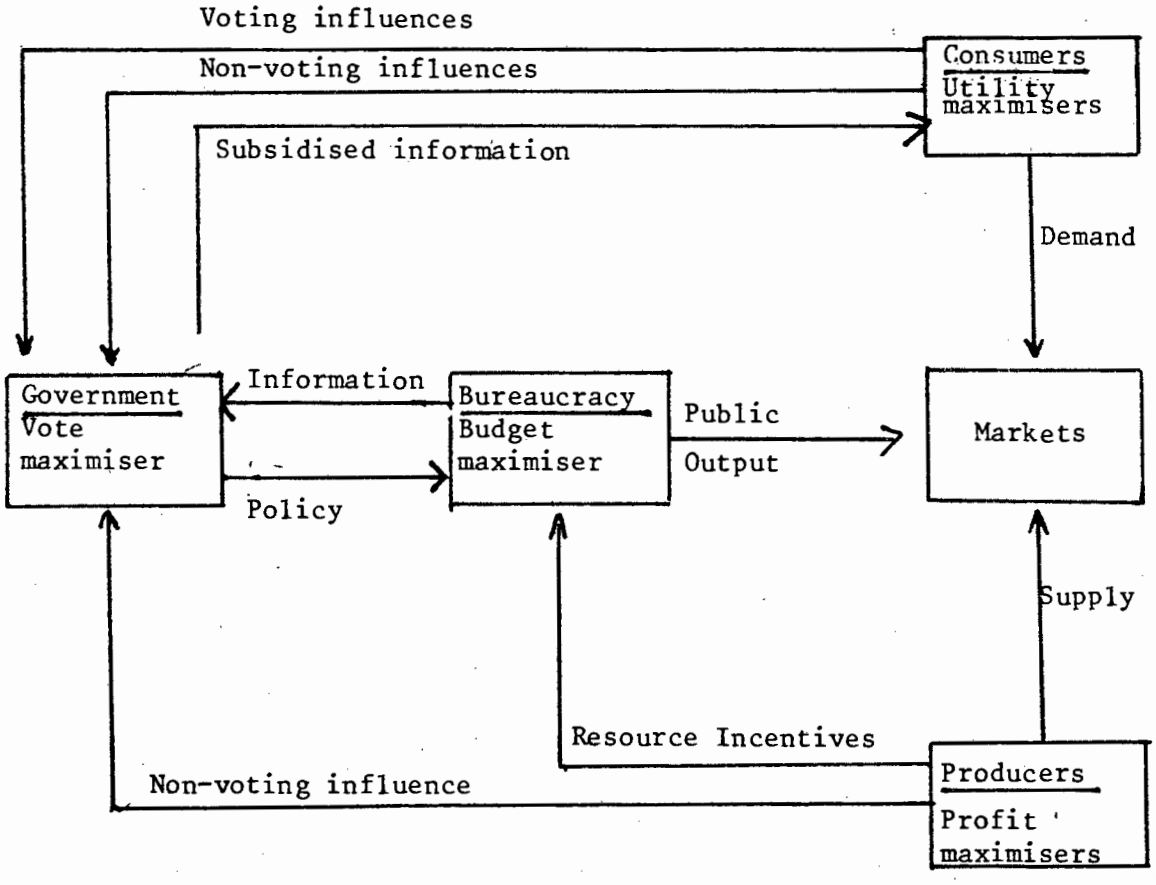
All of the influences, of all of the four sections are continuously being/ ...

being fed into the government decision-making machinery. This infomation is discounted by the recipients on the basis of its origin and then causes policy to be started or changes existing policy. This policy change is directed to the bureaucracy who implement the necessary changes. Of course, the changes the bureaucrat implements might not be exactly those which the subsidised information and policy change directed but the net effect is a production of public output other than would have occured without the subsidised information.

The volume of pre-discounted information any particular agent or body offers depends on the relationship between marginal costs and expected marginal benefits of supplying the information. Within this restrictions on information supply in any one area, there are in many cases alternative avenues of supplying information eg. one issue can be subsidised through campaign funding, a correspondence campaign, sponsored press and radio coverage, and a sponsored public opinion poll. Therefore the extent to which any one person, agent, body or producer can subsidise information depends largely on the resources at its disposal. The more resources a body can call upon the more it is able to influence policy i.e. the distribution of income is responsible for the distribution of influence of subsidised information. This in turn will be responsible for policy changes favouring the larger distributors of information i.e. wealthier sectors of the community. One can say therefore that while in most democratic countries each vote is equal, non vote influence is not equal and will often favour the wealthy and producer sectors.[46]

1-1-3 : THE MODERN MODEL — A SYNTHESIS

A synthesis of the modern view of public sector involvement is depicted in the diagram below. This is a four sector model incorporating consumers who are utility maximisers, producers who are profit maximisers, the government who is a vote maximiser and the bureaucracy which is a budget maximiser.



Consumers and producers interact with each other in the production, sale and consumption of goods and services for mutual benefit. The government relies for its being in office on securing at least, a majority/ ...

majority of votes if not a maximum. Faced with great uncertainty regarding consumer needs, and seeking minimum cost ways of finding this information, the government will become the willing recipient of subsidized information. This information is offered to the government by the other three, self interested, parties. Both the consumer and producer will offer information indicating that a particular policy will be favourably or unfavourably received by the voting public. The bureaucracy offers information on what is better described as a selective basis than on a subsidized basis. Part of the bureaucracy's work is to pass information up the hierarchy to the political decision making body. The bureaucracy achieves its own maximal objective by passing on information that will be advantageous to itself and changing or omitting information that will be disadvantageous.

Within the bureaucracy there exists the possibility of firms offering substantial rewards for bureaucratic favours and for bureaucratic information passed back to government that favours one particular company or sector. The extent to which this occurs depends very much upon established social custom and the strength of the particular government. For example in some countries bribery of officials is the only way to achieve objectives while in other countries this action might land one in jail.

While the government is uncertain of voter opinion and will accept subsidized information, it also offers voters subsidized information regarding its own policies and successes. It thereby subsidizes the voters low/ ...

low marginal benefit from political information by offering information favourable to itself. This subsidized information is accepted by voters depending on the credibility discount which they might apply to it.

All of the above influences are present on the government when policy decisions are taken and passed on to the bureaucracy. Naturally, with all other parties pursuing self interest objectives, the bureaucracy will implement all government policy in a manner which benefits the bureaucracy as much as possible. The final interpretation of government policy is each individual bureaucrat's self interested interpretation as the policy is implemented down through the hierarchy.

The final outcome of the interaction between consumers, private producers and the output of public policies and public goods can be something other than that of achieving maximum Social Welfare. Considering the cost of decision making by the rational voter, non-voting influence is likely to have a greater effect on the size and mix of public output than is voting influence.

1-2 : THE MICRO THEORY OF STATE OUTPUT

This section on the micro theory of the output of public goods is based on the general theory of the output of firms in the private sector. Private/ ...

Private firms are seen as profit maximisers who produce on the margin. Factor inputs are used to the point where the marginal revenue of the input becomes equal to the marginal cost of the input. The implementor of the majority of public policies and public output is the bureaucracy and, as it has been argued above, the bureaucrat is not a profit maximiser. It is the purpose of this section to establish how the bureaucrat's maximand will manifest itself and to determine whether this will give output rules which are different to those of the private sector.

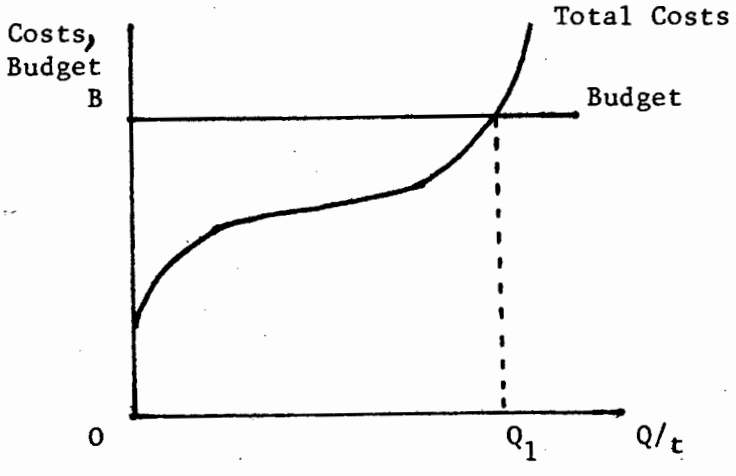
The analysis is based on the following assumptions:

1) The production of public output is undertaken by individual bureaus.
3) The public output produced can display any range of "publicness" i.e. the bureau's output can be a pure public good or a pure private good or it can be in the range between these two extremes.
3) The bureau is a security maximiser which manifests itself as budget maximisation.
4) A bureau producing a public good only, relies on the budget allocated for its entire income.
5) A bureau producing a private good only, relies on sales generated for its entire income.
6) The private sector does not produce any goods already produced by the public sector.
7) The public sector has normal U-shaped average and marginal cost curves.

Production of a pure public good

Where a bureau produces a pure public good it is allocated an annual budget. This budget is used for administration in the bureau and for the purchase of factors of production needed in the production process. Once the budget has been allocated to the bureau the bureaucrat's main motivation must be to utilize it all before the next budget allocation. If there is any surplus of budget allocated over actual expenditure this cannot be carried forward to the next budgetary period.[47] Any budgetary surplus is very detrimental to the bureau's maximand as it considerably decreases the possibility that the bureau can successfully propose an increased budget for the next budgetary period.[48] It can therefore be said that a bureau will produce a pure public good to the full extent of its budget without regard for its cost position. This is shown in Figure 1-4 as point A where the allocated budget (OB) is equal to total costs and giving an output of OQ_1. Therefore it can be said that where a pure public good is produced, the quantity of output is produced without regard for the average and marginal costs.

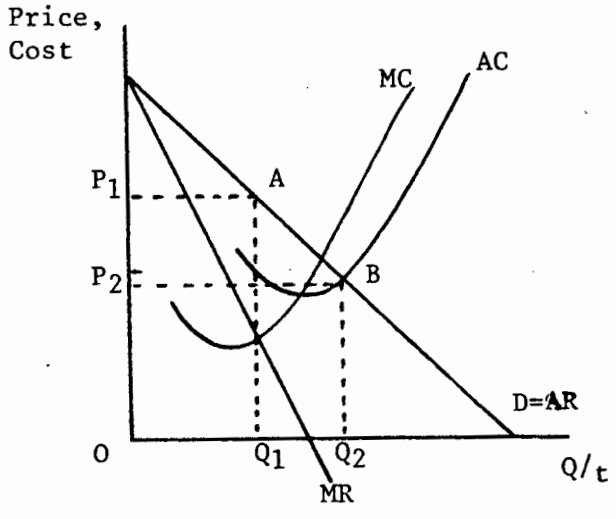
Figure 1-4



Production of a pure private good

Where a bureau produces a pure private good it faces the same demand curve and potential cost curves as does a private entrepreneur. The only difference between the entrepreneur and the bureau is that it is not necessarily profit motivated. As the bureau relies for its income solely on sales revenue it can produce between the two extremes of attempting to maximise profit or attempting to produce zero profit. These positions are shown in Figure 1-5 below. Profit maximisation is achieved with output

Figure



OQ_1 at price OP_1 . The zero profit situation is found at output OQ_2 i.e. at output maximisation where total cost is equal to total revenue.[49]

The extent to which a bureau is a profit maximiser or an output maximiser is determined by two factors:

1) The/ ...

1) The fate of bureau profits and

2) The bureau's time horizon.

Should any profit (surplus) be appropriated by the central authorities at the end of each budgetary year then it will be closer to the bureau's maximand to maximise output rather than maximise profit. However, should a bureau be able to retain part or all of its profit, the extent to which a bureau will be either a profit or output maximiser will depend upon the bureaucrat's time horizon. If the bureau is able to reinvest all profit back into the bureau as capital expenditure the extent to which future bureau growth is discounted against present bureau output will determine whether a bureau is profit or output motivated. If a bureaucrat sees his security maximand being more efficiently served by faster growth of the bureau in the future he will profit maximise and invest all surplus in capital growth. However, if future security is heavily discounted for present security the bureau is likely to be an output maximiser and will invest little or nothing in capital growth.

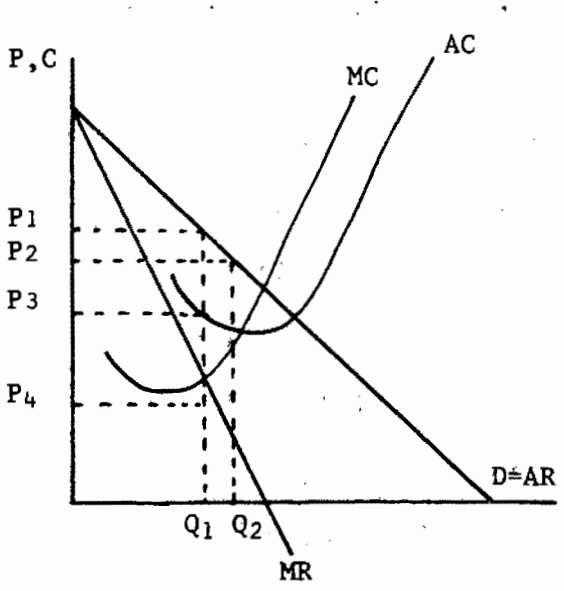
Therefore to summarise: If a bureau produces a pure public good it will allocate its entire budget without regard for marginal and average costs. If a bureau produces a pure private good it will be profit motivated if it is able to keep all or part of its surplus (dependant on its time horizon) and it will be output motivated if unable to appropriate its surplus or if it discounts future security very heavily.

Bureau production of private good with price set less than market price

It is often government practice to produce private goods and charge below market price. These goods fall into the range of so-called "merit" goods.

The position of a bureau supplying a private good as a profit maximiser but charging a price below equilibrium for a merit good is shown in Figure 1-6.

Figure 1-6.

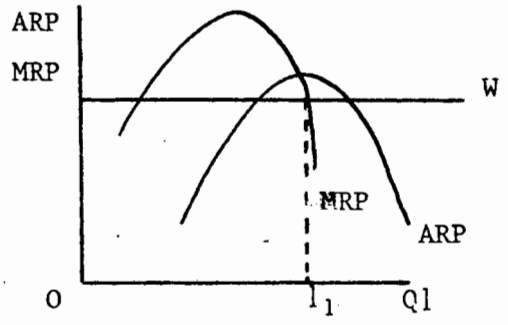


The bureau produces OQ_1 according to profit maximisation rules. Instead of charging market price OP_1 it sets a price below this e.g. P_2, P_3 or P_4. Where the bureau charges OP_3 the entire profit of the bureau is eliminated. Where the bureau charges between OP_1 and OP_3 e.g. OP_2 part of the bureau profit/ ...

Therefore it can be said that any bureau producing public, or private goods will produce on the margin i.e. he will produce where the marginal product of the factor input is equal to the cost.

Figure 1-9

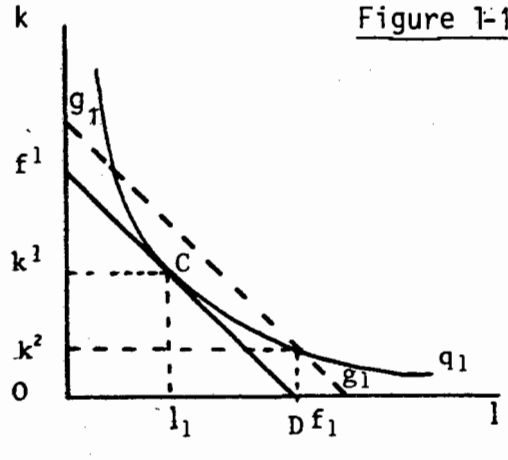
If a revenue can be determined then the producer will use factor inputs to the point where the marginal revenue product of the input is equal to the wage rate.[50] (Figure 1-9).



This maximising condition will be adhered to in the absence of two influences. There must be no outside interference in input practices e.g. through government wishing to decrease unemployment or through some lobbying or pressure group, and the bureau must not attempt to security maximise through employment maximisation. Should either of these two conditions occur factor inputs will not be used where $\frac{MRS_k}{MRS_l} = \frac{P_i}{P_k}$ and the effected factor will not be used where the Marginal Revenue Product is equal to the price.

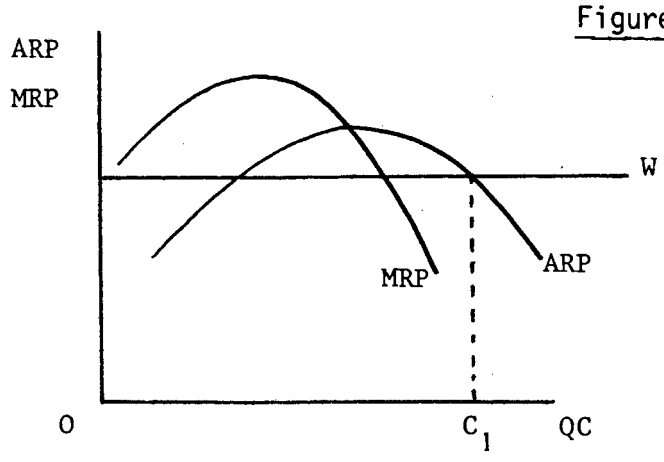
Should the government interfere with the bureau and order e.g. a q_1 level of defence as previously but now also requires an additional minimum labour usage of OD. To still produce the same output the bureau is now forced to use Ok^2 capital. One still has q_1 defence being provided but at a higher budget of g^1g^1.(Figure 1-10)

Figure 1-10



On the other hand, should the bureau see its security maximised best by bureau employment maximisation then the bureau will employ labour to the point where the labour surplus is zero i.e. it will employ where the average product or average revenue product is equal to the wage rate. (See Figure 1-11).

Figure 1-11



To conclude we can say that in the production of public sector output factor inputs will be used efficiently except where the state interferes or where the bureau employment maximises. Therefore should the state see its role as a vote maximiser bettered by using the public sector as an unemployment buffer, labour input could be used inefficiently.

SUMMARY

The state competes with the private sector in the labour market and must pay market wages for the skills it employs. When labour is treated purely as a factor of production in the production of public output its usage is economically/ ...

economically efficient. Should any other factor effect the labour input it is likely that labour useage will be economically inefficient.

In the production of public output, when a pure public good is produced this is undertaken to the full extent of the bureau budget and without regard to average and marginal costs. When a private good is produced and the bureau is able to appropriate trading surpluses, output is compared to marginal cost and market price is charged Where the trading surplus is appropriated by government, the bureau will become an output maximiser.

The factors affecting the total demand for State employment are those factors which determine the total demand and supply of public output. The major components of these factors are:

1) Consumers who are utility maximisers. They demand public output through the direct means of voting and through the indirect means of non-voting pressure. The direct means of voting is severely hampered through the high, often prohibitive, information costs incurred by any voter.

2) Government which is a vote maximiser. This maximand effects public output to the extent that policies are designed for the median voter. The use of ideology is a rational response by both political parties and voters, to the problems of uncertainty and information costs.

3) Producers who are profit maximisers. They effect public output by indirect means only but are likely to be more efficient in this than consumers due to lower organisational costs.

4) Bureaucrats/ ...

4) Bureaucrats who are security maximisers. The bureaucracy is in a unique position to effect output because it actually produces public output. As most control of bureaucrats lies within the bureau itself, and decision making information needed by government is passed up through the bureaucracy a control loss situation can develop.

The net balancing of voting influence against non-voting influence, in a world of great uncertainty, makes it such that the effects of non-voting influence is often more important than voting influence in output supplied. "All decisions made by the vote-maximising collective body must either be obscured or justified. ..., the actual process of voting has little to do with public choice; it is almost exclusively the result of non-voting influence and pressures".[51] To the extent that the wealthy and productive sectors are able to finance proportionately more non-voting influence it can be expected that public policies tend to favour these sectors.

Expectations about the Growth of State Employment

While the above gives some indication of the forces acting on State employment, it gives no indication of any á priori expectations regarding the growth of State employment. The purpose of this section is to establish if any á priori expectations might exist.

'Growth of State employment' can be defined in four ways:

a) As the absolute growth of State employment, i.e. any numerical increase in employment would be regarded as a growth in employment.

b) As the growth of State employment as a percentage of the working labour force (economically active population). This examines the State as a labour market employer. State employment 'grows' when it increases at a rate faster than the increase in the economically active population.

c) As the growth of State employment as a percentage of total population. This measure views the State as serving the population and for State employment to 'grow' it must increase at a rate faster than population increases.

d) The final measure sees a growth in State employment only when λ given in expression (1) below increases

$$\lambda = \frac{SE}{Pop \Big/ \frac{G}{Y}} \qquad (1)$$

where SE - State employment
Pop - Total population
G - State expenditure
Y - National income

This type of measure overcomes a problem common to (b) and (c), viz. if the size of government is á priori expected to grow (as given by size of government theory and discussed below), then State employment, as measured by (b) and (c) is also á priori expected to grow by at least (approximately) the growth of $\frac{G}{Y}$. Expression (1) measures any increase in State employment, over and above that at which it is expected to grow as a result of an autonomous growth in the size of government.

As it has been shown, a growth in State employment will result primarily from a growth of government. Therefore, a discussion of á priori expectations about the growth of State employment must be rooted in size of government theory: Size of government theory, particularly with regard to South Africa, has been summarised, discussed and measured in a recent paper.[52] It would be fruitless to rediscuss the issue here as it does, to a large extent, fall outside the scope of this dissertation. However, the general expectations which emerge from the paper with regard to the growth of government are presented below briefly:

- There is a weak expectation that the size of government will grow at the rate of growth of the economy. This is a result of:
  a) On the supply side: The government's desire to maintain tenure by providing (at least) the same per capita quantity and quality of service.
  b) On the demand side: The population's desire for (at least) the same per capita quantity and quality of service.

- There is a strong expectation that the size of government will grow at a rate faster than the economy. This is a result of:
  a) On the demand side: Wagner's Law, shown to hold in South Africa,[53] maintains that the income elasticity of demand for public sector output is greater than one. Given real increased per capita income in South Africa, it is expected that the size of government will increase more than proportionately.
  b) On the supply side: The forces acting on State output, as given in the general model above, appear to outweigh the forces acting against growth. In practice, this has been demonstrated with a more than proportionate increase in the size of government.

Given the above expectation about the size of government, it is now possible to discuss expectations about the various types of growth in State employment.

Type (a): Given that government is expected to grow absolutely, this type of growth is definitely expected.

Types (b) and (c): Based on the weak expectation with regard to the growth of government, it is expected that State employment will grow (at least) by the growth of the economically active population (and of the total population).

Based on the strong expectation with regard to the size of government, it is expected that State employment will grow faster than both the economically active population and the total population.

Type (d): It is expected that λ as given in expression (1), will increase, i.e. it is expected, given that the size of government will increase, that State employment will increase more than proportionately. This expectation is due to:

(i) Government output is bureaucracy output. As has been shown above, bureaucracies are economically inefficient, being output maximisers. As the size of government grows, given this inefficient use of factors of production, government will need proportionately more factors of production than private sector production and it will exhibit type (d) employment.

(ii) Government output is largely service orientated. Historically, service industries tend to be more labour intensive than producer industries and, as such, the (expected) more than proportionate increase in the size of government leads to an even more than proportionate increase in employment.

NOTES

1) Two surveys which are very comprehensive are:Buchanan, J.M. Public Finance and Public Choice. National Tax Journal, Vol.28, No.4, Dec.1975. pp 383-94 and Mueller,D.C. Public Choice: A Survey. Journal of Economic Literature Vol.14, June 1976.pp 395-433. However, see also the "Size of Government" literature a survey of which is Frey,B.S. and Schneider,F. On the Modelling of Politico-Economic Interdependence. European Journal of Political Research, Dec.1975, 3, pp 339-360. Some of the more prominent, recent "size of government" papers include:
Meltzer,A.H. and Richard,S.F., Taxes,Votes and the Distribution of Income. A Dynamic Model of the Growth of Government,presented at the Conference on Analysis and Ideology, Interlaken, June 1977.
Meltzer & Richards, A Rational Theory of the size of government, Journal of Political Economy, Vol.89,No.5,Oct.1981,pp 914-927.
Peltsman,S., The Growth of Government, Journal of Law and Economics Vol.23,No.2,Oct.1980,pp 209-287.
Fratianni,M.and Spinelli,F., The Growth of government in Italy.Evidence from 1861 to 1979, Public Choice Vol.39, 1982,pp 221-243.

2) Buchanan: Ibid. pp 383-384.

3) The term is derived from the writings of Vilfredo Pareto. A rigorous exposition can be found in Sen, A.K., Collective Choice and Social Welfare, Holden-Day, California,1970, pp 21-24.

4) Samuelson,P.A.: The Pure theory of Public Expenditure. Review of Economics and Statistics, Vol.36, 1954,pp 387-389. Originally found in Public Finance, Selected Readings, R.W.Houghton (ed), Penguin, Middlesex, 197), pp 181-185. See also Samuelson,P.A.: Diagrammatic Exposition of a Theory of Public Expenditure, in R.W. Houghton pp 190-204.

5) Buchanan: Ibid. p.386.

6) Buchanan,J.M.: The Demand and Supply of Public Goods, Rand McNally, Chicago, 1968.

7) Kaldor,N.: Welfare Propositions of Economics and Interpersonal Comparisons of Utility, Economic Journal, 1939, pp 550.

8) Hicks,J.R.: The Valuation of Social Income, Economica, 1940, pp 111.

9) Scitovsky,T.: A Note on Welfare Propositions in Economics, Review of Economic Studies 1941-42.

10) Baumol,W.J.: Economic Theory and Operations Analysis. Prentice-Hall, Princeton, 1977, pp.530-1.

11) Musgrave,R: The Theory of Public Finance, McGraw-Hill, New York, 1959, p.13.

12) Buchanan,J.M.: Public Finance in the Democratic Process, University of North Carolina Press, Chapel Hill, 1967, p.12.

13) Buchanan,J.M.: op.cit., 1975, pp.386-387.

14) De Borda,J.C.: Mémoire sur les Elections au Scrutin. Historie de l'Académie Royale des Sciences, 1781.

De Condorcet, M.: Essai sur C'application de l'analyse à la Probabilité des Décisions Rendues à la Pluraliste des voix, Paris, 1785.

Dodson,C.L.: A method of Taking Votes on More than Two Issues. Written 23 February 1876 and reprinted in The theory of committees and elections by Duncan Black, Cambridge, Cambridge University Press, 1958, pp.224-234.

Black,D.: On the Rationale of Group Decision Making, Journal of Political Economics, Feb.1948, 56, pp.23-34.

Arrow,K.J.: Social Choice and Individual Values, Yale University Press, New Haven, 1963, originally printed by Wiley, 1951.

15) Arrow,K.J.: Ibid. Variations of Arrow's approach can also be found in Vickrey,W.S., Utility,Strategy, and Social Decision Rules, Quarterly Journal of Economics, Nov.1960, 74(4), pp 507-537. Sen,A.K., op.cit., 197), pp.41-55. A survey is contained as part of Mueller's survey op.cit. (1977), pp.419-422.

16) For a detailed discussion of this see Mueller,ibid. ,pp.403-405.

17) Bartlett,R.: Economic Foundations of Political Power, Free Press, New York, 1973, p.12.

18) Mueller, op.cit.,p.406.

19) Buchanan,J. and Tullock,G.: The Calculus of Consent, Ann Arbor, Michigan, 1962, pp.133-145.

20) Mueller, op.cit.,p.406.

21) Buchanan (1975), op.cit.,p.388.

22) The issue of information collection costs and expected benefits is discussed at length in section 1-1-2-4.

23) Strategic voting is discussed further in the theory of constitutions.

24) Buchanan & Tullock, op.cit.,p.213

25) A full discussion on this can be found in Mueller,op.cit., p.408-410.

26) In this case the consumer body is seen as the enfranchised consumer body.

27) Smith,A.: The Wealth of Nations.

28) Downs,A.: An Economic Theory of Democracy,Harper & Row,New York,1957,p.28.

29) Ibid.,Ch.3.

30) Bartlett, op.cit., p.19

31) Riker, W.H.: The Theory of Political Coalitions, Yale University Press, Wisconsin, 1962.

32) For a brief summary of the theory and conclusions see Muëller, op.cit., p.410.

33) Breton, op.cit., pp.159-160.

34) The definitive and most thorough work in this area to date is Tullock,G., The Politics of Bureaucracy, Public Affairs, Washington DC, 1965.

35) Niskanen,D.A.: Bureaucracy and Representative Government, Aldine, Chicago, 1971,p.38. Emphasis provided in the original.

36) Tullock, op.cit.

37) Breton,A.: The Economic Theory of Representative Government,MacMillan, London,1974,pp.164-165.

38) This is pure speculation as at present there appears to be no empirical study which might substantiate this.

39) The effects of uncertainty and possible influences which might arrive from this have been examined extensively by: Downs, op.cit., pp.77-206, Tullock,G.: Towards a Mathematics of Politics,Ann Arbor, Michicgan, 1967,pp.82-132 and Bartlett,op.cit.,pp.27-37 and 129-156.

40) Downs, op.cit., p.60.

41) The approach in the initial stages of this model of information costs is taken from Bartlett, op.cit., pp.27-37.

42) Bartlett, op.cit., p.60.

43) A survey of the median voter literature can be found in Mueller, op.cit., pp. 408-9.

44) See note (39).

45) Information lobbying is information supplied by a lobbiest as an "objective" analysis of the effect of a particular policy or set of policies on the utility of the voting population.

46) This is discussed further in Downs, op.cit., pp.93-94 and Bartlett, op.cit., p.156.

47) In practice the funds which are carried forward and not appropriated are capital funds which have been allocated but not yet drawn on.

48) It would assist the bureaucrat's security maximand even further if he could utilise all the allocated budget and successfully request an additional allocation, i.e. a larger total budget. This might detract from the maximand if the requested additional budget is viewed as poor bureau administration.

49) For a formal proof of this see Ames, E.: The Economic theory of Output Maximizing Enterprises, in The Theory of the Firm, by G.C. Archibald (ed.), Penguin, London, 1973, pp.270-285.

50) For a formal proof of this see Niskanen, W.A.: Bureaucracy and Representative Government, Aldine, Chicago, 1971, pp.53-58.

51) Bartlett, op.cit., p.64.

52) Abedian, I. and Standish, B.: An Inquiry into the Growth of State Expenditure in South Africa: Evidence from 1911 to 1982. UCT: Mimeograph, 1984.

53) Ibid., pp.17-19.

PART II

SOME STATISTICS ON STATE EMPLOYMENT IN SOUTH AFRICA

INTRODUCTION

It is regularly acknowledged that employment by the State in South Africa is a large and growing proportion of total employment. This can be seen as the State employed over 1½ million people in 1980 which is more than 14% of the economically active population. Table 2.1 gives some details of the breakdown of State employment in South Africa in 1980.

TABLE 2.1 STATE EMPLOYMENT IN SOUTH AFRICA 1980[1]

	White	Black	Total
Central Authorities	129 872	194 200	324 072
Provincial Authorities	121 374	125 241	248 703
Local Authorities	56 600	168 000	244 600
Homeland Governments	2 481	188 888	191 309
S A T S	113 959	152 444	266 403
G P O	44 988	30 502	75 490
Control Boards	1 913	906	2 819
Statutory Bodies	13 172	12 444	25 616
Public Corporations (Estimate II)	N/A	N/A	188 503
TOTAL	—	—	1 567 515

Source: Table 2.10.1

Note 1 A detailed explanation of this table can be found in the text. These figures include both dependent and independent National States.

The purpose of this part of the thesis is to present data pertinent to State employment in South Africa, to discuss the difficulties encountered in collecting the data, and where figures have been estimated, to show the basis of these estimates. There is no analysis or interpretation in this section as this is done in Part III.

State employment in South Africa can be broken into nine separate areas, see table 2.1. These are:

Section 2.1: The Central Authorities which consist primarily of the public (civil) service. A functional breakdown of the duties of the Central Authorities is given in section 2.1.1.

Section 2.2: The Provincial Authorities who are responsible for white education, hospital and health services, provincial roads and works, nature conservation, and the construction and maintenance of pleasure resorts.

Section 2.3: Local Authorities which control most of the infrastructure and services necessary in urban and peri-urban areas

Section 2.4: Control Boards, the majority of which are agricultural control boards.

Section 2.5: Statutory bodies which are "... bodies such as the Hotel Board, C.S.I.R., Regional performing arts councils, State libraries, etc. Public corporations and bodies which are integral parts of Government departments or Provincial Administrations are not included".[1]

Section 2.6: The "Homeland" Governments i.e. the "Homeland" public services.[2] A functional breakdown of the duties of the Homeland governments is given in Section 2.6.1.

Section 2.7: The South African Transport Services. It "has been in existence since 31 May 1910 when it took over and combined into a single enterprise the autonomous railway and harbour organisations of the colonies. In 1922 the railways of South West Africa (SWA) and the harbour of Lüderitz, were also placed under its control. Since then they have been operated as an integral part of the South African Railways and Harbours (SAR&H). (Walvis Bay with its harbour was at that time, and still is, a part of the Cape Province.) The total route distance operated by the South African Railways (SAR) at that juncture was 17 885 km.

The organisation, being the country's transport undertaking, comprises a national railway system

together with a comprehensive road transport service, the principal harbours, the airline known as the South African Airways (SAA) and two pipelines for the conveyance of petroleum products".[3]

Section 2.8: The Government Post Office.

Section 2.9: Public Corporations.

Section 2.10: Total State employment.

In each Section an attempt is made to divide employment up into the functions served by each area of employment and secondly, an attempt is made to establish comparable data over as long a period of time as possible.

2.1 The Central Authorities

When the data on Central Authorities employment was first collected it was initially expected that there would be little difference between employment by the Central Authorities and that of the Public Service. When it was found that there were at times large differences in these employment levels, a further section (2.1.4) was added in order to explain these differences.

2.1.1 Functional Division of Central Authorities Employment

An attempt has been made below to divide Central Authorities employment along functional lines. This division is to some extent arbitrary but represents the author's best effort at this division. The division has been undertaken by aggregating government departments which appear to serve common purposes. These are:

General Administration:

This includes the Legislative Administration, Controller and Auditor General, Customs and Excise, Foreign Affairs, the Government Printer, Immigration, Information, Inland Revenue, Interior, Planning and the Environment, Public Works, Public Service Commission, S.A. Mint, Statistics, and Surveys.

Black Administration:

This includes Bantu Administration and Development, Coloured, Rehoboth and Nama Relations, Coloured Affairs and Indian Affairs.

Economic Services:

This includes the departments of Agriculture, Commerce, Forestry, Industries, Labour, Mines, Tourism, Transport, the Treasury and Water Affairs.

Public Order:

This includes the departments of Justice, Police and Prisons.

Defence:

This shows permanent defence force personnel where these figures are available. Data on the number of National Service personnel is not available.

Community Services:

This includes the departments of Community Development, Social Welfare and Pensions, and Sport and Recreation.

Health:

This consists of the department of Health.

Education:

This includes National Education, Bantu Education (Bantu Education has had a variety of names over the years and is presently part of the department of Co-operation and Development), Coloured Education and Indian Education.

Problems with data:

As it was found that data on the actual numbers of personnel employed by the various government departments is rarely available, a proxy is used. This proxy is the authorised establishment for each department i.e. the maximum number of personnel planned and budgeted for by each department. The use of this proxy makes interpretation of the data unreliable in two ways.

Firstly, these are ex anté figures and give no indication of the ex post situation. This is particularly a problem given the perennial labour shortage problems of most of the public sector. Secondly, the total authorised establishment of all government departments, inclusive of education, is less than total Central Authorities employment. For example in 1975 the authorised establishment of all government departments as taken from expenditure estimates was 254 338 while Central Authorities employment was 272 634 (a 7% difference).[4]

As the purpose of this section is to give some indication of the distribution of government employment over specific areas of government control this proxy will at least partially fulfil this purpose. However the figures used do not give an absolutely correct figure of government functional employment. The data for the authorised establishment of government departments divided along functional lines is given in Table 2-1-1. This table is discussed further in Part III, section 3-3.

2.1.2 Employment by the Central Authorities

The objective of this section is to establish comparable time series employment figures for the Central Authorities. This section attempts to explain the factors which make the raw employment data non comparable and the steps that were taken to correct this.

TABLE 2-1-1 Central Authorities Authorised Establishment by function, all races, Selected years, 1930-1984 (11)

	1930	1935	1940	1945	1950	1955	1960	1965	1970	1975	1980	1982	1984	Average Compound Growth Rate p.a. 1930-1984
General Administration :	3235	3814	5744	8304	9957	12075	11674	11839	13190	14457	-	11177	12428	2,48
Legislative Administration	61	147	195	271	379	516	122	151	177	178	N/A	466	142	1,55
Controller & Auditor General	158	162	201	204	285	346	478	575	541	610	N/A	545	N/A	-
Customs & Excise	615	663	907	969	1396	1499	1360	1292	1240	1358	N/A	(2)	-	-
Foreign Affairs 1)	101	110	141	142	143	213	717	850	1008	1167	N/A	2072	2921	6,31
Government Printer	N/A	530	760	996	1299	1368	1322	1330	1273	1212	N/A	N/A	N/A	-
Immigration	-	-	-	-	25	N/A	100	277	309	222	N/A	N/A	N/A	-
Information	-	-	-	-	-	-	-	-	428	501	-	-	-	-
Inland Revenue	425	491	662	1030	1198	1750	2337	2696	3217	3550	N/A	6729 2)	872	-
Interior	308	350	547	582	705	1257	1280	942	984	1324	N/A	(5)	N/A	-
Planning & the Environment	-	-	-	-	-	-	-	128	202	241	N/A	N/A	8156	-
Public Works	848	996	1201	1425	2141	2928	1552	1670	1891	2774	N/A	N/A	N/A	-
Public Service Commission	43	39	57	57	N/A	128	185	191	209	213	N/A	329	337	3,81
S.A. Mint	N/A	N/A	N/A	1486	914	901	649	332	209	211	N/A	(2)	-	-
Statistics	N/A	N/A	N/A	N/A	N/A	N/A	380	487	515	546	N/A	1036	N/A	-
Surveys	676	316	1073	1142	1472	1169	992	917	987	(3)	-	-	-	-
Black Administration:	1376	1413	2686	2923	3431	4046	5336	11118	11185	12579	-	17913	5338	2,54
Bantu Admin & Development	1376	1413	2686	2923	3431	4046	4111	5578	6082	7179	N/A	3894 4)	5338	-
Coloured, Rehoboth & Nama Relations	-	-	-	-	-	-	623	5273	1077	N/A	N/A	N/A	-	-
Coloured Affairs	-	-	-	-	-	-	500	N/A	3477	4984	N/A	14019 5)		-
Indian Affairs	-	-	-	-	-	-	102	267	549	416	N/A	(5)	-	-
Economic Services:	3535	3454	5297	5006	9600	11859	14876	20218	22775	26161	-	17108	14670	2,62
Agriculture	1604	1763	3314	3062	4252	4833	7417	7803	8005	7729	N/A	7981 6)	7908	2,94
Commerce	-	109	212	228	367	588	702	844	562	644	N/A	1134 6)	-	-
Forestry	376	428	-	-	525	622	N/A	2513	2368	2227	N/A	N/A	1203	2,14
Industries	-	-	-	-	-	-	-	-	402	531	N/A	(6)	-	-
Labour	181	210	354	368	1281	1739	1915	1830	1879	1963	N/A	2324	2669	0,72
Mines	432	340	479	480	724	837	898	1007	1013	1279	N/A	1928	1928	2,76
Tourism	-	-	-	-	-	-	-	13	74	69	N/A	(6)	-	-
Transport	118	N/A	144	150	1583	2073	2551	1704	3135	3443	N/A	3741	N/A	-
Treasury	110	88	116	138	178	222	336	377	416	401	N/A	(2)	-	-
Water Affairs	714	516	678	580	690	945	1057	4127	4921	7875	N/A	N/A	N/A	-
Public Order:	15194	14875	16625	16467	26418	29623	36080	42522	50008	55369	-	72218	72569	2,88
Justice	1796	1939	2409	2423	2650	3211	4104	4750	5095	5201	N/A	5721	5812	2,16
Police	10707	10302	11665	11537	20648	22913	28098	31928	36154	37263	N/A	49628	49628	2,83
Prisons	2691	2634	2551	2507	3120	3499	3878	5844	8759	12905	N/A	16869	17129	3,43
Defence: 9)	2253	2605	5322	N/A	10532	9522	17951	25219	30749	32719	N/A	N/A	N/A	-
Community Services:	431	364	581	605	1464	1590	1481	2851	3341	3392	-	6885	-	-
Community Development	-	-	-	-	-	-	-	1410	1750	1749	N/A	6885	-	-
Social Welfare & Pensions	431	364	581	605	1464	1590	1481	1409	1530	1544	N/A	(7)	-	-
Sport & Recreation	-	-	-	-	-	-	-	32	61	99	N/A	(7)	-	-
Health:	3273	3418	4364	480	8939	11644	9724	10995	13321	19174	N/A	25157 7)	25786	3,82
Education:	8236	-	13039	14881	22912	25296	38063	42996	58308	90487	-	169761	-	5,99 12)
National Education	1305	N,A	2887	1280	5142	3039	13063 11)	16234	16043	22646	N/A 10)	48909	48823	6,94 12)
Bantu Education 11) 11)	6931	8090	10152	13601	17770	22257	25000 11)	26762	42265	67841	74208	83742	N/A	4,91 12)
Coloured Education									16353	20720	25986	27924	N/A	
Indian Education 11)									6028	6835	8720	9186	N/A	

1305

Sources:

Education: 1930-1955: Department of Statistics. Union Statistics.
1960-1970: Department of Statistics, Statistical Yearbook 1972.
1975-1982: Republic of South Africa, South Africa 1984.

Establishment: Republic of South Africa: Estimate of the expenditure to be defrayed from the Revenue to be collected for the year ending .... for the relevant year.
Pretoria: Government Printer.

Notes to Table 2.1.1

1. Becomes "Foreign Affairs & Information" in 1979.
2. In 1981 Customs & Excise, the Mint and Inland Revenue were combined to become the "Department of Finance".
3. Becomes part of the Department of Agricultural Credit and Land Tenure.
4. Changed to "Department of Cooperation and Development".
5. Changed to "Department of Internal Affairs" and incorporated Indian and Coloured Affairs.
6. Changed to "Department of Commerce, Industries and Tourism".
7. Changed to "Department of Health and Welfare".
8. Indian and Coloured Education are incorporated under Indian and Coloured Affairs respectively and cannot be separated.
9. Permanent Defence Force only.
10. Incorporated into Bantu Administration and Development.
11. Bantu, Indian and Coloured Education data are for actual employment and not authorised establishment.
12. 1930 – 1982.

TABLE 2.1.2

EMPLOYMENT BY THE CENTRAL AUTHORITIES BY RACE GROUP SELECTED YEARS 1930 - 1981

YEAR	WHITES	COLOUREDS	INDIANS	AFRICANS	TOTAL BLACKS	TOTAL
1930	30146	N/A	N/A	N/A	9445	39591
1940 [1]	43298	N/A	N/A	N/A	10928	54226
1950	68192	N/A	N/A	N/A	24168	92360
1954	77222	N/A	N/A	N/A	29010	106232
1960	103726	9858	644	105508	116010	219736
1961	107090	10640	744	109145	120529	227619
1962	112825	11419	718	111792	123929	236764
1963	117620	11836	807	133805	146448	264068
1964	121851	12574	829	128939	142342	264193
1965	122700	24350	1465	119220	145035	267735
1966	127470	26411	1623	165457	193491	320961
1967	131325	28717	7341	152941	188999	320324
1968	135620	30945	7088	152510	190543	326163
1969	129950	31832	7435	164167	203434	333384
1970	99915	30295	7340	135578	173213	273128
1971	102757	32495	7562	144552	184609	287366
1972	104443	32648	7816	128677	169141	273584
1973	102881	35068	8387	110594 [2]	154049	256930 [2]
1974	102276	41603	8852	110010	160465	262741
1975	105909	43035	8834	114856	166725	272634
1976	116867	49539	9193	120328	179060	295927
1977	121699	51257	9631	123375	184263	305962
1978	123268	53876	10164	127013	191053	314321
1979	128813	57933	11106	116717	185756	314569
1980	129872	58158	12446	123596	194200	324072
1981	129838	60089	13011	132064	205164	335002

SOURCES: 1930 : Official Year Book of the Union of S.A. 1929 - 30
1940 : Richards,C.S. "The Growth of Government since Union" Ibid.
1950 : Official Year Book of the Union of S.A. No. 20 1956.
1954 : Richards, Ibid.
1960/73: Quarterly Bulletin of Statistics for December 1974 Department of Statistics, p. 7.25
1974/75: Department of Statistics. Statistical news release 23/3/76.
1976 : Department of Statistics. Statistical news release 23/12/76
1977/79: Department of Statistics. Statistical Year Book 1980, p.7.19.
1980/81: Department of Statistics. SA Statistics, 1982.

NOTES : (1) Includes 35 departments & Sub departments only.

(2) Excludes 3 417 non departmental servants of the department of Public Health

TABLE 2.1.3 Central Authorities Employment, G P O Employment, Indian and Coloured Education and Net Central Authorities Employment, Selected Years, 1930-1981 (1)

YEAR	CENTRAL AUTHORITIES			GOVERNMENT POST OFFICE			PROVINCIAL EDUCATION		NET CENTRAL AUTHORITIES EMPLOYMENT		
	Whites	Blacks	Total	Whites	Blacks	Total	Coloured Ed.	Indian Ed.	Whites	Blacks	Total
1930	30 146	9 445	39 591	11 819	1 654	13 473		2 144	18 327	9 935	28 262
1940	43 298	10 928	54 226	13 870	1 526	15 396		4 177	29 428	13 579	43 007
1950	68 192	24 166	92 360	27 337	4 100	31 437		7 163	40 855	27 229	68 084
1960	103 726	116 010	219 736	30 737	9 944	40 681	10 141	3 940	72 989	120 147	193 136
1961	102 090	120 529	227 619	31 612	9 952	41 564	10 810	4 157	75 478	125 544	201 022
1962	112 835	123 929	236 764	32 277	10 704	42 681	11 772	4 347	80 558	129 344	209 902
1963	117 620	146 448	264 068	32 794	10 622	43 416	12 172	4 608	84 826	152 626	237 432
1964	121 851	142 342	264 193	32 934	10 749	43 683	12 586	4 884	88 917	149 063	237 980
1965	122 700	145 035	267 735	30 963	12 232	43 195		5 177	91 737	137 980	229 717
1966	127 470	193 491	320 961	31 856	12 065	45 921		5 567	95 614	186 993	282 607
1967	131 335	188 999	320 324	33 734	13 091	46 825			97 591	176 755	274 346
1968	135 620	190 543	326 163	34 275	14 071	4 346			101 345	176 472	277 817
1969	129 950	203 434	333 384	35 881	15 923	51 804			94 069	187 511	281 580
1970	99 915	173 213	273 128						99 915	173 213	273 128
1971	102 757	184 609	287 366						102 757	184 609	287 366
1972	104 443	169 141	273 584						104 443	169 141	273 584
1973	102 881	154 049	256 930						102 881	154 049	256 930
1974	102 276	160 465	262 741						102 276	160 465	262 741
1975	105 909	166 725	272 634						105 909	166 725	272 634
1976	116 867	179 060	295 927						116 867	179 060	295 927
1977	121 699	184 263	305 962						121 699	184 263	305 962
1978	123 268	191 053	314 321						123 268	191 053	314 321
1979	128 813	185 756	314 569						128 813	185 756	314 569
1980	129 872	194 200	324 072						129 872	194 200	324 072
1981	129 838	205 164	335 002						129 838	205 164	335 002

Source: Central Authorities Table 2.1.2
Government Post Office 1920, 1930 : Official Year Book of the Union of S.A. 1930/31 Pretoria
1940 : " " 1940 "
1950 : " " 1950 "
1960 : Monthly Bulletin of Statistics December 1960 Department of Statistics, Pretoria
1961-1965 " " January 1965 " " "
1967-1969 Quarterly Bulletin of Statistics December 1970 " " "
1971-1974 " " March 1976 " " "
Indian and Coloured Education: 1930-1950: Dept of Statistics, Union Statistics
1960-1966: " " Statistical Yearbook 1972

Note (1) For an explanation of this table see Section 2-1-2

Over the span of years examined many of the functions delegated to the Central Authorities have been modified, added to or even removed altogether. As a result of this the available data on Central Authority employment is not strictly comparable over time (see table 2.1.2). While most of the modifications or removals do not affect the accuracy of the data three major changes are necessary to make the Central Authorities employment data comparable. Firstly in 1964 control over Coloured Education was removed from the Provincial Authorities and centralized under the department of Coloured Affairs. Secondly, between 1966 and 1967 the control of Indian Education was also centralised, in this case under the department of Indian Affairs. And thirdly, in 1967 the department of Posts and Telegraphs was made a corporate entity independent of the Central Authorities.[5]

The raw employment data is changed in table 2.1.3 to make the figures comparable over time. This measure of employment by the Central Authorities is 'net' employment and treats the Post Office as having never been part of the Central Authorities, and Indian and Coloured education as always having been part of the Central Authorities.

2.1.3 Public Service Employment

The objective of this section is to establish a comparable set of time series employment by the public service.

Two problems were present with data on employment by the public service. Both problems necessitated some manipulation of the figures and are likely to have undermined the reliability of the final figures.

The first problem with data on public service employment is that there is none available. The only figures available are public service authorised establishment, vacancies and positions filled by temporary personnel (see table 2.1.4). The total for public service employment shown in table 2.1.4 was calculated from this as: public service authorised establishment less vacant posts plus temporary personnel filling vacant posts and temporary personnel employed in addition to the authorised establishment. Therefore "Real" public service Employment is as close an approximation of actual public service employment as could possibly be made.

The second difficulty with public service employment data is that, as with Central Authorities employment data, it is not comparable over time. Three changes were necessary to make the figures comparable:

Police: In 1968 so-called "services" posts in the police force were removed from the authorised establishment of the public service. Figures of actual employment in these "services" posts are available and have been removed from actual public service employment (table 2.1.5).

SADF: In 1967 "services" posts in the defence force were also removed from the authorised establishment of the public service. Unfortunately figures for actual employment in these services posts

Table 2.1.4 Calculation of Real[3] Public Service Employment, Selected Years, 1930-1980[2]

	Authorised Establishment			Posts Vacant			Temporaries Filling Vacant Posts			Temporaries in Addition to AE			Real Public Service Employment(3)		
Year	White	Black	Total	White	Black	Total	White	Black	Total	White	Black	Total	White	Black	Total
1930	N/A	N/A	30 620	N/A	N/A	N/A	N/A	N/A	374	N/A	N/A	1 020	N/A	N/A	N/A
1940	"	"	40 506	"	"	"	"	"	1 742	"	"	12 262	"	"	"
1950	"	"	106 956	"	"	15 903	"	"	9 295	"	"	6 594	"	"	106 942
1960	"	"	148 592	15 258	1 608	16 866	9 280	2 012	11 292	2 341	2 131	4 472	"	"	147 490
1961	"	"	152 174	15 274	1 835	17 082	9 907	1 705	11 612	2 414	1 682	4 096	"	"	150 800
1962	"	"	161 035	16 466	2 096	18 562	9 526	2 871	12 397	2 617	2 048	4 665	"	"	159 535
1963	"	"	167 100	17 713	2 707	20 420	10 285	2 998	13 283	2 494	2 128	4 622	"	"	164 585
1964	"	"	187 049	22 606	2 334	24 940	10 692	2 061	12 753	2 014	304	2 318	"	"	177 180
1965	"	"	191 946	24 578	2 712	27 290	12 994	3 490	16 484	2 130	888	3 018	"	"	184 158
1966	"	"	202 934	23 881	6 873	30 754	14 225	7 619	21 844	1 596	1 153	2 749	"	"	196 773
1967	142 264	70 524	212 788 [4]	27 004	3 156	30 160	15 025	6 990	22 015	1 821	1 782	3 603	132 106	76 140	208 246
1968	87 030	63 106	150 136	16 949	11 356	28 305	11 901	10 727	22 628	1 409	1 245	2 654	83 391	63 722	147 113
1969	89 421	65 905	155 326	17 646	3 423	21 069	11 245	3 054	14 299	1 760	1 706	3 466	84 780	67 242	152 022
1970	74 691	55 131	129 822	20 846	16 220	37 066	13 335	13 885	27 220	3 679	1 950	5 629	70 859	54 746	125 605
1971	74 366	59 827	134 193	18 307	16 060	34 367	14 527	15 349	29 876	1 942	1 471	3 413	72 528	60 587	133 115
1972	75 351	61 532	136 883	18 737	16 603	35 340	14 932	15 895	30 828	2 269	1 413	3 682	73 815	62 238	136 053
1973	77 341	65 364	142 705	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1974[1]	78 997	70 279	149 276	24 676	21 806	46 482	17 109	15 695	32 804	2 718	983	3 701	74 148	65 151	139 299
1975[1]	82 571	75 256	157 827	28 975	5 419	34 394	22 188	4 270	26 458	2 784	388	3 172	78 568	74 495	153 063
1976[1]	83 694	78 484	162 179	32 804	20 033	52 837	21 480	12 093	33 573	3 378	2 453	5 631	75 748	72 997	148 745
1977[1]	85 365	81 992	167 357	29 445	27 875	57 320	20 275	19 143	39 418	4 047	2 399	6 446	80 242	75 659	155 901
1978[1]	88 393	81 718	170 111	26 187	15 624	41 811	17 860	12 877	30 737	3 979	763	4 742	84 045	79 734	163 779
1979[1]	93 641	85 721	179 362	22 131	14 031	36 162	12 617	11 912	24 529	1 226	548	1 774	85 353	84 150	169 503
1980[1]	95 463	110 377	205 840	30 298	16 289	46 587	20 834	11 665	32 499	1 656	1 443	3 101	87 657	107 196	194 853
1981[1]	97 804	132 134	229 938	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1982[1]	100 672	139 738	240 410	74 842	45 271	120 113	13 754	27 331	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Source: Annual reports of the Public Service Commission for the relevant years. Pretoria: Government Printer.

Notes: (1) Reclassification of vacancies occurred and post 1974 figures are not strictly comparable with pre 1974 figures.

(2) Figures until 1971 are for December. Figures for 1972 onwards are for June.

(3) Real = Authorised Establishment LESS Vacancies PLUS Temporary Labour.

(4) Over 1967 - 1968 C.P.O. personnel ceased to be part of the Public Service.

TABLE: 2.1.5 Calculation for Net Real Public Service Employment, Selected Years, 1930 - 1980[1]

	Real Public Service			Post Office Employment			"Services" in S.A.P.			Authorised Establishment "Services" SADF	Net Real Public Service Employment		
	White	Black	Total	White	Black	Total	White	Black	Total		White	Black	Total
1930	N/A	N/A	N/A	11 819	1 654	13 473	-	-	-	2 023	N/A	N/A	N/A
1940	N/A	N/A	N/A	13 870	1 526	15 396	-	-	-	8 575	N/A	N/A	N/A
1950	N/A	N/A	106 942	27 337	4 100	31 437	10 478	7 343	17 821	8 952	N/A	N/A	48 732
1960	N/A	N/A	147 490	30 737	9 944	40 681	11 938	13 813	25 751	11 355	N/A	N/A	69 703
1961	N/A	N/A	150 800	31 612	9 952	41 584	12 249	13 777	26 026	12 770	N/A	N/A	70 440
1962	N/A	N/A	159 535	32 277	10 704	42 681	12 778	13 853	26 631	14 246	N/A	N/A	75 977
1963	N/A	N/A	164 585	32 794	10 622	43 416	13 770	13 673	27 443	16 254	N/A	N/A	77 472
1964	N/A	N/A	177 180	32 934	10 749	43 683	14 528	13 812	28 340	18 143	N/A	N/A	87 014
1965	N/A	N/A	184 168	30 963	12 232	43 195	14 678	14 108	28 786	16 267	N/A	N/A	95 920
1966	N/A	N/A	196 773	31 856	12 065	45 921	15 437	14 500	29 937	17 744	n/A	N/A	103 171
1967	132 106	76 140	208 246	33 734	13 091	46 825	16 316	14 810	31 126	18 081	63 975	48 239	112 214
1968	83 391	63 722	147 133	-	-	-	16 587	15 166	31 753	-	66 804	48 556	115 360
1969	84 780	67 242	152 022	-	-	-	16 376	15 513	31 889	-	68 404	51 729	120 133
1970	70 859	54 746	125 605	-	-	-	-	-	-	-	70 859	54 746	125 605
1971	72 528	60 587	133 115	-	-	-	-	-	-	-	72 528	60 587	133 115
1972	73 815	62 238	136 053	-	-	-	-	-	-	-	73 815	62 238	136 053
1973	N/A	N/A	N/A	-	-	-	-	-	-	-	N/A	N/A	N/A
1974	74 148	65 151	139 299	-	-	-	-	-	-	-	74 148	65 151	139 299
1975	78 568	74 495	153 063	-	-	-	-	-	-	-	78 568	74 495	153 063
1976	75 748	72 997	148 745								75 748	72 997	148 745
1977	80 242	75 659	155 901								80 242	75 659	155 901
1978	84 045	79 734	163 779								84 045	79 734	163 779
1979	85 353	84 150	169 503								85 353	84 150	169 503
1980	87 657	107 196	194 853								87 657	107 196	194 853

Sources: Public Service - Table 2.1.4
Post Office - Table 2.1.3
"Services" S.A.P. : Annual reports of the Commissioner of Police for the relevant years, Pretoria : Government Printer.
"Services" SADF: RSA: Estimates of the expenditure to be defrayed from revenue to be collected for the relevant years; Pretoria : Government Printer.

Notes: (1) For an explanation of this table see Section 2.1.3.

and authorised establishment in these services posts are not available. However, apart from a few personnel the entire permanent constituent of the defence force is employed in services posts. Figures are available on the authorised establishment of the entire permanent defence force although not disaggregated by race. These have been used as a proxy and removed from the figures on public service employment prior to 1967. As vacancies undoubtedly occurred in the permanent defence force, the comparable public service employment given in table 2.1.5 prior to 1967 is slightly understated. The permanent Defence force has been treated as all white in the calculations; apart from more recent history this procedure is unlikely to distort the results.

Post Office:

In 1967 the department of Posts and Telegraphs was dissolved and post office personnel became independent of the public service. To rectify the data, employment by the post office has been removed from public service employment for all years prior to 1967.

So comparable public service employment figures i.e. Net Real Public Service Employment (as shown in table 2.1.5) is equal to Real Public Service Employment (from table 2.1.4) less Post Office employment prior to 1967, less authorised "services" posts in the SADF prior to 1967 and less "services" personnel in the police force prior to 1967. To summarise, the comparable Public Service

employment data treats the GPO and "services" in the SADF and SAP as never having been part of the Public Service.

2.1.4 Differences between Central Authorities Employment and Public Service Employment (the Residual)

When this study was started it was expected that employment by the Central Authorities and by the Public Service would be approximately equal. It was discovered that differences in employment do exist and that these have been substantial on occasion (for example in 1966 this difference was more than 110 000 personnel).

Therefore the objective of this section is to establish a comparable time series for these employment differences (called the Residual) and discuss the problems encountered in this calculation.

The Residual of Central Authorities employment is simply the difference between Central Authorities employment and Public Service employment. A more accurate measure can be obtained by using Net Central Authorities employment (section 2.1.2) and Net Real Public Service employment (section 2.1.3). Unfortunately a Residual calculated by this method will be overestimated because certain categories are employed by the Central Authorities but are not part of the public service. These are:

(i) Board members and elected office bearers (for example, Members of Parliament and members of commissions of inquiry);

(ii) 'Services' posts in the South African Defence force. This incorporates virtually all members of the permanent defence force;

(iii) 'Services' posts in the Police Force. This incorporates virtually all serving police personnel;

(iv) Teaching personnel involved in Coloured and Indian education; and

(v) general temporary labour.

Actual data, or proxies are available for categories (ii), (iii) and (iv) above. Therefore the aggregate size of categories (i) and (v) can be deduced by removing categories (ii) - (iv) from the difference between 'net' employment by the Central Authorities and 'net real' employment by the public service. This is called the 'Residual' and is shown in table 2-1-6. As it has been stressed above, the adjusted data for the public service could be subject to some error and consequently the Residual could also be subject to error. (The Residual is discussed further in Part III).

TABLE 2-1-6 Residual of Central Authorities Employment, Selected Years, 1930-1980[1)]

Year	Net Central Authorities			Net Real Public Service			"Services" S A D F & S A P			Indian & Coloured Education	Residual of Central Authorities Employment		
	White	Black	Total	White	Black	Total	White	Black	Total		White	Black	Total
1930	18 327	9 935	28 262	N/A	N/A	N/A	N/A	N/A	N/A	2 144	N/A	N/A	N/A
1940	29 428	13 579	43 027	N/A	N/A	N/A	N/A	N/A	N/A	4 117	N/A	N/A	N/A
1950	40855	27 229	68 084	N/A	N/A	48 732	19 430	7 343	26 773	7 163	N/A	N/A	(-7 457)
1960	72 989	120 147	193 136	N/A	N/A	69 703	23 293	13 813	37 106	14 081	N/A	N/A	72 246
1961	75 478	125 544	201 022	N/A	N/A	70 440	25 019	13 777	38 796	14 967	N/A	N/A	76 819
1962	80 558	129 344	209 902	N/A	N/A	75 977	27 024	13 853	40 877	16 119	N/A	N/A	76 929
1963	84 826	152 606	237 432	N/A	N/A	77 472	30 024	13 673	43 697	16 780	N/A	N/A	99 483
1964	88 917	149 063	237 980	N/A	N/A	87 014	32 671	13 812	46 483	17 470	N/A	N/A	87 019
1965	91 737	137 980	229 717	N/A	N/A	95 920	30 945	14 108	45 053	17 470	N/A	N/A	71 274
1966	95 615	186 993	282 607	N/A	N/A	103 171	33 181	14 500	47 581	18 191	N/A	N/A	113 664
1967	97 591	176 755	274 346	63 975	48 239	112 214	34 397	14 810	49 207	19 183	(- 781)	(94 523)	93 742
1968	101 345	176 472	277 817	66 804	48 556	115 360	33 645	14 810	48 455	20 130	896	92 976	93 872
1969	94 069	187 511	281 580	68 404	51 729	120 133	34 296	15 537	49 835	21 575	(-8 631)	(98 670)	90 039
1970	99 915	173 213	273 128	70 859	54 746	125 605	34 692	15 531	50 223	22 383	(-5 636)	(80 553)	74 917
1971	102 757	184 609	287 366	72 528	60 587	133 115	35 782	15 333	51 115	23 299	(-5 553)	(85 390)	78 837
1972	104 443	169 141	273 584	73 815	62 238	136 053	35 948	15 218	51 166	24 601	(-5 320)	(67 084)	61 764
1973	102 881	154 049	256 930	N/A	N/A	N/A	36 099	15 222	51 321	25 125	N/A	N/A	N/A
1974	102 276	160 465	262 741	74 148	65 151	139 299	36 650	15 713	52 363	26 324	(-8 522)	(53 277)	44 755
1975	105 909	166 725	272 634	78 568	74 495	153 063	33 514	15 903	49 417	27 555	(-6 173)	(48 772)	42 599
1976	116 867	179 060	295 927	75 748	72 997	148 745	34 799	16 038	50 837	28 941	6 320	61 084	67 404
1977	121 699	184 263	305 962	80 242	75 659	155 901	35 817	16 202	52 019	30 402	5 640	62 000	67 650
1978	123 268	191 053	314 321	84 045	79 734	163 779	36 341	15 624	51 965	31 898	2 882	63 797	66 679
1979	128 813	185 756	314 569	85 353	84 150	169 503	36 464	15 612	52 076	33 543	6 996	52 451	59 447
1980	129 872	194 200	324 072	87 657	107 196	194 853	35 303	16 968	52 271	34 666	6 912	35 370	42 282

Sources:

Net Central Authorities: Table 2.1.3
Net Real Public Service: Table 2.1.5
"Services" Posts: As in Table 2.1.5
Indian and Coloured Education: 1930-1950: Department of Statistics: Union Statistics
1960-1970: Department of Statistics: Statistical Year Book 1972
1971-1980: Department of Statistics: SA Statistics 1982

Note:

1) For an explanation of this table see Section 2.1.4

2.2 PROVINCIAL AUTHORITIES

INTRODUCTION

Data on Provincial Authorities employment was collected with two objectives. As with Central Authorities employment it was both necessary to divide Provincial employment along functional lines (subsection 2.2.1) and also to establish comparable time series data (subsection 2.2.2) As both areas proved problematic this section discusses the difficulties that were encountered and the solutions that were implemented. As a result of finding differences between employment by the Central Authority and the Public Service, Provincial Authorities data was tested for the same thing (subsection 2.2.3.).

2.2.1 Functional Division of Provincial Authorities Employment

The two main areas in which the Provincial Authorities employ labour are those of white education, and hospitals and health services (see table 2.2.1). While the Provincial Authorities also have control over such areas as roads and works (excluding urban areas), nature conservation, provincial traffic control and the construction and maintenance of pleasure resorts, the proportion of labour used in these areas is minimal compared to the two main functions.

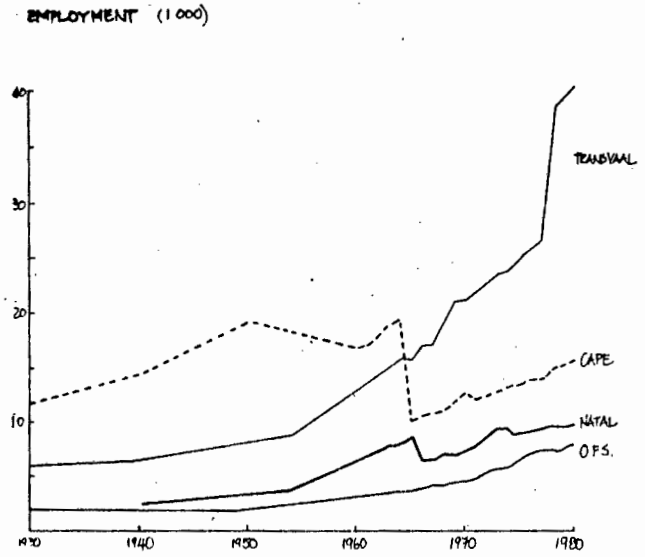


FIGURE 2-1: AUTHORISED ESTABLISHMENT FOR PROVINCIAL EDUCATION BY PROVINCE, SELECTED YEARS, 1930—1980

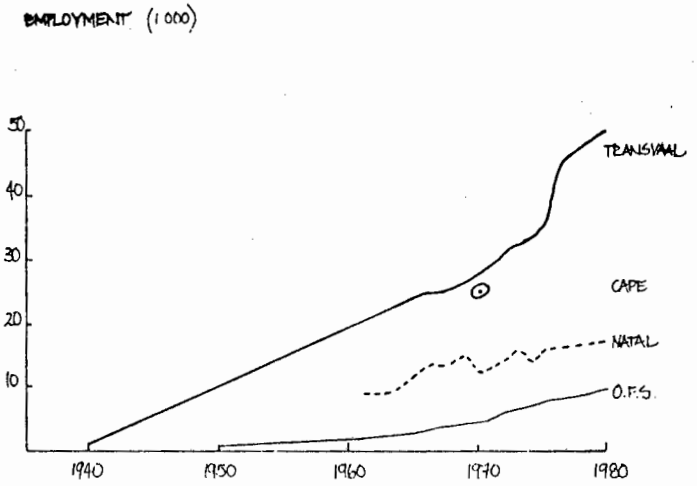


FIGURE 2-2: AUTHORISED ESTABLISHMENT FOR PROVINCIAL HOSPITAL AND HEALTH SERVICES BY PROVINCE, SELECTED YEARS, 1940 — 1980

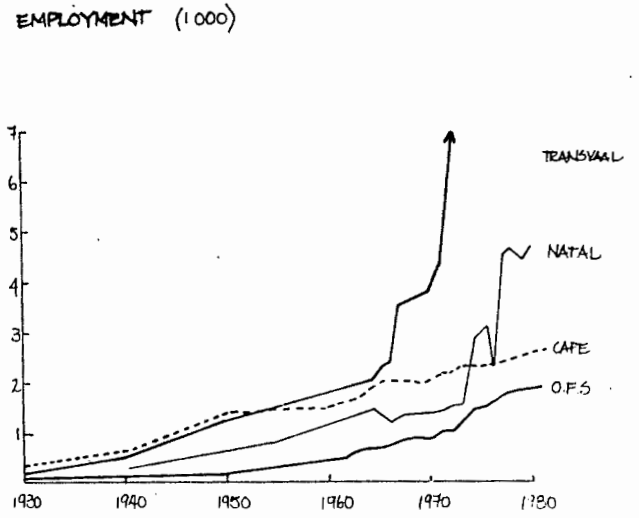


FIGURE 2-3: TOTAL AUTHORISED ESTABLISHMENT OF THE PROVINCIAL AUTHORITIES EXCLUDING EDUCATION AND HOSPITAL AND HEALTH SERVICES, BY PROVINCE, SELECTED YEARS, 1930 — 1980.

TABLE 2.2.1 Provincial Authorities Authorised Functions, Selected Years 1940 - 1980

YEAR	TOTAL[3]	Education I	Hospital and[3] Health Services (II)	Total[3] Less (I) & (II)
1940	27 556	25 837	139 (1)	1 580
1950	N/A	21 399 (2)	860 (1)	1 637 (2)
1960	N/A	23 497 (2)	N/A	-
1961	N/A	24 614 (2)	9 445 (1)	-
1962	N/A	29 462 (2)	2 431 (1)	-
1963	N/A	30 901 (2)	12 270 (1)	-
1964	N/A	N/A	13 428 (1)	5 970
1965	84 061	38 460	39 050	6 551
1966	N/A	34 390 (2)	37 546	5 572
1967	88 357	38 731	41 860	7 766
1968	92 594	41 048	43 602	7 944
1969	100 076	45 754	46 262	8 060
1970	N/A	46 143	17 667 (1)	8 220
1971	104 350	47 357	47 929	9 064
1972	N/A	41 504 (2)	52 208	-
1973	136 013	52 125	54 866	29 022
1974	138 983	53 405	54 932	30 646
1975	145 475	54 333	60 184	30 958
1976	156 840	57 773	68 595	30 472
1977	162 722	58 771	71 568	32 383
1978	175 948	68 428	73 809	33 711
1979	180 128	71 533	74 395	34 200
1980	180 617	75 605	76 090	34 922

Source: Tables 2-2-2; 2-2-3; 2-2-4

Notes: (1) Excludes Transvaal
(2) Some provinces excluded as data incomplete.
(3) Excludes Cape

TABLE 2.2.2: Provincial Authorities Authorised Establishment for White Education. Selected Years, 1930 - 1981

YEAR	CAPE	NATAL	O F S	TRANSVAAL
1930	11 966	N/A	2 215	5 930
1940	14 680	2 443	2 133	6 581
1950	14 285	N/A	2 114	N/A
1954	N/A	3 819	N/A	9 913
1960	16 980	6 517	N/A	N/A
1961	17 573	7 041	N/A	N/A
1962	18 373	7 390	3 699	N/A
1963	19 075	8 060	3 766	N/A
1964	19 798	7 997	3 867	16 163
1965	10 375	8 433	3 951	15 701
1966	10 514	6 290	N/A	17 586
1967	10 697	6 668	4 143	17 223
1968	10 984	6 835	4 204	19 025
1969	12 330	7 149	4 725	21 550
1970	12 741	7 532	4 794	21 076
1971	12 163	8 286	4 810	22 098
1972	12 616	N/A	5 720	23 168
1973	12 949	9 481	5 883	23 812
1974	13 266	9 535	5 986	24 618
1975	13 642	8 222	7 314	25 155
1976	14 077	10 639	7 450	25 607
1977	14 079	10 770	7 557	26 365
1978	14 845	10 196	7 479	35 908
1979	15 193	10 624	7 714	38 002
1980	15 314	10 638	8 002	41 651
1981	16 031	N/A	8 035	N/A

Source: R S A Estimates of the expenditure to be defrayed from revenue to be collected for the year .... for the relevant years and provinces. Pretoria : Government Printer.

TABLE 2.2.3: Provincial Authorities Authorised Establishment for Hospital & Health Services, Selected years, 1930-1981

YEAR	CAPE	NATAL	O F S	TRANSVAAL
1930	N/A	N/A	N/A	39
1940	N/A	N/A	N/A	139
1950	N/A	N/A	N/A	N/A
1960	N/A	N/A	N/A	N/A
1961	N/A	9 445	N/A	N/A
1962	N/A	N/A	2 431	N/A
1963	N/A	9 753	2 517	N/A
1964	N/A	10 534	2 894	N/A
1965	N/A	12 129	2 981	23 940
1966	N/A	12 983	N/A	24 563
1967	N/A	13 013	3 978	24 869
1968	N/A	13 728	4 253	25 621
1969	N/A	15 047	4 344	26 871
1970	24 095(1)	12 924	4 743	N/A
1971	N/A	13 617	4 998	29 314
1972	N/A	14 203	6 208	31 797
1973	N/A	15 277	6 590	32 999
1974	N/A	14 698	7 266	32 968
1975	N/A	16 404	7 567	36 213
1976	N/A	16 109	8 358	44 128
1977	N/A	16 099	8 959	46 510
1978	N/a	16 096	9 497	48 216
1979	N/A	16 496	9 620	48 279
1980	N/A	16 360	10 276	49 454
1981	N/A	N/A	10 359	51 282

Source: R S A Estimates of the expenditure to be defrayed from revenue to be collected for the year ..... for the relevant years and provinces. Pretoria : Government Printer

Data for Cape 1970 obtained directly from the Provincial Auditor.

Note: (1) Actual employment figures. Does not include "professional posts" Other years are not available.

TABLE 2.2.4: Provincial Authorities Total Authorised Establishment Excluding Hospital, and Health Services and Education Staff, Selected Years 1930-1981

YEAR	CAPE	NATAL	O F S	TRANSVAAL
1930	329	N/A	8	262
1940	605	278	139	558
1950	1 492	N/A	208	N/A
1954	N/A	833	N/A	1 462
1960	1 497	N/A	N/A	N/A
1961	1 690	1 595	N/A	N/A
1962	1 578	N/A	549	N/A
1963	1 754	1 298	587	N/A
1964	1 940	1 385	640	2 005
1965	2 022	1 517	688	2 324
1966	2 011	1 138	N/A	2 428
1967	2 019	1 401	826	3 520
1968	2 027	1 395	845	3 677
1969	1 994	1 443	848	3 775
1970	2 071	1 417	856	3 876
1971	2 257	1 506	1 003	4 298
1972	2 258	N/A	1 134	6 579
1973	2 346	1 545	1 227	23 914
1974	2 348	2 832	1 472	23 994
1975	2 295	3 014	1 579	24 070
1976	2 349	2 177	1 719	24 227
1977	1 771	4 866	1 777	24 169
1978	2 356	4 704	1 789	24 862
1979	2 391	4 431	1 853	25 525
1980	2 414	4 889	1 961	25 658
1981	2 453	N/A	2 638	25 896

SOURCE: R S A Estimates of the expenditure to be defrayed from revenue to be collected for the year....for the relevant years and provinces. Pretoria : Government Printer.

There are unfortunately no figures available on actual employment by the Provincial Authorities over their various areas of responsibility. As a proxy the authorised establishment of the provinces over the various areas of control has been used. However it should be realized that while these figures will indicate ex ante intentions of the Provincial Authoritiess over their areas of control they give no idea of the ex post levels of employment. This will be especially true in those two areas of employment which suffer extensive vacancies: white education, and hospitals and health services.

The functional division of Provincial Authorities authorised establishment is given below: Authorised establishment for white education is given in table 2.2.2 and figure 2.1. Authorised establishment for hospitals and health services is given in table 2.2.3 and figure 2.2. The authorised establishment of the other functions of the Provincial Authorities is given in table 2.2.4 and figure 2.3.

2.2.2 Provincial Administration Employment

The objective of this section is to establish a comparable set of time series employment by the Provincial Administrations. This

section attempts to explain the factors which made the raw employment data non comparable and the steps that were taken to correct this.

Two entirely different problems were encountered with this data. Firstly all the compatability problems discussed in relation to Central Authorities employment in Section 2.1.2 are again present. These are discussed in subsection 2.2.2.1. Secondly, no official pre-1960 data is available which is comparable with post-1960 data. The solutions are discussed in subsection 2.2.2.2.

2.2.2.1 'Net' employment by the Provincial Authorities (Table 2-2-5)

The removal of Coloured and Indian Education from Provincial control in 1964 and 1966/67 respectively makes available employment by Provincial Authorities non-comparable. In section 2.1.2. (the difficulties with employment data for the Central Authorities) Central Authorities employment was made comparable by summing it with the authorised establishment for Indian and Coloured education. Therefore the Provincial Authorities have been treated as if they never had control over Coloured and Indian Education in order to avoid double counting and make the data comparable. This new figure called 'Net' Provincial Authorities employment is equal

TABLE 2-2-5 'Net' Employment by the Provincial Authorities, 1960 - 1981[1)]

Year	Whites	Blacks	Coloured Education	Indian Education	Net Blacks	Net Total	Black / White
1960	N/A	N/A	10 141	3 940	N/A	N/A	-
1961	65 098	80 348	10 810	4 157	65 381	130 479	1,00
1962	67 449	81 801	11 772	4 347	65 682	133 131	0,97
1963	69 711	84 371	12 586	4 608	67 177	136 888	0,96
1964	72 153	79 836		4 884	74 952	147 105	1,04
1965	73 131	81 220		5 177	76 043	149 174	1,04
1966	78 503	80 167		5 567	74 570	153 073	0,95
1967	80 588	80 723			80 723	161 311	1,00
1968	85 283	83 205			83 205	168 488	0,98
1969	89 339	90 559			90 559	179 898	1,01
1970	92 081	93 280			93 280	185 361	1,01
1971	95 313	95 306			95 306	190 619	1,00
1972	98 537	100 027			100 027	198 564	1,02
1973	101 022	100 239			100 239	201 261	0,99
1974	104 033	106 367			106 367	210 370	1,02
1975	108 441	111 807			111 807	220 248	1,03
1976	112 194	110 744			110 744	222 938	0,99
1977	116 987	112 739			112 739	229 726	0,96
1978	120 867	115 887			115 887	236 754	0,96
1979	123 193	118 878			118 878	242 071	0,96
1980	127 329	121 374			121 374	248 703	0,95
1981	125 326	125 241			125 241	250 567	1,00

Sources:

1960-1975 Department of Statistics, Statistical Year Book 1976
Coloured and Indian Education: Table 2-1-5

1980-1981 Department of Statistics, SA Statistics 1982, Pretoria, Government Printer.

Note:

1) For an explanation of this table see 2-2-2-1

to Provincial Authorities employment less Coloured and Indian Education employment until 1964 and 1966/67 respectively (see table 2.2.5).

2.2.2 Establishment of long term growth trend

There is no data available for employment by the Provincial Authorities for the years before 1960. To establish a long term growth trend for Provincial Authorities figures by Richards before 1957 have been used (table 2.2.6)[6]. Unfortunately these figures are not comparable to the post 1960 employment data and some changes have been made to this post 1960 data to establish a long-term growth trend.

TABLE 2.2.6: Employment in the Provincial Administrations 1917-1953

Year	Staff employed[1]	Teachers	Total
1917	938[2]	15 821	16 759
1939	3 808	32 279	36 087
1950	7 756	45 690	53 446
1951	8 360	47 274	55 634
1953	9 269	52 457	61 716

Source: Richards, C S Growth of Employment in S A since Union, Department of Commerce, University of the Witwatersrand, June 1957.

Notes: 1 These are Public Service positions only, plus hospital posts in Natal.
2 Figure for 1922.

TABLE 2.2.7 Provincial Administration Employment and Authorised Hospital Staff 1965 and 1970

A	Year	Total Employment I	Hospital AE II	I - II
	1965	148 635	39 050[1]	109 585
	1970	185 361	69 854[2]	115 507
B		Total Employment III	Hospital AE (Less Natal AE)	III - IV
	1965	148 635	26 921[1]	121 714
	1970	185 361	56 930[2]	128 431

Source: Total employment. See Table 2.2.5.
Hospital Authorised Establishment: Calculated from Estimates of Expenditure to be defrayed from Revenue to be collected for the year... for the relevant years for the O F S, Transvaal and Natal. Cape Hospital Employment figure directly from the Cape Provincial Auditor.

Notes: 1 Excludes Cape.

2 Excludes Cape Authorised Establishment. Includes actual number employed in Cape but excludes those employed in the Professional" category. Authorised Establishment of Transvaal is based on average of 1969 and 1971.

Abbreviation: AE - Authorised Establishment

As can be seen in Table 2.2.6 Richard's figures include neither hospital posts in any of the provinces except in Natal nor employment by all provinces in the "Roads and Works" division. The numbers employed in the Roads and Works division is insignificant in relation to total employment and this difference can be ignored in establishing the long term growth trend. However employment in Provincial Hospitals and Health Services is substantial and in attempting to find a long term growth trend the post 1960 data (Table 2.2.7) must be reduced by the Hospitals and Health Services employment of all provinces but Natal. Unfortunately figures for employment in Hospitals and Health Services are not available but authorised establishment data has been used as a proxy. These authorised establishment figures only became available in 1965 so the data for 1965 and 1970 shown in Table 2.2.7 are comparable to Richards' pre 1960 figures.

2.2.3 The Residual of Provincial Administration employment - difference between Provincial Administration actual employment and authorised establishment

As was found under Central Authority employment, a considerable difference exists between actual Provincial employment and Provincial Administration authorised establishment. However unlike the Central Authority Residual, particularly extreme fluctuations have not occurred (See Table 2.2.8) These figures are comparable over time. However as the authorised establishment does not

TABLE 2-2-8: Provincial Authorities Residual Employment: Actual Employment and Authorised Establishment 1961-1980

YEAR	TOTAL EMPLOYMENT	TOTAL AUTHORISED ESTABLISHMENT	RESIDUAL (1)
1961	130 479	-	-
1962	133 131	-	-
1963	136 838	-	-
1964	147 105	-	-
1965	149 174	84 061	65 113
1966	153 073	-	-
1967	161 311	88 357	72 954
1968	168 488	92 594	75 894
1969	179 898	100 076	79 822
1970	185 361	-	-
1971	190 619	115 304	75 315
1972	198 564	-	-
1973	201 261	136 013	62 551
1974	210 570	138 983	71 387
1975	220 248	145 475	74 773
1976	222 938	156 840	66 098
1977	229 726	162 922	66 804
1978	236 754	175 948	60 806
1979	242 071	180 128	61 943
1980	248 703	186 617	62 086

SOURCE: 2-2-5 and 2-2-1

NOTE: (1) The Authorised Establishment does not include Hospital and Health service workers for the Cape so this Residual is overestimated by approximately 30% on the 1970 figure.

include Hospital and Health workers in the Cape the differences are overestimated. Using the only known figure for Cape Hospital and Health employment of 24 095 in 1970 (Table 2.2.3) the difference is overestimated by approximately 30%.

2.3 LOCAL AUTHORITIES

INTRODUCTION

The purpose of this section is twofold.

Firstly, the levels of Local Authority employment are presented in Table 2.3.1. There are no problems with this data and the time series is comparable without any changes.

Secondly, employment by the various types of local authorities is examined to determine which are the most important users of labour. This is examined below.

2.3.1 Employment by the various types of Local Authorities

There are three general types of Local Authorities in South Africa:

TABLE 2-3-1: Local Authorities — Employment, Average Salaries and Wages (R1 000), Selected Years 1920-1981[1]

	WHITES		COLOUREDS	ASIANS	AFRICANS	TOTAL BLACKS		TOTAL EMPLOYMENT	
Year	Number	Average S and W	Number	Number	Number	Number	Average S and W	Number	B/W
1920	10 357	0,28	N/A	N/A	N/A	30 010	0,04	40 367	2,90
1930	17 350	0,24	"	"	"	42 386	0,04	59 736	2,44
1937	21 400	N/A	"	"	"	52 936	-	74 336	2,45
1940	26 099	"	"	"	"	58 484	0,05	84 583	2,24
1945	28 706	"	"	"	"	N/A	-	N/A	-
1950	31 095	1,05	"	"	"	72 969	0,22	104 064	2,35
1951	31 262	1,13	"	"	"	77 655	0,23	108 917	2,48
1952	31 521	1,26	"	"	"	78 991	0,25	110 512	2,51
1953	31 274	1,31	"	"	"	76 673	0,25	107 947	2,45
1954	33 567	1,40	"	"	"	89 215	0,24	122 782	2,66
1955	34 467	1,43	"	"	"	94 775	0,24	129 242	2,75
1956	33 066	1,52	"	"	"	93 156	0,25	126 222	2,82
1957	35 174	1,52	"	"	"	98 396	0,28	133 570	2,80
1958	35 512	1,59	"	"	"	100 534	0,29	136 046	2,83
1960	38 361	1,83	14 801	2 378	95 917	113 098	0,32	151 459	2,95
1961	38 267	1,88	15 491	2 398	92 739	110 621	0,35	148 888	2,89
1962	38 877	1,95	16 062	2 393	91 185	109 640	0,38	148 517	2,82
1963	39 465	1,97	16 312	2 610	93 439	112 262	0,37	151 727	2,84
1964	40 300	2,10	17 800	2 900	99 800	120 500	0,40	160 800	2,99
1965	41 917	2,26	17 301	3 035	104 972	125 308	0,44	167 225	2,99
1966	43 400	2,41	17 100	3 000	110 700	130 800	0,47	174 200	3,01
1967	44 632	2,54	17 273	3 144	109 131	129 548	0,48	174 180	2,90
1968	45 326	2,77	18 492	3 347	114 539	136 378	0,50	181 704	3,01
1969	45 456	2,93	18 465	3 324	117 951	139 740	0,52	185 196	3,07
1970	47 364	3,25	19 028	3 519	121 383	143 930	0,57	191 294	3,04
1971	49 137	3,68	20 145	3 714	128 590	152 449	0,57	201 586	3,10
1972	52 222	3,87	22 571	3 992	131 157	157 720	0,70	209 942	3,02
1973	52 392	4,32	22 587	4 090	131 525	158 202	0,82	210 594	3,02
1974	54 863	4,99	22 403	4 295	139 194	165 892	0,95	220 755	2,02
1975	57 500	5,59	26 400	4 900	143 200	174 500	1,11	232 000	3,03
1976	57 900	6,48	22 800	5 000	142 300	170 100	1,30	228 000	2,93
1977	57 900	7,14	24 100	5 600	136 000	165 700	1,54	223 600	2,86
1978	58 100	7,56	23 900	5 700	140 600	170 200	1,64	228 300	2,92
1979	57 200	8,40	25 800	5 600	135 100	166 500	1,85	223 700	2,91
1980	56 600	10,10	27 700	5 600	134 700	168 000	2,27	224 600	2,97
1981	56 400	12,20	27 300	5 600	137 400	170 300	2,72	226 700	3,02

SOURCES:
1920 : Official Year Book of the Union of S A 1910 - 1920 p 279
1930 : Official Year Book of the Union of S A 1931 - 1932 p 102
1942-43 : Official Year Book of the Union of S A 1946 Prt IV p 18
1950-52 : Official Year Book of the Union of S A 1951 - 52 p 131
1953 : Official Year Book of the Union of S A 1954 - 55 p 93
1954-55 : Official Year Book of the Union of S A 1956 - 57 p 93
1956-58 : Official Year Book of the Union of S A 1960 p 125
1960-75 : Department of Statistics. Statistical Year Book 1976 pp 7.19
1976-79 : Department of Statistics. S A Statistics 1980 pp 7.20
1980-81 : Department of Statistics. S A Statistics 1982 pp 7.20

Note: (1) Transkei excluded since 1976, Boputhatswana since 1977, and Venda since 1979.

2.3.1.1: Rural Coloured Local Authorities

These exist only in the Cape, comprise approximately 4% of the total number of Local Authorities (table 2.3.2) and were responsible for 0,1% of all employment by Local Authorities in 1972 (table 2.3.3).

2.3.1.2: Peri-Urban Local Authorities

In 1976 these consisted of 14,3% of all of Local Authorities (table 2.3.2) but totalled only 3,4% of total Local Authorities employment (for 1972) (table 2.3.3).

2.3.1.3 Urban Local Authorities

These are responsible for the majority of employment by Local Authorities (95,4% in 1972) are the largest category of Local Authorities.

Urban Local Authorities control most of the infrastructure and services necessary in urban areas, inter alia administration and maintenance of roads and electricity, sewerage and other drainage, market and abbatoir services, park recreation, cultural facilities, fire fighting and ambulance services.

TABLE 2-3-2: Types of Local Authorities for 1967, 1970/71 and 1975/76

Year	Municipalities and Town Boards		Village Management Boards/Councils		Rural "Coloured" areas		Other		Total
	No	% of total	No	% of total	No	% of total	No	% of total	
1967	293	56,9	151	29,3	18	3,5	53	10,3	515
1970-71	299	59,4	123	24,5	23	4,6	58	11,5	503
1975-76	347	63,5	99	18,1	22	4,0	78	14,3	546

Source: Calculated from RSA, Local Authority Statistics of the four provincies for the relevant years.

TABLE 2-3-3: Totals Employed by the Various Local Authorities for 1972

Type	Cape (1)		Natal		O F S		Transvaal		Total	
	No	% of total	No	% of total	No	% of total	No	% of total	No	% of Total
Municipalities	57 743	98,6	34 278	88,8	13 697	95,4	92 095	91,3	197 733	93,2
Village Boards	619	1,1	-	-	611	4,3	1 944	1,9	3 174	1,4
Town Boards	-	-	1 858	4,8	-	-	-	-	1 858	0,8
Health Committees	-	-	1 561	4,0	-	-	702	0,7	2 263	1,1
Rural "Coloured" Areas	101	0,2	-	-	-	-	-	-	101	0,1
Other	46	0,01	894	2,4	49	0,3	6 127	6,1	7 116	3,4
Total	58 509	100	38 591	100	14 357	100	100 788	100	212 245	100

Source: R S A Local Authority Statistics for the various provinces for 1972.

Note: (1) Includes Transkei.

2.4 Control Boards

Employment by Control Boards is presented in table 2.4.1. There are no problems with these figures and the time series is comparable. Pre-1960 employment figures for Control Boards are not available. These figures are discussed in Part III Section 3.4.

2.5 Statutory Bodies

Employment by Statutory Bodies is given in table 2.5.1. There are no problems with the figures and it is time series comparable. Employment levels before 1974 are not available. This data is discussed further in Part III, Section 3.4.

2.6 The "Homeland" Governments

Data on homeland Government employment was collected with two objectives. As with both Central Authorities and Provincial Authorities employment an attempt has been made to divide homeland Government employment along functional lines. This is discussed in subsection 2.6.1. Secondly, comparable time series data for homeland government employment was established and is presented in subsection 2.6.2.

TABLE 2-4-1: Control Boards : Employment,[1] Salaries and Wages, 1960-1981

YEAR	EMPLOYMENT WHITES	BLACKS	TOTAL	B/W	AVERAGE SALARIES (R1 000) WHITES	BLACKS
1960	1 206	425	1 631	0,35	2,10	0,32
1961	1 165	589	1 754	0,51	2,06	0,24
1962	1 207	445	1 652	0,37	2,14	0,41
1963	1 245	537	1 782	0,43	2,29	0,37
1964	1 256	474	1 730	0,38	2,43	0,46
1965	1 292	541	1 833	0,42	2,52	0,46
1966	1 356	659	2 015	0,49	2,60	0,46
1967	1 338	548	1 886	0,41	3,17	0,54
1968	1 561	541	2 102	0,35	3,04	0,53
1969	1 573	579	2 152	0,37	3,32	0,54
1970	1 574	522	2 096	0,33	3,79	0,67
1971	1 584	656	2 240	0,41	4,36	0,63
1972	1 650	577	2 227	0,35	4,45	0,76
1973	1 608	596	2 204	0,37	5,19	0,89
1974	1 615	682	2 297	0,42	6,04	1,07
1975	1 600	739	2 339	0,46	6,58	1,22
1976	1 599	850	2 449	0,53	7,28	1,25
1977	1 617	741	2 358	0,46	7,73	1,62
1978	1 836	912	2 748	0,50	8,68	1,88
1979	1 838	1 026	2 864	0,56	9,60	1,88
1980	1 913	906	2 819	0,47	12,58	2,28
1981	1 909	813	2 722	0,43	15,18	2,98

SOURCE: 1960-1964 R S A Department of Statistics, Statistical Year Book 1970 p H-59; Pretoria: Government Printer
1965-1975 R S A Department of Statistics, Statistical Year Book 1976 p 716, " " "
1976-1979 R S A Department of Statistics, South African Statistics 1980 pp 7-17 " " "

Note: 1) Does not include members of Boards.

TABLE 2-5-1: Statutory Bodies[1] : Employment, Salaries and Wages, 1974 - 1981

Year[2]	EMPLOYMENT[2] White	Black	Total	AVERAGE SALARIES (R1 000) White	Black	B/W
1974	10 942	9 051	19 993	5,36	0,64	0,83
1975	11 313	10 036	21 349	6,30	0,72	0,89
1976	12 187	10 482	22 669	6,76	0,97	0,86
1977	12 464	10 948	23 412	7,46	1,14	0,88
1978	12 618	11 043	23 661	7,90	1,26	0,88
1979	12 685	11 094	23 779	8,91	1,41	0,87
1980	13 172	12 444	25 616	10 72	1,68	0,94
1981	13 373	12 470	25 843	12,50	1,99	0,93

SOURCE: R S A, Dept of Statistics, Statistical News Releases 1974 & 1975: (20/6/76) Pretoria
1976: (20/6/77) Pretoria
1977: (26/6/78) Pretoria

1979: R S A Department of Statistics South African Statistics 1980 p 7.21

1980: R S A Department of Statistics South African Statistics 1982 p 7.21

Notes: (1) Covers bodies such as the Hotel Board, C.S.I.R., regional Performing Arts Councils, State Library, etc. Public corporations and bodies which are integral parts of Government departments or Provincial Administration are not included.
(2) Figure for 1974 is for December. 1975-1981 Average for all four quarters.

2.6.1 Functional division of employment by the Homeland governments

As with the Central Authorities homeland governments have tended to centralise such responsibilities as Justice, Agriculture and Forestry. However, unlike the Central Authorities the function of economic development is undertaken by the various homeland development corporations and the South African Bantu Trust. While the homeland governments are not the sole government agency operating in the homelands they are certainly the largest. In 1976 homeland government expenditure totalled over 55% of all State expenditure in the homelands (see table 2.6.1).

The most important areas over which the homeland governments have centralized control are:

Education
Agriculture and Forestry
Roads and Works
General Administration
Health

Determining a functional division of homeland government employment proved difficult as available data on homeland government employment is very limited. Neither adequate time series data prior to 1972, nor a breakdown of staff over the five

TABLE 2-6-1: The Relative Contribution to Expenditure by Various Government Institutions in the Homelands (1960 - 1976)[1]

Institution/Year	1960	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
Department of Bantu Administration and Development	22,3	21,6	19,7	17,5	20,5	21,0	10,2	16,7	18,1	17,7	17,9	6,7	6,1	4,0	3,8	2,6	2,6
Department of Bantu Education	48,0	48,4	41,2	35,1	30,7	24,5	16,9	18,6	20,1	18,4	10,1	6,1	5,7	2,5	2,4	1,9	1,7
Department of Health	-	-	-	-	-	-	-	-	-	-	-	15,1	14,2	15,5	12,1	10,5	8,3
S A Bantu Trust	28,0	27,8	36,2	44,7	43,7	49,3	53,3	42,5	37,2	38,0	40,7	29,0	30,0	17,4	12,9	15,9	15,1
Homeland Governments	1,5	1,8	1,5	2,3	4,7	4,23	18,2	19,5	21,7	20,7	23,3	36,5	36,8	52,3	58,9	53,5	55,6
Corporation for Economic Development	0,2	0,4	1,4	0,4	0,4	1,0	1,4	2,5	0,8	2,2	3,9	3,3	3,5	5,0	5,8	8,4	9,8
Xhosa Development Corporation	-	-	-	-	-	-	-	0,2	2,1	3,0	4,1	3,3	3,7	3,0	3,8	6,9	6,4
Bantu Mining Corporation	-	-	-	-	-	-	-	-	-	-	-	-	-	0,3	0,3	0,3	0,5

SOURCE: Calculated from Table B.14.2 in Bembo : Economic Development of the Homelands, Johannesburg: Perskor, 1976 p 182

Note: (1) These are the only years for which data is available with this degree of disaggregation.

areas of government is available. However data is available for the separate authorised establishment of each Homeland government. While a compilation of the data would be largely irrelevant due to the very small numbers involved, the largest homeland government employer, the Transkei, has been studied for an idea of the proportions of staff in the various areas of control and the change in these proportions over time. The authorised establishment for the Transkei government is given in Table 2.6.2.

2.6.2 Homeland Government Employment

Comparable time series data for homeland government employment for 1973 to 1981 is given in table 2.6.3. Data for other years is unavailable.

Some additional data is available which is of interest. table 2.6.4 shows employment of the Ciskei, Kwazulu, Boputhatswana and the Transkei divided into Officials, Teachers and Labourers for 1970 to 1973. Table 2.6.5 gives the same data as table 2.6.4 for the Transkei only, but for the years 1971 to 1977. Data for other years is not available. The variations in the totals for tables 2.6.3, 2.6.4 and 2.6.5 are noted. These are thought to result from enumeration and definitional problems.[7]

TABLE 2-6-2: Authorised Esablishment of the Transkeian Central Authorities by department, 1966 - 1981 (2)

DEPARTMENTS	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977 (2)	1980	1981	% o Tote In 198
Chief Minister and Finance	N/A	160	171	162	178	141	131	141	161	163	195	196	323	328	1,1
Justice, Police and Prisons	465	466	441	445	455	497	510	701	706	757	910	1 895	3 121	1 139	3,8
Education	5 083	5 283	6 270	6 774	7 077	7 460	7 840	8 237	8 628	9 077	10 141	12 873	16 259	15 591	52,5
Interior and Social Services	51	57	65	60	68	69	71	73	76	89	97	1 105	750	783	2,6
Agriculture and Forestry	1 250	1 441	1 492	1 544	1 638	1 703	1 819	1 902	1 923	2 064	2 101	2 397	2 452	2 984	10,1
Roads and Works	582	700	771	1 081	1 053	1 054	1 066	1 084	1 092	1 119	1 395	1 433	1 412	1 490	5,0
Health	-	-	-	-	-	-	-	(1)	(1)	(1)	1 738	1 988	9 277	6 066	20,4
Foreign Affairs	-	-	-	-	-	-	-	-	-	-	-	-	71	73	0,2
Commerce and Tourism	-	-	-	-	-	-	-	-	-	-	-	-	42	100	0,3
Post Office	-	-	-	-	-	-	-	-	-	-	-	-	850	939	3,2
Transport	-	-	-	-	-	-	-	-	-	-	-	-	195	194	0,7
Total	6 439	8 107	9 210	10 066	10 489	10 924	11 437	12 138	12 586	13 269	16 577	20 892	34 752	29 687	-

SOURCE: Transkeian Government, Estimates of the Expenditure to be defrayed from the Revenue to be collected for the year..... for the relevant year, Umtata.

NOTES: (1) The Department of Health was started in 1973 but no authorised establishment figures are available until 1976
(2) Data for 1978 - 1979 is not available

TABLE 2-6-3 Homeland Government Employment 1973 - 1981

		1973 No.	% of total	1974 No.	% of total	1975 No.	% of total	1976 No.	% of total	1977 No.	% of total	1978 No.	% of total	1979 No.	% of total	1980 No.	% of total	1981 No.	% of total	Compound Growth 1973-1981
Transkei	: Total	31224	32,9	37568	31,1	41166	30,9	45848	32,5	58820	36,8	61300	35,8	65712	38,2	66990	35,0	68300	33,7	9,1
	Black	30864		37200		40800		45500		58500		61000		65432		66700		68000		
	White	360		368		366		348		320		300		280		290		300		
Bophutatswana :																				
	Total	12636	13,3	12875	10,7	15946	12,0	17743	12,6	18839	11,8	19500	11,4	22872	13,3	28950	15,1	30730	15,1	10,4
	Black	12291		12502		15555		17351		18389		19000		22375		28500		30300		
	White	345		373		391		392		450		500		497		450		430		
Venda	: Total	3095	3,3	6427	5,4	6395	4,8	7258	5,1	8391	5,3	8495	5,0	8484	4,9	8867	4,6	9196	4,5	12,9
	Black	2985		6307		6259		7122		8250		8350		8319		8650		9000		
	White	110		120		126		136		141		145		165		217		196		
Ciskei	: Total	8540	9,0	11858	9,8	12462	9,4	12884	9,1	13158	8,2	13982	8,2	12297	7,0	13430	7,0	14627	7,2	6,2
	Black	8247		11577		12191		12618		12891		13722		12043		13180		14381		
	White	293		281		271		266		267		260		254		250		246		
KwaZulu	: Total	18911	19,8	21847	18,1	27222	20,5	25805	18,3	24973	15,6	28858	16,9	29235	17,0	36809	19,3	38583	19,0	8,2
	Black	18500		21382		26758		25326		24474		28348		28722		36226		37930		
	White	411		465		464		483		499		510		513		583		653		
Qwaqwa	: Total	573	0,6	1046	0,9	1331	1,0	1325	0,9	1845	1,2	2834	1,7	3746	2,2	3613	1,9	3517	1,8	22,3
	Black	559		989		1289		1281		1796		2812		3686		3537		3440		
	White	14		37		42		44		49		52		60		76		77		
Lebowa	: Total	11632	12,2	20083	16,6	18331	13,8	19425	13,8	21188	13,3	20712	12,1	18049	10,5	20242	10,6	21959	10,8	7,3
	Black	11320		19779		18029		19062		20782		20297		17668		19849		21651		
	White	312		304		302		363		406		415		381		393		308		
Gazenkulu	: Total	5985	6,3	6312	5,2	7311	5,5	7897	5,6	9523	6,0	12452	7,3	8571	5,0	8008	4,2	10422	5,1	6,4
	Black	5853		6173		7171		7754		9389		12215		8447		7880		10292		
	White	132		139		140		143		134		137		124		128		130		
KaNgwane	: Total	2431	2,6	2683	2,2	2772	2,1	2860	2,0	2961	1,9	3115	1,8	3192	1,9	4400	2,3	5617	2,8	9,8
	Black	2399		2649		2735		2823		2914		3008		3100		4306		5512		
	White	32		34		37		37		47		107		92		94		105		
Total	: Total	95027		120679		132926		141074		159698		171118		172158		191309		202951	-	8,8
	Black	93018		118558		130787		138857		157385		168752		169792		188828		200506		
	White	2009		2121		2139		2217		2313		2366		2366		2481		2445		

Source : 1973-1979: R.S.A., South Africa 1982, Pretoria : Government Printer 1982
1980-1981: Benso, Statistical Survey of Black Development, Pretoria : Benso 1982 Table 100.

TABLE 2-6-4 Employment of Blacks by the Homeland Central Authorities, 1970 - 1973

	1970				1971				1972				1973			
Homeland	Officials	Teachers	Labourers	Total	Off.	Teach	Labour	Total	Off.	Teach	Labour	Total	Off.	Teach	Labour	Total
Ciskei	563	2375	3372	6310	615	2758	3890	7263	654	3021	1588	5263	772	3483	2617	6872
% of total	9,0	37,6	53,4		8,5	38,0	53,5		12,4	57,4	30,2		11,2	50,7	38,1	
KwaZulu	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1741	7725	12328	21794	2185	8247	14359	24791
% of total	-	-	-	-	-	-	-	-	8,0	35,4	56,6	-	8,8	33,3	57,9	-
Bophuthutswana	399	3794	2035	6228	452	4194	2201	6847	629	4594	2261	7484	1074	5094	2956	9124
% of total	6,4	60,9	32,7	-	6,6	61,3	32,1	-	8,4	61,4	30,2	-	11,8	55,8	32,4	-
Transkei	2651	7089	15000	24740	3003	7444	15000	25447	3493	7815	15000	26308	5554	8132	18063	31749
% of total	10,7	28,7	60,6	-	11,8	29,2	59,0	-	13,3	29,7	57,0	-	17,4	25,6	57,0	-
TOTAL	3613	13258	20407	37278	4070	14396	21091	39557	6517	23155	31177	60849	9585	24956	37995	72536
% of total	9,7	35,6	54,7	-	10,3	36,4	53,3	-	10,7	38,1	51,2	-	13,2	34,4	52,4	-

Sources: Transkeian Government, Department of the Interior, Transkei Statistical Labour Report 1970, 1971, 1972, 1973. Unnumbered, Mimeograph.

TABLE 2-6-5 Transkeian Central Authorities Employment 1971 - 1977

Year	Public Service Personnel	Teachers	Labourers	Police, Prisons & Defence	Total
1971	4044	7871	14420	N/A	26335
% of total	15,4	29,9	54,7	-	-
1973	5656	8585	15743	N/A	29984
% of total	18,9	28,6	52,5	-	-
1974	6110	8678	18148	N/A	32936
% of total	18,6	26,3	55,1	-	-
1975	8585	10348	16786	N/A	35719
% of total	24,0	29,0	47,0	-	-
1976	11615	12100	16050	1975	41740
% of total	27,8	29,0	38,5	4,7	-
1977	15791	13124	23491	2216	54622
% of total	28,9	24,0	43,0	4,1	-

Source: Transkeian Government, Dept. of Interior, Transkei Statistical Labour Report, for the various years, Mimeograph, unnumbered.

2.7 The South African Transport Services

Of the South African Transport Services' many activities it is the railways which is of overwhelming importance in employment. Of the total SATS employment of 266 000 in 1980 the railroad accounted for over 244 000 (91%), a proportion which has varied little since 1950 (see table 2.7.1 and figure 2.4).

All the data presented in this section includes personnel used in the SATS operations in South West Africa. As the number of personnel totalled only 6 000 in 1975, and changes in South West African employment do not significantly effect changes in total SATS employment no attempt was made to exclude South West African figures from the data (see table 2.7.2).[8]

2.7.1 SATS Employment

No problems were encountered in establishing comparable time series data for SATS employment. The results are shown in table 2.7.3.

The occasional differences which occur between the data presented in tables 2.7.1, 2.7.2 and 2.7.3 are thought to be marginal enumeration problems. The sources could offer no explanation for the differences.

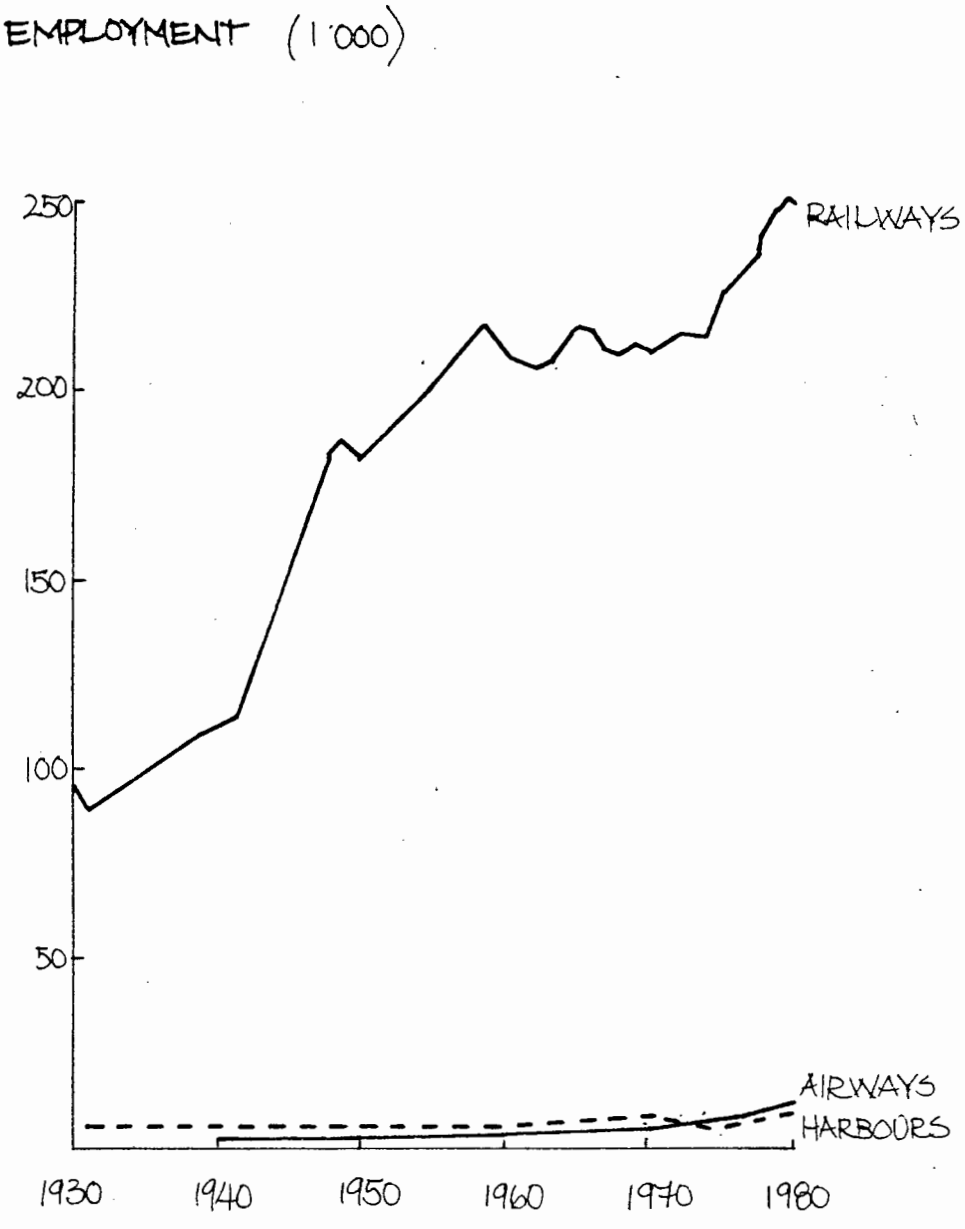


FIGURE 2-4 : EMPLOYMENT BY THE RAILWAYS, HARBOURS AND AIRWAYS, SELECTED YEARS, 1930 — 1980.

TABLE 2-7-1 S.A.T.S. : Employment by Railways, Harbours, Airways and Pipelines, Selected Years, 1929 - 1980

Year	Railways	Harbours	Airways	Construction & Pipelines	Total
1929	91866	4733	-	2419	99018
1930	93212	4868	-	1860	99940
1931	88072	4449	-	2160	94681
1939	109315	3531	414	10138	123398
1940	111044	3577	423	8122	123166
1941	113597	4160	373	6192	124322
1948	180880	4991	1834	-	187705
1949	186098	4890	2031	-	193019
1950	180403	5409	2169	-	187981
1955	202821	5443	2029	-	210293
1959	217006	5841	2706	-	225553
1960	210280	4962	2750	-	217992
1961	208273	4803	2998	-	216074
1962	206766	4809	3382	-	214957
1963	211011	4619	3549	-	219169
1964	214537	6083	3580	-	224200
1965	215772	6393	3568	-	225733
1966	217415	6103	4050	-	227568
1967	210776	5937	4326	174	221213
1968	209798	7833	4501	208	222340
1969	213651	5924	4827	204	224606
1970	210995	6164	5256	292	222707
1971	213437	6225	6242	339	226243
1972	215372	6619	7325	372	229688
1973	214376	6577	7551	415	228919
1974	216483	6929	7704	451	231567
1975	229418	8349	8691	434	244892
1976	236237	8093	9922	483	254735
1977	240042	8192	10495	477	259206
1978	248673	8388	10550	513	268121
1979	243581	9944	10938	510	264973
1980	244658	10000	10741	609	266008

Source : R.S.A., Controller & Auditor General, Report on the accounts of the S.A.T.S., for the relevant years, Pretoria : Government Printer.

TABLE 2.7.3 SATS Employment, Selected Years, 1920 - 1981

	WHITES		BLACKS		TOTAL		
Year	No.	% growth p.a.	No.	% growth p.a.	No.	% growth p.a.	W : B
1920	40669	-	42669	-	83338	-	1 : 1,05
1922	37444	-3,96	34774	-9,25	72218	-6,67	1 : 0,92
1925	47224	8,71	45148	9,94	92372	9,30	1 : 0,96
1930	58306	4,69	42245	-1,29	100551	1,77	1 : 0,72
1935	54351	-1,36	36210	-2,86	90561	-1,99	1 : 0,67
1938	66088	7,20	54879	17,19	120967	11,19	1 : 0,83
1940	69567	2,63	53599	-1,17	123166	0,91	1 : 0,77
1945	85726	4,65	64154	3,94	149880	4,34	1 : 0,75
1950	103372	4,12	84578	6,37	187950	5,08	1 : 0,82
1952	102290	-0,53	91815	4,28	194105	1,64	1 : 0,90
1954	104755	1,20	98055	3,40	202810	2,24	1 : 0,94
1956	107341	1,20	114434	8,35	221775	4,68	1 : 1,07
1958	110549	1,50	122240	3,41	232789	2,48	1 : 1,11
1960	109268	-0,58	107961	-5,84	217229	-3,34	1 : 1,00
1961	110859	1,46	104010	-3,66	214869	-1,09	1 : 0,94
1962	111011	0,14	104360	0,34	215371	0,23	1 : 0,94
1963	113459	2,21	107728	3,23	220187	2,24	1 : 0,95
1964	113911	0,40	109760	1,89	223671	1,58	1 : 0,96
1965	115040	0,99	111892	1,94	226932	1,46	1 : 0,97
1966	116383	1,17	109265	-2,35	225648	-0,57	1 : 0,94
1967	114822	-1,34	106288	-2,72	221110	-2,01	1 : 0,93
1968	115128	0,27	108510	2,09	223638	1,14	1 : 0,94
1969	114309	-0,72	110203	1,56	204592	0,43	1 : 0,96
1970	109099	-4,56	112631	2,20	221730	-1,27	1 : 1,03
1971	112652	7,19	114975	2,08	227627	2,66	1 : 1,02
1972	110972	-1,49	117439	2,14	228411	0,34	1 : 1,06
1973	110218	-0,68	119683	1,87	229901	0,65	1 : 1,09
1974	107803	-2,19	124099	3,69	231902	0,87	1 : 1,15
1975	111844	3,75	138365	11,50	250209	7,89	1 : 1,24
1976	113046	1,07	142892	3,27	255938	2,29	1 : 1,26
1977	114399	1,97	147666	3,34	262065	2,39	1 : 1,29
1978	116469	1,81	152786	3,47	269255	2,74	1 : 1,31
1979	113441	-2,60	152095	-0,45	265536	-1,38	1 : 1,34
1980	113959	0,46	152444	0,23	266403	0,33	1 : 1,34
1981	115852	1,66	155636	2,09	271488	1,91	1 : 1,34

Source : 1920 - 1975 R.S.A. Department of Statistics, Statistical Year Book 1975, p. 7.4. Pretoria : Government Printer.

1976 - 1981 R.S.A. Department of Statistics, South African Statistics 1982, p.7.18. Pretoria : Government Printer.

TABLE 2.7.3 SATS Employment, Selected Years, 1920 - 1981

	WHITES		BLACKS		TOTAL		
Year	No.	% growth p.a.	No.	% growth p.a.	No.	% growth p.a.	W : B
1920	40669	-	42669	-	83338	-	1 : 1,05
1922	37444	-3,96	34774	-9,25	72218	-6,67	1 : 0,92
1925	47224	8,71	45148	9,94	92372	9,30	1 : 0,96
1930	58306	4,69	42245	-1,29	100551	1,77	1 : 0,72
1935	54351	-1,36	36210	-2,86	90561	-1,99	1 : 0,67
1938	66088	7,20	54879	17,19	120967	11,19	1 : 0,83
1940	69567	2,63	53599	-1,17	123166	0,91	1 : 0,77
1945	85726	4,65	64154	3,94	149880	4,34	1 : 0,75
1950	103372	4,12	84578	6,37	187950	5,08	1 : 0,82
1952	102290	-0,53	91815	4,28	194105	1,64	1 : 0,90
1954	104755	1,20	98055	3,40	202810	2,24	1 : 0,94
1956	107341	1,20	114434	8,35	221775	4,68	1 : 1,07
1958	110549	1,50	122240	3,41	232789	2,48	1 : 1,11
1960	109268	-0,58	107961	-5,84	217229	-3,34	1 : 1,00
1961	110859	1,46	104010	-3,66	214869	-1,09	1 : 0,94
1962	111011	0,14	104360	0,34	215371	0,23	1 : 0,94
1963	113459	2,21	107728	3,23	220187	2,24	1 : 0,95
1964	113911	0,40	109760	1,89	223671	1,58	1 : 0,96
1965	115040	0,99	111892	1,94	226932	1,46	1 : 0,97
1966	116383	1,17	109265	-2,35	225648	-0,57	1 : 0,94
1967	114822	-1,34	106288	-2,72	221110	-2,01	1 : 0,93
1968	115128	0,27	108510	2,09	223638	1,14	1 : 0,94
1969	114309	-o,72	110203	1,56	204592	0,43	1 : 0,96
1970	105099	-4,56	112631	2,20	221730	-1,27	1 : 1,03
1971	112652	7,19	114975	2,08	227627	2,66	1 : 1,02
1972	110972	-1,49	117439	2,14	228411	0,34	1 : 1,06
1973	110218	-0,68	119683	1,87	229901	0,65	1 : 1,09
1974	107803	-2,19	124099	3,69	231902	0,87	1 : 1,15
1975	111844	3,75	138365	11,50	250209	7,89	1 : 1,24
1976	113046	1,07	142892	3,27	255938	2,29	1 : 1,26
1977	114399	1,97	147666	3,34	262065	2,39	1 : 1,29
1978	116469	1,81	152786	3,47	269255	2,74	1 : 1,31
1979	113441	-2,60	152095	-0,45	265536	-1,38	1 : 1,34
1980	113959	0,46	152444	0,23	266403	0,33	1 : 1,34
1981	115852	1,66	155636	2,09	271488	1,91	1 : 1,34

Source : 1920 - 1975 R.S.A. Department of Statistics, Statistical Year Book 1975, p. 7.4. Pretoria : Government Printer.

1976 - 1981 R.S.A. Department of Statistics, South African Statistics 1982, p.7.18. Pretoria : Government Printer.

TABLE 2.8.1 Post Office Employment, Selected Years, 1928 - 1980

Year	White	Black	Total	B/W
1928	N/A	N/A	12805	-
1929	N/A	N/A	13182	-
1930	N/A	N/A	13472	-
1951	N/A	N/A	32304	-
1952	N/A	N/A	34330	-
1953	N/A	N/A	35672	-
1954	N/A	N/A	37276	-
1958	N/A	N/A	45603	-
1959	N/A	N/A	45291	-
1960	N/A	N/A	44327	-
1962	N/A	N/A	46520	-
1963	N/A	N/A	46707	-
1964	N/A	N/A	46680	-
1965	N/A	N/A	47447	-
1966	N/A	N/A	48690	-
1967	N/A	N/A	49812	-
1968	34811	13314	51140	0,38
1969	35433	14790	52773	0,42
1970	38202	16805	55007	0,44
1971	40325	18037	58362	0,45
1972	40433	19157	59590	0,47
1973	40854	20390	61244	0,50
1974	40975	22347	63322	0,55
1975	43524	24057	67581	0,55
1976	43649	24057	67706	0,55
1977	43914	26301	70215	0,60
1978	44905	28047	72952	0,62
1979	45576	29368	74944	0,64
1980	44988	30502	75490	0,68

Source : R.S.A., Post Office, Annual Reports of the G.P.O., for the relevant years. Pretoria : Government Printer.

2.9.1.1 Product corporations

These are corporations which produce marketable goods. They are few in number but the most important group as regards employment and capital investment. This catagory includes such giants as Iscor, Escom, Sasol and Foscor.

2.9.1.2 Service Corporations

These corporations are not particularly numerous and employment by them is insignificant compared to that of the other two types. Some of the more important service corporations are the South African Broadcasting Corporation, South African Tourist Corporation (Satour) and the Uranium Enrichment Corporation of South Africa.

2.9.1.3 Finance Corporations

These cover both the pure finance corporations such as the Land and Agricultural Bank of South Africa and the South African Reserve Bank, and the many numerous development corporations like the Industrial Development Corporation, the Fisheries Development Corporation, the Corporation for Economic Development (formerly the Bantu Investment Corporation) and the South African Inventions Development Corporation.

The number of pure finance corporations is minimal and their employment is insignificant. However it is with the development corporations that a definitional difficulty arises in relation both to State involvement in the economy and total employment. In South Africa there exist hundreds, perhaps thousands, of corporations under the apparent control of the private sector which would simply not exist were it not for State finance channelled through the development corporations. Furthermore other corporations exist which were launched with private capital but have at one time or another benefited from State financial aid. With this type of corporation it is impossible to decide whether it would still exist had it not benefited from State aid and whether its employment is State employment or private sector employment. There is a third type of corporation which, while financially sound, has received State aid for specific investment projects. While without this State aid the resultant employment from these investment projects would not have occurred, it is unclear whether this employment is 'State' employment.

Data is available for the numbers employed within some of the development corporations. Little data is however available on the number of 'private' corporations wholly owned by the development corporations, partially owned or funded by the development corporations, or those recipient of the investment funds of the development corporations. Data on employment by these corporations is even more elusive. Data is available on the number

of employment opportunities created by homeland development corporations although considerable doubt exists as to the accuracy of these figures.

2.9.2 Employment by Public Corporations

Finding data on individual public corporation employment proved to be very difficult in some cases. The sources used for determining the levels of public corporation employment were primarily the annual reports of the relevant companies. When these were non-existent or did not contain employment figures the company was contacted directly. Within this latter group only a moderate number of companies made their data available while the rest replied that the figures were 'secret' or 'classified'.

A second difficulty occurred with the definitional problem in that grey area of what actually comprises State employment discussed in 2.9.1. It is almost impossible to estimate the total employment of all companies owned or assisted by the development corporations with any degree of accuracy. Some estimates have been made but these are obviously subject to a wide degree of error.

2.9.2.1 Product corporations

Escom: Employment by Escom is given in table 2.9.1. The data is comparable over time.

Iscor: Those years where data is available for Iscor are given in table 2.9.2. The data is comparable over time.

Sasol: The very limited data available on Sasol is given in table 2.9.3. Personal communication with Sasol proved unhelpful.

2.9.2.2 Service Corporations

Employment data on service corporations is very limited. Available data is confined to the SABC (table 2.9.4), Soekor (table 2.9.5) and Satour (table 2.9.6).

2.9.2.3 Finance Corporations

Employment by the various State finance houses is regarded as 'confidential' in South Africa. Data on employment by the various development corporations was almost as difficult to obtain and only four corporations eventually made their figures available:

TABLE 2-9-1: ESCOM - Employment and Wages, Selected Years 1929 - 1980 (1)

	ESCOM - EMPLOYMENT				TOTAL RSA ELECTRICITY GENERATION EMPLOYMENT		AVERAGE WAGES IN RSA ELECTRICITY (R1 000)	
Year	White(1)	Black(2)	Total(3)	$\frac{B}{W}$	Total(4)	$\frac{B}{W}$(5)	White(6)	Black(6)
1929	N/A	N/A	633	N/A	3 573	2,13	N/A	N/A
1930	"	"	688	"	4 648	1,92	"	"
1935	"	"	778	"	6 100	1,70	"	"
1940	"	"	1 189	"	8 980	1,78	"	"
1944	"	"	1 328	"	10 564	2,37	"	"
1948	"	"	2 692	"	N/A	-	"	"
1949	"	"	8 764	"	"	-	"	"
1950	"	"	9 352	"	14 356	2,41	"	"
1952	"	"	10 889	"	N/A	-	"	"
1954	"	"	12 317	"	"	-	"	"
1956	4 707	8 270	12 977	1,76	18 281	2,97	"	"
1958	N/A	N/A	14 312	-	N/A	-	"	"
1960	"	"	14 654	-	14 300	1,86	"	"
1961	"	"	15 441	-	14 900	1,87	"	"
1962	"	"	16 467	-	15 800	1,93	"	"
1963	5 896	10 908	16 804	1,85	16 734	2,00	"	"
1964	6 032	11 140	17 172	1,85	17 142	2,07	"	"
1965	6 254	11 597	17 851	1,85	17 300	2,04	"	"
1966	6 455	12 124	18 579	1,89	18 307	2,10	"	"
1967	6 946	12 871	19 817	1,85	19 500	1,95	"	"
1968	7 322	13 571	20 893	1,85	21 266	1 93	"	"
1969	7 684	13 960	21 644	1,82	21 800	1,91	"	"
1970	8 014	14 686	22 700	1,86	22 481	1,82	"	"
1971	9 080	15 970	25 050	1,76	24 200	1,85	"	"
1972	9 566	17 371	26 937	1,82	26 157	1,80	"	"
1973	10 207	17 761	27 968	1,74	28 200	1,82	5,12	0,97
1974	10 917	18 874	29 891	1,73	29 900	1,77	8,08	1,21
1975	12 394	21 605	33 999	1 74	32 200	1,82	6,80	1,48
1976	13 503	23 412	36 915	1,73	37 300	1,87	7,11	1,61
1977	14 356	24 756	39 112	1,72	38 700	1,76	7,81	1,91
1978	15 380	25 660	41 040	1,87	40 800	1,72	8,32	2,08
1979	16 730	26 960	43 690	1,61	42 600	1,77	9,60	2,31
1980	18 301	29 189	47 490	1,59	48 900	N/A	N/A	N/A

SOURCES: Columns (1), (2), (3) : Escom Escom Annual Reports, for the relevant years

(4),(5),(6): Calculated from 1973-1976: Department of Statistics Quarterly Bulletin - December 1977 p 2.13 p 213

1977-1980: Department of Statistics South African Statistics 1982

NOTE : (1) Enumeration problems exist between the totals of columns (3) and (4)

TABLE 2-9-3 Employment by SASOL for 1956, 1961 and 1975

YEAR	WHITE	BLACK	TOTAL	$\frac{B}{W}$
1956	2360	2150	4510	0,91
1961	$\pm$ 2600	$\pm$ 2400	$\pm$ 5000	0,92
1975	$\pm$ 4000	$\pm$ 4000	$\pm$ 8000	1,00

Sources: 1956 : Richards, C.S., op.cit.

1961 : Sasol, Men, Machines, Imagination, Sasolburg: Hartley and Le Roux, 1962

1975: Meintjies, J.P. Sasol 1950 - 1975, Cape Town: Tafelberg, 1975

TABLE 2.9.4 S.A.B.C. Employment Selected Years 1950 - 1980

YEAR	WHITE	BLACK	TOTAL	$\frac{B}{W}$
1950	754	154	908	0,20
1951	809	196	1005	0,24
1952	883	227	1110	0,26
1954	940	275	1215	0,29
1955	967	319	1286	0,33
1956	1001	325	1326	0,32
1957	993	315	1308	0,32
1958	1066	343	1409	0,32
1959	1126	329	1455	0,29
1960	1188	347	1535	0,29
1961	1187	480	1667	0,40
1962	1212	585	1797	0,48
1963	1310	628	1938	0,48
1964	1350	626	1976	0,46
1965	1489	655	2144	0,44
1966	1583	677	2260	0,43
1967	1683	648	2331	0,39
1968	1692	661	2353	0,39
1969	1628	714	2342	0,44
1970	1683	736	2419	0,44
1971	1728	723	2451	0,42
1972	1819	700	2579	0,38
1973	1946	716	2662	0,37
1974	2230	740	2970	0,33
1975	2764	802	3566	0,29
1976	3080	931	4011	0,30
1977	3144	920	4064	0,29
1978	3166	934	4100	0,30
1979	3030	857	3887	0,29
1980	3226	1012	4238	0,31

Source: S.A.B.C., Annual Reports, for the various years.

TABLE 2.9.5 SOEKOR : Employment & Salaries, Selected Years, 1974 - 1981 (1)

YEAR	EMPLOYMENT		AVERAGE SALARIES (R1000 pa)	
	WHITE	BLACK	WHITE	BLACK
1974	102	22	N/A	N/A
1975	104	37	N/A	N/A
1978	113	36	N/A	2,09
1979	102	41	N/A	2,56
1980	155	95	11,31	2,98
1981	180	91	13,17	3,20

Source: Personal Communication with Soekor.

Notes: (1) Although Soekor was formed in 1965 no data is available until 1974.

(2) No data is available for 1976 - 1977.

TABLE 2.9.6 SATOUR : Employment & Salaries, Selected Years, 1965 - 1981

YEAR	EMPLOYMENT		AVERAGE SALARIES (R1000 p.a.)	
	WHITE	BLACK	WHITE	BLACK
1965	76	2	N/A	N/A
1970	85	3	N/A	N/A
1975	89	4	N/A	N/A
1978	92	4	7,28	1,63
1979	96	4	7,65	1,86
1980	89	4	8,98	2,21
1981	93	4	9,89	2,06

Source : Personal Communication with Satour.

The Industrial Development Corporation has employed approximately 310 persons for the past ten years (table 2.9.7)

The Fisheries Development Corporation employed 112 persons in 1977 (table 2.9.8)

The Coloured Development Corporation employed some 100 persons in 1977.[9]

The Inventions Development Corporation employed 12 whites and no blacks in 1977 (table 2.9.9).

2.9.3 Total (Estimated) Employment by Public Corporations

As pointed out above an estimate of employment by all public corporations is unlikely to be completely accurate. This is due to a lack of data on employment by many public corporations and the lack of data on the total number of 'private' companies under the control of State development corporations.

The problem of data shortage has been tackled by calculated guesswork which introduces the possibility of large errors. The problem of deciding what degree of State financial control over a private company will make the company a public corporation has been side-stepped by using three separate estimates:

TABLE 2.9.9 SOUTH AFRICAN INVENTIONS DEVELOPMENT CORPORATION, EMPLOYMENT AND WAGES, SELECTED YEARS, 1965-1977.[1]

YEAR	WHITES	AVERAGE WAGE (R1 000 p.a.)
1965	3	4,92
1970	5	7,14
1975	10	10,91
1977	12	11,16
1978	11	N/A
1981[2]	14	N/A

Source: Personal Communication with S.A.I.D.C.

Notes: (1) All employees are White.
(2) No data available for 1979 - 1980.

Estimate I (table 2.9.10) is the total of employment by all public corporations created through Acts of Parliament. All companies created through the development corporations and subsidiary companies of Iscor are excluded. This is the most conservative estimate and is not really an accurate reflection of employment as it excludes companies like Sasol and Foscor which were funded through the IDC.

Estimate II (table 2.9.11) includes both employment in Estimate I and employment in wholly owned subsidiaries of public corporations. This is a reasonably realistic but still conservative estimate.

Estimate III (table 2.9.12) Includes both employment in Estimate II and employment in partially owned subsidiaries of public corporations. State employment in these partially owned companies has been set at a roughly estimated nevertheless arbitrary level of 25% of the subsidiaries' total employment.

Calculations of the Estimates:

Discussed below are the methods by which the estimates were calculated:

TABLE 2-9-10: Estimated Public Corporation Employment, Selected Years, 1956 - 1980

	1956			1965			1970			1975			1977			1980		
	Whites	Blacks	Total	Whites	Blacks	Total	Whites	Blacks	Total	Whites	Blacks	Total	Whites	Blacks	Total	Whites	Blacks	Total
ESTIMATE 1																		
ESCOM	4 707	8 270	12 977	6 254	11 597	17 172	8 014	14 686	22 700	12 394	21 605	33 999	14 356	24 756	39 112	18 301	29 189	47 490
ISCOR	9 400	11 800	21 200	14 544	13 707	28 251	17 440	15 527	32 697	23 508	23 650	47 158	26 950	28 536	55 486	30 320	31 050	61 370
S A Reserve Bank[1]	505	73	578	-	-	700	-	-	800	-	-	900	-	-	1 000	-	-	1 200
Land & Agricultural Bank[2]	-	-	150	-	-	180	-	-	200	-	-	225	-	-	250	-	-	275
National Finance Corp[3]	-	-	150	-	-	180	-	-	200	-	-	225	-	-	250	-	-	275
S A B S	1 001	325	1 326	1 489	655	2 144	1 683	736	2 419	2 764	802	3 566	3 144	920	4 064	3 226	1 012	4 238
SATOUR[4]	0	0	0	76	2	78	85	3	88	89	4	93	91	4	95	93	4	97
X D C[5]	-	-	-	-	-	-	-	-	100	-	-	120	-	-	140	-	-	160
C E D[6]	-	-	-	-	-	-	-	-	100	-	-	120	-	-	140	-	-	160
Venda D C[6]	-	-	-	-	-	-	-	-	50	-	-	80	-	-	100	-	-	120
Ciskei D C [6]	-	-	-	-	-	-	-	-	50	-	-	80	-	-	100	-	-	120
Bophuthetswana D C[6]	-	-	-	-	-	-	-	-	50	-	-	80	-	-	100	-	-	120
Qwaqwa D C[6]	-	-	-	-	-	-	-	-	50	-	-	80	-	-	100	-	-	120
Shangaan D C[6]	-	-	-	-	-	-	-	-	50	-	-	80	-	-	100	-	-	120
Caprivi D C[6]	-	-	-	-	-	-	-	-	50	-	-	80	-	-	100	-	-	120
Lebowa[6]	-	-	-	-	-	-	-	-	50	-	-	80	-	-	100	-	-	120
Rehoboth D C[6]	-	-	-	-	-	-	-	-	50	-	-	80	-	-	100	-	-	120
Indian D C[6]	-	-	-	-	-	-	-	-	50	-	-	80	-	-	100	-	-	120
Rand Water Board[7]	-	-	-	-	-	-	-	-	50	-	-	80	-	-	100	-	-	120
S A Inventions Dev.Corp.[7]	-	-	-	3	0	3	5	0	5	10	0	10	12	0	12	14	0	14
I D C	65	7	72	-	-	-	250	60	310	250	60	310	250	60	310	250	60	310
Fisheries Dev. Corp.	0	0	0	29	0	35	41	15	56	58	31	89	68	44	112	75	55	120
Armscor[7]	-	-	-	-	-	-	-	-	50	-	-	80	-	-	100	-	-	120
Coloured Dev. Corp.	-	-	-	-	-	-	-	-	± 30	-	-	± 80	-	-	100	-	-	120
Uranium Enrichment Corp. of S [7]	-	-	-	-	-	-	-	-	50	-	-	80	-	-	100	-	-	120
TOTAL			36 453	-	-	48 743	-	-	60 355	-	-	88 135	-	-	102 371	-	-	117 389

SOURCES & NOTES: See Section 2.9.3

x = Estimated

TABLE 2.9.11 ESTIMATE II for 1970, 1975 & 1980.

	1970			1975			1980		
	WHITE	BLACK	TOTAL	WHITE	BLACK	TOTAL	WHITE	BLACK	TOTAL
ESTIMATE I	-	-	60355	-	-	88135	-	-	117389
SASOL[1]	N/A	N/A	6500	+4000	+4000	+8000	-	-	12000
SOEKOR	102	22	124	104	37	163	155	95	250
ALUSAF[2]	250	500	750	-	-	1000	-	-	1400
FOSKOR	-	-	750	-	-	1000	-	-	-
C.D.C.[3]	-	5400	5400	-	6000	6000	-	7000	7000
X.D.C. & C.E.D.[4]	-	5000	5000	507	7184	7681	-	10000	10000
OTHER HOMELAND D.C.[5]	-	14400	14400	-	16000	16000	-	26664	26664
I.D.C.[6]	-	-	10800		-	10800	-	-	10800
ISCOR SUBSIDIARIES[7]	-	-	3000	-	-	3000	-	-	3000
TOTAL	-	-	107079	-	-	141779	-	-	188503

Sources & Notes: See Section 2.9.3.
x = estimated.

TABLE 2.9.12 ESTIMATE III for 1970, 1975 and 1980

CORPORATION	1970	1975	1980
ESTIMATE II	107079	141779	188503
I.D.C.[1]	4912	7000[X]	9000[X]
C.E.D.[2]	3000[X]	4610	6000[X]
C.D.C.[3]	5400	6000	7000[X]
OTHER HOMELAND DEVELOPMENT CORPS.	14400[X]	16000[X]	26664[X]
F.D.C.[4]	800[X]	1000[X]	1200[X]
TOTAL	135591	176389	238367

SOURCE & NOTES : See Sec. 2.9.3.
x = estimated.

Calculation of Estmate I

Estimate I is shown in table 2.9.10. Unavailable data was estimated as below:

1 SOUTH AFRICAN RESERVE BANK: Employment for 1956 is known. The staff is unlikely to have increased radically since then.

2 LAND AND AGRICULTURAL BANK is taken to be much smaller than the S A Reserve Bank, and a figure of one quarter of estimated S A Reserve Bank employment is used.

3 National Finance Corporation: Employment has been taken identical to that of the Land and Agricultural Bank.

4 (See table 2.9.7).

5 The Ciskei and Transkei Development Corporations (formerly united as the Xhosa Development Corporation) and the Corporation for Economic Development (C E D) (formerly the Bantu Investment Corporation) as major development corporations are likely to be greater employers than the Coloured Development Corporation. Employment could be as high as that of the I D C but a conservative estimate has been used. The Ciskei Development Corporation and the Transkei Development Corporation are referred to as the X D C in the estimate. Data is only available for the X D C and not for the now separate development corporation.

6 The Homeland Development Corporations are taken as smaller than X D C and C E D.

7 Guesswork.

Calculation of Estimate II: Estimate II is shown in table 2.9.11. Unavailable data was estimated as below.

1 The Sasol employment figure for 1970 is not available. The average of the 1965 and 1975 totals has been used.

2 Source: S A Panorama: December 1971, pp 18-20.

3 The figure of approximately 6 000 personnel employed by companies controlled by the CDC was obtained directly from the CDC. Data for the other years has been estimated from this.

4 XDC, CED: The figure for 1974 is from Benbo, Black development in S A p. 116. Other years are estimated from this.

5 There are eight other Homeland development corporations. It has been assumed that on average each corporation could be responsible for about one third of total CDC employment.

6 IDC: In 1971 over seventy companies were controlled by the IDC or with an IDC director or co-ordination. Most of these appear to be small but also include companies such as[10]

- Sentrachem which holds the controlling interest in various chemical companies including Klipfontein Organic Products.
- The entire Rossing Group of Companies.
- Industrial Selections.
- Impala Platinum Limited.

If employment of 150 is estimated for each company total employment is 10 800.

7 Iscor holds 73% of Metkor (1972) which has controlling interests in Companies like Dorman Long, Stewards and Lloyds, Baldwins etc.[11]

Calculation of Estimate III

1 IDC: In 1971 131 companies were under obligation to be either in "constant touch with IDC" or where "annual financial attention is required."[12]

If an employment of 150 is estimated and the IDC is responsible for 25% of the companies finances then it is responsible for employment of 4 912.

2 Corporation for Economic Development (CED):

In 1974 the CED supplied 39,9% of total investment in the Homeland agency system. The agency system is reported to have increased employment by 11 556 posts.[13] While it is realised that this employment increase might not necessarily be a real increase, the relatively small numbers involved do not justify extensive modification of this figure.[14] Therefore the CED's share of the employment increase is 4 610 posts.

3 Employment by Coloured Development Corporation and other Homeland development corporations has been assumed to be as great as wholly owned subsidiaries in Estimate II.

4 In 1975 FDC held shares worth just under R1 million. It is not known to what extent FDC control existed over these companies. The estimated employment here is guesswork.

2.10 Total Employment by the State in South Africa

2.10.1 Growth of State Employment

State Employment between 1955 and 1980 is given in table 2.10.1. For 1970, 1975 and 1980 three estimates are given:

Estimate I omits employment by wholly owned subsidiaries of government corporations (for example: Sasol, Soekor, etc) and therefore understates actual employment.

Estimate II includes these wholly owned subsidiaries and is regarded as an accurate conservative measure of State employment. Data is however only available for 1970, 1975 and 1980.

Estimate III is employment in Estimate II and employment by partially owned subsidiaries of State corporations and is regarded as a liberal measure of the real position.

The data presented in table 2.10.1 is discussed further in Part III.

TABLE 2-10-1: State Employment in South Africa, Selected Years 1955 - 1980

	1955			1960			1965			1970			1975			1980		
EMPLOYER	Whites	Blacks	Total	Whites	Blacks	Total	Whites	Blacks	Total	Whites	Blacks	Total	Whites	Blacks	Total	Whites	Blacks	Total
Central Authorities	56 922[2]	72 391[2]	129 313[2]	72 989	120 147	193 136	91 737	137 980	229 717	99 915	173 213	273 128	105 909	166 725	272 634	129 872	194 200	324 072
Provincial Authorities	N/A	N/A	N/A	65 098[4]	65 381[4]	130 477[4]	73 131	76 043	149 174	92 081	93 280	185 361	108 441	111 897	220 248	121 374	125 241	248 703
Local Authorities	34 467	94 775	129 242	38 361	113 098	151 459	41 917	125 308	167 225	47 364	143 930	191 294	57 500	174 500	232 000	56 600	168 000	244 600
Homeland Government	-	-	-	-	-		N/A	N/A	N/A	N/A	N/A	N/A	2 739	130 787	132 926	2 481	188 808	191 309
S A T S	107 241[1]	114 434[1]	221 775[1]	109 268	107 961	217 229	115 040	111 892	226 932	109 099	112 631	221 730	111 844	138 365	250 209	113 959	152 444	266 403
C P O	27 588	8 580	36 168	N/A	N/A	44 327	N/A	N/A	47 447	38 202	16 805	55 007	43 524	24 057	67 581	44 988	30 502	75 490
Control Boards	-	-	-	1 206	425	1 631	1 292	541	1 833	1 574	522	2 096	1 600	739	2 339	1 913	906	2 819
Statutory Bodies	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11 313	10 036	21 349	13 172	12 444	25 616
Public Corps (Estimate I)	19 953[1]	23 596[1]	43 549[1]	-	-	42 598	-	-	48 743	-		60 355	-	-	88 135	-	-	117 389
TOTAL	246 271	313 776	560 047	-	-	780 857	-	-	871 071	-		988 971	-	-	1287 421	-	-	1 496 401
Estimate II	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	46 724	N/A	N/a	53 644	N/A	N/A	71 114
TOTAL	-	-	-	-	-	-	-	-	-	-		1035 695	-	-	1341 065	-		1567 515
Estimate III	-	-	-	-	-	-	-	-	-	-	-	28 512	-		34 610	-	-	49 864
TOTAL	-	-	-	-	-	-	-	-	-	-		1064 207	-	-	1395 675	-	-	1 617 379

Notes: (1) 1956
(2) An average of employment over 1950 and 1960 is used
(3) Calculated as the average between 1956 and 1965
(4) 1961

SOURCES: 1956 : Richard C.S. The Growth of Government since Union op. cit., p.19
1960-1980: See relevant Tables in text.

NOTES TO PART II

1 RSA, Department of Statistics Statistical News Release 20-6-78, p.1.

2 Throughout this paper "Homelands" must be read to include both dependent and independent National States.

3 RSA. South Africa 1980 Pretoria: Government Printer, 1981, p.365.

4 Totals of table 2.1.1 and 2.1.3 respectively.

5 This was an attempt at increased efficiency through financial decentralisation.

6 Richards, C.S., Growth of Employment in SA since Union Department of Commerce, University of the Witwarersrand, June 1957.

7 The sources could offer no explanation for these differences.

8 The coefficient between SATS employment in SA and SWA corrected for auto correlation is $r = 0.9$.

9 This figure of approximately 100 persons employed by the CDC was given in personal communication with CDC. No specific data was made available.

10 Management magazine, November 1971, p.48.

11 Financial Mail, June 1972, p.714.

12 Management, op. cit. p.48.

13 Benbo, op. cit.

14 The agency system will report increased employment where it simply takes over existing, privately owned enterprises. This is obviously only a nominal increase and not a real increase in employment.

PART III

ANALYSIS AND DISCUSSION

3.1 The Growth in State Employment

The two most obvious facts which emergé from the statistical part of this thesis are that not only has employment by the State increased tremendously but that the largest part of this increase was due to increased employment of blacks. These in particular are black bureaucrats and teachers employed by the Central Authorities and the homelands. When each of the four different measures of growth which emerge from the theoretical part of the thesis are applied to the data, all but one show dramatic increases, particularly in black employment and the one measure which does not indicate growth over the entire 1920-1980 period shows growth for most of the period.

The four different ways of measuring State employment and the results are discussed below:

Type (a): This measure views a growth in State employment as an increase in absolute numbers. Total estimated State employment in 1920 was 150 000 which by 1980 had increased to 1 600 000: a compound growth of 4.0% p.a. This is made up of increases in white employment from 67 000 to 617 000 (3,7% p.a.) and black employment from 83 000 to 983 000 (4,1% p.a.). Both the growth in State employment and the large growth in black employment are well evident.

Table 3-1 Total State Employment, Compound annual growth rates and racial ratios, 1920-1980 (five year intervals) [1]

	White	Black	Total	$\frac{B}{W}$(2)
1920	–	–	–	1,26
1920-25	6,31	2,99	4,52	1,04
1925-30	4,13	1,79	2,96	0,93
1930-35	0,85	0,35	0,61	0,91
1935-40	4,79	7,58	6,51	1,00
1940-45	3,51	3,51	3,51	1,00
1945-50	5,06	4,43	4,75	0,97
1950-55	2,89	8,46	5,78	1,26
1955-60	3,28	5,60	4,60	1,41
1960-65	2,81	3,81	3,40	1,48
1965-70	2,09	3,94	3,21	1,62
1970-75	3,04	4,49	3,94	1,74
1975-80	4,75	2,93	3,61	1,59

Sources: Calculated from the totals of data presented in Part II

Note: (1) Data estimated where not available

(2) $\frac{B}{W}$ shown is for the last year in each period

The growth in State employment in five year intervals is given in table 3-1. State employment grew fastest 1935-40 at 7% and slowest 1930-35 at 1%. This is an obvious result of the State making up a backlog in the demand for its services caused by a loss of revenue in 1930-35. As such 1930-1940 averaged 3,5% and the real period of highest growth was 1950-55 at 6%. White employment achieved its highest growth of 6% in 1920-25 and black employment its highest of 8% in 1950-55.

Unfortunately for analytical purposes type (a) growth is only

useful for discussing longterm growth and the relative growth in different periods. One of the drawbacks of this measure is that it does not take into account that State employment is, a priori, expected to grow. Employment by the State responds to a number of factors, one of which is State output i.e. State employment is related to the supply of goods and services produced by the State. In turn, State output responds to all those factors contributing to a growth in the size of government. Type (a) growth therefore shows no indication of how State employment has grown, given that it is expected to grow.

Type (b): This measure examines State employment as a percentage of the working population of the country: (TABLE 3.2)

As a proportion of the white economically active population, white employment by the State has grown from 12% in 1921 to 31% by 1980. Black employment grew from 5% in 1946 to 11% by 1980. Total employment grew from 9% in 1946 to 14% in 1980. The decrease in the white and total percentages in table 3.2 between 1960 and 1970 results from a short term drop in white employment from 450 560 in 1969 to 421 528 in 1970. The data for 1970 does not indicate a steady decrease between 1960 and 1970 but a short deviation from the long term trend. By 1972 employment had increased to 450 057.

Type (c): This measure examines State employment as a percentage

TABLE 3.2 Total State employment as a percentage of economically active population, State white employment as a percentage of economically active white population, State black employment as a percentage of economically active black population, 1921-1980 (Selected Years)

State Employment as a Proportion of Economically Active Population

Year	Total	White	Black
1921	N/A	12,36	N/A
1936	N/A	17,86	N/A
1946	8,84	22,86	5,47
1951	10,71	24,93	6,84
1960	13,96	28,76	10,23
1970	13,62	27,94	10,35
1980[1]	14,15	30,69	10,55

Source: State employment is taken from the relevant sectors of Part II. Data are estimated where unavailable.

Note: 1 The economically active data available for 1980 excludes the Transkei, Bophuthatswana and Venda. The economically active population for 1980 has been estimated by using the compound growth rate bewteen 1970 and 1975 extrapolated to 1980.

of the population in the country.

An examination of the data presented in table 3.3 shows white employment as a percentage of white population has increased from 5% in 1920 to 13% in 1980. Black employment as a proportion of blade population increased from 2% to 4% and total State employment from 2% to 6%.

Type (c) growth is presented in figure 3-1 for yearly observations. Ordinary least square regression lines plotted through white, black and total employment as percentages of population measure:

$$\alpha_1 = 2{,}00 + 0{,}06\ t \qquad (1)$$

Where α_1 is $\left(\frac{\text{State employment}}{\text{total population}}\right) \times 100$

t is time in years

the growth in white employment measured:

$$\alpha_2 = 1{,}20 + 0{,}02\ t \qquad (2)$$

Where α_2 is $\left(\frac{\text{white employment by State}}{\text{total population}}\right) 100$

and the growth in black employment was:

$$\alpha_3 = 0{,}80 + 0{,}04\ t \qquad (3)$$

Where α_3 is $\left(\frac{\text{black employment by State}}{\text{total population}}\right) 100$

The annual compound growth in type (c) growth is 1,5% in total employment, 1,3% in white employment and 1,7% in black employment.

PERCENTAGE OF TOTAL POPULATION

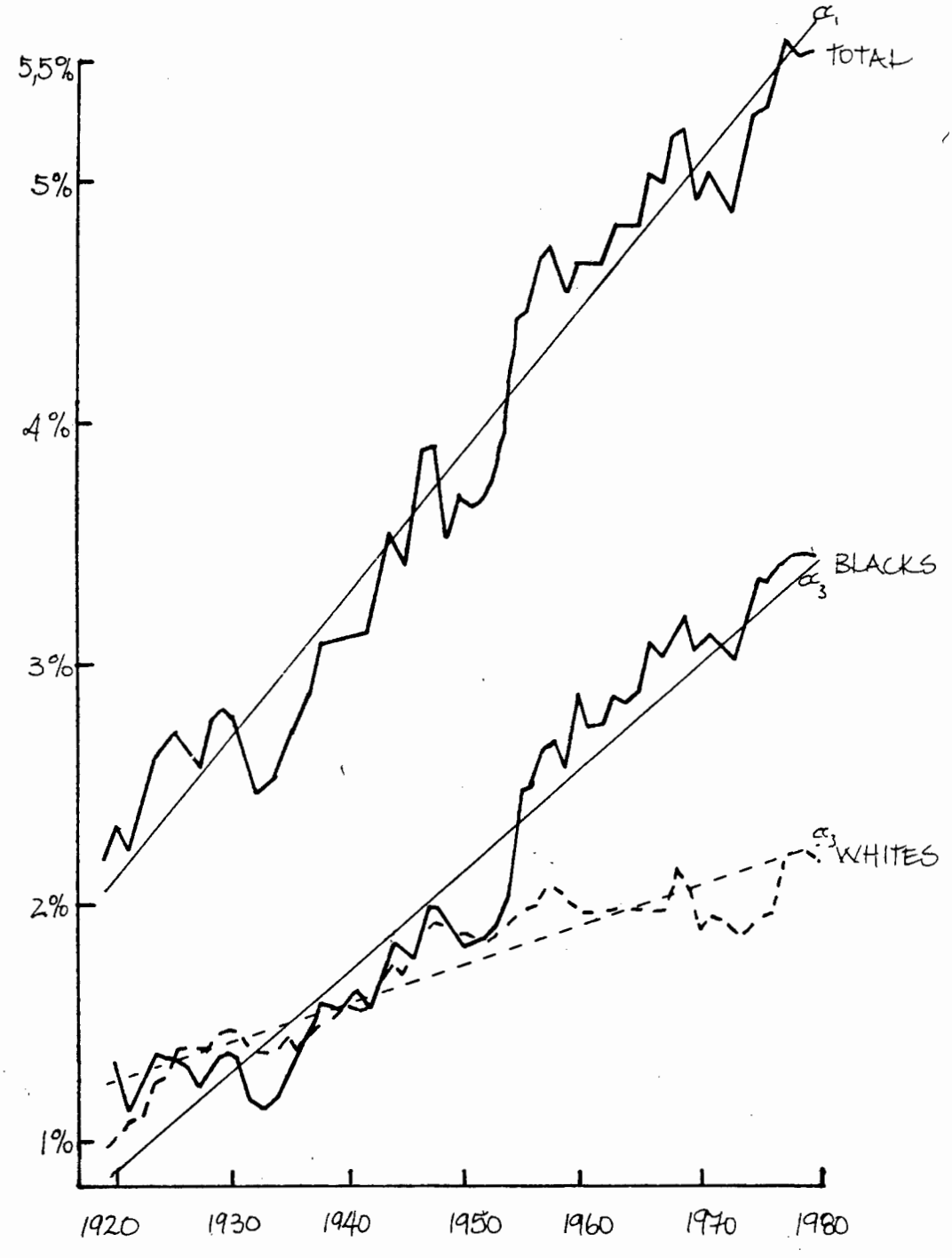


FIGURE 3-1: STATE EMPLOYMENT AS A PERCENTAGE OF TOTAL POPULATION (WHITES AS A % OF TOTAL POP., BLACKS AS A % OF TOTAL POP.), 1920 — 1980.

TABLE 3.3: Total State employment as a percentage of population, State white employment as a percentage of white population, and State black employment as a percentage of black population, 1920 - 1981 (Selected Years)

State Employment as a Proportion of Population

Years	Total	White	Black
1920	2,20	4,47	1,57
1930	2,81	6,55	1,75
1940	3,10	7,45	1,97
1950	3,69	9,35	2,27
1960	4,66	10,79	3,32
1970	4,92	10,99	3,67
1980	5,56	13,20	4,03
1981	5,57	13,21	4,08

Source: State employment: Taken from the relevant sectors of Part II. Data are estimated where unavailable.

Population:
1920-1959: Department of Statistics:
Union Statistics for fifty years
Pretoria: Government Printer, 1960

1960-1981: Department of Statistics:
South African Statistics 1982
Pretoria: Government Printer, 1983

The deviations from the OLS line are shown in figures 3-1 and 3-2. In figure 3-1 employment of both blacks and whites are taken as a proportion of total population and black | and white population respectively. This was adopted to determine relative contributions of whites and blacks employed to total State employment without distortions due to differing population growth rates.

In figure 3-2 the deviations shown are for white employment as a proportion of white population, and black employment as a proportion of black population, and not total population. This was adopted as in this case it was not necessary to correct for distortions due to differing population growth. The fact which is immediately apparent but is merely noted at this stage is that deviations in white employment are generally far more volatile than those for black employment. A specific discussion of deviations is however not presented here as it is more relevant in the context of the political economic history of South Africa.

Type (d): This measure is an increase in λ

where $\lambda = \frac{S\ E/Pop}{G/Y}$ (4)

SE - State employment

Pop - Total population

G - State expenditure

Y - National income

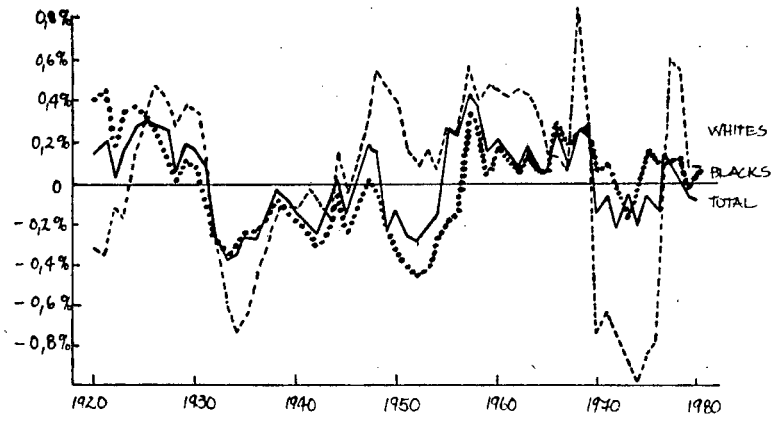


FIGURE 3-2: STATE EMPLOYMENT AS A PERCENTAGE OF TOTAL POPULATION — DEVIATIONS FROM THE LONG TERM GROWTH TREND (WHITES AS % OF WHITE POP., BLACKS AS % OF BLACK POP.), 1920 — 1980.

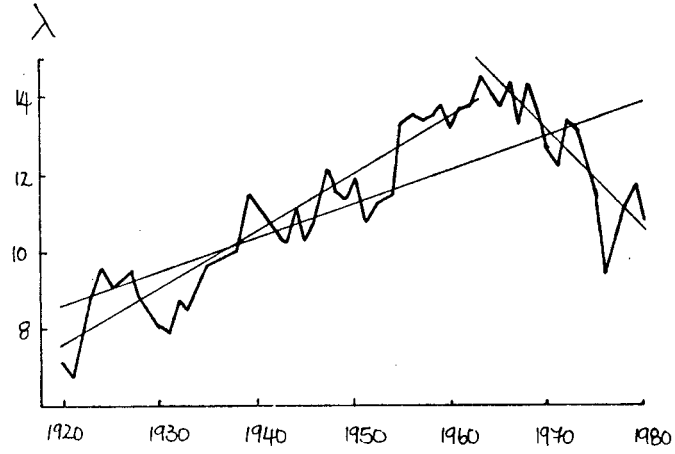


FIGURE 3-3: THE RATIO OF STATE EMPLOYMENT AS A PERCENTAGE OF TOTAL POPULATION TO STATE EXPENDITURE AS A PERCENTAGE OF G.D.P. (λ), 1920 — 1980

This is the most stringent measure to test for a growth in State employment. The ratio λ tests for a growth in State employment as a percentage of population over and above that growth which is expected. State employment is expected to grow as a percentage of population because State expenditure is known to have grown as a proportion of GDP. Therefore if the ratio SE/Pop is deflated by the known growth in the size of the State, any increase in λ will indicate whether there has been a proportionate increase in State employment in excess of that which is, a priori, expected. (This growth would have been more accurately measured if State employment had been taken as a percentage of the working population and not total population. Unfortunately this is not possible as pre 1948 data for economically active population is incomplete and less accurate than total population data). The expectation with regard to type (d) employment growth proves only partly correct. The ratio λ is shown in figure 3-3. While the least square regression line for the entire period shows an OLS in λ of b = 0,07, λ did in fact increase from 1920 to reach a maximum in the early 1960s (1920-1963 b = 0,15). Since the mid 1960s the general trend has been downwards with b = 0,24 (1964-1980).

Time series data for λ is not presented for the same reason that short term variations in λ are not considered important. In the ratio λ national income is the most volatile element. Any change in the business cycle causes a change in λ without affecting any real change in type (d) growth.

3.2 State Employment and State Functions

Given the varied political economic history of South Africa, it was expected that an examination of the various types of State activities would prove useful in a discussion of State employment, To allow more comprehensive discussion, data on State expenditure is also included.

As is shown in tables 3.4, 3,5 and 3.6 State activities have been grouped into eight areas: General Administration, Black Administration, Economic Services (which includes State enterprises and public corporations), Public Order, Health Services, Educational, Defence, and Community Services. Tables 3.5 and 3.6 show the relative contribution of each area of functional State expenditure and employment to the total of that year. Figure 3.4 shows State employment by function and figure 3.5 shows State expenditure by function at constant (1975) prices. In both cases Economic Services are omitted for the sake of scale.

General Administration: In 1930 the State employed 3 235 staff against this function. By 1980 this figure had reached 30 922. In 1930 this category constituted 2% of total staff and by 1980 it comprised 3%. Over the fifty years examined it ranged between 2% and 4% reaching a relative maximum in 1945.

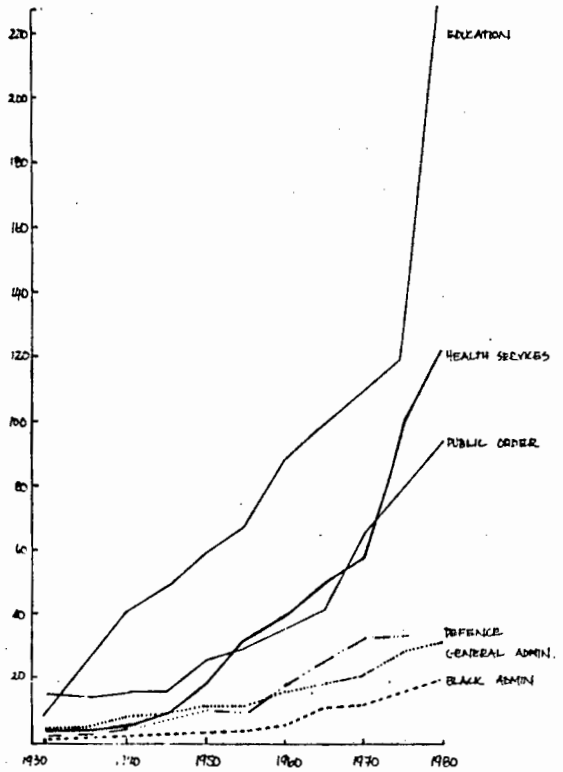


FIGURE 3-4: STATE EMPLOYMENT BY ACTIVITY, FIVE YEAR INTERVALS, (1 000), 1930 — 1980.

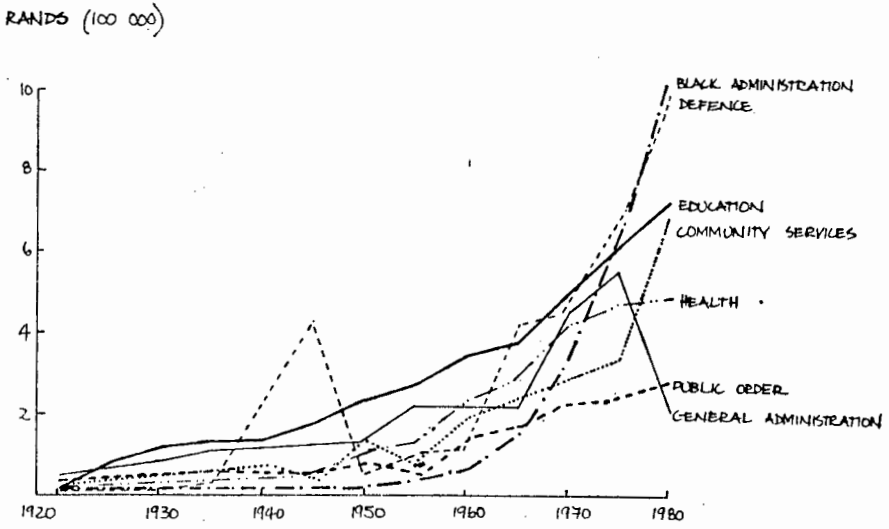


FIGURE 3-5: STATE EXPENDITURE BY ACTIVITY AT 1975 PRICES, FIVE YEAR INTERVALS, 1920 — 1980.

TABLE 3-4 State Employment by function, five-year intervals, 1930-1980[1)]

	1930	1935	1940	1945	1950	1955	1960	1965	1970	1975	1980
General Admin.:	3 235	3 814	7 324	9 904	11 594	13 875	16 474	18 390	21 410	28 415	30 922
Central Authorities	3 235	3 814	5 744	8 304	9 957	12 075	11 474	11 839	13 190	14 457	13 000[5)]
Provincial Author.	N/A	N/A	1 580	1 600	1 637	1 800[5)]	5 000[5)]	6 551	8 220	13 958	17 922
Black Admin.:	1 376	1 413	2 686	2 923	3 431	4 046	5 336	11 118	12 785	15 097	20 000
Central Author.	1 376	1 413	2 686	2 933	3 431	4 046	5 336	11 118	11 185	12 579	16 000[5)]
Homeland Author.[2)]	-	-	-	-	-	-	-	-	1 600[5)]	2 519	4 000[5)]
Economic Services:	117 558	107 288	144 155	173 039	229 854	271 859	276 432	294 597	329 512	392 285	425 893
Central Author.	3 535	3 454	5 297	5 006	9 600	11 859	14 876	20 218	22 775	26 161	20 000[5)]
Provincial Author.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
S A T S	100 551	90 561	123 166	149 880	187 950	220 000	217 229	226 932	221 730	250 209	266 403
G P O	13 472	13 273	15 692	18 153	32 304	40 000	44 327	47 447	55 007	67 581	75 490
Homeland Author.[2)]	-	-	-	-	-	-	-	-	30 000[5)]	48 334	64 000[5)]
Total Economic Services plus Public Corporations:											
Estimate I	N/A	N/A	N/A	N/A	N/A	308 312	320 000	343 340	389 867	480 420	543 283
Estimate II	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	436 591	534 064	614 396
Estimate III	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	465 103	568 674	664 260
Public Order:	15 194	14 875	16 625	16 467	26 418	29 623	36 080	42 522	66 008	80 092	94 000
Central Author.	15 194	14 875	16 625	16 467	26 418	29 623	36 080	42 522	50 008	55 369	60 000[5)]
Homeland Author.[2)]	-	-	-	-	-	-	-	-	16 000[5)]	24 723	34 000[5)]
Hospitals & Health S.:	3 273	3 418	5 364	9 801	18 939	31 644	39 724	50 045	58 832	95 672	122 090
Central Author.	3 273	3 418	4 364	4 801	8 939	11 644	9 724	10 995	13 321	19 174	23 000[5)]
Provincial Author.	N/A	N/A	1 000[5)]	5 000[5)]	10 000[5)]	20 000[5)]	30 000	39 050	47 000	60 184	76 090
Homeland Author.	-	-	-	-	-	-	-	-	10 500[5)]	16 314	23 000[5)]
Education:[6)]	10 380	-	42 993	48 242	60 575	68 231	87 144	99 647	109 501	152 286	232 405
Central Author.	8 236	N/A	13 039	14 881	22 912	25 296	38 063	42 996	58 308	90 487	147 000[5)]
Provincial Author.	2 144	2 959	29 954	33 361	37 663	42 935	49 081	56 651	46 193	54 333	75 605
Homeland Author.	-	-	-	-	-	-	-	-	5 000[5)]	7 466	9 800[5)]
Defence:	2 253	2 603	5 322	N/A	10 532	9 522	17 951	25 219	30 749	30 719	N/A
Community Services:											
Central Authorities	431	364	581	605	1 461	1 590	1 481	2 851	3 341	3 392	N/A

NOTES

(1) Excludes Local Authority Employment as a function division as this is not available.
(2) A functional division of total Homeland employment is not available. It has been estimated by dividing the total employment of Table 6-4 by the functional distribution of Transkei's employment in 1975 as shown in Table 6-3. 1970 and 1975 estimated from 1973 and 1978 respectively.
(3) Data incomplete.
(4) Excludes Cape.
(5) Estimated.
(6) Coloured and Indian Education were under Provincial control till 1964 and 1966 respectively and then under Central Authority control.

SOURCE

See relevant tables in Part II.

TABLE 3-5 Relative Contribution (%) of various types of State expenditure to growth of total State expenditure,[2] 1920-1980 (5-year intervals)

Year	General Administration	Black[1] Administration	Economic Services	Public Order	Health	Education	Defence	Community Services	Public Debt	Total
	%	%	%	%	%	%	%	%	%	%
1920	17,1	0,8	60,3	9,0	2,5	4,7	2,2	3,4	0,1	100
1925	8,9	0,5	60,0	6,1	2,3	10,5	1,5	3,7	6,5	100
1930	8,6	0,5	60,7	5,2	2,3	10,6	1,2	4,7	6,2	100
1935	8,5	1,5	60,5	4,4	2,6	10,1	1,6	4,9	6,0	100
1940	5,4	0,9	41,8	2,9	2,0	6,4	33,8	3,4	3,3	100
1945	5,8	0,2	39,6	2,6	3,8	7,3	35,1	1,1	4,6	100
1950	5,9	0,5	60,4	3,5	7,6	10,4	2,8	5,4	3,5	100
1955	8,0	1,1	61,7	1,7	5,1	11,6	1,7	5,8	3,2	100
1960	6,1	1,0	58,3	3,7	6,6	11,3	3,2	7,1	2,8	100
1965	4,0	4,4	56,8	2,9	5,4	8,1	7,4	8,2	2,8	100
1970	6,7	4,8	55,8	3,0	5,4	8,3	5,7	6,6	3,8	100
1975	5,2	5,1	57,0	2,5	4,4	7,4	10,1	4,6	3,3	100
1980	1,6	3,3	53,3	1,9	3,2	6,9	8,7	5,4	15,7	100

Source:
Calculated from revised data used in: Abedian,I. and Standish,B; An inquiry into the growth of government expenditure in South Africa, 1920-1982, Cape Town: UCT, Mimeograph, 1983.

Notes:

1) Includes all Homeland government expenditure.

2) Excludes Local Authorities, Control Boards and Statutory Bodies.

TABLE 3-6 Relative Contribution (%) of various types of State employment to growth of total State employment,[1] 1930-1980 (5-year intervals)

Year	General Administration	Black Administration	Economic[2] Services	Public Order	Health	Education	Defence[3]	Community Services	Total
	%	%	%	%	%	%	%	%	%
1930	2,10	0,90	76,49	9,89	2,13	6,75	1,47	0,28	100
1935	2,36	0,87	66,34	9,20	2,11	-	1,61	0,23	(100)
1940	3,25	1,19	64,05	7,39	2,38	19,10	2,36	0,26	100
1945	3,69	1,09	64,45	6,13	3,65	17,97	-	0,23	(100)
1950	3,20	0,95	63,35	7,28	5,22	16,70	2,90	0,40	100
1955	2,97	0,87	66,04	6,35	6,78	14,62	2,04	0,34	100
1960	3,14	1,02	61,04	6,88	7,58	16,62	3,42	0,28	100
1965	3,10	1,87	57,89	7,17	8,44	16,80	4,25	0,48	100
1970	3,09	1,85	56,30	9,53	8,50	15,81	4,44	0,48	100
1975	3,21	1,70	54,22	9,04	10,79	17,19	3,47	0,38	100
1980	2,87	1,86	50,48	8,73	11,34	21,59	-	-	(100)

Source:
Calculated from Table 3-4.

Notes:

1) Contributions corrected where data are not available.

2) Includes State enterprises and Estimate I for public corporations.

3) Permanent Defence Force only.

In terms of expenditure the R20 ml spent in 1920 consisted of 17% of total expenditure, compared to the R460 ml of 1980 which comprised 2%. The dramatic drop from nearly 5% in 1975 to less than 2% in 1980 is possibly due to Finance Minister Horwood's pledge to reduce the size of government but can also be attributed to a transfer of funds to the independent homelands.[1]

Black Administration: In 1930 the State employed 1 376 staff against this function (1% of the total). By 1980 this had risen to 20 000 (2% of the total). No significant increase occurred until after 1960 where employment increased from 1% of the total to 2% in 1965 and has remained at that level.

The growth in expenditure changed from 1% of the total in 1920 to 3% by 1980. Again real growth in this function occurred only after 1960, and also reflects the growth of the Department of Bantu Administration and Development into the monolith of Cooperation and Development.

Economic Services: The provision of economic "services" is, and always has been, the largest component of State activities. The totals in tables 3.4, 3.5, and 3.6 include government departments with direct economic functions, the SA Transport Services, Post Office and public corporations. Data for the provinces could not be disaggregated. The employment data used for public corporations is Estimate I. This is the most conservative estimate

but the only one available for any reasonable part of the period.[2]

Employment in economic services changed from 117 558 in 1930 (76% of total State employment) to 543 283 in 1980 (50%). Expenditure changed from 56% of the total in 1920 (the lowest share over the period) to 63% in 1980 (the highest share). The fluctuations were within fairly narrow boundaries and are not seen as significant.

Public Order: In the provision of the service of public order, State employment increased from 15 194 in 1930 (10% of the total) to 94 000 in 1980 (9% of the total). It is the fourth largest area in functional State employment. Over the period employment as a proportion of the total fell gradually till 1960, increased gradually over the 1960s, increased till 1970 and has since declined. Expenditure decreased gradually from 9% of the total in 1920 to 3% in 1945 and since 1950 it has fluctuated between 2% and 4% of the total.

Health: Employment in health services, of which the Provincial Authorities are responsible for over half, was the third largest area of State employment in 1980. Employment in this activity has increased consistently from 2% of the total in 1930

(3 273 personnel) to 11% in 1980 (122 090).

As a proportion of total expenditure health expenditure ranked as third lowest proportion of expenditure in 1980 viz. 3%. This compared to its position relative to employment, reflects the extent to which health services are labour intensive. Expenditure on health services increased from 3% of the total in 1920 to 8% in 1950 before declining gradually to 3% in 1980.

Education: Education employment increased from 10 380 (7% of the total) in 1920 to 42 993 (19%) by 1940. Since 1940 State education employment has ranged around 15% of total employment before reaching a maximum of 232 405 in 1980 (22% of the total). As a proportion of expenditure, education expenditure has decreased from 11% in 1925-1960 to 7% in 1980. As with Health Services this reflects the labour intensiveness required in the provision of educational services.

Defence: Employment figures for defence shown in tables 3.4 and 3.6 are for permanent force personnel only. Data on National Service personnel are unavailable from all sources. Permanent defence force personnel have increased from 2 253 in 1930 to 30 719 in 1975.[3] As a proportion of total employment it has increased from 1,5% in 1930 to 3,5% in 1970-75. Excluding the years of World War II defence expenditure as a proportion of total expenditure

ranged between 2% and 3% 1920-1960 from 2% 1920-1935 to 4% in 1960. Since 1965 defence expenditure has remained between 6% and 10% of total expenditure. (R2 514 ml in 1980).

Community Services: This service consists primarily of transfer payments and is dominated by the department of Social Welfare. This is reflected in the relative employment and expenditure data. In 1930 community services accounted for 0,28% of total employment (431 personnel) and for 0,38% (3 392)by 1975.[5] Expenditure fluctuated from 3% in 1920 to 8% in 1965.

3.3 The Sectors of State Employment

The State is conventionally broken into nine distinct sectors. These are: Central Authorities, Provincial Authorities, Local Authorities, Dependent and Independent Homeland Governments, Control Boards and Statutory Bodies, the South African Transport Services, the Post Office, and the Public Corporations. These are examined below.

3.3.1 The Sectors of State employment as Proportions of total State Employment

The discussion below refers to tables 3.7, 3.8 and 3.9 and figures 3.6, 3.7, and 3.8. The data presented in this section for the Central and Provincial Authorities is not for 'net' employment as discussed in Part II. It is the actual employment for the sectors shown.

Central Authorities: In 1980 the Central Authorities ranked as the largest employer in the public sector being responsible for 21% of white employment and 20% of black employment by the State. As a proportion of total white employment by the State it decreased from 30% in 1920 to 24% in 1945, then increased to 32% in 1965 before decreasing to 24% in 1970. As a proportion of total black employment it increased gradually from 6% in 1920 to 10% in 1950, to 22% five years later, 26% in 1965 and gradually decreasing to 20% in 1980.

Provincial Authorities: While data is only available after 1961 for Provincial employment some estimates have been made from incomplete data. In 1980 white employment by the Provincial Authorities ranked second in white employment by the State, accounting for 21% of the total. In the same year black employment

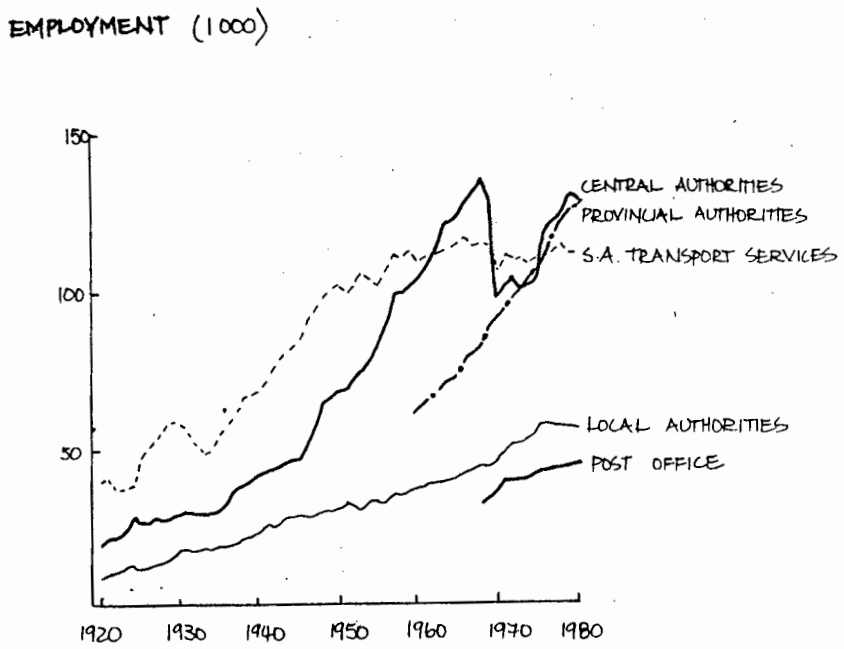


FIGURE 3-6 : WHITE EMPLOYMENT BY STATE BY SECTOR, 1920 – 1980.

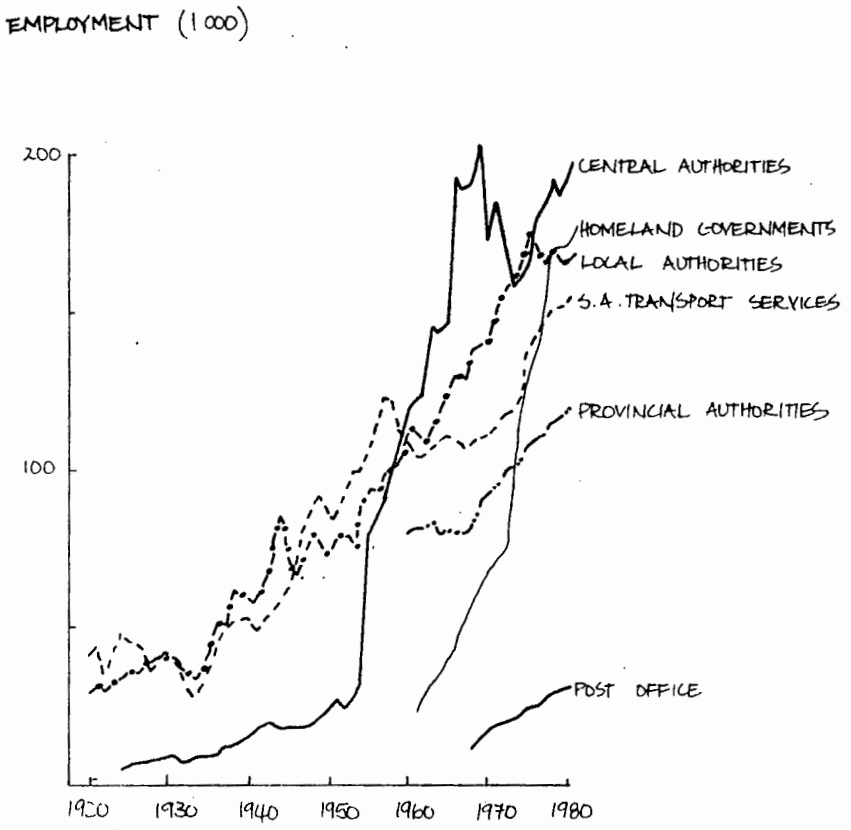


FIGURE 3-7 : BLACK EMPLOYMENT BY STATE BY SECTOR, 1920 – 1980.

TABLE 3-7: The Contribution of the various areas of White State Employment to total White State Employment, 1920-1980 (five year intervals) (Percentages)

	Central Authorities	Provincial Authorities	Local Authorities	Homeland Authorities	Control Brd Statutory Bodies	S.A.T.S.	G.P.O[2].	Public Corporations Estimate II	TOTAL
1920	30.00 [1]	9.00 [1]	13.50	0	0	61.00	-	0	100
1925	28.05 [1]	8.31 [1]	14.03	0	0	49.07	-	0.52 [1]	100
1930	25.59	9.34 [1]	14.73	0	0	49.50	-	0.85 [1]	100
1935	25.68	13.02 [1]	15.46	0	0	44.22	-	1.63 [1]	100
1940	26.33	13.07 [1]	15.25	0	0	43.30	-	2.05 [1]	100
1945	24.28	13.62 [1]	15.04	0	0	44.91	-	2.15 [1]	100
1950	27.91	14.73 [1]	12.73	0	0.04 [1]	42.29	-	2.29 [1]	100
1955	30.33	17.75 [1]	12.24	0	0.21 [1]	36.81	-	2.66 [1]	100
1960	31.33	19.03 [1]	11.59	0.15 [1]	0.36	33.00	-	4.53 [1]	100
1965	32.27	19.24	11.03	0.29 [1]	0.34	30.26	-	6.58 [1]	100
1970	23.70	21.84	11.24	0.38 [1]	0.37	24.93	9.06	8.47	100
1975	21.63	22.15	11.75	0.44	2.64	22.85	8.89	9.65	100
1980	20.92	20.62	9.17	0.40 [1]	2.44	18.46	7.29	10.18	100

Sources: Calculated from the relevant tables in Part II.
Data estimated when unavailable.

Notes: (1) Estimated

(2) The G P O was a department of the Central Authorities until 1969

TABLE 3-8: The Contribution of various areas of Black State Employment to Total Black State Employment, 1920-1980 (five year intervals) (Percentages)

	Central Authorities	Provincial Authorities	Local Authorities	Homeland Authorities	Control Brd Statutory Bodies	S.A.T.S.	G.P.O[2].	Public Corporations Estimate II	Total
1920	5.95 (1)	8.78 (1)	34.50 (1)	0	0	50.77	-	0	100
1925	7.97 (1)	9.81 (1)	36.21 (1)	0	0	45.01	-	1.00	100
1930	8.62	12.34 (1)	38.67	0	0	38.54	-	1.82 (1)	100
1935	7.76	17.64 (1)	38.55 (1)	0	0	32.46	-	3.59 (1)	100
1940	9.77	16.07 (1)	36.71	0	0	33.35	-	4.11 (1)	100
1945	9.18	16.75 (1)	36.19	0	0	33.59	-	4.29 (1)	100
1950	10.19	18.67 (1)	30.76	0	0	35.66	-	4.72 (1)	100
1955	21.95	17.27 (1)	26.62	0	0	29.94	-	4.21 (1)	100
1960	24.82	16,58 (1)	24.19	4.81 (1)	0.09	23.09	-	6.42 (1)	100
1965	25.74	14.40	22.24	8.78 (1)	0.10	19.86	-	8.87 (1)	100
1970	25.33	13.64	21.04	10.53 (1)	0.08	16.47	2.46	10.44	100
1975	19.58	13.13	20.49	15.36	1.27	16.25	2.83	11.10	100
1980	19.74	12.34	17.08	17.79	1.35	15.82	3.10	12.78	100

Sources: Calculated for the relevant tables in Part II. Data estimated where unavailable.

Notes: (1) Estimated

(2) The G P O was a department of the Central Authorities until 1969

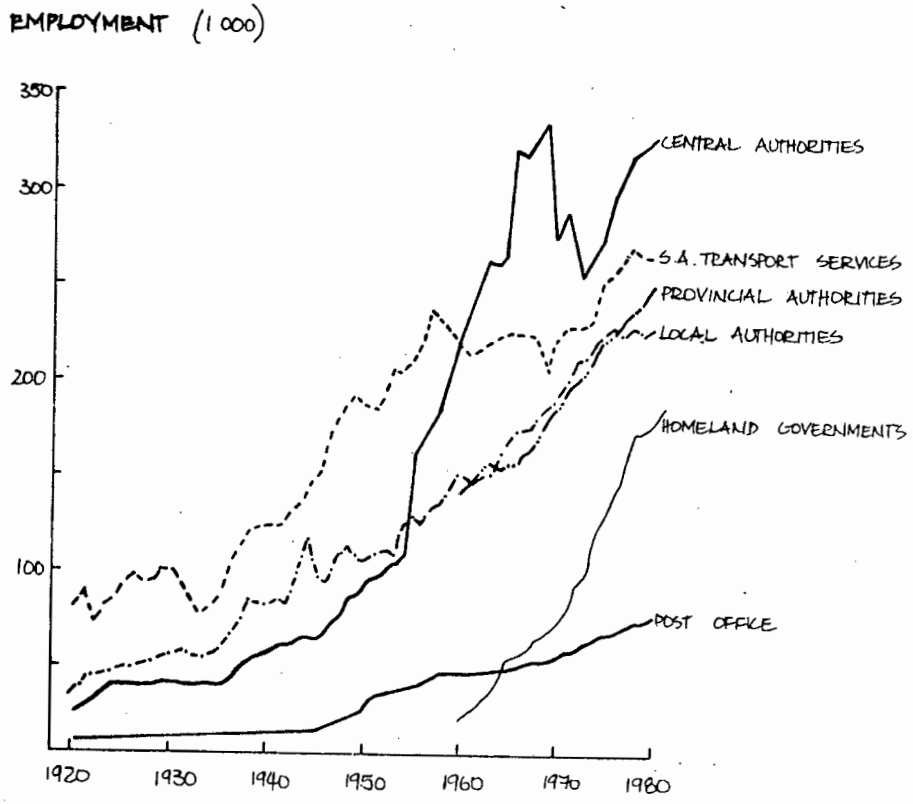


FIGURE 3-8: TOTAL EMPLOYMENT BY STATE BY SECTOR, 1920 - 1980

TABLE 3-9: The Contribution of various areas of State Employment to Total State Employment, 1920-1980 (five year intervals) (Percentages)

	Central Authorities	Provincial Authorities	Local Authorities	Homeland Authorities	Control Brd Statutory Bodies	S.A.T.S.	G.P.O.[2].	Public Corporations Estimate II	Total
1920	16.59 (1)	8.88 (1)	25.21 (1)	0	0	55.29	-	0	100
1925	17.01 (1)	9.08 (1)	25.35	0	0	47.00	-	0.76 (1)	100
1930	17.41	10.79 (1)	26.27	0	0	44.22	-	1.32 (1)	100
1935	17.16	15.22 (1)	25.59 (1)	0	0	38.62	-	2.56 (1)	100
1940	18.05	14.57 (1)	25.98 (1)	0	0	38.32	-	3.08 (1)	100
1945	16.73	15.81 (1)	25.62	0	0	39.25	-	3.38 (1)	100
1950	19.18	16.67 (1)	21.61	0	0	39.03	-	3.49 (1)	100
1955	25.65	17.48 (1)	20.27	0	0	32.98	-	3.79 (1)	100
1960	27.52	17.59 (1)	18.97	2.88 (1)	0.20	27.20	-	5.63 (1)	100
1965	28.37	16.36 (1)	17.72	5.47 (1)	0.19	24.05	-	7.95 (1)	100
1970	24.71	16.77	17.30	6.66 (1)	0.19	20.05	4.98	9.69	100
1975	20.33	16.42	17.30	9.91	1.77	18.66	5.04	10.57	100
1980	20.24	15.53	14.03	11.09 (1)	1.78	16.64	4.71	11.78	100

Sources: Calculated from the relevant tables in Part II.
Data estimated when unavailable.

Notes: (1) Estimated

(2) The G.P.O. was a department of the Central Authorities until 19[illegible].

accounted for 12% of the total. White employment had increased gradually as a proportion of the total until 1975 and by 1980 it declined to 21% of the total. Black employment increased from 9% of the total in 1920 to 19% in 1950 before gradually decreasing to 12% in 1980.

Local Authorities: White employment by Local Authorities increased from 13% of the total in 1920 to 15% over the period of the Great Depression, before gradually decreasing to 9% in 1980. In 1920 black employment by Local Authorities was the second largest part of total employment at 35%. This increased to 39% during the 1930s before gradually declining to 17% by 1980.

Homeland Authorities: Data on employment by Homeland Authorities only became available in 1972. Employment has been estimated from 1960 to 1972 by intrapolation. White employment by the Homelands is minimal, having reached a maximum of one half of a percent of the total in 1975. Black employment by the Homeland Authorities is the second most important part of total black employment by the State reaching 18% of the total in 1980.

Control Boards and Statutory Bodies: White employment in this category increased from 0,04% of the total in 1955 to 2% by 1980. Black employment increased from 0,09% in 1960 to 1% by 1980.

South African Transport Services: Employment by the SATS has declined in importance since being the most important area of both black and white employment in 1920 (51% and 61% respectively). Proportionately, white employment declined gradually to become the third most important area of total employment in 1980 (18%). Black employment has also declined proportionately to become the fourth largest sector (16%).

Post Office: Prior to 1969 the Post Office was a department under the Central Authorities. Post Office employment is minor compared to the total State employment. For example it employed 3% of whites and 5% blacks in 1980.

Public Corporations: Significant public corporation employment started with the establishment of Iscor in 1925. White and black employment have increased gradually to become 10 and 13% respectively of the 1980 total.

3.3.2 Further Discussion on the Sectors of State Employment

Unlike the above section the figures discussed here for the Central and Provincial Authorities are the 'net' figures for Part II.

A: 'Net' employment by the Central Authorities

The growth of net employment by the Central Authorities shows the most notable growth rates of all areas of State employment (see table 2.1.3). Employment by Central Authorities employment grew from less than 29 000 in 1930 to a massive 335 000 in 1981. This is a compounded annual growth rate of nearly 5% since 1930, compared to a compound annual population growth rate between 1936 and 1970 of 2,53%.[5]

It can also be seen from figure 3.9 and table 3.10 that the proportion of whites and blacks employed over the period under study has changed considerably. From a B:W ratio of 0,54:1 in 1930, black employment increased to reach a maximum of 1,73:1 in 1970 and declined proportionately to 1,50:1 in 1980. White employment has grown at an average annual rate of 3,91% compared to the growth in black employment of 6,12%. A notable difference between white and black employment by the Central Authorities is the generally regular changes in the growth of white employment, compared to often abrupt changes in levels of black employment. It

TABLE 3.10: Net Employment by the Central Authorities.

Compounded annual growth rate and racial ratios, five year intervals, 1935-1980.[1]

	White	Black	Total	B/W^2
1925-30	2,23	3,38	2,50	0,54
1930-35	0,93	-1,72	0,32	0,47
1935-40	6,03	12,65	7,60	0,46
1940-45	1,85	2,22	1,95	0,59
1945-50	8,03	6,63	7,73	0,67
1950-55	4,61	26,45	12,11	1,36
1955-60	3,96	8,22	6,08	1,12
1960-65	4,68	2,81	3,53	1,50
1965-70	1,72	4,65	3,52	1,73
1970-75	1,17	-0,79	-0,04	1,57
1975-80	3,99	2,19	2,90	1,50

Source: Table 2.1.3

Note: 1 Data estimated where not available

2 $\frac{B}{W}$ is for the last year of each period

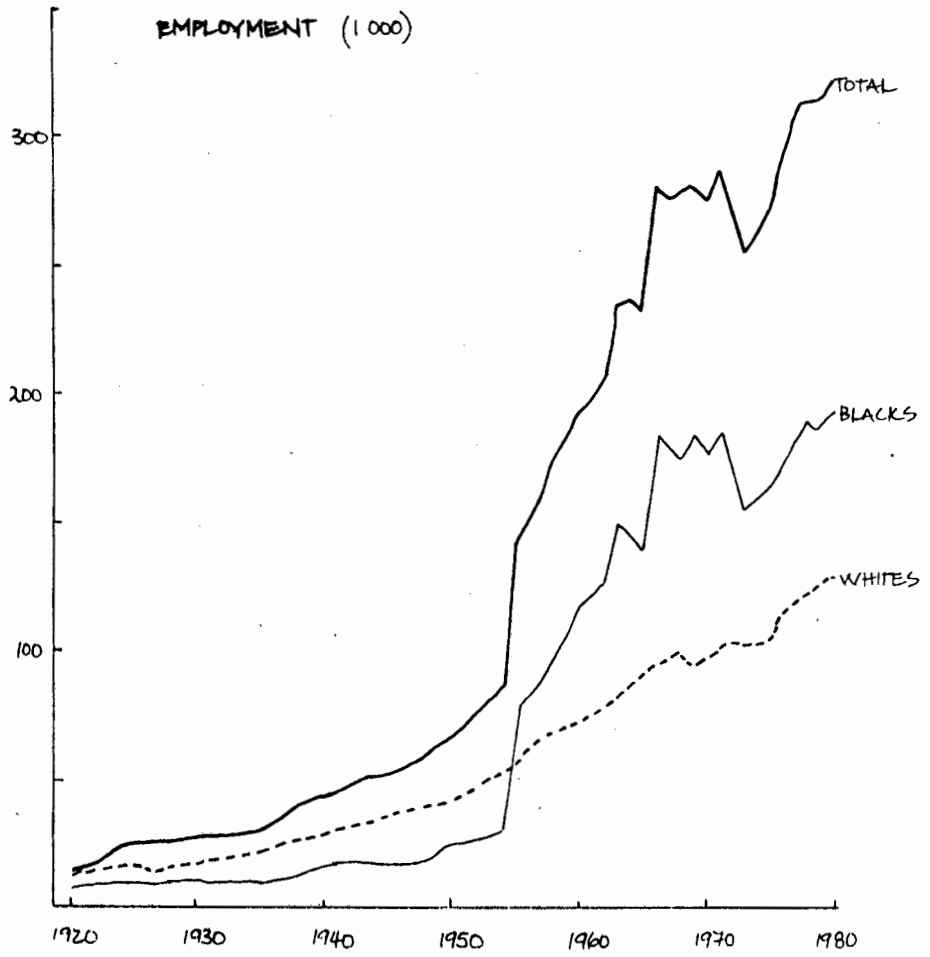


FIGURE 3-9 : 'NET' EMPLOYMENT BY THE CENTRAL AUTHORITIES, 1920 - 1980.

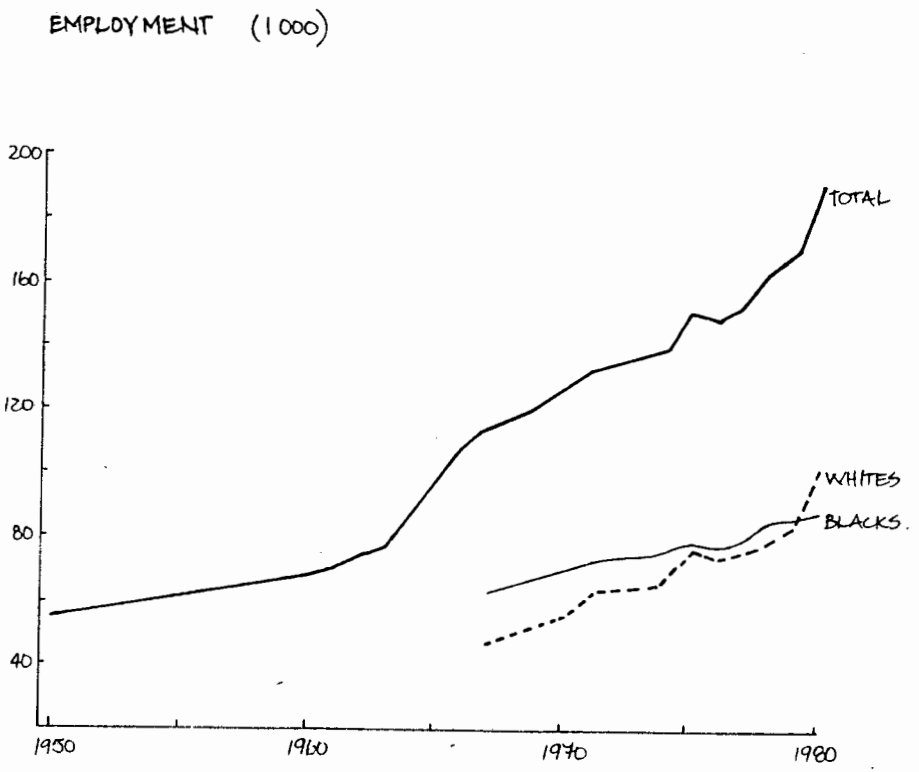


FIGURE 3-10 : 'NET' EMPLOYMENT BY THE PUBLIC SERVICE, SELECTED YEARS 1950 – 1980.

can be seen from figure 3.9 that white employment only ever decreased in 1927 and 1968. The former period was a brief change; the latter persisted as slow growth until 1975 (see table 3-10) and was caused by labour being attracted by the private sector as a result of the Central Authorities not responding to rapidly increasing wages in the private sector. Black employment on the other hand has exhibited remarkable changes in growth. The tremendous growth which has been recorded under Central Authorities employment was caused by very rapid increases in black employment in the periods 1954-1965 and 1974-1980. The period 1966-1973 saw a net decrease in black employment of 2,73% p.a. with some fluctuations.

The growth in net employment by the Public Service:

The most reliable measure of public service employment, 'net real' public service employment (see table 2.1.5 and figure 3.10) shows that public service personnel grew in number from 49 000 in 1950 to 195 000 by 1980. This is an annual average increase since 1950 of nearly 5%. The 1960s is the decade over which employment growth was at its greatest. Between 1960 and 1970 employment grew at an annual average of 6% compared to 4% over both the 1950s and the 1970s.

A most notable event occurred in 1980 when, for the first time, more blacks than whites were employed in the public service. What is particularly significant is the magnitude of the increase. Since 1967 the number of blacks to whites employed changed slowly from 0,75:1 to 0,99:1 by 1979[6]. In 1980 black employment increased by over 27% (23 000) and the employment ratio increased to 1,22:1.

Central Authorities Residual Employment

Persons who are employed by the Central Authorities but who are not part of the Public Service form this Residual employment. There are five categories of persons who are part of this Residual, viz.

(i) Board members and elected office bearers (for example, Members of Parliament and members of commissions of enquiry);

(ii) 'Services' posts in the South African Defence force. This incorporates virtually all members of the permanent defence force;[7]

(iii) 'Services' posts in the Police Force. This incorporates virtually all serving police personnel;

(iv) Teaching personnel involved in Coloured and Indian education; and

(v) general temporary labour.

It has been possible to reduce the Residual to contain only categories (i) and (v), the results of which are presented in tables 2.1.6 and 3.11. It is expected that category (i) is a small and stable component and that the fluctuations which have occurred in the Residual are due to changes in the size of the general temporary labour component of the Central Authorities. The Residual estimation process has rendered the results very unreliable, as evidenced by 'negative' white employment between 1969 and 1975, and as such the results can only be a general guide to the true situation.

The Residual grew from 72 000 in 1960[8] to over 113 000 by 1966 only to fluctuate downwards to a little over 42 000 by 1980[9]. It can be seen from table 3.11 that extreme fluctuations have occurred in the Residual and, where data is available, that these fluctuations have not been confined to any particular race group, although blacks constitute the largest component of the Residual.

It is quite obvious that the Residual is the temporary labour component of the public service. What is surprising is the numbers

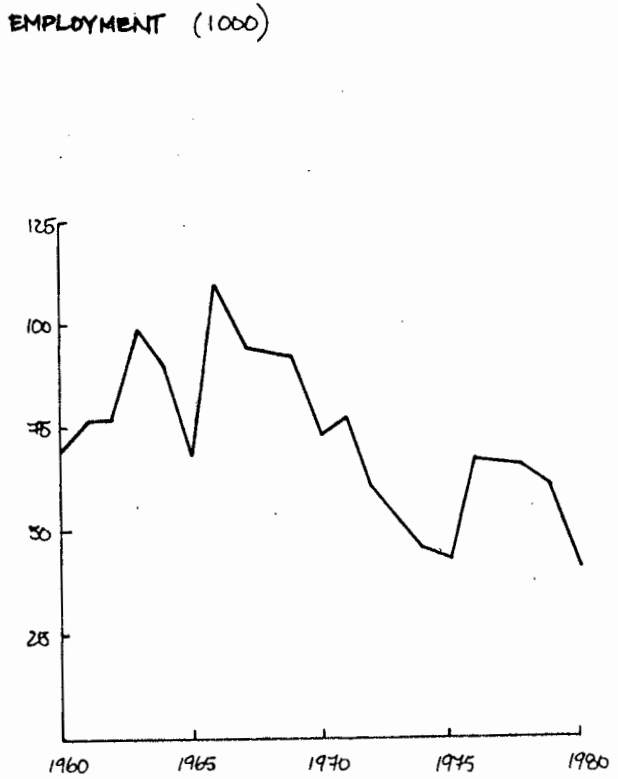


FIGURE 3-11 : 'RESIDUAL' EMPLOYMENT BY THE CENTRAL AUTHORITIES, 1960 - 1980.

TABLE 3-11 Central Authority Residual Employment: Compound growth rate and racial ratios, 1961-1980

Year	Black / White	Total % p.a.
1961	—	6,33
1962	—	- 0,14
1963	—	29,31
1964	—	-12,53
1965	—	-18,09
1966	—	62,28
1967	—	-17,52
1968	—	0,14
1969	—	- 4,08
1970	—	-16,79
1971	—	5,23
1972	—	-21,58
1973	—	N/A
1974	—	-13,77
1975	—	- 4,82
1976	9,67	58,23
1977	10,99	0,35
1978	22,14	- 1,42
1979	7,50	-10,84
1980	5,12	-28,87

Source:

Table 2-1-6

involved e.g. in 1966 the public service employed 103 000 permanent members while the Residual constituted over 113 000 i.e. the public service had a temporary labour force greater than its permanent staff. By 1980 these figures had changed to 195 000 and 42 000 respectively.

There are many institutional factors peculiar to the bureaucracy which might account for the existence of the Residual. The prime factor is seen to have been the growing need to increase public service employment which occurred at a time of increasing white labour shortages when political constraints prevented increasing the number of blacks in the public service. The greatest increases in Central Authorities employment occurred in the 1950s but this is not reflected in growth in public service employment. While it appears that the need for more labour occurred in the public service over the 1950s, its ability to employ more white public servants was limited through budgetory constraints and an inability to attract white labour at the wages offered. Its ability to allow increases in the number of black public servants was limited by the political constraints of the 1950s i.e. it would have been politically inadvisable for a government advocating apartheid policies to increase substantially the number of black public servants in its employment. The solution to this dilemma was to employ additional blacks as temporary labour and not as public servants and led to the creation

of the Residual. The implications of this are that until 1980 the public service (although possibly not the Central Authorities) operated under fixed factor proportions which limited the number of blacks that could be employed, given a particular level of white employment.

The level of this fixed factor proportion can be seen purely from observation and might be seen as, until 1980, simply employing more whites than blacks in the South African Public Service.

B : 'Net' Employment by the Provincial Authorities

This section examines two areas:

Employment by the Provincial Authorities in the post 1960 period when reliable data first became available, and secondly, a discussion of the employment growth since 1917. Available data prior to 1960 is incomplete and is not comparable to post 1960 data.

The growth in employment shown in table 3.12 and figure 3.12 is based on 'Net' Provincial employment and is therefore comparable over time[11]. For the period where data is available, 1961-1981, employment grew at an average compound rate of 3,32%, with no unusual fluctuations being noted. The numbers of blacks to whites

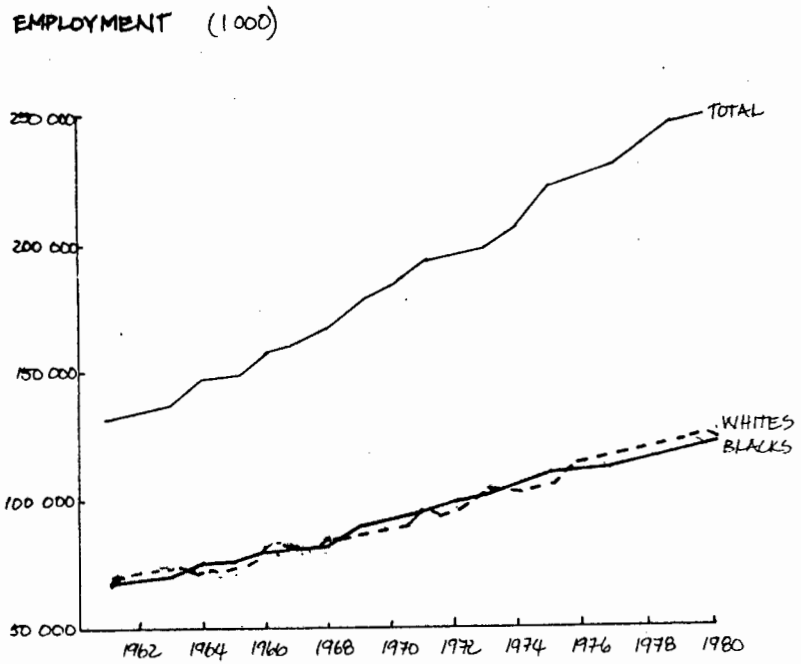


FIGURE 3-12 : 'NET' EMPLOYMENT BY THE PROVINCIAL AUTHORITIES, 1961 — 1980

TABLE 3.12: 'Net' Employment by the Provincial Authorities.
Compound annual growth rate and racial ratios, five year intervals, 1961-1980

Year	White	Black	Total	B/W[1]
1961	-	-	-	1,00
1961-65	2,35	3,85	3,40	1,04
1965-70	3,24	4,17	4,44	1,01
1970-75	3,32	3,69	3,51	1,03
1975-80	3,26	1,66	2,46	0,95

Source: Table 2.2.5

Note: 1 $\frac{B}{W}$ is for the last year of each period

employed has ranged around 1:1 having achieved a maximum of 1,04 (B/W) in 1964, a minimum of 0,95 in 1980, and rose to 1,00 in 1981.

While reliable data on Provincial employment is only available for the years after 1960 some estimates[12] have been made to determine Provincial employment growth since 1917.

From the data which is available (table 3-13) employment by the Provincial Authorities has grown at an average annual rate of 3,50%. The period of greatest growth was 1950 to 1965 (5,82%) and that of lowest growth was 1965-1970 (1,08%).

The most remarkable factor noted about Provincial employment, particularly since 1961 is that while employment growth has shown some changes (but nothing like that of the Central Authorities) these moderate changes have occurred over both white and black employment and the ratio of the number of blacks to whites has remained almost constant over the entire period.

The issue is why the white to black employment ratio remained so stable when the Central and Local Authorities were both increasing black employment proportionately in the face of growing white labour shortages.

TABLE 3.13: Estimation of the growth in Provincial Authorities Employment, Selected Years, 1917-1979

Year	Employment Estimates	Annual Compound Growth
1917	16 759	-
1939	36 087	2,43
1950	53 446	3,63
1953	61 716	4,91
1965	121 714	5,82
1970[1]	128 431	1,08
1970[2]	185 361	-
1979	242 071	3,01

Sources: 1917-1953: Table 2.2.6

1965-1970[1]: Table 2.2.7

1970[2]-1979: Table 2.2.5

Notes: 1 This figure for 1970 is comparable to the data for 1917-1965

2 This figure for 1970 is comparable to the 1979 data

The two largest components of Provincial Authorities employment are health services and white education. The low wages paid are partially explained by these both being monopoly markets in which one would expect wages to be lower. It is thought that the stable white/black employment ratio is partially the result of the services provided by the Provincial Authorities being uniquely racially separated viz. white education and health services: It can be expected that only whites will teach in white schools and until 1980 in health services the different race groups were largely served by their own people, even if shortages existed in white posts. Except for isolated positions, the Provincial Authorities were unable to place blacks in vacant white posts, even in a temporary capacity. As such, this has limited significant substitution of blacks for whites under Provincial Authorities employment.

While the above might explain that the growth in Provincial Authorities could have been greater if it had been institutionally possible to substitute blacks for whites, the above reasoning does not explain why the ratio of whites to blacks employed by the provinces should have remained at roughly 1:1 since 1960! The only explanation which can be offered is that the Provincial Authorities, as did the public service and the Railways, operated under a system of fixed factor proportions where the number of blacks employed should not significantly exceed the number of whites employed.

C: Growth of Local Authorities Employment

Since 1920 the long term growth rate of employment by Local Authorites has shown no remarkable change or divergence from trend (see table 3.14 and figure 3.13). Employment increased from 40 000 in 1920 to over 223 000 in 1979 which is a mean annual growth rate of 2,91%. Using five year intervals the percentage growth ranged from a maximum of 6% in 1920-1925 to minimum of -0,65% in 1975-80. The number of blacks to whites employed has ranged from 2,26 (B/W) in 1935 to 3,22 in 1970, and stood at 2,97 in 1980.

Local Authorities and Urbanisation

As was shown above, State employment has increased remakarbly over population. Under Local Authority employment the opposite occurs. Local authorities employment as a proportion of total urban population has been decreasing since 1932 (see table 3.15). In 1932 employment by local authorities comprised 2,47% of the urbanised population while by 1980 this had fallen to 1,79%[12].

There are three possible factors contributing to this relative decline:

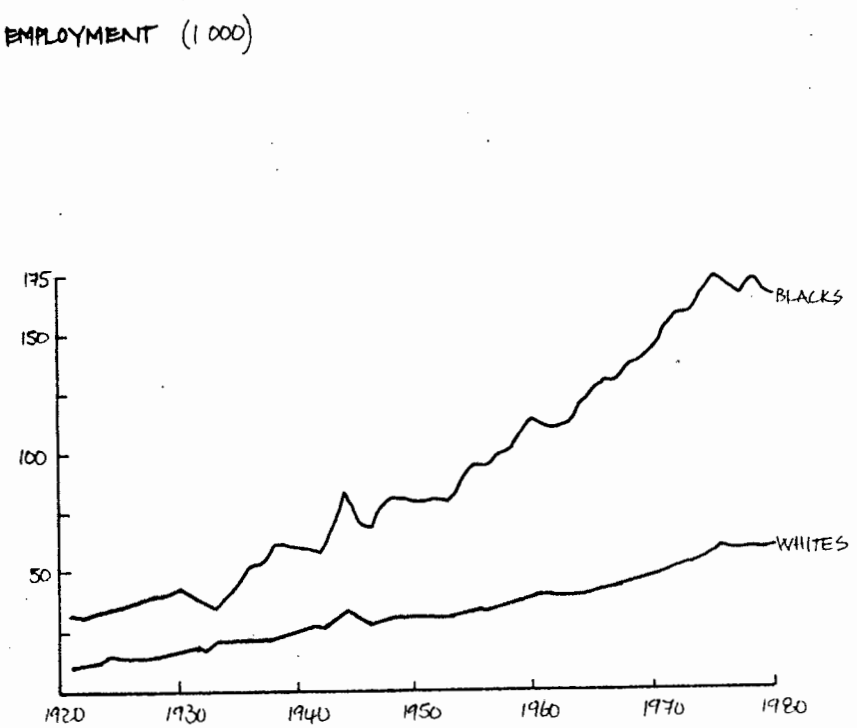


FIGURE 3-13: EMPLOYMENT BY LOCAL AUTHORITIES, 1921 – 1980

TABLE 3.14: Local Authorities Employment. Compound annual growth rates are racial ratios. 1920-1980 (five year intervals)

Year	Whites	Blacks	Total	B/W [1]
1920	-	-	-	3,22
1920-25	8,45	4,61	5,60	2,69
1925-30	5,14	3,13	3,69	2,44
1930-35	1,83	0,29	0,09	2,26
1935-40	5,22	2,88	6,83	2,41
1940-45	3,22	3,21	3,22	2,41
1945-50	1,61	1,09	1,25	2,35
1950-55	2,08	5,37	4,43	2,75
1955-60	2,16	3,60	3,22	2,95
1960-65	1,79	0,94	2,00	2,99
1965-70	2,47	2,81	2,73	3,04
1970-75	3,95	3,93	3,93	3,03
1975-80	-0,32	-0,76	-0,65	2,97

Source: Table 2.3.1

Note: 1 $\frac{B}{W}$ is for the last year of each period

Local Authorities and Urbanisation

Table 3.15 Local Authority Employment as a Percentage of Total Urban Population (Selected Years) 1921-1980[1]

Year	Employment as Proportion of Urban Population
1921	2,32
1932	2,47
1946	2,29
1951	2,02
1960	1,98
1970	1,84
1980	1,79

Note 1: 1980 excludes Transkei, Bophuthatswana and Venda.

Sources: Employment: Table 2.3.1

Urban Population: 1921-1970: Calculated from R S A, Department of Statistics. Statistical Year Book 1975, Pretoria: Government Printer, 1976 pp 1.8 and 1.11, 1980 : Calculated from RSA, Department of Statistics South African Statistics 1982, Pretoria : Government Printer, 1983. pp 1.8 and 1.11.

(i) Inherent economies of scale exist in the services provided by Local Authorities and it is these which are partly responsible for the falling employment/urbanisation ratios. As a town grows proportionately less firemen, ambulance drivers, administrators and library staff will be needed in order to provide the same services to the urbanised population;

(ii) Since one can reasonably assume that blacks receive less services than whites, and that over time the proportion of blacks in the cities has been rising it follows that with relatively less services being provided proportionate increases in employment will be low.

(iii) The relative fall in the size of Local Authority employment is consistent with the observations of David Solomon in his study on Local Authorities financing in South Africa.[13] Solomon finds that the relative size of Local Authorities has been decreasing consistently over time and he lays most of the blame for this phenomenon with the Central Authorities who appear to have discouraged any growth in Local Authorities.[14] It is possible that, with the current talks on greater Local Authority autonomy that the above trend might be reversed.

D: Employment by Control Boards

Employment by Control Boards has been very erratic but it is insignificant in relation to total State employment. While total

employment increased from 1 631 in 1960 to 2 684 in 1979 (an annual average increase of 3%) growth has not been on a regular basis. Decreases in employment have occurred in many years. This erratic behaviour was not confined to one particular racial group although decreases in black employment have occurred more regularly than in white employment. There is no consistent pattern in the ratio of white to black employment which ranged from 1:0,33 in 1970 to 1:0,56 in 1979 (table 2.4.1).

E: Employment by Statutory Bodies:

Data on this category of employment only became available in 1974. Employment in 1974 was 19 993. Between 1974 and 1981 employment increased to 25 843 (an annual average increase of 3,73%, see table 2.5.1).

F: Total Homeland Government Employment

In 1981 total employment by the Homeland governments stood at over 200 000 and for those years where data is available the growth in employment has in all cases been greater than population growth.[15] Between 1973 and 1981 the growth in total employment averaged 8,80% with Qwaqua showing a growth of more than 22% over the same period. (This was however a real increase of less than 3 000 personnel.)

While the growth in this category has been high, the growth against de-facto population and increases in the labour supply has been low. Employment by the Homeland governments as a proportion of total de-facto population is shown in table 3.16 for 1973 and 1980. In all cases, except for Gazankulu, this proportion has increased. Also in all cases can be seen evidence of the relatively low quantity of services provided to blacks, particularly blacks in the Homelands. If this is compared to table 3.3 which repeats the same exercise for total State employment it can be seen that the relative Homeland employment is considerably lower than that of both total white and total black employment by the State.

TABLE 3.16: Selected Homeland Government Employment as a Proportion of the Estimated de-facto population 1973 and 1980[1]

Homeland	1973	1980
Bophuthatswana	1,20	2,72
Transkei	1,60	2,87
Ciskei	1,37	1,97
Qwaqua	1,16	2,26
KwaZulu	0,76	1,06
Gazankulu	1,96	1,53

Note: 1 Black employees only

Sources: 1973 Calculated from Tables presented on pages 30 and 119 of Benbo's Black Development in South Africa Pretoria: Perskor, 1974

1980 Calculated from Tables 7 and 100 presented in Benso's Statistical Survey of Black Development Parts I and II. Pretoria: Benso, 1982

With regard to changes in the supply of labour, the most conservative estimate of which was 100 000 between 1973 and 1975[16], total increases in Homeland government employment rank as insignificant.

Whites employed by the Homeland Governments

Whites are employed largely in the higher technical and administrative positions and a small number are employed as teachers. The number of whites employed is very low in proportion to total employment. The proportion declined from 1:45,8 (W:B) in 1973 to 1:66,0, in 1975. (table 2.6.3). This trend can be expected to continue as more blacks qualify for the higher technical and administrative positions.

G: Employment by the South African Transport Services

In 1920, with employment of over 83 000, the SATS ranked as the largest single employer in South Africa. With an annual average increase of 1,92% in employment the SATS employed over 265 000 personnel by 1979 (although it is no longer the largest employer.) This growth in employment has not been constant and can be broken into three distinct phases (see tables 2.7.3 and 3.17 and figure 3.14):

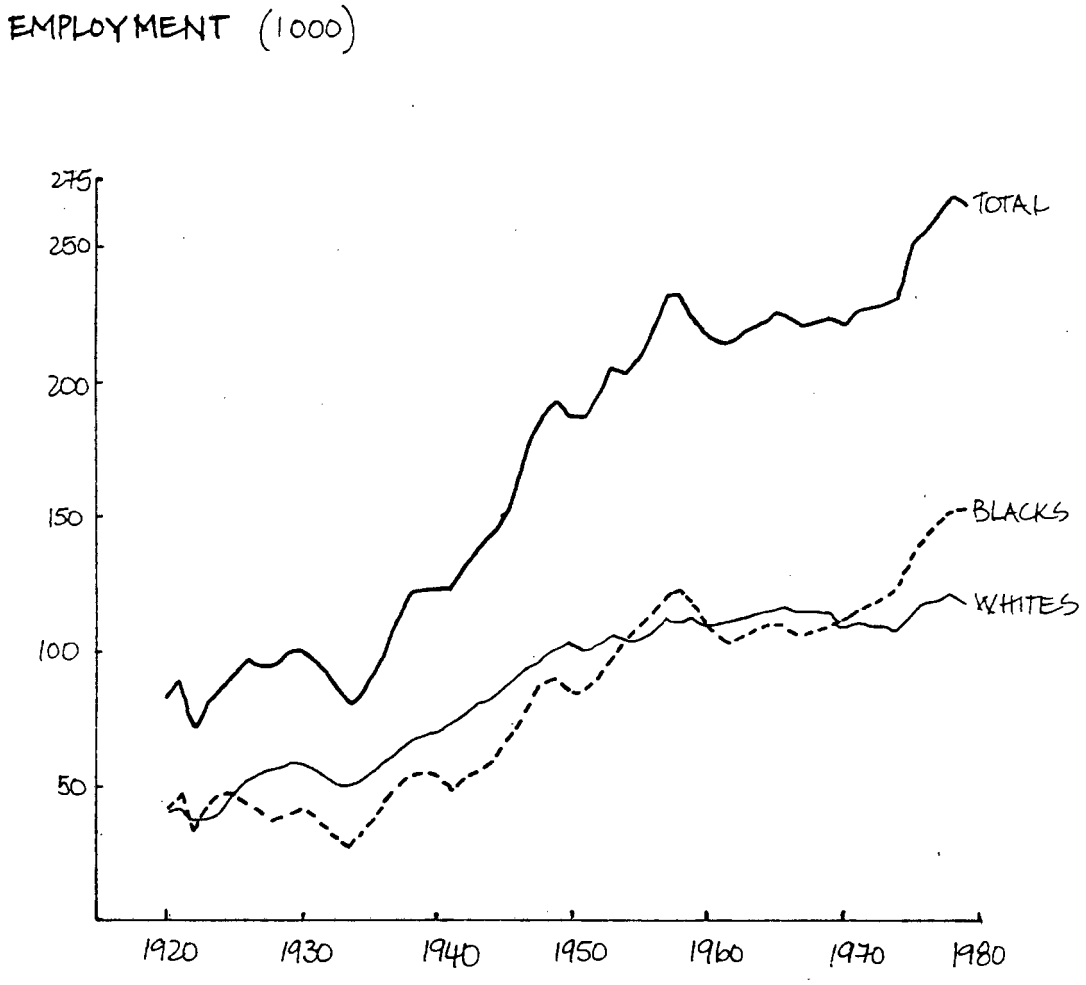


FIGURE 3-14: EMPLOYMENT BY THE S.A. TRANSPORT SERVICES, 1920 — 1980.

1920-1935: The number of personnel grew from 83 000 in 1920 to over 100 000 in 1930 before falling off to a little over 90 000 by 1935. This is an increase of 0,54% p.a. over the period.

7.1.2 : 1936-1955: This span of twenty years marks the most rapid increases in SATS employment. The number of personnel increased from 90 000 in 1935 to over 220 000 by 1955. This was a very high average annual increase of 5% p.a.

7.1.3 : 1956-1980: Since 1956 the SATS employment has shown some fluctuation from year to year but the general long term growth between 1956 and 1980 has been a very low annual average change of 0,56%.

TABLE 3.17 S A Transport Services, Employment, Compound growth rates and racial ratios, five year intervals, 1920-1980.

Year	White	Black	Total	(B/W)[1]
1920	-	-	-	1,05
1920-25	3,03	1,14	2,08	0,96
1925-30	4,31	-1,32	1,71	0,72
1930-35	-1,40	-3,04	-2,07	0,67
1935-40	5,06	8,16	6,43	0,77
1940-45	4,27	3,66	3,99	0,75
1945-50	3,81	5,68	4,64	0,82
1950-55	0,07	4,74	2,32	1,00
1955-60	1,05	0,25	0,65	1,00
1960-65	1,03	0,72	0,88	0,97
1965-70	-1,79	0,13	-0,47	1,03
1970-75	1,25	4,20	2,46	1,24
1975-80	0,38	2,38	1,26	1,34

Source: Calculated from Table 2.7.3

Note: 1 $\frac{B}{W}$ is for the last year of each period

Except for three distinct periods the SATS has always employed more whites than blacks. In 1920 the ratio of black to white employed was 1,05(B/W) but this had falled to 0,92 by 1922. Between 1954 and 1958 this changed from 0,94 to 1,11 only to fall back to 0,94 by 1961. Since 1970 the SATS has consistently employed more blacks than whites. In 1980 it employed 1,34 blacks to every white.

Within the context of the above there is one short term phenomenon which is noted. In 1955 the Railways, for the first time since 1929, employed more blacks than whites (see figure 3.14). Yet, by 1959 the position had again been reversed. The change is seen as significant because it was both large (see table 2.7.3) and occurred at a time of increasing labour shortages for the Railways (see section 3.5). While no evidence is available to explain this disturbance it is thought that the Railways, faced with a growing shortage of labour, attempted a substitution of black labour for white. It is felt that white Trade Union pressure forced a reversal of the trend, for the next time the Railways substituted whites with blacks, in 1970, this occured only after consultation with white Railway Trade Unions.

The above hypothesis implies that the Railways functioned under a fixed constraint. It is unknown whether this was an implicit or explicit ratio but evidence would suggest that it was explicit but flexible. It is thought that this would have been monitored very

closely by the white Railway Unions. If the above is correct, it has important implications for the Railways potential growth in that period. Increases in Railway employment were constrained by the Railways having to employ such that the white : black ratio was greater than one. This would not be a constraint in periods of excess white labour viz until ± 1948. In periods where there were white labour shortages viz after 1950, increases in Railway employment were constrained by its ability to attract white labour. This is reflected in the history of the Railways employment: the Railways experienced its most rapid growth in employment in the period 1936-1956 and as the economy began its dramatic advance over the 1950s and 1960s increases in Railways employment initially slowed and were almost constant for the 1960s while demand for Railways services increased dramatically. Only after 1969 when an easing of the racial employment constraint occurred did Railway employment again begin to increase.

H: Government Post Office

There is nothing particularly significant about GPO employment growth. Between 1920 and 1940 employment changed from 10 000 to 16 000 (2% growth) and between 1940 and 1980 has grown steadily at an average annual rate of 3,94% to 75 000. (See table 2.8.1 and figure 3.15).

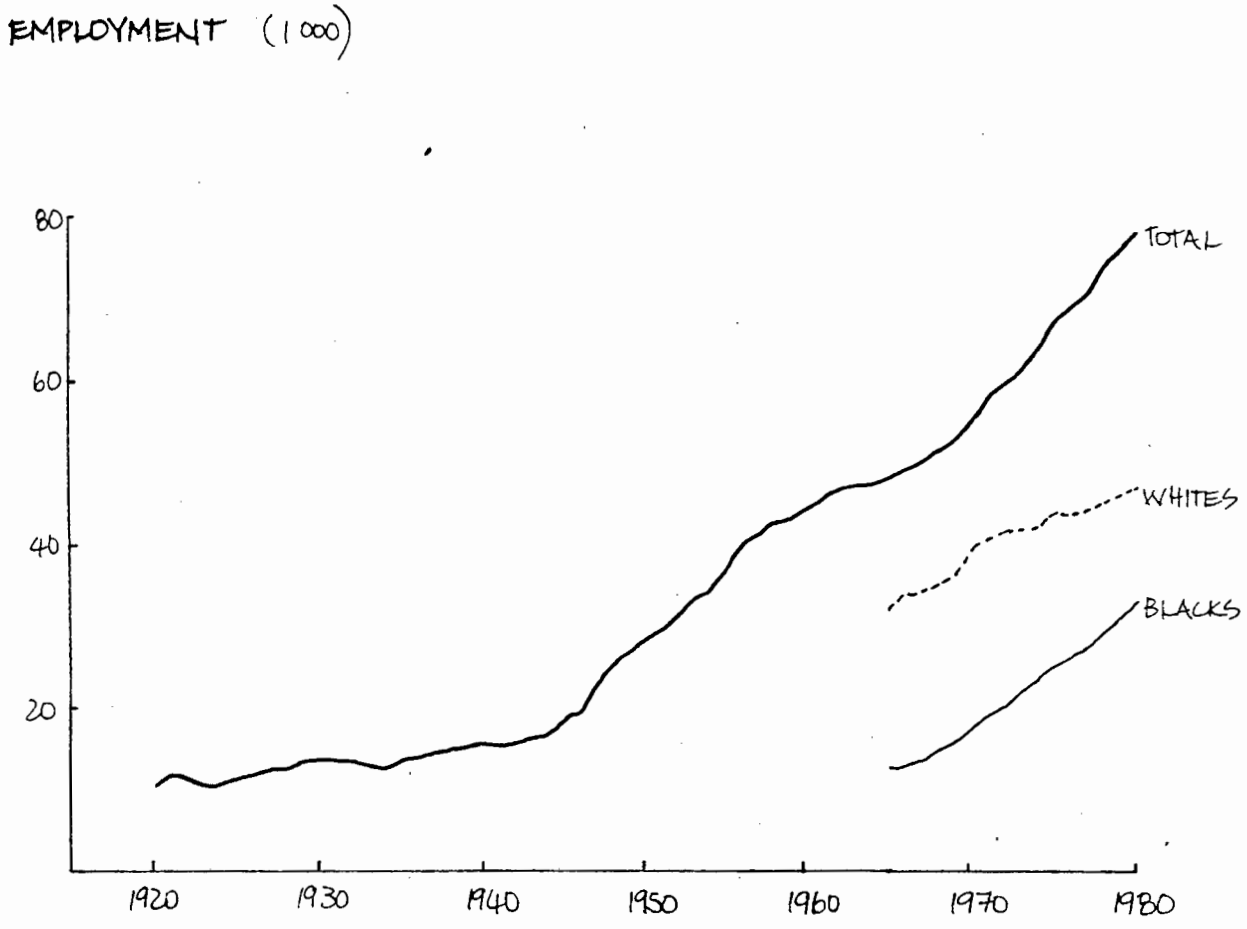


FIGURE 3-15 : EMPLOYMENT BY THE POST OFFICE, 1920 – 1980.

I: Employment by the Public Corporations

Total employment by all the public corporations has already been discussed in Section 3.4.1 above. For the individual public corporation where data is available, only two are large enough to have significant employment levels viz. Escom and Iscor.

Escom: Both Black and White employment has increased at a reasonably stable rate (see figure 3.16). The annual average increase in employment between 1950 and 1980 was 5,38%.

The unusual increase in employment in 1948 was due to Escom assuming control over the Victoria Falls Power Company.

Iscor: For the years when data is available Iscor's employment increased from 1 445 in 1928 to 32 000 in 1970 (a compound growth of 7,31% on the 1928 total), to 47 000 in 1975 (9,39%) and to 62 000 in 1981 (8,18% p.a.) (An overall increase of 7,35% p.a.) see figure 3.17.

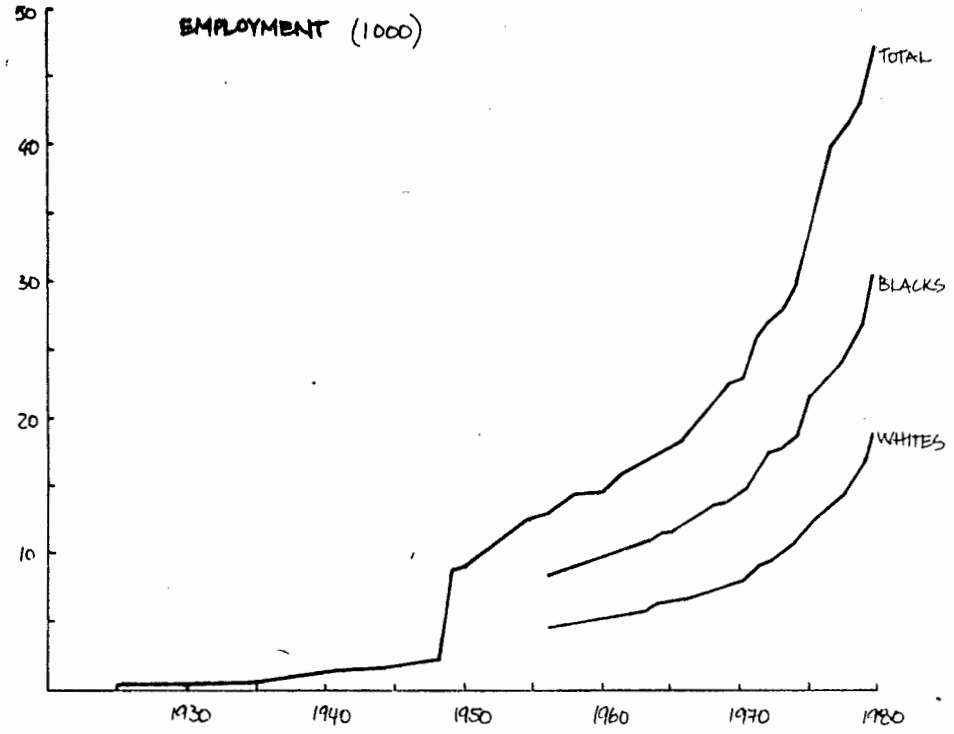


FIGURE 3-16: EMPLOYMENT BY ESCOM, SELECTED YEARS, 1927 — 1980

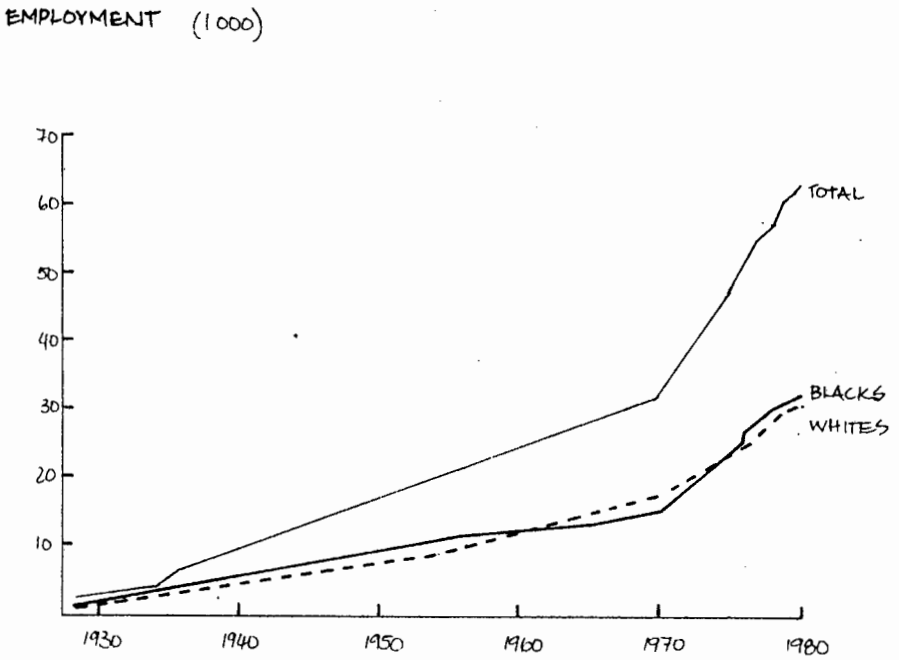


FIGURE 3-17: EMPLOYMENT BY ISCOR, SELECTED YEARS 1928 - 1980.

3.4 STATE EMPLOYMENT AND THE POLITICAL ECONOMIC HISTORY OF SOUTH AFRICA

Introduction:

This section of the thesis is designed to give context to the work presented above.

In the course of this study it was realised that a number of issues, both short term and long term, could only be discussed within the political economic history of South Africa. These issues cover such short term factors as sudden short-lived employment variations as shown, for example, in figure 3.8 and isolated political or economic disturbances which might have affected employment like the Great Depression. The long term issues discussed deal with issues like the effects of different governments and social philosophies, and economic factors like the effects of skilled labour shortages on State employment. The objective of this section is to explain, if possible, the various changes which have occurred in State employment in relation to the political and economic forces acting on the State at the time. This section became particularly important when it was discovered that the role of the State as an 'employer of last resort' did not occur in the form originally expected and a need existed for a

deeper examination of the political factors which might have affected State employment.

A political economic history is presented below on which further discussion is based. It is both selected history and briefly presented; selected because only sections relevant to changes in State employment are discussed and brief because there are many written histories of South Africa

The discussion presented below is divided into five parts corresponding to periods which appear to have had differing influences on State employment.

Laissez-faire Government : Pre 1924

"Prior to 1924 the economic philosophy of the administration was essentially based upon the tenets of economic liberalism in all affairs other than labour matters."

Jill Nattrass (1981)[17]

There is little reliable data available on State employment for the years prior to 1920 and discussion is confined to the period 1920 to 1924. Between 1920 and 1924 total State employment increased from an estimated 150 000 to 188 000 (table 3.18). This growth was

greater than the OLS[1)] growth rate (see figure 3.1) of State employment as a percentage of population by between 0,03% in 1922 and 0,28% in 1924. This period is dominated by the Railways which was not only the largest sector of State employment but was also solely responsible for the decrease in total employment in 1922 (see figure 3.8). It is noted that this decrease occurred in both white and black railway workers (figures 3.6 and 3.7) although proportionately more blacks were affected.

TABLE 3.18 : Some indicators of the changes in State employment, 1920-1924

Year	Total Employment	$\frac{B}{W}$	Deviations from the OLS growth of employment as a percentage of population $_1$)		
			White	Black	Total
1920	150 718	1,26	-0,33	0,40	0,14
1921	160 921	1,31	-0,35	0,46	0,20
1922	155 703	1,03	0,11	0,17	0,13
1923	171 693	1,14	-0,18	0,33	0,16
1924	188 153	1,11	0,14	0,38	0,28

Sources: Extracted and calculated from Part II. Data estimated where unavailable

Note: $_1$) OLS is the ordinary least squares line for 1920-1980 shown in fig. 3-1.

One interesting occurrence in this period is that it marked the start of a fundamental change in State employment. In this period black employment as a percentage of population is well above the OLS line and remained so until 1928. White employment as a percentage of population started below its OLS growth (-0,35% in 1921) and increased rapidly to 0,14% by 1924. This sudden increase in white employment and relative decrease in black employment marks the start of a declining number of blacks employed per white. The proportions existing in 1921 declined to a low of 0,81:1 in 1933 and did not return to the 1921 level until 1960. These changes can to some extent be understood in the light of the political forces operating at that time.

The main issues and problems that faced the administration and legislature were threefold. There existed at the time of Union a shortage of black mine labour prepared to work at wage rates which would keep the gold mining industry profitable although it is thought that the Land Act of 1913 did succeed partially in increasing the supply of black labour and depressing black wages by its restrictions on access to the land.[18]

The second problem, and one which is still felt today, was that in the face of this vast growing pool of unskilled labour an ever increasing shortage of skilled labour was experienced, particularly skilled mining labour. The resultant disparity

between skilled (white) wages and unskilled (black) wages, coupled with growing working costs and a falling price of gold, saw several attempts at black-white labour substitution and when it received government sanction, eventually led to the Rand Rebellion of 1922.

The third and most sensitive issue faced by the government was that of deteriorating relations between English speaking and Afrikaans speaking whites. Botha's policy as the Union's first leader was a reconciliation between English and Afrikaans speaking whites in an attempt to create a common white South African people. However it was clear by 1912 with Hertzog's break-away from the South African Party and the establishment of the National Party that Botha was not to succeed. This problem was further aggravated by two factors. Firstly, National elements were also Republican elements and those, already incensed by Botha's and the Union's close ties with the British Empire, were outraged by Botha's allegiance with the Empire at the outbreak of the Great War. The emergence of Smuts as Prime Minister on the death of Botha in 1919 further weakened English-Afrikaans relations as the Nationalists recognised "....the part he had played as imperial statesman during the First World War had enabled (them) to taunt him with being the handyman of the Empire". Secondly, a growing number of poor whites, the majority of whom were Afrikaans speaking, started to emerge as a political and social force. The increased supply of

unskilled black labour and the consequent downward pressure on unskilled wages, created greater competition for employment between unskilled white and unskilled black labour and further aggravated the poor white problem.

It is thought that the changing pattern in State employment is rooted in the above factors. Smuts' government, perceiving a growing discontent in the working population, deliberately increased white and decreased black employment proportionately. However, the measures applied were 'too little too late' and in 1924 the Nationalist-Labour coalition Pact government was brought to power.

Paternalistic White Government: 1924-1947

The emergence of the Pact government marked the end of a laissez-faire South African economy. As Jill Nattrass explains: "....the transference of political power to the Pact Alliance in 1924, produced a dramatic change in government attitudes towards the economy, and in the way in which the State perceived its own economic role. This government was the result of an alliance between white labour interests, those of the infant Afrikaner business sector and the white rural areas. Quite naturally, in view of its constituent members, this ruling party placed strong emphasis on the need for the South African economy to develop in its own right and on a broader basis than that of the mining

industry alone. The ideology brought in by the Pact government was destined to live on long after the alliance itself and the 26 years from 1924 - 50 saw a continuous growth in the extent of the economic activity undertaken by the South African state."[20]

The Pact union came about through a respective dislike of Smuts and his imperial ties and a basic distrust of foreign capital.[21] As a result, the economic policies which resulted from this union are not surprising. It is also not surprising that both the Fusion government of 1933 and the United Party government of 1939 continued with these policies as this can only be viewed as political expediency in accepting the delicately established status quo.

The Pact victory marked two changes in the South African political life. Firstly, as has been noted, there were the significant increases in direct government intervention in the economy. These policies were highlighted with the establishment of Iscor and the introduction of customs tariffs. Directly linked to the beginning of State economic intervention was a renewed drive to overcome the Poor White Problem, a problem which in 1931 the Carnegie Commission reported included 300 000 whites in a total white population of 1,5m.[22] Previous to 1925 the government had helped poor whites but it was the Pact government which led firm commitment to the 'Civilised Labour Policy'.[23]

Economically three events are important over this period:

Firstly, the Great Depression of 1929 which affected the South African economy from 1930-31. Secondly, South Africa leaving the gold standard and the devaluation of the pound in 1933, and thirdly between 1923 and 1945 what Hobart Houghton, in the light of Rostow, has called the period of take off into self sustained growth.[24]

TABLE 3.19: Some indicators of the changes in State employment, selected years, 1925-1947

Year	Total Employment	$\frac{B}{W}$	Deviations from the OLS growth of growth of employment as a percentage of population		
			White	Black	Total
1925	196 541	1,04	0,33	0,30	0,28
1926	204 180	0,99	0,49	0,27	0,29
1928	204 434	0,90	0,29	0,02	0,04
1929	220 645	0,93	0,39	0,11	0,18
1930	227 408	0,93	0,36	0,09	0,15
1931	223 033	0,91	0,06	0,01	0,06
1932	211 982	0,85	-0,36	-0,25	-0,24
1933	206 802	0,81	-0,60	-0,37	-0,37
1938	308 079	1,06	-0,10	-0,06	-0,05
1940	321 403	1,00	-0,12	-0,18	-0,16
1946	405 340	1,00	0,13	-0,17	-0,02
1947	441 055	1,04	0,34	0,01	0,19

Sources: Extracted and calculated from Part II Data estimated where unavailable.

This 'take off' saw a rapid increase in demand for skilled white labour and a general disappearance of a need for the 'Civilised Labour Policy'.[25] Black labour supply increased as a result of both growing impoverishment of the reserves and greater effectiveness of the labour legal institutions.[26]

Over this period total State employment increased from 196 541 to 441 055 (an annual average growth of 3,74%, see table 3.19). The growth of total employment as a percentage of population was greater than the OLS growth rate until 1931 (figure 3.2). It remained below the OLS growth rate before growing to 0,19% above by 1947. The number of blacks employed per white decreased from 1,04 in 1925 (table 3.19) to 0,90 in 1928 and this is largely ascribed to the effects of the Civilised Labour Policy. The Railways is the only sector where any noticeable effect of the Civilised Labour Policy is evident (figures 3.6 and 3.7). Between 1925 and 1930 white employment by the Railways increased from 47 000 to 58 000 (an annual increase of 4,30%) while black employment decreased from 45 000 to 38 000 between 1925 and 1928 (an annual decrease of 5,40%). The result of this was that cost of implementing the civilised labour policy became so embarrassing to the Railways that the Railways and Harbours Board minuted the General Manager of the Railways need no longer record the cost of the policy.[27]

The only sector of the State where the Civilised Labour Policy

was implemented to any significant degree was the Railways. The other areas under State employment indicate little evidence of having accommodated the policy. In one area of the State, that of Local Authorities, direct controls existed through differential rates of subsidy for the government to force Local Authorities to implement the Civilised Labour Policy. While it is reported by Van Biljon that these controls were actively implemented during the late 1920s and early 1930s, no significant changes in Local Authorities employment can be observed.[28]

The Great Depression, reaching the country early in 1930, had a far greater impact on State employment than did the Civilised Labour Policy. State employment decreased from 227 408 in 1930 to 206 892 in 1933. This decrease was severest for black labour with the number of blacks per white employed falling from 0,93 to 0,81 over that period. The decrease was significant for both the Railways and Local Authorities (figure 3.8). For the Local Authorities the decrease was confined to black labour only, while it occurred over both black and white in the Railways (figures 3.6 and 3.7). The effects of the Great Depression were also felt by Iscor which had since inception employed a totally white labour force. Severely handicapped by the Depression, Iscor claimed in early 1932 that it could no longer employ labour on humanitarian and not economic grounds and allowed blacks into its workforce.[29]

Between 1933 and the beginning of World War II, little of

significance is observed in State employment with both black and white employment remaining below their respective long term growth rates. During the war black employment by Local Authorities increased by a significant 44% between 1941 and 1944 (58 484 to 84 404) only to decrease to 67 992 by 1946. This fluctuation remains unexplained but as white employment by Local Authorities did not decrease (figure 3.6) it is not seen as a result of war induced labour shortages. The year 1947 (and 1948) marked a sudden but shortlived increase in State employment which occurred over both black and white employment.

The Era of Pure Apartheid : Malan, Strydom, Verwoerd 1948-1964

The election of 1948 saw the triumph of a pure Afrikaner government even if it did comprise an uneasy truce within Afrikanerdom.[30] This victory had a twofold effect on government policies. Firstly, while the problem of the poor (Afrikaner) white was largely overcome well before 1948, and Afrikaner Nationalism had emerged as a decisive force, the Afrikaans volk was still commercially and economically dominated by English speaking whites. It appears to have become implicit government policy to change or at least equalise this economic imbalance of the ownership of capital. This emerged as active support by the government in favour of Afrikaner business and the Afrikaner bureaucracies established in the previous period, and a challenging of English business through the

various State enterprises and public corporations.[31] As Giliomee writes: "The Malan government started to use the Industrial Development Corporation (IDC) to strengthen Afrikaner participation in the industrial progress of the country.... The IDC was widely seen in Afrikaner circles as a bulwark against the Anglo American Corporation, which has caused concern because of its wide involvement in a large number of ventures.... The IDC, which, at the time of its establishment, was looked upon as a corporation intended to assist generally industrial development in the private sector, tended to become an industrial conglomerate like any financial corporation in the private sector, and tended to enter into direct competition with the private sector instead of assisting it."[32] It is likely that the creation of more public corporations was partly a result of similar motivation: "through the Industrial Development Corporation the government has built upon the precedent of Iscor ten further semi-public undertakings. Apart from giving the government an important leverage in the economy, these enterprises have created employment opportunities and training in entrepreneurial skills for Afrikaners."[33]

Secondly, the Nationalist government achieved political victory on the apartheid platform and began to implement these policies on a vigorous basis. It is not always obvious in the initial part of this period that Malan and Strydom had definite, predetermined policies for the implementation of apartheid and many

of the policies appear to be little more than a collection of ad hoc decisions. It required the vision of Verwoerd to formalise and institutionalise the rigorous doctrine of apartheid.[34] "The essence of Apartheid was that White and Non-white did not, could not and must not constitute a single social system. The self existence of the whites subsisted in excluding Non-whites from a shared reality of human relationships, however much the existence of the Non-white proved an economic entity. The parliamentary programme of Afrikanerdom directed itself accordingly."[35]

Just as the Pact government of 1924 had brought about decisive and important changes to the economy, so the Nationalist victory of 1948 brought about changes both economic and social. The hardening of the white attitude to the industrial colour bar, plus the effect of white trade unions, continued to keep blacks out of skilled positions. The separation of the various racial groups, both physically and socially, the report of the Tomlinson Commission and Verwoerd's apartheid plan created the need for that bureaucratic monolith the (now) department of Cooperation and Development. Growing social unrest as a result of the implementation of the implementation of the policies led to the introduction of conflict regulation which is interpreted as so powerful that much "conflict" is suppressed.[36] The effects of this has been to keep public order employment at a fairly constant proportion of State employment - approximately 10% (table 3.6), and at a fairly constant proportion

of total population.[37] After South Africa achieved Republican status, two other factors developed which affected State employment. Firstly the initial five years of the Republic saw the severest imposition of 'petty apartheid' or what Horwitz calls 'klein apartheid'.[38] Secondly, Republican status saw exchange control introduced to South Africa and a closure of the links between the Johannesburg Stock Exchange and the London Stock

TABLE 3.20 Some indicators of the changes in State employment, selected years, 1948-1964

Year	Total Employment	$\frac{B}{W}$	Deviations from the OLS growth of employment as a percentage of population		
			White	Black	Total
1948	471 644	1,03	0,58	-0,05	0,16
49	449 254	1,02	0,39	-0,23	-0,29
50	481 518	0,97	0,39	-0,38	-0,17
51	492 081	1,01	0,15	-0,42	-0,27
52	505 277	1,01	0,07	-0,44	-0,30
55	637 717	1,26	0,22	-0,19	0,26
58	727 075	1,30	0,39	0,30	0,39
59	749 491	1,29	0,48	0,05	0,14
60	798 545	1,41	0,45	0,18	0,20
62	840 744	1,39	0,44	0,05	0,08
63	892 646	1,46	0,43	0,17	0,17
64	912 783	1,45	0,30	0,08	0,09

Sources: Extracted and calculated from Part II. Data estimated where unavailable.

Exchange effectively 'trapped' foreign capital in the country. It is reported that the (then) Finance Minister, Dönges, persuaded Verwoerd that a favourable investment climate had become essential after the imposition of exchange control and the preferred means of achieving this was through a massive injection of State capital expenditure.[39]

Within the context of the above the State was poised to extend social, political and economic change over the country. The changes, when they occurred, are reflected in the changes in State employment.

In the 1945-1960 period State employment, particularly black employment, increased at a rate greater than at any other time. Total employment increased from 472 000 in 1948 (3,9% of the population) to 913 000 in 1964 (4,8%). This is an annual average increase of 4,21%. The dominant part of this increase is due to increases in the employment by the Central Authorities (see figure 3.8) but can also be partially attributed to increases in Provincial employment and in Railways employment (see section 3.3). The increase in employment by the Central Authorities was so great that in 1960 it became an employer larger than the Railways. Over the same period the number of blacks employed per white by the State increased significantly from 1,03 in 1948 to 1,45 in 1964. Again it was the Central Authorities which contributed largely to this change. By the end of the period the Central Authorities was

the largest single employer of Blacks in the State and in the country (see figure 3.7); table 3.20 and figure 3.1 reflects these changes. Total white employment varied between 0,07 percent and 0,58 percent above its OLS growth (with a mean of 0,36%). Total black employment was below OLS growth by -0,05% in 1948 and reached -0,44% in 1952. By 1955 this rose to -0,19% and by 1958 to 0,30%, declining erratically to 0,08% in 1964.

This period marks extensive contradictions between what the government was attempting socially and what it was doing with its workforce. The government introduced and implemented apartheid with such vigour that by 1964 no section of the country remained unaffected. In order to implement these changes, a large bureaucracy was needed, but this would, in keeping with government philosophy, have been a predominantly white bureaucracy. Unfortunately for what Davenport calls the 'Social Engineers'[40] the period was also marked by high economic growth, and structural changes in the economy that led to large demand increases for skilled (i.e. white) labour.[41] These changes brought significant increases in real incomes in the private sector, and yet apart from the public corporations[42] the public sector did not respond to the changed economic circumstances and began suffering white labour 'shortages'. The State's response to these changing circumstances was a toleration of white labour shortages and a substantial increase in black labour filling both vacant white posts where

possible and also filling some newly created black posts. This was contrary to apartheid philosophies, but necessary to overcome economic realities. Only by the tacit acceptance of this contradiction could the implementation of apartheid philosophies be achieved and as such the State set the country an objective which it could not itself accomplish.

From Apartheid to Separate Development 1965-1971

> "The credibility of the Nationalist Government depended at all times on its ability to find a workable solution to its population problems which would enable the white people to survive as a distinct community and at the same time permit other communities to share the decencies of life."[43]
>
> Davenport (1978)

It was over this period, especially after the death of Verwoerd in 1966, that growing labour problems presented themselves.[44] The increasing shortage of skilled labour really prevented pure apartheid from ever being fulfilled. "I need not dwell upon the subsequent history of the policy of separate development, save perhaps to mention that the National Party government never really gave it a chance. Not wishing to burden the white electorate to the extent envisaged by the Tomlinson Commission, the Government rejected from the outset some of the most fundamental demands

formulated by the Commission. It substituted in their place a lukewarm implementation of the policy of separate development, thereby frustrating the very purpose of that policy."[45]

Realising the country's economic need of black labour, the goal of complete separation in the labour market was abandoned. "It has built an elaborate structure designed to permit the use of African labour but to dispel any notion that Africans can be regarded as a permanent part of the population in the 'White areas' or acquire the rights reserved for the White population."[46] This period marked what Davenport has called a time of "Maintenance and Modification".[47] While pure apartheid was never implemented as a social system, the drive for productivity in the economy was never allowed to threaten the Afrikaner culture and way of life. The entire decade is marked with the realisation that apartheid would not work but that lip service would still be paid to the "objectives".[48]

The maintenance and adjustment of apartheid without any real changes evident is reflected under State employment. Total employment increased from 944 000 in 1965 (4,8% of the population) to 1 175 000 in 1972 (5,0%) an annual average increase of 3,18%. Total employment remained above the OLS growth until 1970 when it declined to -0,14% and reached -0,21% by 1972. The decline in 1970 centred largely on whites with the black/white employment ratio increasing from 1,54 in 1969 to 1,63 in 1971.

TABLE 3.21: Some indicators of the Changes in State employment, 1965-1972

Year	Total Employment	$\frac{B}{W}$	Deviations from the OLS growth of employment as a percentage of population		
			White	Black	Total
1965	943 676	1,48	0,11	0,09	0,05
1966	1 017 694	1,57	0,12	0,29	0,22
1967	1 025 611	1,54	0,04	0,15	0,07
1968	1 107 620	1,46	0,86	0,20	0,26
1969	1 143 365	1,54	0,44	0,24	0,22
1970	1 105 295	1,62	-0,74	0,04	-0,14
1971	1 160 000	1,63	-0,61	0,08	-0,08
1972	1 175 118	1,61	-0,76	-0,04	-0,21

Source: Extracted and calculated from Part II.

Data estimated where unavailable

The two most important sectors under State employment, the Central Authorities and the Railways, show the effects of the period: Under Central Authorities employment, black employment which had previously exhibited tremendous growth now entered a period of rapid fluctuation and an overall net decline. In the Railways the black/white ratio declined as less blacks were employed and only increased again in 1969.

It is this period which is noted for the tremendous shortages of skilled white labour.[49] It was a shortage which affected all employers but particularly those parts of the public sectors offering wages at the lower end of the market rate. As is shown in

tables 3.23, 3.24 and 3.25 vacancy levels increased significantly for the Public Service and the Railways between 1966 and 1971/72. It is also noted that the Post Office vacancy levels shown in table 3.24 are likely to be unrepresentative. It is the writer's impression that the Post Office also suffered increasing labour shortages over this period.

The modifications made by the public sector in the light of these labour shortage shows mainstream apartheid being modified, but primarily maintained. Even while the numbers of blacks to whites employed by the State continued to increase, nowhere is mention made of the pragmatic possibility that blacks should permanently fill vacant white posts. The response was rather to introduce labour saving capital where ever possible, two examples of which are the containerisation program of the Railways, and automatic mail sorting machines of the Post Office, which were introduced during this period. Yet even these measures were of little effect as the black/white ratio continued to increase and white labour shortages remained.

Economic Needs and the Easing of Racial Discrimination: 1972-1980

> "If the 1960s was a decade in which the crass attack on the emerging welfare system began to abate, the 1970s represented something new - an acceptance of policy-orientations which had previously been under attack. By the end of the 1970s it was clear that a

> tide had turned, and that a combination of internal and external pressures had pushed the South African political economy, probably irrevocably, towards integration, deracialisation and welfarism - a path that was in various ways 'in its own logic' to traverse. Few critics would have believed in 1970 that by the end of the decade black trade unions would be an established reality, all statutory job reservation outside the mining industry would be abolished, or that in a decade of relatively slow real growth a 10 percent change in the relative income shares of white and black would take place in a progressive direction."
>
> Bromberger (1982)[50]

Four factors combined to bring about this movement away from discrimination: Internal unrest in the form of labour strikes, student protests and urban terrorism continued unabated throughout the decade. Secondly, external pressure began to mount in the form of pressure from South Africa's trading partners, particularly during the Carter administration and also as pressure from the newly independent 'frontline' states of Angola, Mozambique and Zimbabwe increased. Thirdly, skilled labour shortages which started in the mid 1960s reached epidemic proportions during the 1970s. And fourthly, there was an increasing concern for the growing army of black unemployed. The result of this was a move by government away from overt discrimination to a policy of 'winning the hearts and minds of the people'.[51]

This period saw State employment increase from 1 181 000 in 1973 (4,9% of the population) to 1 601 000 by 1980 (5,6%). This is an annual average growth of 4,44%. Apart from 1977 and 1978 total employment was below its OLS growth. Black employment was below OLS growth in 1973 and

1979-1980. White employment was below OLS growth from 1973 to 1976.

TABLE 3.22 Some indicators of the changes in State employment, selected years, 1973-1980

Year	Total Employment	B/W	Deviations from the OLS growth of employment as a percentage of population		
			White	Black	Total
1973	1 181 181	1,61	-0,85	-0,19	-0,08
74	1 264 059	1,70	-0,99	0,00	-0,22
75	1 341 063	1,74	-0,84	0,13	-0,09
76	1 383 719	1,72	-0,74	0,09	-0,12
77	1 495 600	1,55	0,60	0,09	0,11
78	1 548 894	1,57	0,55	0,10	0,05
79	1 548 379	1,58	0,09	-0,05	-0,09
80	1 601 158	1 59	0,08	-0,04	-0,10

Sources: Extracted and calculated from Part II. Data estimated where unavailable.

The year 1973 marked the first time that the State publically acknowledged that blacks would be substituted for whites in vacant white positions. In many cases, particularly with the Railways, this was only undertaken after extensive consultations with the relevant trade unions. Slowly, but with growing momentum, more and more blacks were being employed permanently as shunters/marshallers in the Railways and as telephone technicians and clerks in the Post Office and this change is

reflected in the number of blacks per white employed by the State which increased from 1,61 in 1973 to 1,74 in 1975 before declining to 1,72 in 1976. There is one very important feature of this period which needs highlighting. The year 1976 marks the first real decline in the economic prosperity which the country had been experiencing since the early 1960s., The recession lasted until 1978 and its effect on employment is evident. Between 1976 and 1977 the number of blacks employed per white declined from 1,72 to 1,55, its lowest since 1969 and had only moved to 1,59 by 1980 (see figure 3.2 and table 3.22). It is thought that this increase was a response to increasing white unemployment. The State, acting as employer of last resort for whites, was in a position to use vacant white posts to partially relieve the hardships of increased white unemployment.

3.5 Racial Wage Differences and the State in South Africa

There are two generally held beliefs amongst observers of the South African labour situation: Average earnings for blacks are consistently lower than for whites, and it is frequently argued that the public sector has assisted in maintaining these differences through a system of acting as an employer of last resort for whites. Racial wage differentials are both self evident and well documented (see figure 3.18(a)) and it has been argued that these earning differentials have been preserved on the supply side by superior educational facilities provided for whites and on the demand side by the effective provision of jobs for whites in the public sector.[53]

While these two beliefs are acknowledged, there exist considerable disagreement as to the factors causing the wage differences, and the role of the public sector in the formation and continued maintenance of the differences.

The purpose of this section is firstly to examine and, if possible, reconcile the different theories of racial wage differences. Secondly, to examine the role of the public sector and thirdly, offer a theory of racial wage differences which incorporates the public sector.

Most writers on racial wage differences in South Africa

AVERAGE WHITE WAGE

AVERAGE BLACK WAGE

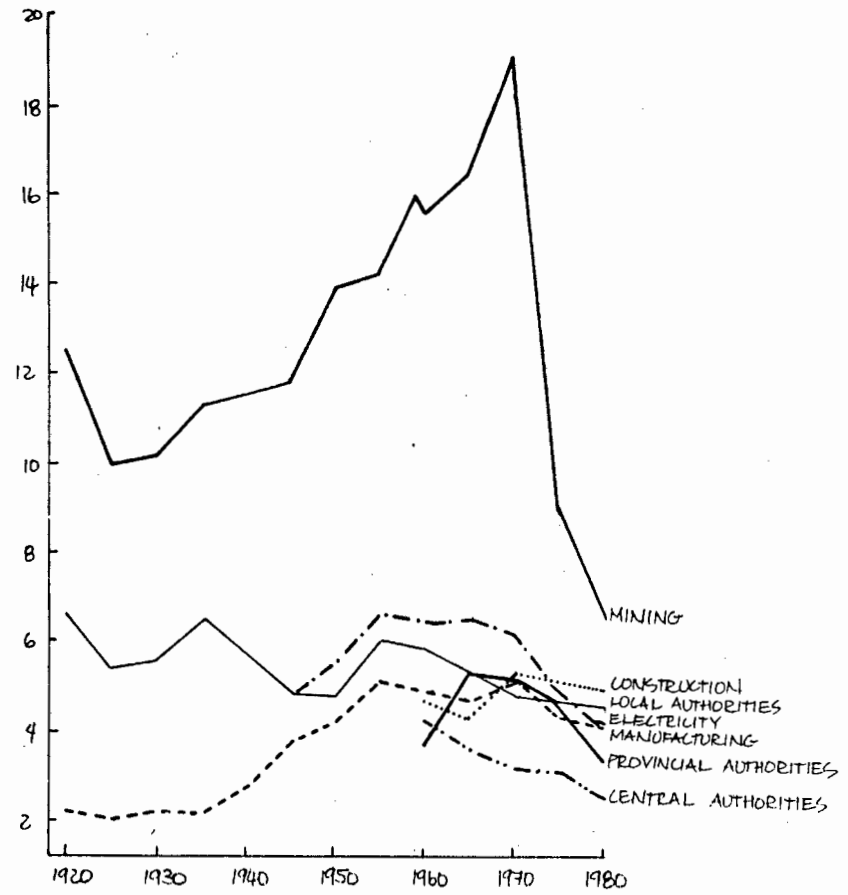


FIGURE 3-18 (a): RATIO OF AVERAGE WHITE TO BLACK WAGES, VARIOUS SECTORS, FIVE YEAR INTERVALS, 1920 – 1980.

BLACK EMPLOYMENT

WHITE EMPLOYMENT

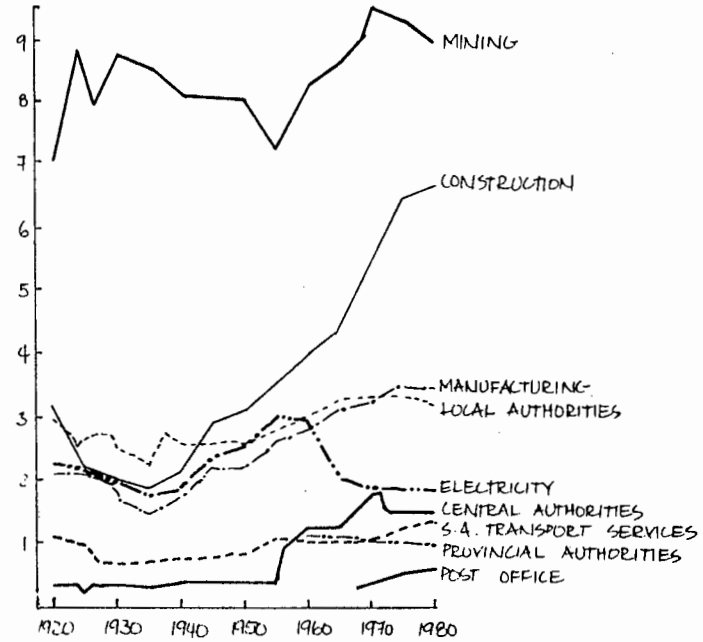


FIGURE 3-18 (b): NUMBER OF BLACKS EMPLOYED PER WHITE, VARIOUS SECTORS, SELECTED YEARS, 1920 – 1980.

generally agree that these are caused by market forces operating under constraints. The disagreement is which are the appropriate constraints to consider, and how these have caused racial wage differences. As Kantor and Rees suggest, "The analytical problem is to establish the separate effects on incomes of market forces and of trade unions - and government - imposed restraints on competition for jobs when all that can be observed are actual market incomes in cash and kind".[54]

There is a second body of theory which attempts to explain racial wage differences through segmented (or dual) labour market theory. Under segmented labour market theory the labour market is divided into a primary sector associated with skilled labour conditions and a secondary sector which offers the low pay and poor working conditions associated with unskilled labour.[55] Within these two markets, wages may be determined by market forces[56] or even, according to some theorists, by institutional arrangements and custom.[57] While it can be shown conclusively that wages are market determined[58] the possibility of the existence of a dual labour market needs further research.[59] It should however be noted that one of the earliest academics to advance dual labour theory (John Knight, 1964[60]) concludes in a 1977 article that available evidence no longer supports the applicability of dual labour theory to South Africa.[61]

3.5.1 Neo Classical Wage Determination

Neo Classical theory sees the determination of wages purely as a function of the demand and supply of labour. Exogenous factors acting to constrain demand and/or render the supply of labour non-homogenous can be analysed within the neo classical theory.

What follows below is a discussion of the relative factors which might have affected the demand and supply of labour in South Africa:

A: Levels of Skill: Wages paid are a direct reflection of the expected productivity of the worker by the employer. To the extent that there is a tremendous, although decreasing, disparity between black and white skills, there exists the likelihood that this is the main cause of wage differences. Three factors are important when considering skill levels: formal education, in-house training and returns to education.

Formal Education: With regard to the first factor it is well known that there exists wide differences between race groups due to State redistribution policies. For example in 1980 60% of whites had attained at least a full primary course (8 years of schooling) while only 14% of blacks attained the same level.[62] It is generally acknowledged that there also exists a considerable

quality difference in formal education with white education having better qualified teachers, lower pupil-teacher ratios and no double teaching sessions.[63]

In-house training: With regard to in-house training, i.e. the acquisition of specific skills as opposed to general skills, observation would lead one to conclude that employers faced with unskilled black labour turnover, are less likely to invest in general skill training for blacks.[64]

B: Fixed factor proportions: Fixed white to black employment ratios are an integral part of some industries in South Africa although the proportion of affected industries has been decreasing. Fixed factor proportions are important to wage differences as they limit the demand for blacks and therefore depress black earnings. Employment ratios in many sectors of the economy have been increasing since the mid 1960s (see figure 3.18(b)) but as this is primarily a response to a shortage of skilled white labour, it in no way undermines the effects of fixed factor proportions on wage differences.[65]

The argument that fixed factor proportions do in fact work against racial wage differences is only relevant in one specific case. Kantor and Rees argue that where white labour is paid according to the output of a black labour team, it is in the

interest of a white team leader to increase the size of his black team to the point where the productivity of an extra worker is equal to his wage rate.[66] This argument is only relevant where white labour is paid according to black output i.e. where the white team leader is acting as a firm, and the returns to this factor is profit not wages. In the more general case where white labour receives wages (and not profits) any substitution of black for white leads to increased supply, a reduction in the rate for that job and the surplus accrues to the firm. The special case described by Kantor and Rees will hold for the entire mining industry when the surplus is redistributed by the Mine Workers Union. In the Gold Mining case black labour has been substituted for white wage earning categories like locomotive drivers, artisan aides, timbermen, journeymen and onsetters in contrast to white (profit earning) labour like miners, developers and shaft sinkers. The meaning of this is that the mines have a decreased wage bill while the remaining white workers are no better off (for at least the short term). The only way in which the remaining white workers might experience immediate benefit is if the black/white substitution is negotiated through white trade unions and white wages are increased. It follows that the white workers who actively encourage increased employment of blacks are the profit earning white workers who are paid set rates per metre of rock brocken or cleared. For these whites increased profit will be

realised by increasing the size and number of teams working under a white miner.

In recent years there is evidence to suggest that there has been a white motivated move to increase the size of black teams working for white miners and developers.[67]

C: Job Reservation: Job Reservation would be likely to increase racial wage differences in the same way as fixed factor proportions by limiting demand for blacks. The roots of Job Reservation lie in the Mines and Works Act No.12 of 1911 and as amended in 1926 where the Governor General was empowered to issue certificates of competency to most grades of mine labour.[68] This was revised and expanded by the Industrial Conciliation Act of 1956 which allowed certain jobs to be reserved for specific race groups.[69]

As the actual number of jobs reserved never affected more than two or three percent of the work force,[70] and this was limited by the increasing shortage of white labour,[71] it might be suggested that job reservation has had little impact on racial wage differences. As Sheila van der Horst writes "Formally this is true, but the importance of job reservation was the uncertainty it created and the fear amongst employers that it would be applied if they transgressed government policy, as distinct from legislation."[72]

Also important in this 'implicit' job reservation is the attitude of white management: On this Knight and McGrath comment "This picture of profit maximising managers constrained only by circumstances beyond their control is too simple. Virtually all employers and managers in South Africa are of the white race. Even in multinational companies the majority of managerial staff normally are whites. While the good relationship which often exists between management and white workers is likely to be based on rational economic calculation by management, there may be an element of racial sympathy and fellow-feeling."[73]

D: Trade Unions: Trade unions can either opt for the highest possible wage for its employed members, or it can bargain for full employment of all its members irrespective of the wage received, or it can settle on some compromise between these two extremes. In South Africa it is likely that white trade unions have also been able to use the unique political position of the whites to further enhance and reinforce racial wage differences. It has been suggested by Kantor and Rees that white trade unions have effectively gained little for white workers.[74] With only 30% of white workers unionised, effective union power would have resulted in incomes to unionised workers being greater than incomes to non unionised workers. This would result in excess supply to these industries. As there actually exists excess demand in these unionised industries Kantor and Rees conclude that white trade unions have not directly benefited their members.

However on the other hand it can be argued that even though only one third of white workers are unionised the agreements concluded between these trade unions and employers have affected the entire labour market and as a result have benefited the entire white working population by maintaining (or increasing) racial wage differences. Just as with only 2 to 3% of workers being directly affected by statutory job reservation, yet this having direct repercussions on the entire economy, in the same way white trade union policies are likely to have affected the entire economy and have benefited most of the white working population, both unionised and non-unionised. White trade unions have been party to: fixed (although negotiable) factor proportion agreements in the mining industry, job reservation agreements (particularly those unions affiliated to the S A C L),[75] closed shop agreements (which, in the period when mixed trade unions were illegal, effectively created racially reserved jobs) and 'rate for the job' policies.[76]

In the face of strong white trade unions, white government and black trade unions not being legally recognised, organising black labour proved difficult and sometimes impossible. The result was that for most of the period under study black labour was unable to effect any change in racial wage differences. Some of the causes of narrowing black-white differences since 1972 are likely to have been the decrease in supply of black labour following from the

aircraft crash in Francistown in 1974, the uncertainty regarding the continued supply of labour from Mozambique following that country's independence and the increase in the price of gold. The wide-spread labour unrest of 1972 marked a significant start to growing black labour power, and the legal recognition of black trade unions added further impetus to this.[77] Little can really be said yet as to the future role of black trade unions. If black trade union power does become effective they have three avenues for increasing their earnings: they can either appropriate some of the producers' surplus, compete with white labour and reduce white incomes or limit the number of black workers in particular industries.[78]

3.5.2 The Role of the State in determining Racial Wage Differences

The role of the public sector in determining racial wage differences in South Africa can be examined in two parts viz. the role the public sector might play in maintaining white wages and therefore furthering wage differences in the economy, and secondly a discussion of the actual wage differences in the public sector. Bromberger sees the government as influencing the primary and secondary distribution of income in seven ways.[79] In this section we are concerned with the first of these ways: that of a labour market operator.

A: The State and White Labour

As whites have until very recently been the sole enfranchised group in the country they can by definition be expected to have been favoured by the public sector. As circumstances change and have changed since Union the objective and manner by which white labour has been favoured by the public sector will also have changed.

Over the period under study various changes have occurred which have directly affected the position of white labour and the role of the public sector as a labour market operator. A detailed chronological discussion of the forces operating in the country are discussed in section 2.4 above. What is discussed here are the general observations of the behaviour of the public sector as a labour market operator, particularly in the white labour market.

Two sets of observers have commented on the expected role of government behaviour towards white labour.[80] Bromberger summarises Knight and McGrath's view as:

> "The relevant policies included (a) a preference for whites in government employment and something like a commitment to find work for all whites otherwise unemployable; and (b) a salary and wage policy of paying whites a 'civilised wage' and practising wage discrimination either by paying whites more than blacks for similar work or, when white and black performed different work, by overpaying the former."(81)

Kantor and Rees have suggested that it is possible that racial wage differences can be maintained by the public sector acting as an "'employer of last resort'"[82] and as such determining a minimum wage for whites.

Some tests were devised in order to see whether the public sector really does conform to the above analysis. In order to do this it was accepted that public sector employment was expected to grow endogenously as a proportion of total population (from Part I) and that real G D P was expected to grow over time. The data that was tested was (a) deviations in the long term growth rate of white public sector employment as a percentage of total white population, (b) deviations in the long term growth rate of black public sector employment as a percentage of total black population, (c) deviations in the long term growth trend of G D P,[83] (seven year moving average (d) registered white unemployment, and (e) deviations in the growth of the number of blacks per white employed by the State (seven year moving average).

The tests that were carried out are (i) (a) against (b) for 1921 to 1981 where a negative correlation was expected, i.e. it was expected that whites would be substituted for blacks during recessions and blacks would be substituted for whites during periods of white labour shortages; (ii) (a) was tested against (c) where a negative correlation was expected, i.e. it was thought that during economic recessions more whites would be employed and during

booms the reverse would occur (irrespective of whether there is an opposite effect on black employment); (iii) (a) against (d) where a positive relationship was expected, i.e. white employment by the State was expected to increase during periods of growing white unemployment; and (iv) (c) against (e) where a positive relationship was expected i.e. in boom period the number of blacks employed per white was expected to increase and in recessionary period the reverse was expected.

Some of the test results proved surprising:

Test (i): It was expected that there would be some negative relationship between deviations for the longterm growth trends of white and black State employment. It was found that between 1920 and 1960 there was some positive correlation ($r = 0,55$). For the entire period 1920 to 1981 the results are less significant. The results imply that for the period ending 1960, changes in State employment were reflected, in the same direction, in both black and white labour.

Test (ii): It was expected that there would be some negative relationship between business cycle fluctuations and changes in the growth of white State employment. It was further expected that this relationship would be more significant over the earlier part of the period. The results showed relatively insignificant but negative relationship viz. 1920-1939: $r = -0,19$; 1920-1950: $r = -0,20$; 1920-1960: $r = -0,21$; 1920-1970: $r = -0,19$; 1920-1981: $r =$

-0,19. The results suggest that the State, to some extent, increases its white employment during recessions and decreases it during booms.

The insignificant results to test (ii) led to test (iii), an examination of white State employment against white unemployment. The results for the period examined (1948-1980) show an insignificant but positive relationship (r = 0,29). Unfortunately unemployment data prior to 1948 are unavailable as more significant results were expected for this earlier period. What both test (ii) and (iii) suggest is that there is little relationship between white unemployment, particularly that as a result of business fluctuations, and changes in white labour employed by the State.

Test (iv) was designed to check for any relationship between changes in the number of blacks per white employed by the State and fluctuations in economic activity. The results for the entire 1920-1980 period were positive but insignificant (r = 0,31). However for the latter part of the period the results are significant and positive (1960-1969 : r = 0,63; 1960-1980 : r = 0,52). The results mean that since 1960, during economic boom periods the State tended to increase its black employment relative to white employment and in economic recessions it tended to increase white employment relative to black employment. The reason appears fairly obvious: Since 1960, when white labour shortages

were begininning to appear, boom periods drew white labour away from the public sector and to some extent blacks were substituted for these whites; during economic downturns unemployed white labour would be drawn to the public sector and thus displace black labour with the State acting as an employer of last resort for white labour. It does again appear fairly obvious why the test evidences the 'last resort' role of the State only for the period after 1960: prior to 1960 there was little white labour shortage - as a result economic booms would not cause a net white labour decrease in the public sector; economic booms would simply draw more whites into the economically active part of the population.

Therefore as a result black labour would not be displaced in periods of economic recession. In the peroid prior to 1960 it can therefore, a priori, be expected that business cycle activity would have little effect on the number of blacks employed per white by the State.

If the above is correct it defines more closely the role of the State when it acts as an employer of last resort: This role is only relevant with regard to unemployment as a result of business cycle fluctuations.

The State did not function as an employer of last resort for white labour which was structurally unemployed viz. during the 'poor white' period.

With the insignificance of tests (ii) and (iii) one more test was devised. Test (v) measured the relationship between business cycle fluctuations and vacancies in the public service. The result was expected to be positive. Over the period where data is available (1960-1972) the results are somewhat significant and positive ($r = 0,49$), although the limited number of observations undermine the realiability of the result.

The largely insignificant results found on *some* of the tests does not of course mean that the role of the public sector proposed above is wrong. Deviations from longterm public sector employment trends are affected by both economic and political factors. The above section tested for economic factors. If political factors have dominated economic factors in causing the deviations from longterm growth trends then the model is still correct even if the tests are insignificant. Obviously if economic factors have dominated political factors then the model is wrong. It is unfortunately impossible to separate economic and political factors to the extent that the testable data would be reliable.

B: Employment Practises of the State The second area which is examined in relation to the public sector and white labour, is the labour policies of the public sector (where evidence is available). The purpose of this exercise is to reconcile, if possible, the generally held notion by scholars of South African political

history that the State has, and does, actively favour white labour at the expense of black labour, having something like a commitment to reducing white unemployment, against the statistics of the previous section which show this to be only partially correct.

The evidence since Union suggests strongly that the State has imposed (or had imposed on it) two forms of employment practises which stand to have benefitted whites. These are fixed factor proportions and a preference for white labour through a 'Civilised Labour Policy'.

Fixed Factor Proportions: It has been suggested in section 3.3.2 that fixed factor proportions operated or still operate in the public service, in provincial employment and in the Railways. It is also possible that fixed factor proportions existed in the Post Office and Iscor where the proportion of whites to blacks employed is surprisingly high . Unfortunately no evidence is available to support the proposal for these two organisations.

These fixed factor proportions have helped whites by: firstly, benefitting whites who work for the State by assuring them that they are unlikely to be replaced by blacks. Secondly, it will have reduced any white unemployment which might have existed. Thirdly, by having increased the demand for white labour it will have raised white wages generally.

The effect which fixed factor proportions appear to have had on State employment is to have restricted its potential growth during periods of white labour shortages. This result certainly follows theoretically, as, given white labour shortages, the State would be unable to increase employment in those sectors affected by fixed factor proportions. Two sets of evidence support this hypothesis: The period noted for the largest increases in State employment was $\pm$ 1935 to $\pm$ 1958 - a period over which there was little shortage of white labour. In the post 1960 period there is a marked slowing in the growth of State employment with no a priori reason why this should occur. In fact given the dramatic changes in the country since 1960 one would have expected the opposite to have happened. The second set of evidence is the unexpected decline in type (d) growth between 1965 and 1975. Type (d) growth (i.e. λ) shows if the growth in State employment is above or below that which is expected as a result of the State having grown relative to GDP. (Type (d) is a priori, expected to grow). It is thought that this sudden and unexpected decline in type (d) between 1965 and 1975 reflects the State's inability to increase total employment as a result of fixed factor proportions and white labour shortages.

The Civilised Labour Policy: the evidence since Union suggests that the white protection program - later known as the 'Civilised Labour Policy' - was endorsed by the public sector and did only at times

meet with some success. Hepple writes of the 'Civilised Labour Policy' that civilised labour was "...the labour rendered by persons whose standard of living conforms to the standard generally recognised as tolerable from a European standpoint", while uncivilised labour was "...labour rendered by persons whose aim is restricted to the bare requirements of the necessities of life as understood among barbarous and under developed people."[84]

During the years after Union there was a substitution of whites for blacks in the labourer categories. The policy was pursued with such vigour in the Railways that by 1915, 4 160 blacks had been replaced by whites.[85] In fact, the programme was so successful that by 1920 the Railways admitted itself to be overstaffed.[86] The Pact victory of 1924 and the reintroduction of the 'Civilised Labour Policy' was again actively pursued by the Railways. While by 1925 it had only increased white employment by 853 personnel[87], the number of white labourers increased from 4 705 in 1921 to 15 878 by 1925.[88] The consequences of this were that in 1925 the black/white employment ratio in the railways had been 0,96 (B/W)[88] by 1930 it fell to 0,72 and by 1935 to 0,67. Except for the brief period 1956 to 1960, this ratio did not reach and stay above 1,00 until 1970.

By the late 1940s the consequences of this labour practice were being felt in the public service, the post office and the

Railways in the form of labour shortages. The Railways, even after absorbing 7 500 white and 3 200 black ex-volunteers in 1945[90], experienced labour shortages a few years later. (In the Public Service the first indication that labour shortages were being experienced was in 1946.[91]) By the 1950s the situation had become chronic and has continued relatively unabated to the 1980s.[92]

The vacancy levels in the Public Service, the Post Office and the Railways are given in tables 3.23, 3.24 and 3.25 for those years where data is available.

For the Public Service, vacancy levels increased from 15% in 1950 to almost 20% by 1955. By 1960 the level had fallen to around 13%, only to climb steadily to nearly 26% by 1972. From 1972 the form of the data changes; the post 1972 data is described in a format different to the pre 1972 data. Some doubt exists as to the comparability of these two sets of data and it is no longer possible to extract accurate vacancy levels. The Public Service reduces vacancy levels by the use of temporary labour. These temporaries are unqualified (by Public Service standards) for the work they perform and cannot therefore be appointed to permanent posts.

Post Office vacancy levels are shown in table 3.24 as ranging between nearly 11% in 1951 to overfull in 1971. The vacancy levels

TABLE 3-23 Public Service Vacancies and Temporary Labour, Selected years, 1950-1980[1)]

Year	(1) Authorised establish-ment	(2) (1) less Adminis-trative posts	(3) Number em-ployed on Auth.Estab.	(4) Vacancies	(5) (4) as percentage of (1)	(6) No. of temporary employees	(7) Actual vacancies	(8) (7) as percentage of (1)	(9) Temporary W : B
1950	106 956	N/A	91 053	15 903	14,87	16 889	- 986	- 0,01	N/A
1955	124 065	N/A	100 361	23 704	19,11	18 002	5 702	4,60	N/A
1960	148 592	N/A	129 726	18 866	12,69	15 764	3 102	2,09	1:0,36
1961	152 174	N/A	135 092	17 082	11,23	15 708	1 375	0,90	1:0,27
1962	161 035	N/A	142 473	18 562	11,53	17 062	1 500	0,93	1:0,41
1963	167 100	N/A	146 680	20 420	12,22	17 905	2 515	1,51	1:0,40
1964	187 049	N/A	162 109	24 940	13,33	15 071	9 869	5,28	1:0,19
1965	191 946	N/A	164 656	27 290	14,22	19 502	7 788	4,06	1:0,29
1966	202 934	N/A	172 180	30 754	15,15	24 593	6 161	3,04	1:0,55
1967	212 788	N/A	182 628	30 160	14,17	25 618	4 542	2,13	1:0,31
1968	150 136	N/A	121 831	28 305	18,85	25 282	3 023	2,01	1:0,90
1969	155 326	N/A	134 257	21 069	13,56	17 765	3 304	2,13	1:0,36
1970	129 822	N/A	92 756	37 066	28,55	32 849	4 217	3,25	1:1,02
1971	134 193	N/A	99 826	34 367	25,61	33 289	1 078	0,80	1:0,99
1972	136 883	N/A	101 543	35 340	25,82	34 510	830	0,61	N/A
1973	142 705	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1:0,84
1974	149 276	92 403	102 794	N/A	N/A	32 804	13 678	9,16	1:0,19
1975	157 827	97 753	123 433	N/A	N/A	26 458	7 936	5,03	N/A
1976	162 178	100 189	109 341	N/A	N/A	33 573	19 264	11,88	N/A
1977	167 357	102 242	110 037	N/A	N/A	39 418	17 902	10,70	N/A
1978	170 111	100 555	128 300	N/A	N/A	30 737	11 074	6,51	N/A
1979	179 362	106 559	143 200	N/A	N/A	24 529	11 633	6,45	N/A
1980	205 840	108 282	159 253	N/A	N/A	32 499	14 088	6,84	N/A

Source: Calculated from the Annual Reports of the Public Service Commission for the relevant years.

Note:

1) The post-1974 data excludes vacancies in administrative posts.

TABLE 3-24 Post Office Employment and Vacancies 1951-1971 [1)]

Year	Authorised Establish-ment (A E)	Employment under Authorised Establishment	Vacancies	% Vacancies	Total Employment	Total Employment in Addition to A E	Additional as % of A E
1951	24 953	22 236	2 717	10,9	32 304	7 351	29,5
1952	26 016	23 647	2 369	9,1	34 330	8 304	31,9
1953	27 459	24 513	2 946	10,7	25 672	8 213	31,5
1954	29 067	26 944	2 123	7,3	37 276	8 209	28,2
1955	30 779	27 881	2 898	9,4	39 140	8 361	27,2
1956	31 460	30 043	1 417	4,5	42 410	10 950	34,8
1957	33 699	31 823	1 876	5,6	45 425	11 726	34,8
1958	34 452	32 752	1 700	4,9	45 603	11 151	32,4
1959	34 993	33 341	1 652	4,7	45 291	10 298	29,4
1960	35 556	33 426	2 130	6,0	44 426	8 870	24,9
1961	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1962	35 948	35 124	824	2,3	46 520	10 572	29,4
1963	36 445	35 637	808	2,2	46 707	10 262	28,5
1964	37 407	35 604	1 803	4,8	46 608	9 201	24,6
1965	38 302	36 103	2 199	5,7	47 447	9 145	23,9
1966	39 260	37 612	1 648	4,2	48 690	9 430	24,0
1967	40 347	38 657	1 690	4,2	49 812	9 465	23,5
1968	41 145	39 315	1 830	4,4	51 140	9 995	24,3
1969	41 903	40 583	1 320	3,2	52 773	10 870	25,9
1970	45 387	43 831	1 556	3,4	57 540	12 153	26,8
1971	46 560	46 842	- 287	- 0,6	61 298	14 738	31,7

Source: South Africa, Government Post Office Annual Reports for the relevant years. Pretoria: Government Printer

Note 1 These are the only years for which data is available.

TABLE 3- 25 Vacancies in the S.A. Transport Services 1966-1973[1)]

Year	PARENT GRADES			TRAINEE & ENTRY GRADES		
	Authorised	Vacancies	% Vacancies	Quota	Vacancies	% Vacancies
	All employee grades except artisans					
1966	33 038	3 254	9,85	7 171	3 619	50,47
1967	33 275	4 374	13,15	6 797	3 488	51,32
1968	33 534	4 466	13,32	4 009	855	21,33
1969	33 597	5 365	15 97	3 944	1 347	34,15
1970	33 491	6 079	18,15	4 345	1 207	27,77
1971	33 895	6 367	18,78	4 405	1 861	43,25
1972	32 826	6 550	19,95	4 677	2 548	54,48
1973	31 835	6 305	19,80	4 355	2 138	49,09
	CLERKS GRADE II					
1966	9 586	305	3,18	1 812	871	48,07
1967	9 299	722	7,76	1 806	709	39,26
1968	8 186	335	4,09	1 555	385	24,76
1969	6 241	N/A	N/A	1 534	493	32,14
	ARTISANS					
1966	12 011	2 067	17,21			
1967	12 095	2 732	22,59			
1968	12 042	1 795	14,91			
1969	12 204	2 393	19,61			

SOURCE: R S A, S A R & H Annual Reports of the Railways & Harbours, for the relevant years, Pretoria : Government Printer

NOTE 1 The years shown are the only years for which data is available.

shown are misleading as 'Employment under Authorised Establishment' counts both permanent and temporary workers and cannot be disaggregated. Certainly these figures understate the vacancy problem: in 1970, the year the Post Office declared a -0,6% vacancy, the South African Institute of Race Relations records a 33,9% vacancy level for permanent staff.[93] The difference (12 812) is filled by temporary staff. The Post Office also employs temporary staff in addition to those temporaries employed under permanent posts. For example in 1970 it employed 12 153 additional temporary workers. This results in the Post Office having had in 1970 a labour force comprising over 43% temporary labour and therefore unqualified (by Post Office Standards) for permanent posts. As if these problems are not already sufficient, the Post Office has also in this period, experienced a chronic labour turnover problem.[94] In 1976 the Post Office experienced a turnover in labour of 24%[95], in 1978 and 1979 over 20%[96], 1981 and 1982 were both 27% and in 1983 experienced a 20% turnover.[97] The area of greatest shortage to the Post Office is in technical staff, particularly telephone technicians.[98]

Table 3.25 shows the vacancy levels for the S A Transport Services for those years where data is available. In the non-artisan grades the levels range between 10 and 20%, in the artisan grades between 15 and 23% and in the trainee grades between 25 and 55%.[99]

The question which the above raises is why has the State, or at least a very large section of the State, allowed itself to suffer white labour shortages since the late 1940s, a period of nearly forty years? It could have been as a result of institutional factors derived from political forces operating over that time. This might have caused certain categories of work to be reserved for whites and if no whites could be found to fill these posts they simply remained vacant (or were filled by blacks employed on a temporary basis).

Yet it appears extraordinary that a situation like that could have endured for nearly forty years if it had not been reinforced by other factors. One of these factors might have been the misinterpretation by the State of the role required for it as an 'employer of last resort'. In the years up till World War II a purpose was definitely served by the State acting as an 'employer of last resort'. Subsequent to the economic development of the economy of the 1950s and 1960s, a state of white labour shortage, not surplus, was the norm. Certainly there were and are whites who would not be able to find employment other than working for the State. Yet as the evidence in tables 3.23, 3.24 and 3.25 suggests, white labour shortages were experienced over all grades, even the less skilled (white) grades.

Either the public sector is myopic by acting as if there still remains a need for it as an employer of last resort of white

labour, in the face of very large white labour shortages, or the public sector feels that there is still a need for it to act as an employer of last resort for whites. As it is very unlikely that even the public sector could misinterpret a situation for nearly forty years, it can only be concluded that the State still sees a need for itself to act as an employer of last resort for whites. Certainly the evidence in recent periods of raising white unemployment bears out that the State does still act as an employer of last resort for whites. As was shown in section 3.4, growing levels of white unemployment in 1976 led to significant increases in white employment by the State and the first large change in the black-white employment ratio since the mid 1950s.

C: Wage discrimination in the Public Sector

The Public Sector is the meeting ground of the least advanced white labour, and the most advanced black labour. Knight and McGrath: "In 1970 it employed 74% of Africans in professional, technical, administrative and managerial occupations. This sector was less dominant at the clerical level, accounting for 24% of African employees."[100] In the same year it employed 51% of whites in professional and technical occupations and 35% at the clerical level.[101]

This is commented on by Knight and McGrath:

> "The most overt cases of wage discrimination are to be found in the public sector, where for many years it has been the enshrined principle. A three-tier salary structure, applying in descending order to Whites, Asians, and Coloureds, and Africans, is found over a broad spectrum of skills".(103)

In 1977 it was announced by the Prime Minister that a move was being made towards the gradual elimination of racial differences in public sector salary scales.[104] In 1983 it was announced that this task had been completed in the public service and progress was being made in other areas of the public sector.[105]

Since Knight and McGrath reported on racial salary scale differences in 1977 this data is no longer made available by the public sector.[106] All sources for the data no longer publish these figures and questions asked in Parliament are unanswered, in the apparent interest of State security.[107] The only areas where some information was found are education, and health services. Racial salary scales have been eliminated in education from Category C up.[108] Category C posts relate to an inexperienced teacher with three years of post matric training. Racial salary scales for staff in health services are given in table 3.27 below.

TABLE 3-26 Ratio of average white to black wages, various sectors, 5-year intervals, 1920-1980

Year	Mining & Quarrying	Manufacturing	Construction	Electricity	Central Authorities	Provincial Authorities	Local Authorities	S A T S	G P O
1920	12,35	2,36	N/A	N/A	N/A	N/A	6,41	N/A	N/A
1925	9,78	2,01	"	"	"	"	5,47	"	"
1930	10,29	2,21	"	"	"	"	5,66	"	"
1935	11,23	2,16	"	"	"	"	6,54	"	"
1940	11,66	2,70	"	"	"	"	N/A	"	"
1945	11,86	3,73	"	4,75	"	"	4,86	3,98	"
1950	14,26	4,14	"	5,55	"	"	4,78	3,76	"
1955	14,31	5,13	"	6,49	"	"	5,96	5,12	"
1960	15,11	4,81	4,70	6,24	4,30	3,80	5,71	5,79	4,24
1965	16,14	4,63	4,24	6,47	3,63	5,19	5,14	5,28	3,80
1970	19,06	5,15	5,18	6,00	3,19	5,05	4,68	4,32	2,75
1975	8,45	4,39	4,15	4,60	3,15	4,71	5,04	5,73	3,52
1980	5,91	4,00	4,70	4,18	2,54	3,38	4,45	3,99	3,18
1981	5,72	3,93	4,81	3,97	2,58	3,41	4,49	4,11	3,02

Sources: 1920 - 1955: Department of Statistics: Union Statistics for Fifty Years Pretoria : Government Printer, 1960

1960 - 1970: Department of Statistics: Statistical Year Book 1970 Pretoria : Government Printer, 1971

1975 - 1981: Department of Statistics: South African Statistics 1982 Pretoria : Government Printer, 1983

TABLE 3.27 Maximum Salary Scales by Race in Selected Health Services Posts in Natal, 1982. (Rands p.a.)

Post	Whites	Africans	Other Races
Medical Specialist	17 400	16 200	17 400
Intern	6 000	4 320	5 160
Security officer	4 950	2 820	3 540
Nursing Sister	6 300	6 300	6 300
Student Nurse	3 360	3 360	3 360

Source: Province of Natal, Estimates of Expenditure 1982/83, Pietermaritzburg: Government Printer, 1982.

D: Theory of Wage Differences

This section makes no pretence at being original work as it draws heavily on the ideas of Kantor and Rees, and particulary Knight and McGrath. The objective of this section is to present the redefined role of the State sector and incorporate this into a more general model of wage discrimination as initally developed by Knight and McGrath.

The two critical assumptions are that the demand curves for black and white labour can be separated, and that the State effectively maintains some minimum white wage (a 'civilised labour' wage). The demands for labour are separated through implicit or explicit job reservation and as a result of educational differences. The public sector maintains white wages mainly by maintaining vacancies for whites but also by substituting white for black labour when necessary. It is not necessary to distinguish whether in doing this the public sector will attempt to maintain a constant level of employment or a constant budget.[109] The fix factor proportions which appear to have operated in portions of the public sector will not prevent the demand curves of white and black labour from being separated. This would only be the situation had fixed factor proportions been in force across the entire economy.

Figures 3.19 (a) and (b) show respectively a separated white

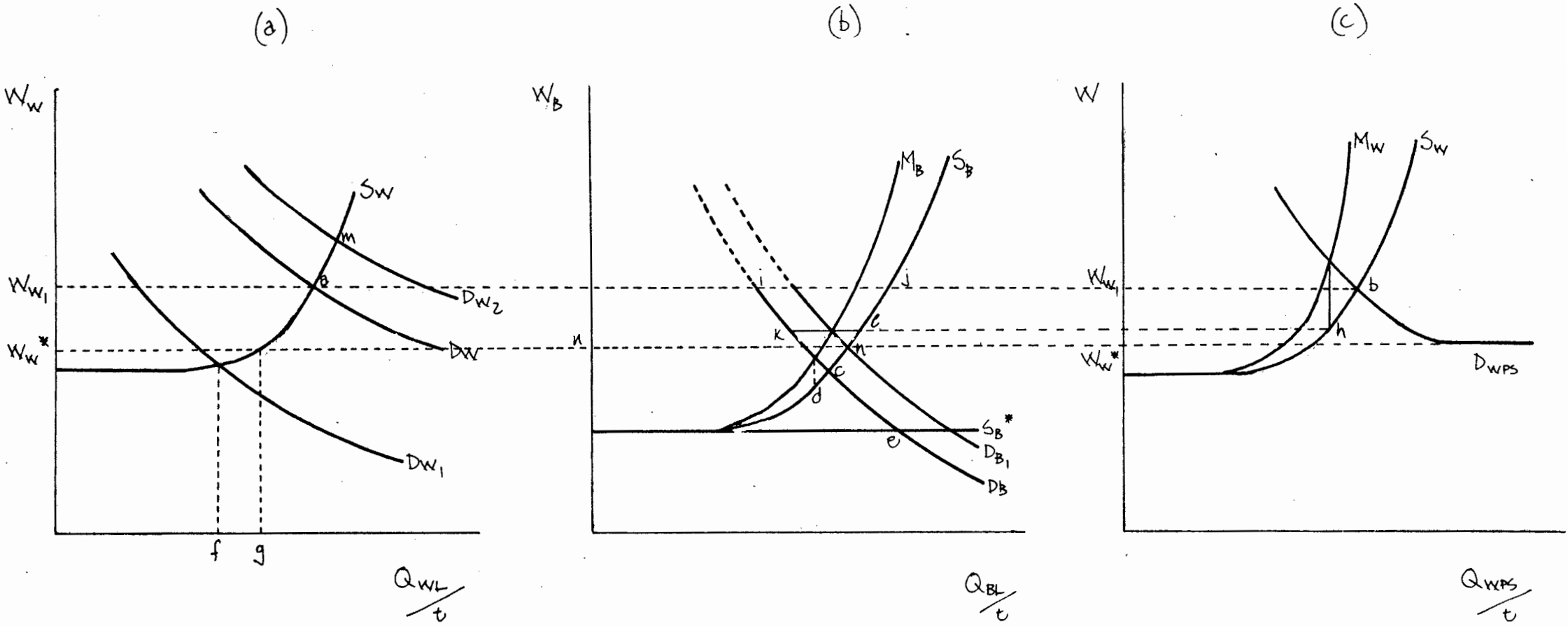

(a)
(b)
(c)
W_W
W_{W_1}
W_W^*
S_W
D_{W_2}
D_W
D_{W_1}
m
a
f
g
Q_{WL}/t
W_B
M_B
S_B
S_B^*
D_{B_1}
D_B
i
j
k
l
n
c
d
e
Q_{BL}/t
W
M_W
S_W
W_{W_1}
W_W^*
b
h
D_{WPS}
Q_{WPS}/t

FIGURE 3-19.

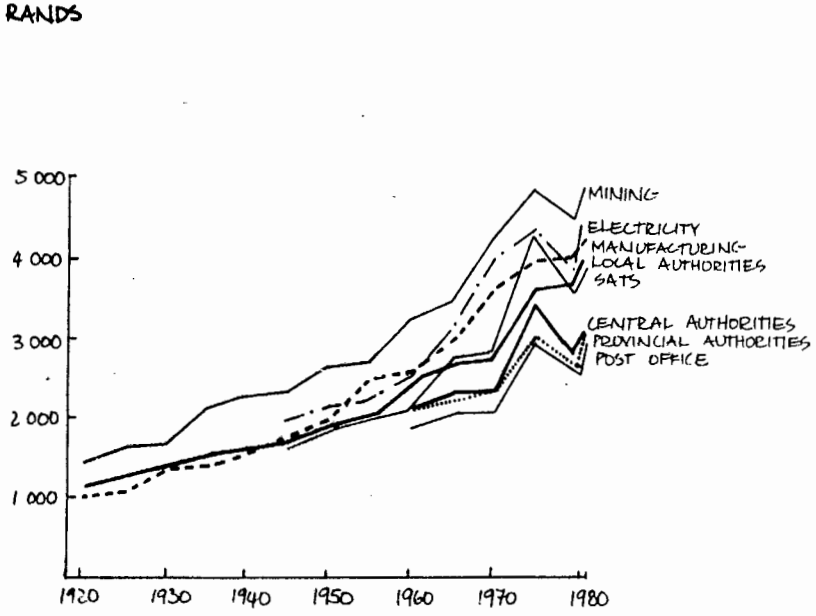


FIGURE 3-20 : AVERAGE WHITE WAGES AT 1970 PRICES (RANDS P.A.), VARIOUS SECTORS, FIVE YEAR INTERVALS, 1920 – 1981

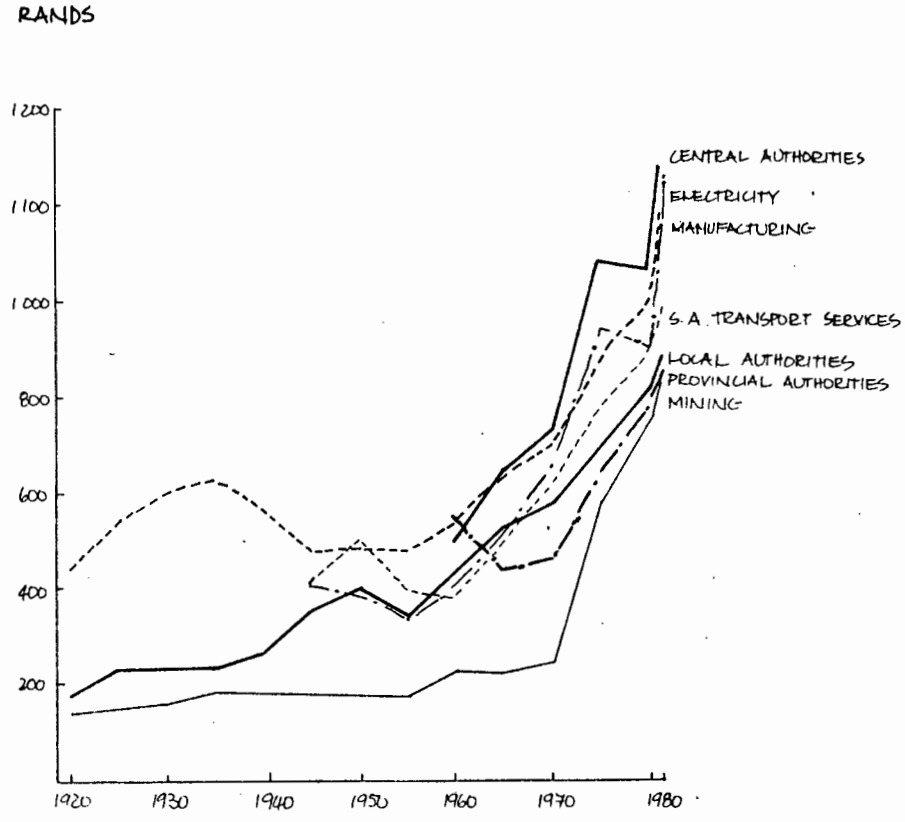


FIGURE 3-21: AVERAGE WAGES PAID TO BLACKS BY VARIOUS SECTORS AT 1970 PRICES (RANDS P.A.), FIVE YEAR INTERVALS, 1920 – 1981.

and black labour market. Both supply curves are shown as typically perfectly elastic, becoming increasingly less elastic as the quantity supplied per time period increases: The only period where the supply of white labour might have been perfectly elastic would have been during the 'poor white' era ending approximately 1939, even though real white wages have been increasing consistently since 1920. (See figure 3.20)

The supply of black labour appears to be elastic until the 1950s when real average wages began to increase (see figure 3.21). S_W is shown as having a higher initial starting point than S_B as some blacks have access to the land as a means of increasing income.[110] The demand curves for whites (D_W) and blacks (D_B) are separated. Whites can be substituted for blacks but up until the mid-1970s no black could be substituted for a white, then D_B is discontinued above the equilibrium white wage W_{W1}. Blacks are only really placed in previously held white positions as whites move up the job hierarchy. The removal of racial wage differentials in the public service and some Provincial posts should not be seen as blacks being positively substituted for whites. In some cases these blacks are being placed in vacant white positions as, for example, in the police force. In other cases, for example, black teachers and nurses, this is not substitution as teachers and nurses serve primarily their own race groups.

The role of the public sector in de facto determination of wage differences is shown in figure 3.19 (c) which shows public sector demand for white labour. Public sector demand for black labour is not shown as in the earlier periods black employment levels appear to have been constrained through white employment levels. In the latter period figure 3.19 (c) can be seen as public sector demand for both black and white labour given the non differential wage policy in the public service and in some posts in the other areas of the public sector.

The public sector demand curve - (D_{WPS}) is a kinked demand curve becoming perfectly elastic at some pre-determined minimum or 'civilised' wage (W_{W*}). The public sector therefore sets de facto minimum white wage levels. With regard to supply the public sector faces the same supply curve of white labour (S_W) as does the private sector. The public sector is a price (wage) taker and must therefore offer a market wage (W_{W1}) in order to attract labour. For the purposes of this model these wages are cash wages but can incorporate subsidies (housing benefits) and non-pecuniary benefits (e.g. job security, and job satisfaction in 'vocational' work).

Should the demand for white labour fall to D_{W1}, as a result of business fluctuations, or structural factors such as in the 'poor white' era, then the market determined wage would be below the 'minimum' white wage. The public sector 'automatically' take up

white labour by filling vacant white positions and increases the market wage to W_{W*}.

Given D_W, S_W, D_B and S_B white labour is paid W_{W1} and black labour, except for some public sector grades, is paid at c. Should monopsony powers exist in either market the wage will then be less than these. If a monopsony market exists in the recruitment of black labour the wage paid will be d. If a monopsony market exists for white public sector labour, as it does for teachers and nurses, then it will be paid at h. The shortage of white teachers and nurses since the late 1960s is a direct result of the longterm effect of these monopsony policies. Monopsony will effect lower wages in the short term but given sufficient labour mobility in the longterm, supply will fall and raise wages in these grades to market rates for the given levels of training and work conditions.

To the extent that the public sector pays black labour the same rate as (the equivalent) white labour some black labour is paid W_{W1}. This leads to a surplus of black labour willing to work for the public sector equal to ij. If a monopsony market exists and pays a rate equal to h, there will be a surplus of black labour equal to kl.

In the private sector where white trade unions insist on the rate for the job, black wages are fixed at W_{W1} and black entry is

controlled. With economic growth the demand for white labour increases to D_{W2} and white wages increase to M. If employers are able to bargain with white trade unions to allow blacks to move into previously filled white positions two events occur: D_W will not move as far as D_{W2} and white wages will not rise to m. Secondly D_B moves to D_{B1}. As blacks now enter previously held white positions, crowding occurs and the previous rate paid for the job i.e. a now falls to n. The net effect on the black labour market is a wage increase from c to n. (If black labour supply is perfectly elastic wages remain at e.[111]

S U M M A R Y

There are four main features which emerge from this part of the work:

The most surprising and the least expected result is the evidence regarding the tremendous growth in the number of blacks working for the State. This growth is largely centred around the growth of black employment in the bureaucrat services viz: the Central Authorities during the 1950s and the homeland governments since the 1960s.

The second most important finding was to see the way in which the Civilised Labour Policy affected State employment: The numbers who benefitted from the Civilised Labour Policy appear to have been low and the policy itself appears to have been applied only at irregular intervals and for short periods. This policy has had one fundamental effect on State employment: The State has, and still does, regard itself as an employer of last resort for white labour. It implements this through the existence of perpetual vacancies for whites in lower grade posts at wages which are at the lower end of the market rate. This has two important effects: It sets a minimum wage for whites - a civilised wage. Any change in the rate of pay to whites in these positions changes the minimum wage to whites in the economy. Secondly, the State, because it implements the policy through the existence of

vacancies is likely to be operating at less than the full efficiency level which can be expected of bureaucratic organisations.

Evidence suggests that for certain periods and for certain sectors of the State, a limit was imposed on the number of blacks who could be employed given the number of whites employed. The effect of this was to severely restrict the growth in employment by these sectors in those periods where there were white labour shortages.

State employment divided by activity shows the interesting result that half of all State employment is involved in the provision of economic services. The 1980 results show employment in education, the second most important employment activity, involved 20% of State employment.

SOME AREAS FOR FUTURE RESEARCH

At some point in thesis work it becomes necessary to stop researching and to write up the existing conclusions. The result of this is that some areas of the work are not fully considered or might not be considered at all. It can be that when these under examined areas are focussed on, the conclusions reached in the initial stages of the work are inaccurate or inconclusive. Contained below is a list of some of the areas which might yield important insights to future research.

1. The discussion on black/white employment ratios and wage ratios could be refined by incorporating the relative shares of the various sectors as well as the conditions operating within the sectors.

2. The discussion on the wages paid to the private sector/public sector might benefit from the development of a composite private sector/public sector wages index which takes account of all income accrued, not simply cash income (as is the case in this thesis).

3. The discussion on public sector vacancies might benefit from a micro analysis of public sector/private sector wages, i.e. does any real income difference exist (cash and kind) between identical jobs in the private and public sector?

4. The discussion on public sector vacancies might benefit from an analysis of the ability of the government to raise wages in the light of increasing vacancies.

5. The effects of Afrikaner Nationalism on State employment have not been touched on in this work. Persons working in the fields of Political

NOTES TO PART III

1 It should be noted that this is the only area of decrease. It should also be noted that this decrease in expenditure had no effect on employment in this activity.

2 See Part II for a discussion of these estimates.

3 Data after 1975 are not available.

4 Data after 1975 are not available.

5 Calculated from R.S.A., Department of Statistics. South African Statistics 1980. Pretoria: Government Printer, 1981. p 1.7.

6 A racial breakdown of the data are not available before 1967.

7 National Servicemen are not included in Central Authorities employment and are therefore not part of the Residual.

8 1960 is the earliest year for which data is reliable.

9 See table 2.1.6

10 For a discussion of 'Net' Provincial Employment see Part II Section 2.2.

11 For a discussion of the difficulties in determining growth rates, see Part II Section 2.2.2.

12 These percentages are likely to be overstated in the later years due to the possible under-counting of certain population as a result of the existence of 'illegal' urban residents.

13 Soloman, D. The Economic and Financial Policies of Local Government in South Africa: A Theoretical Analysis. M.A. Dissertation, U.C.T., Cape Town, 1983.

14 Ibid., Ch. 7.

15 See table 2.6.3.

16 Benbo. Black Development in South Africa. Pretoria: Perskor, 1974, p.105.

17 Nattrass, J. The South African Economy, its growth and change, Oxford University Press, Cape Town, 1981, p.26.

18 Wilson, F. Labour in the South African Gold Mines, 1911-1969, Cambridge: Cambridge University Press, 1972, p.3.

19 Marquad, Leo. The Peoples and Policies of South Africa, Oxford University Press, Cape Town, 1969, p.146.

20 Nattrass, op. cit., p.231.

21 Marquad, op.cit., p.147 .

22 Horwitz, R. The Political Economy of South Africa, Praeger, New York, 1967, p.94.

23 Ibid.

24 Hobart Houghton, D. The South African Economy, Oxford University Press, Cape Town, 1972, p.16.

25 Ibid.,

26 Horwitz, op.cit., p.241.

27 Horwitz, op.cit., p.116.

28 Van Biljon, F.J. State Interference in South Africa, London: King & Son, 1939, p.72.

29 Horwitz, op.cit., p.253.

30 Giliomee, H. The Growth of Afrikaner Identity, in "The Rise and Crisis of Afrikaner Power" by H. Adam and H. Giliomee (eds), David Philip, Cape Town, 1979, p.5.

31 Adam, H. Modernizing Racial Domination:South Africa's Political Dynamics, University of California Press, London, 1971, p.170.

32 Wassenaar, A.D. Assault on Private Enterprise, The Freeway to Commission, Tafelberg, Cape Town, 1977, p.123.

33 Welsh, D. The Political Economy of Afrikaner Nationalism, in "South Africa : Economic Growth and Political Change" by A. Leftwich (ed) Allison & Busby, London, 1974, p.261.

34 Davenport, T.R.H. South Africa. A Modern History (2nd Ed.) MacMillan, Johannesburg, 1978, Ch.14.

35 Horwitz, R. op.cit., p.272.

36 Schlemmer, L. Conflict and Conflict Regulation in South Africa. In "The Government and Politics of South Africa" by Antony de Crespigny and Robert Schrire (eds). Cape Town: Juta, 1978, pp 160-1.

37 South African Police, Annual Report 1976 Pretoria: Government Printer. Annexure II.

38 Horwitz, op.cit., p.410.

39 Ibid. p.287.

40 Davenport, op.cit., p.257

41 Hobart Houghton, D. op. cit., p.219.

42 For which there is little information regarding their labour shortages.

43 Davenport, op.cit., p.295.

44 Van der Horst, S.T. Labour Policy in South Africa (1948-76) : A Sketch. In "Public Policy and the South African Economy" by M.L. Truu (ed), Oxford University Press, Cape Town, 1976, p.102.

45 Van der Vyver, J.A. Prospects for the Future Political Development of South Africa, in "The Government and Politics of South Africa" by A. de Crespigny and R. Schrire (eds), Juta & Co, Cape Town, 1978, pp 247-8.

46 v.d. Horst, op.cit., p.101.

47 Davenport, op.cit., Ch.16.

48 Horwitz, op.cit., p.275.

49 Hobart Houghton, D. op.cit.

50 Bromberger, N. Government Policies Affecting the Distribution of Income, 1940-1980, in "South African Public Policy Perspectives" by R. Schrire (ed), Juta & Co, Cape Town, 1982, p.183.

51 This paragraph draws heavily on Bromberger (1982) pp 183-185.

52 See Hendrie, D. Employment and Earnings Statistics for the South African Manufacturing Sector 1970-1979, Vol.II, SALDRU working paper 38, April 1981.

53 Kantor, B and Rees, D. South African Economic Issues, Juta, Cape Town, 1982, Ch.3

54 Ibid. p.49.

55 Cassiem, F. Labour Market Segmentation in South Africa. African Studies Institute, University of the Witwatersrand, Mimeograph, 1982, p.5.

56 Ibid. p.6.

57 Doeringer, P. and Piore, M. Internal Labour Markets and Manpower Analysis, Massachusetts, 1971. Original source - Cassiem (1982).

58 See for example Wilson, F. : Current labour Issues in South Africa in "The Apartheid Regime. Political Power and Racial Domination" by R.M. Price and C.G. Rosberg (eds), David Philip, Cape Town 1980, and also figure 3.18(a) in the text.

59 Op.cit., Cassiem p.16.

60 Knight, J. A theory of income distribution in South Africa Oxford Bulletin of Economics and Statistics, Nov.1964.

61 Knight, J and McGraath, M. An Analysis of racial wage discrimination in South Africa. Oxford Bulletin of Economics and Statistics, Nov. 1977.

62 R.S.A. Department of Statistics. Census 80 No.02-80-02 Government Printer, Pretoria, 1980.

63 See, for example, South African Statistics 1982, part 5.

64 Hobart Houghton, D. The South African Economy 3rd Ed. Oxford University Press, Cape Town, 1973, p.91.

65 Kantor & Rees, op.cit., pp 55-6.

66 Ibid., pp 51-2.

67 This is based on the writers personal experience from working on the Free State gold mines. This is an area where future research might prove useful.

68 Horwitz, R. : The Political Economy of South Africa. Praeger, New York, 1967, p.83.

69 Van Der Horst, S.T. Labour Policy in South Africa (1948-1976) : A Sketch In M.L. Truu (ed) "Public Policy and the South African Economy". Oxford University Press, Cape Town, 1976, p.102.

70 Ibid., p.102.

71 Davenport, T.R.H. South Africa. A Modern History (2nd Ed.), MacMillan, Johannesburg, 1978, pp 363-4.

72 v.d. Horst, op.cit., p.107.

73 Knight & McGraath, op.cit., p.264.

74 Kantor & Rees, op.cit., p.56.

75 Knight & McGraath, op.cit., p.263.

76 As discussed by Knight & McGraath p.262, and Kantor & Rees, p.60, "rate for the job" agreements effectively "crowd" lesser skilled (black) workers into lower paying work and so further increase racial wage differences.

77 F. Wilson (1980), op.cit.

78 Kantor and Rees, op.cit., p.58

79 Bromberger, N Government Policies Affecting the Distribution of Income 1940-1980, in R. Schrire (ed) "South Africa - Public Policy Perspectives" Juta, Cape Town, 1982, p.168.

80 Knight & McGraath, op.cit., 1977 and Kantor & Rees, op.cit, 1982.

81 Bromberger, op.cit. p.169.

82 Kantor & Rees, op.cit., p.57.

83 The approach was necessary in order to prevent auto correlation.

84 Hepple, A. South Africa : A Political and Economic History, London : Pall Mall, 1966, p.211.

85 Union of South Africa, Board of the Railways and Harbours, Annual Report - 1915, Pretoria : Government Printer, 1966, p.9.

One of the less successful policies of the Railways at that time was to slow the rapid urbanisation which was taking place. The jobs which were offered to whites were confined to rural areas.

86 Ibid., Annual Report - 1920, p.15.

87 Ibid., Annual Report - 1925, p.24.

88 Hepple, op.cit., p.211.

89 Table 2.7.3.

90 Board of the Railways and Harbours, op.cit., 1945, p.14.

91 Union of South Africa, Public Service Commission, Annual Report - 1946, Pretoria : Government Printer, 1947, p.7.

92 The occupational differentiation scheme recently introduced into the Public Service will undoubtedly solve some of the Public Service's labour problems.

93 S.A.I.R.R. A Survey of Race Relations, 1970, Johannesburg: Natal Witness Press, 1971, p.122.

94 Given the extent of its temporary labour force, a high turnover rate must be expected.

95 S.A.I.R.R. A Survey of Race Relations, 1977, Johannesburg, Natal Witness Press, 1970, p.281.

96 G.P.O. Annual Reports, 1978 and 1979, pp 25 and 28 respectively.

97 G.P.O. Annual Reports 1981 and 1982, pp 27 and 22 respectively.

98 G.P.O. Annual Report 1983, p.26.

99 SATS Annual Reports : 1953/1954 p.2, 1963/1964 p.3, 1972/1973 p.29, 1974/1975 p.6.

100 Knight & McGraath, op.cit., pp 257-8.

101 Department of Statistics, Population Census 1970 Occupations, No.02-05-04.

102 Calculated from Table 3.21.

103 Knight & McGraath, op.cit., p.258.

104 Ibid., p.259.

105 SABC-TV News item 1/11/83.

106 Knight & McGraath (1977).

107 Hansard, No.10, 7 October 1981, Col.659.

108 Personal communication with the Department of Education and Training.

109 The distinction is relevant to size of government theory.

110 See: Bell, T. Migrant labour : Theory and Policy SAJE, December 1972.

111 This paragraph draws heavily on Knight & McGraath 1977.

APPENDIX A : SOURCES TO FIGURES

2-1 : Table 2.2.2

2-2 : Table 2.2.3

2-3 : Table 2.2.4

2-4 : Table 2.7.1

3-1 : Employment data calculated from data presented in Part II. Data estimated where unavailable. Population data from department of Statistics.

3-2 : As for fig. 3-1

3-3 : Employment data as for fig. 3-1. Expenditure and G.D.P. data from I. Abedian and Standish, B. An inquiry into the Growth of State expenditure in South Africa. Evidence from 1911 to 1982. U.C.T., Mimeograph, 1984.

3-4 : Table 3-4

3-5 : As for fig. 3-3

3-6 : Part II; Data estimated where unavaiable.

3-7 : As for fig 3-6

3-8 : As for fig. 3-6.

3-9 : Table 2.1.3.; data estimated where not available

3-10 : Table 2.1.5.; data estimated where not available.

3-11 : Table 2.1.6

3-12 : Table 2.2.5

3-13 : Table 2.3.1

3-14 : Table 2.7.3

3-15 : Table 2.9.1

3-17 : Table 2.9.2

3-18 : Calculated from department of Statistics: Union Statistics, Statistical Year Book 1976, South African Statistics 1982

3-19 : ═══════

3-20 : As for fig 3-18

3-21 : As for fig 3-18

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EDUCATION, EMPLOYMENT AND EARNINGS : A STUDY OF THE SOUTH AFRICAN MANUFACTURING SECTOR

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ABSTRACT

This study examines the relationship between the educational process and the labour market by focusing on the relative importance of formal education, labour market experience, occupational attainment, training, gender and race as determinants of earnings.

Use was made of a qualitatively-rich data set derived from an establishment survey of 1205 employees in the four major cities.

The analysis of the data is conducted within the context of various labour market theories particularly the human capital and segmentation theories but neither set of theories provides an adequate explanation of the structure of the labour market.

One of the main findings of the study is that the private rates of return to schooling of Africans is low and in fact negative for females. This is attributed to the poor quality of African education and to "crowding" of Africans in low-paying occupations.

The returns to experience and training are positive suggesting that the scope for skill acquisition through on-the-job experience is significant for all races.

Occupation exerts a powerful influence on earnings through its effect on skill acquisition. In general the less educated do not enter the more skill intensive occupations although the more educated are entering the lower skill intensive occupations as the supply of educated labour increases. Because of educational expansion and low level job creation at the higher levels, the lower occupations are being filled increasingly by individuals with higher educational qualifications than in the 1950s and 1960s

Substantial earnings differences exist by race and gender. Racial and gender wage discrimination has been attributed to job discrimination. Although education has been expanding and discriminatory legislation in the labour market has been scrapped, the economy has been stagnating and low growth of employment creation has meant that there have been few openings for educated Black labour in the higher occupations.

It is recommended, firstly, that urgent need be given to the qualitative improvement of Black education. The fact that the labour market is rewarding the attainment of higher secondary education by Africans suggests that the economy may benefit if resources are concentrated on students at the secondary level. This does not necessarily mean sacrificing efficiency for equity but both goals may be attained if a state-funded "Education Policy for the Poor" is adopted. Secondly, there is a need to expand opportunities for training either through greater state-subsidisation of employers or through more state involvement in the provision of training. Thirdly, supply-side (education and training) policies can only be effective if successful demand-side (job creation) policies are implemented.

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CHAPTER ONE

THE ISSUES

1.1 AIMS OF THE THESIS

This thesis aims to provide an understanding of the relationship between the educational process and the labour market through an analysis of the manufacturing sector in the major cities of South Africa.

Given the historical existence of racial discrimination both in terms of educational provision and in access to and mobility within the labour market, this study seeks to explain the relative importance of education and other variables such as employment experience, occupation, formal on-the-job training, race and gender as determinants of earnings.

On the supply side, racial inequality in the provision of education has inhibited human capital formation for a substantial proportion of the workforce. Although educational inequality is still pervasive, education since the mid-1970s has been characterised by a rapid quantitative expansion of public

resources for Black, particularly African, education[1]. Consequently, there has been a dramatic increase in the number of Black students emerging from the school system with a matriculation certificate. However, this quantitative expansion has not been accompanied by correspondingly significant qualitative improvements in school education. In spite of increased state expenditure, Black education is still characterised by a large proportion of poorly qualified teachers, high attrition rates and an output of large numbers of school leavers unsuitable either for higher education or for gainful employment in the labour market.

This study attempts an assessment of the impact of educational expansion, the rising educational level of the work force and the qualitative stagnation of education on one sector (manufacturing) of the labour market.

On the demand side, the mobility of African labour both horizontally (geographic mobility) and vertically (occupational mobility) has been hindered by a host of discriminatory legislation. Foremost amongst these laws are the 1913 and 1936 Land Acts, the migrant labour system, influx control and job reservation. Furthermore, the restriction on trade union rights for Africans has affected the determination of wages. However, as with education, beginning in the 1970s, much of this discriminatory legislation has been repealed. Moreover, the rapid growth of the trade union movement in the 1970s has meant

that it is now a major force influencing wage determination in manufacturing and other sectors.

The data engendered by the survey in the manufacturing sector can shed light on many important linkages between the educational process and the labour market. In particular the focus is on the relative importance of education and other variables as determinants of earnings.

The issues that are addresssed in this thesis are listed below:

(1) What is the profitabilty of investment in human capital for those employed in the manufacturing sector? Are there variations in the returns for the various races and for both sexes? How do the returns to education differ by level of education? Estimates of the returns to education are provided using Mincer-type (1974) earnings functions.

(2) What is the relationship between quality of schooling, certification and earnings? Do employers screen and reward individuals with the possession of a matriculation certificate and/or post-secondary education?

(3) What is the nature of the relationship between employment experience and earnings? Are earnings related to seniority? What is the extent of labour turnover and what are the determinants of turnover?

(4) What role does race and gender play in the determination of earnings and the distribution of occupations?

(5) To what extent does occupation influence wages? Conventional labour market analysis explains earnings in terms of individual characteristics of workers. This thesis looks at the role of occupation and skill acquisition through an analysis of the labour market using clearly-defined occupational categories. It also examines the extent of occupational mobility for various groups. Moreover, it seeks an explanation of the determinants of occupational mobility.

(6) How is the educational structure of earnings affected by an expansion of education? In competitive labour markets an increase in the supply of a factor of production should lead to a decrease in its price. Therefore it would be expected that when persons with secondary and tertiary education are scarce they would receive a relatively high premium in their earnings but that this premium would decline with an increase in the supply of such persons.

However, two types of effects are possible here. First, the increased supply of persons with the appropriate educational qualifications for a particular occupation should result in a decline in wages for that occupation. Second, an increased supply of educated persons would result in "filtering down" of the educated into lower-paying jobs that in the past have been performed by those with less education. The latter mechanism is

likely to be more common where institutional factors such as public sector employment or strong unions protect the wages of those in employment. This study explores the extent to which filtering down has occurred as a consequence of educational expansion.

(7) To what extent are the earnings associated with human capital formation acquired outside the formal education system through on-the-job training programmes?

(8) Finally, what is the role of the firm or sub-sector in the determination of earnings?

Chapter Two describes the survey of the manufacturing sector on which on this thesis is based. Details are provided about the methodology, sampling, collection and processing of the data. The comparative representativeness of the data is also analysed.

An overview of relevant labour market theories is provided in Chapter Three. Theories evaluated include human capital theory, the screening hypothesis, theories of discrimination and various institutional approaches. This chapter provides the theoretical context for the analysis of the data.

Chapter Four examines the relationship between education and earnings by estimating rates of return based on Mincerian (1974) earnings functions. Chapter Five takes the analysis of the earnings determination process further through an analysis of the influence of employment experience, occupation, race and gender

on earnings.

In Chapter Six, the controversial issue of the quality of education is addressed. In particular, the aim is to determine whether employers are screening individuals on the basis of their matriculation results and whether employers distinguish between the matriculation qualifications of individuals from the various racially-structured education systems.

Chapter Seven examines the relationship between earnings and job tenure (seniority) within the context of labour market theories which predict that employers reward current employment experience (because of the acquisition of firm-specific skills, which by definition, raise productivity in the current firm only) as opposed to prior experience (because general skills raise productivity in more than one firm). This chapter also considers the extent of and determinants of labour turnover in the survey data.

Chapter Eight provides a full exposition of the role of occupation in the determination of earnings. It also examines the extent of "filtering down" into lower occupations as a result of the increased supply of educated labour. Finally, this chapter measures the extent of occupational mobility.

Chapter Nine analyses the incidence of and the returns to formal on-the-job training programmes. A description of the extent of

vocational education and industrial training programmes in the broader South African economy is also provided.

Chapter Ten looks at the influence of the firm and the sub-sector in the earnings determination process. In contrast to Chapters Four to Nine which analysed the individual characteristics of workers, this chapter evaluates the impact of firm and sub-sector characteristics. Chapter Eleven summarises and concludes.

The rest of this chapter comprises four sections. In the next section the relationship between education and economic development is explored. Three issues are highlighted: the contribution of education to economic growth, the analysis of education as an investment good, and the linkage between education and equity. Section 1.3 describes the provision of education in South Africa. The inequalities and changes in education are highlighted through an evaluation of various indicators such as teacher-pupil ratios, output from the system, enrolment ratios and the educational attainment of the labour force. Section 1.4 analyses the developments in the labour market with specific reference to statutory discrimination and the changes that have occurred in the 1980s. Finally, section 1.5 describes the state of the South African economy as background information for the analysis that follows.

1.2 EDUCATION AND ECONOMIC DEVELOPMENT

1.2.1 EDUCATION, ECONOMIC GROWTH AND DEVELOPMENT

The concept that investment in education promotes economic growth dates back to the time of Adam Smith and the early classical economists, who emphasised the importance of investing in human skills (Psacharopoulos & Woodhall, 1985). The work of Schultz (1961), Denison (1967) and others provided evidence from 29 countries that a "substantial proportion of the rate of growth of the economy can be attributed to increases in the educational level of the labour force" (Psacharopoulos, 1988:1). Table 1.1 shows that the contribution of education to economic growth is greater, on average, the lower the country's stage of development. For example, the share of the rate of economic growth due to education in Africa is two to three times that of Europe and Latin America (Psacharopoulos, 1988:1).

Table 1.1: The Contribution of Education to Economic Growth

Region	Economic growth rate explained by education (per cent)
Africa	17
Asia	11
Latin America	5
Europe & N. America	9

Source: Psacharopoulos, 1988.

The contribution of education to economic growth is presumed to occur through its ability to increase the productivity of an existing labour force in various ways. But exactly how education increases productivity, how important it is, and in what ways it is important, are questions which have not been resolved.

While a shortage of educated people might limit growth, it is not clear that promoting education will foster more rapid growth. Furthermore, it is not clear what kinds of education are best at assisting growth - general formal education, technical training, or informal education related to specific jobs.

In general, countries that have higher levels of income also have higher levels of educational attainment (see Table 1.2), but this cannot be interpreted to mean that education is a necessary cause of higher levels of output and income. Education is both an investment good and a consumption good. As income grows people demand more education, and can afford more education, both for themselves and their children. Whether this education contributes to raising productivity is a debateable point. Education may become a kind of screening device used by employers to make hiring decisions. Faced with a large number of applicants for a given job, an employer tends to narrow his or her options by looking seriously only at those with the highest levels of education. As a result the education level required to gain entry to certain jobs tends to move upward over time with little or no change in basic productivity.

Table 1.2: Per Capita Incomes and Education Enrolment Ratios - Selected Countries, 1980s

	Per Capita Income		Enrolment Ratios[2]		
	US $ 1988	Growth 1965-1988	Prim	Sec	Tert
Middle Income Countries					
South Africa	2290	0.8	111	56	14
Algeria	2360	2.7	96	55	9
Hungary	2460	5.1	97	70	15
Uruguay	2470	1.3	110	73	42
Argentina	2520	0.0	110	74	39
Yugoslavia	2520	3.4	95	80	19
Venezuela	3250	-0.9	107	54	27
South Korea	3600	6.8	101	88	36
Chile	1510	0.1	103	70	18
Malaysia	1940	4.0	102	59	7
Mexico	1760	2.3	118	53	16
Botswana	1010	8.6	114	32	3
Peru	1300	0.1	122	65	25
Brazil	2160	3.6	103	39	11
Low Income Countries					
Tanzania	160	-0.5	66	4	0
China	330	5.4	132	43	2
Kenya	370	1.9	96	23	1
Sri Lanka	420	3.0	104	66	4
High Income Countries					
United Kingdom	12810	1.8	106	83	22
Netherlands	14520	1.9	115	104	31
France	16090	2.5	113	92	31
Canada	16960	2.7	105	104	58
West Germany	18480	2.5	103	94	30
Sweden	19300	1.8	100	91	31
United States	19840	1.6	100	98	60
Japan	21020	4.3	102	96	28

Sources: World Bank (1990); Dostal (1989) - S.A. education data.
Note: Abbreviations - Prim: Primary Schooling; Sec: Secondary; Tert: Higher or Tertiary.

The overall conclusion is that increased education of the labour force appears to explain a substantial part of the growth of output in both developed and developing countries. However, these estimates rest on a wide variety of theoretical assumptions that have been challenged. In particular, it is assumed that the earnings of different groups of workers are a measure of their contribution to output; that the higher earnings of educated workers are a measure of their increased productivity, and therefore of their contribution to economic growth.

Several attacks on these assumptions have helped to undermine the widespread belief that investment in education contributes to economic growth. However, research using econometric techniques to relate inputs to output, has demonstrated the link between education and growth of output. One such study (Hicks, 1980) examined the relationship between growth and literacy, as a measure of educational development, and life expectancy in 83 developing countries during the period 1960-1977 and found that the twelve developing countries with the fastest growth rate had well above average levels of literacy and life expectancy. According to these results, not only do literacy levels rise with national income, but these 12 countries had higher levels of literacy and life expectancy than would be predicted for countries of that income level on the basis of the regression between literacy and per capita income. It does not, however, prove the opposite: that countries with high levels of human resource development will thereby achieve faster economic growth.

Correlation, however, does not prove causation. Early work by Bowman and Anderson (1963) and others certainly demonstrated a correlation between level of per capita income and level of educational development. However, the fact that rich countries have higher levels of literacy and spend more on education than poor countries could mean that education helps countries become rich, or it could mean that rich countries can afford to spend more on education.

The whole literature on education and development is ultimately concerned with the specific problem of measuring the effect of enhanced educational inputs upon economic outputs. However, it has been argued also that this issue must be seen within a broader historical and sociological perspective which attempts to examine the problematic relationship between education and development in the widest sense.

While the specifically economic literature concerns itself with the measurable individual and social returns to educational investment and uses these as an indicator of the contribution of education to economic development, a historical or sociological perspective emphasises the essentially interactive relationship between the economic and educational dimensions. Educational expansion is initially dependent upon a degree of structural economic change having already occurred in local economies, though it may, in turn, become a catalyst for further economic development. For example, although a broad literacy base may be a

prerequisite for sustained growth, it is apparent that a demand for literacy and schooling will not emerge unless traditional social and economic structures have already been partly integrated into a broader exchange economy. (Foster, 1988).

This suggests that the role of education as an instrument of economic development will be highly variable over time. The expansion of formal education (classified by level and type and not in gross terms) may have a substantial "payoff" at some stages in the development process while at others its impact may be negligible in terms of other development options that may be available. Thus in spite of the the spate of literature on the role of education in development that has appeared since the 1950s, failure to recognise this caveat has led to overly simplistic educational policy prescriptions.

1.2.2 EDUCATION AS INVESTMENT

One approach which attempts to measure the impact of education on productivity consists of recasting education as an investment in human capital. In theories developed by Becker (1964), Schultz (1961), and a host of others, it is assumed that rational people will attempt to invest in education up to the point where returns to them in terms of extra income are equal to the costs of undertaking education, including the income forgone while

education is being undertaken. Social returns to education will differ from private returns to the extent that recipients of education do not pay the full costs of this education. On the other hand, the social gains from education will be measured as pretax income, while the private gains will be net of taxes.

Table 1.3: Social Returns to Investment in Education (per cent)

Country	Primary	Secondary	Higher
Developing	27	16	13
Intermediate	16	14	10
Advanced	n.a.	10	9

Source: Psacharopoulos, 1981

For developing countries, the high social returns found for primary education (27 percent) contrast sharply with the more modest returns for higher education (13 per cent). This suggests that these countries may have overinvested in higher level education, and neglected primary education. For the more advanced countries, the social rates of return for higher education averaged only 9 per cent, suggesting that further rapid expansion of higher education would not be warranted. The fact that private returns to higher education in developed countries still averaged 12 per cent (Psacharopoulos, 1981, not shown in Table 1.3) however, indicates that there may still be popular pressure to expand higher education beyond the point where it has a net social benefit, or any real impact on growth. Thus primary

education in developing countries could still make significant contributions to growth assuming that other investments could not match the average rate of return of 27 per cent. Further investments in higher education in developed countries could actually slow growth, if more productive investments elsewhere are forgone. Thus education's impact on growth depends on the level of development of both the economy and the labour force, and will be country and time-specific.

Where there is an oversupply of a certain class of educated people, salaries will be driven down and hence prospective rates of return will fall, which in turn will discourage entrants. Where systems of public education are well-developed, and financial markets permit borrowing against future earnings, rates of return on education will , in the long run, equal the rates of return on other productive assets. Thus, higher than normal rates of return reflect some sort of market imperfection, such as in developing countries where neither public nor private education is available, and people are unable, because of their low incomes, to sacrifice present consumption levels to finance education. In summary, education is likely to be more important to economic growth in situations marked by underinvestment in human capital, limited supplies of skilled and educated workers, and relatively undeveloped education systems.

Much of the earlier research of the human capital approach and its effect on, for example, per capita incomes had virtually no

implications for educational policy. Its general effect was rather to create a climate of opinion that was favourable to enhanced educational investment in both the developed and less developed nations, without at the same time providing any meaningful guidelines as to the optimal form of such investments or any suggestion as to how education actually contributed to the development process.

The same reservations can be attached to the various exercises in national correlation comparisons that many social scientists, notably, Harbison and Myers (1964), performed on human resource indicators. Although a correlation analysis using similar measures of educational development had suggested that primary schooling and literacy were more highly correlated with level of economic development than the provision of secondary or tertiary education (Anderson and Bowman, 1963), the human resource indicators developed by Harbison and Myers were weighted in such a manner as to emphasise the greater contribution of post-primary and particularly tertiary-level technical and scientific education to economic development.

Although the creation of indicators of educational development requires a degree of technical expertise, the assumptions underlying the whole correlation exercise were simplistic in the extreme. Governments bent upon educational provision inferred that simple correlations had causal significance and reached the

erroneous conclusion that rates of economic development were largely determined by the supply of high-level manpower, particularly in the technical and scientific fields. The equally plausible assumption that developed nations had larger pools of such skills because they were developed received little attention.

The human resource indicator approach seriously retarded the developmental efforts of some countries. It led to a distortion of resource allocation towards higher levels of the educational system while primary schooling was viewed largely in terms of its feeder role to the secondary sector. Educational systems as a whole were seen largely as passive suppliers of skills to the occupational structure with no independent role, as it were, in the development process. Finally, the belief that scientific and technical training would make a greater contribution to development than general education was without foundation.

Similar criticism can be directed to the practice of manpower forecasting, whose rationale was closely linked to the assumptions of the resource indicator approach. Besides overemphasising the contribution of tertiary training, manpower planning was based on a set of largely untenable assumptions, namely : zero price elasticity for skills, low levels of substitutability between factor inputs, and a belief in a unilineal pattern of structural economic change. The latter assumption had particularly unfortunate consequences where less developed countries (LDCs) based their estimates of manpower

"needs" on "labour coefficients" that were presumably based on means derived from manpower distributions prevailing in developed nations. By the early 1970s both the assumptions and consequences of manpower forecasting activities had become increasingly unacceptable.

Starting in the 1970s planning for educational development moved away from manpower planning towards cost-benefit (rate of return) analysis, whose assumptions concerning the role of education in development were totally at variance with those of the manpower and macroplanning traditions. The historical origins and assumptions of cost-benefit analysis, its major empirical findings, and its principal policy implications have been treated by Psacharopoulos in three major cross-national studies (1973, 1981, 1985). The results have been to question both the premises and major conclusions of the manpower planning approach.

The policy implications of Psacharopoulos' findings were clear. Both developing and developed countries needed to pay particular attention to the quality and provision of schooling at lower levels while at the same time adopting a more critical attitude to the development of highly specific (and high-cost) forms of technical and vocational training. In particular, they should be conscious of the dangers of expansion and massive public subsidisation of tertiary education where the individual rates of return may be substantial but the social benefits far more problematic.

The cost-benefit approach has itself come in for criticism (Blaug, 1976). Basically, most objections stem from a degree of scepticism concerning the nature of the relationship between productivity and observable income-education profiles. Some of these criticisms are, in fact not incompatible with the assumptions of cost-benefit analysis but others are more convincing, particularly in the context of less developed countries (LDCs) characterised by a relatively small "modern" exchange sector but with a far greater proportion of the population involved in subsistence or semi-subsistence activties. In these countries analytic problems of specification and measurement are formidable and the calculation of rates of return thus more hazardous. Moreover, although the approach works well in terms of explaining individual investment behaviour, its definition of social rates of return is perhaps more questionable and less convincing.

Despite these reservations it is fair to say that the positive contributions of the cost-benefit approach (in contrast to the those of the manpower tradition) have far outweighed its limitations. Its initial assumptions are more flexible and provide a means by which a crude and partial estimate of the economic consequences of educational expansion can be made.

1.2.3 EQUITY IN EDUCATION

In the 1950s and 1960s a climate of optimism concerning the economic benefits of educational investment led to a massive expansion in educational provision in both the developed and less developed countries. Integral to most expansionary policies was the notion that development not only involved increases in GNP per capita but that increased educational provision would be associated with the equalisation of educational opportunities (defined largely in terms of access to and continuance in schooling) (Foster, 1988:96).

In the event, growth was associated with a series of unanticipated consequences that were not predicted in the conventional literature and which in the LDCs stemmed largely from uneven rates of structural change. Although it was recognised that early educational development had been associated with major inequalities in access to schooling in terms of the region or the ethnic and social origin of students, it was believed that these disparities would largely disappear as development proceeded.

However, while absolute levels of enrolment everywhere rose, regional differentials in access also increased, with the gap between "leading" and "backward" areas becoming more pronounced. This was the result of a disproportionate allocation of resources in the more advanced regions. In themselves, such inequalities

were not incompatible with policies designed to maximise the short-term contribution of education to economic development, but in the long run the political and economic consequences of these disparities could be serious, particularly where regional inequalities were linked with ethnic differences in plural societies.

Thus, economic strategies had to be tempered by policies designed to minimise some of the inequalities resulting from development. These took the form of special educational aid to "backward" regions or, in some cases, the imposition of "ethnic quotas" in educational recruitment. The long-term consequences of such policies are as yet, obscure but in the short term they seem to have had no significant effect on the distribution of educational life chances. However, the issue remains even more relevant in the LDCs as a result of the limited resources at their disposal and the fact that rates of return to education are higher than in the developed world.

Although regional and ethnic inequalities persist in reduced form in developed countries, the inequality of opportunity issue in them has tended to focus on the relation between educational achievement and social background. However, in all societies it was anticipated that educational expansion would eradicate disparities ultimately stemming from the social background of students. This issue has little to do with the degree of aggregate mobility in a society for this is largely determined by

the rate of structural and economic change, but rather concerns the extent to which educational achievement is influenced by social origins and how far final social or occupational position is predicted by achievement level independent of social background.

Studies show that throughout the developed and less developed world educational access and continuance is correlated with social background (Foster, 1988:96). Everywhere, social background is the strongest single predictor of educational achievement but, of equal importance, it is rather less significant in the LDCs than in the developed countries. Moreover, in all societies the final social (or occupational) status, achieved by an individual is only weakly predicted by his social background and mainly in an indirect fashion through educational achievement.

1.3 THE PROVISION OF EDUCATION IN SOUTH AFRICA

The striking feature of education in South Africa is racial educational inequality in terms of both the level and kind (quality) of education that is provided. On the one hand, the White population receives a very high level and quality of education, comparable with the best in the industrially advanced societies. Black education, on the other hand, is characterised by an inequitable allocation of resources, overcrowded

classrooms, high drop-out rates and insufficient and poorly-qualified teachers. There are differences even within Black education, with education for Africans showing the greatest degree of underdevelopment (Pillay, 1990:30).

However, following the Soweto uprising of 1976, the state embarked on a quantitative expansion of Black education. This expansion is best reflected in an analysis of state expenditure, enrolment ratios and output levels.

Between 1975 and 1985, for instance, state expenditure on African education increased by an annual average rate of 15 per cent in real terms; in the same period expenditure on White education increased by a real average annual rate of 3 per cent, that on Coloured education by 9 per cent and Indian education by 7 per cent (derived from Table 1.4). In nominal rands, total expenditure on African education increased from R165 million in 1975 to R2178 in 1985 (Trotter, 1988). (It should be noted that Africans comprise approximately 75 per cent of the population, Whites 13 per cent, Coloureds 9 per cent and Indians 3 per cent).

Table 1.4: Government Expenditure on Education, 1975, 1985, (Rm)

Group	1975		1985
	current	constant 1985 rands	
All	1046	3558	6563
African	165	561	2178
White	739	2514	3328
Coloured	91	310	728
Indian	50	170	329

Source: Trotter (1988) for current figures.

Table 1.5 which shows average education enrolment ratios for primary, secondary and tertiary levels for the world, various regions as well as for South Africa nationally and by race, provides a suitable commentary on racial inequality in access to education. The following points are pertinent with respect to Table 1.5:

(a) The South African figures reflect the rapid quantitative expansion at all levels, especially for Africans and Coloureds at the primary and secondary level and for Whites and Indians at the tertiary level.

(b) The White enrolment ratios are comparable with those in the developed countries; in fact, tertiary education ratios for White South Africans are higher than the average in developed nations.

(c) The African figures are closer to the norm for African countries and LDCs in general.

Table 1.5: Education Enrolment Ratios: 1960 and 1985 (per cent)

	Primary		Secondary		Tertiary	
	1960	1985	1960	1985	1960	1985
World	77	99	27	46	6	12
Developed Countries	106	112	55	88	13	34
LDCs	60	98	13	38	2	6
Africa	44	84	5	33	<1	4
South Africa	78	111	16	56	4	14
Africans	77	109	3	49	0.7	5
Whites	118	115	69	87	18	44
Coloureds	109	129	15	62	2	7
Indians	125	106	23	88	4	24

Source: Dostal, 1989.
Note: South Africa - Primary: refers to sub-A-std.4. and the age group 6-11. Percentages larger than 100 indicate that a number of pupils older than 11 years attended primary school. Secondary: refers to stds. 5-10 and the age group 12-17. Tertiary: refers to age group 18-22. International: enrolment ratios refer to number of pupils enrolled as percentage of the appropriate age cohorts in the population. The appropriate age cohorts vary for different countries. Primary education may refer to ages 5-6 to 11-14; secondary ranges from ages 11-12 to 17-19 and tertiary from ages 18-20 to 24.

In terms of output from the education system, as Table 1.6 shows, the number of Black matriculants increased significantly during the period 1970-1987. During this time the number of African pupils passing matriculation increased thirty-fold, that of Indians six times, Coloureds nine times and Whites less than twice.

Table 1.6: Matriculation Passes* by Race - 1970, 1975, 1987

Year	Whites	Africans	Coloureds	Indians	Total
1970	36544	2820	1926	1406	42696
	(85.6)	(6.6)	(4.5)	(3.3)	(100.0)
1975	42985	6761	3920	3048	56714
	(75.8)	(11.9)	(6.9)	(5.4)	(100.0)
1987	62067	84966	11836	12419	171288
	(36.2)	(49.6)	(7.3)	(6.9)	(100.0)

Source: Pillay, 1990.
Note: *Includes university entrance and school leaving passes.
Figures in parenthesis show percentages of total.

Nevertheless, despite an unprecedented increase in overall enrolments and educational expenditure especially in the last decade, vast educational inequalities still exist racially, sexually and regionally. These inequalities co-exist with a high level of adult illiteracy especially amongst African and Coloured adults.

Moreover, the quantitative expansion in education has not translated into significant changes in the quality of education provided to the majority of the Black population. Attempts to introduce equity in access to education have not resulted in corresponding changes in efficiency. A brief reference to some quality and quantity indicators and measures of educational efficiency follows.

The quality of teachers in Black schools is a serious problem. While all White and 94 per cent of Indian teachers had a

matriculation certificate, the corresponding figure for Africans was 46 per cent and for Coloureds 68 per cent in 1986 (South African Institute of Race Relations-SAIRR-1988). Only 12 per cent of Coloured and 7 per cent of African teachers had university degrees.

While the increasing trend in the number of Black matriculants is impressive, a more important statistic reflecting the quality of school output is the number of students gaining a matriculation exemption, as this provides access to university education and ultimately a professional occupation. In 1987, while 56 per cent of African students passed the matriculation examination, only 28 per cent who wrote gained a university entrance pass. In 1988, this proportion was 17 per cent and in 1989 10 per cent (SAIRR, 1989, 1990).

A commonly used indicator for measuring the efficiency of the education system is the drop-out rate. While enrolment ratios have been rising during the 1970s and the 1980s, they tend to mask the high attrition rates. It has been estimated that of every 10000 African children who start school, only 1300 (13%) reach matriculation, 27 (2.7%) achieve a university entrance pass and only one (0.01%) gets an exemption in mathematics and science (The Sunday Times, 1990).

The racial inequalities in educational provision co-exist with a high level of adult illiteracy. In 1980 it was estimated that 33

per cent of the adult African population outside the "independent" Bantustans (approximately 3.3 million people) were illiterate (Adams & Pillay, 1989:4).

Educational inequality has also contributed to the maldistribution of skills. Table 1.7, for instance, shows the distribution of Blacks in certain high-level occupations. It is evident that an inadequate number of Blacks is emerging with the necessary qualifications to alter significantly the racial distribution of skills.

Table 1.7: Blacks in Selected Occupations, 1965 and 1985
(Percentage Distribution)

	1965	1985
Engineers	0.0	0.1
Scientists	0.6	5.5
Medical Doctors	2.0	8.1
Nurses	44.9	60.0
Lawyers	0.9	6.0
Educationists	56.2	63.0
Architects	0.0	2.9
Managing Directors	3.6	3.9
Other managers	1.7	3.0

Source: National Manpower Commission (NMC), 1987b.

The expansion of education during the 1970s and 1980s was reflected in, inter alia, increased state expenditure on Black education, rising enrolment ratios at all levels and comparatively large numbers of Black matriculants emerging from

the schooling system. Educational expansion, however, was not accompanied by proportionate increases in the quality of education largely because of the continued crisis in the training of sufficient numbers of qualified teachers for Black schools and the inadequate provision of textbooks and facilities such as classrooms, libraries and laboratories. Educational efficiency has also been impaired and this is reflected in such indicators as a persistently high attrition rate.

Nevertheless, what the process of educational expansion has achieved is a significant increase in the educational level of the workforce. Between 1970 and 1985, the mean years of schooling for the labour force increased from 4.9 to 7.1 (Table 1.8). The most significant rise was in the African labour force where the mean years of schooling increased from 2.8 to 5.0. Although the table highlights clearly the discrepancy in educational provision for Whites and Africans, it does show that the educational level of the latter group is growing at the fastest rate, albeit from an extremely low level. However, the median level of education of the labour force remained unchanged at a scale rating of 2 (incomplete primary) for Africans, Coloureds and for the whole population between 1970 and 1985 (Table 1.9).

Table 1.8: Mean Years of Schooling of the Labour Force by Race: 1970, 1980, 1985

Year	African	Coloured	Indian	White	Total
1970	2.8	5.5	7.5	10.8	4.9
1980	4.3	6.3	8.9	11.4	6.1
1985	5.0	6.8	9.4	11.8	7.1

Source: Pillay, 1989.

Table 1.9: Median Level of Education of the Labour Force by Race: 1970, 1980, 1985

Race	1970	1980	1985
African	2	2	2
Coloured	2	2	2
Indian	3	4	4
White	4	5	5
Total	2	2	2

Source: Pillay, 1989.
Note:1: No education; 2: Incomplete primary; 3: Complete primary; 4: Incomplete secondary; 5: Complete secondary; 6: post-secondary

Although a large proportion of the labour force still has a low level of education (68.8 per cent of Africans had incomplete primary or no education - Table 1.10), there has been nevertheless, an overall improvement in the educational attainment of the labour force. This study will attempt to determine what this increase in educational attainment has meant in terms of earnings and occupational distribution. (Chapter Eight)

Table 1.10: Percentage Distribution of the Labour Force at Various Levels of Education, 1985

Race	Level of Education					
	(1)	(2)	(3)	(4)	(5)	(6)
African	25.4	43.4	11.7	14.4	4.2	0.9
Coloured	12.0	39.1	16.8	22.5	6.8	2.8
Indian	3.2	16.3	18.4	32.5	20.5	9.1
White	0.5	1.1	4.7	30.0	36.1	27.7
Total	17.5	32.9	10.8	19.3	12.1	7.4

Source: Pillay, 1989

1.4 STATUTORY DISCRIMINATION IN THE SOUTH AFRICAN LABOUR MARKET

Racial discrimination has always been a feature of South African society from the days of the early settlers. However, statutory discriminatory measures affecting the labour market were largely twentieth century events. The earliest of these measures were the the 1913 and 1936 Land Acts which reserved 14 per cent of the land for Africans who constituted 70 per cent of the population. Outside the tribal reserves or Bantustans, Africans could not own or even rent land. These Acts ensured that Africans would provide a large source of cheap labour for the mines and White farms.

A feature of the statutory discriminatory measures was the extensive system of controls over African labour. These controls primarily related to the mobility of labour and to other measures restricting workers' rights.

Pass laws or influx control legislation controlled the flow of African labour from the rural sectors into the modern urban cities and towns, and allocated labour between sectors and regions. Africans who met specified legal criteria were allowed to live in townships in White urban areas and formed the labour supply for the White economy; those who did not were forced to live in the homelands and could only be recruited according to employers' needs, as single men, on contracts of not more than one year's duration, thus becoming migrants in their own country (Lipton, 1985).

Job reservation legislation specified certain jobs for Whites only, or provided for the employment of a minimum ratio of Whites. The Mines and Works Acts of 1911 and 1926 barred Africans from the more skilled mining jobs. In the state sector, the 1924 "civilised labour" policy, designed to protect unskilled Whites from undercutting by Blacks, provided that Whites should be given preferential employment in unskilled jobs at rates of pay at a level "at which the European employee can maintain his standard of living" (Lipton,1985:19).

The 1924 Industrial Conciliation Act which provided for the recognition and registration of trade unions, gave a key role to White workers in determining the occupational structure, access to training, and wages. The Industrial Conciliation Act was not explicitly racial, but the definition of employee excluded "pass

bearers", i.e. African men and, after the extension of passes to them in 1952, African women. This effectively excluded Africans as members of trade unions.

The Industrial Conciliation Act provided for the establishment of Industrial Councils to be jointly controlled by the registered unions and employers. The dominant position of the unions on these councils enabled White workers to exclude Africans, and often Coloureds and Indians, from skilled jobs.

In addition to pass laws and exclusion from the registered unions, many African worker rights were limited further through Masters and Servants Laws , such as the 1911 Native Labour Regulation Act and the 1932 Native Service Contract Act, which made breach of contract by African farm and mine workers a criminal offence and meant they could not legally leave their jobs without their employer's consent.

With the advent of the Nationalist party government in 1948, both vertical and horizontal controls on labour were tightened. The "civilised labour" policy was reaffirmed, job reservation was tightened on the mines and extended to manufacturing and comerce.

The pass laws were tightened, extended to women and an elaborate, centrally controlled system of labour bureaux was developed to control and direct the flow of African labour.

In summary, Africans were prevented from moving freely to offer their services in the labour market; they were denied even limited upward mobility by legislation that prohibited apprenticeship and access to skilled jobs, excluded them from membership of registered trade unions, severely restricted their employment in urban areas and reserved a wide range of jobs for Whites. In education, separate structures and grossly inferior standards ensured that Blacks were severely handicapped in job advancement generally.

The 1950s and 1960s brought rapid economic growth to South Africa owing partly to world economic growth with heavy foreign dependence on South African mineral resources, large scale foreign investment and the availability of a captive and cheap African labour force. However, that very growth led to problems for business leaders, who began in the early 1970s to complain that the labour system, too rigid to permit the maintenance of the growth rate, would inhibit their efforts to transform South Africa into a major economic power. They argued that, with Africans forming 70 per cent of the total labour force, yet subject for political reasons to the prohibitions and controls described above, as well as to cumbersome and expensive recruitment procedures, the White, Coloured and Indian population groups could not by themselves be expected to ensure the development skills or the labour market flexibility that continued economic growth required. These pressures for change were accompanied in 1973-74 by widespread strikes in Natal by

African workers, some of them members of unregistered unions, who demanded improved wage rates. These, the first large scale strikes by Black workers for several years, were generally successful in achieving short-term gains. They also had the effect of calling the attention of the government and employers to the growth of the unregistered trade union movement, which was not recognised by either and was subjected to considerable official harassment. In addition, the strikes revived international concern about poverty wages in particular and the Black labour situation in general and brought new pressures to bear on the government. Matters came to a head in 1976 with the Soweto uprising, which spread rapidly throughout much of the country. Although initially a protest against inadequate Black education, the riots escalated into a demonstration against the overall limitations and restrictions placed on Blacks. The government put down the 1976 riots with considerable loss of life among Blacks but, in a subsequent appraisal of the new situation created by the riots, concluded that fuller economic utilisation of Blacks, as proposed by business would have political as well as economic advantages by damping down Black political protests and eventually creating a Black "middle class" which would be a stabilising influence within the Black population.

The first steps consisted of increases in spending on Black education and the appointment of the Wiehahn and Riekert Commissions to examine labour legislation and Black geographic mobility respectively.

As a result of the recommendations of the Wiehahn and Riekert Commissions, there was a major erosion of discrimination in the labour market in the late 1970s and 1980s. The government accepted the Riekert Commission's recommendation that restrictions on African businessmen in the townships be eased and that designated free trade areas be established both in the White areas and in the African townships where businessmen of all races could operate.

In 1979 the government also accepted the Wiehahn Commission's recommendation that Section 77 of the Industrial Conciliation Act, providing for job reservation, be abolished.

The government in 1980 finally amended the law to allow all employees, irrespective of race to join registered trade unions. But workers in agriculture, domestic service, state and local authority employment and certain persons in educational institutions were excluded.

To prevent the blocking of Black training by the White unions, the Wiehahn Commission recommended that Blacks be trained in separate institutions and that a National Training Board be established to examine the "representativeness" of the apprenticeship committees.

Thus at the time of the survey on which this thesis is based,

much of the racially discriminatory legislation in the labour market had been repealed and educational provision was expanding rapidly although the education system remained racially structured.

1.5 THE SOUTH AFRICAN ECONOMY

The previous two sections described the changes that have occurred in the education sector and in the labour market especially during the last decade. While there have been some important positive changes in the education sector, especially with regard to educational spending and the rising educational attainment of the labour force, and statutory discrimination has virtually disappeared from the labour market, the performance of the South African economy during the 1980s has declined drastically. This section reviews some economic indicators.

1.5.1 ECONOMIC GROWTH AND EMPLOYMENT

Table 1.11 shows the average GDP growth rate for the South African economy in the post World War II period. It is evident that there has been a downward trend in economic growth since the early 1970s but more importantly, this trend has been exacerbated during the 1980s.

Table 1.11: Average GDP Growth in South Africa, 1946-1985

Period	Growth rate of GDP (per cent)
1946-60	4.4
1960-65	6.1
1965-70	5.5
1970-75	4.0
1975-80	2.7
1980-85	1.1

Sources: Kaplinsky, 1989; Hofmeyr, 1990.

Growth of modern sector employment followed a similar path (Table 1.12), being between 3.6 and 4.4 per cent for the period 1951 to 1975 but declining to 0.21 per cent for the period 1975 to 1985. For Africans, the decline in employment was even more dramatic with modern sector employment falling from 4.20 per cent between 1951-60 to - 0.27 between 1975-85. Similarly, growth of manufacturing employment peaked in the 1960s, dropped slightly in the period 1970-75 but then declined drastically in the 1975-85 period.

Table 1.12: Modern Sector and Manufacturing Employment, 1951-1985

Group	Period	Modern Sector	Manufacturing
All	1951-60	3.60	2.76
Africans		4.20	3.39
All	1960-70	4.39	4.67
Africans		4.97	5.11
All	1970-75	4.34	4.03
Africans		5.40	4.85
All	1975-85	0.21	0.07
Africans		-0.27	-0.34

Source: Hofmeyr, 1990. Modern sector excludes agriculture, mining and services

1.5.2 WAGES

The distinctive features about the trend in wages since the 1960s are the rise in African real wages and the consequent narrowing of the Black-White wage differential.

Between 1960 and 1980 African real wages grew at an annual average rate of 4.2 per cent while that of Whites grew at 1.9 per cent (McGrath, 1984). The most rapid growth period for African workers was between 1970 and 1975 when the annual growth rate averaged 7.3 per cent against 1.2 per cent for Whites.

Hofmeyr (1990) has argued that the narrowing of the wage differential between Blacks and Whites was due mainly to economic forces "arising out of the process of economic development"

rather than to institutional factors (1990:129). He suggested that the fundamental cause of rising Black wages in the 1970s was a labour shortage (even at the unskilled level), brought about by the sustained high growth of the post-war boom. He also argued that even the institutional changes were, directly or indirectly, a result of the high growth rate and the strains this induced in the economy. He goes on to say that the "pool of surplus labour available to the modern sector dried up in the 1960s, and thereafter labour scarcity in the face of a growing demand forced wages up" (1990:133). He downplays the the influence of institutional factors such as pressure on multinationals, and government and trade union pressure in arguing that market forces dominated over institutional factors in the determination of African wages.

After 1975 African wages continued to rise but a lower rate in spite of the poor performance of the economy. According to Hofmeyr, the increase in wage levels was the result of changes in the wage levels for specific occupations and African occupational mobility.

Official figures confirm that racial wage differentials declined between 1975 and 1984/85. In 1975 Africans in formal employment earned, on average, 20 per cent of the White average salary. In 1984 they earned 26 per cent. For Coloureds the increase was from 32 to 34 per cent and for Indians from 38 to 48 per cent. In the manufacturing sector Africans earned 20 per cent of the White

average in 1975, Coloureds 26 per cent and Indians 30 per cent. In 1985 these proportions had changed to 26, 29 and 36 per cent respectively (Central Statistical Services-CSS-1988).

1.5.3 WAGE DETERMINATION

In South Africa at the present time there are four principal mechanisms for determining wage rates:

(1) Industrial Council Agreements negotiated between labour unions and employers;
(2) Wage determinations made by the Wage Board;
(3) Private agreements between labour unions and employers; and
(4) The Public Service where wage scales are determined by various state agents.

Of 8.6 million economically active people in 1988, approximately 4.1 million are covered by a minimum wage of one sort or another (Horner, 1991). Significant wage increases have been obtained in the 1980s for groups covered by (1) and (3) above. This has been due largely to the substantial growth of trade union membership especially in the independent trade union movement. Table 1.13 provides some idea of the growth of trade union membership between 1975 and 1985. It is estimated that trade union membership increased further to 1.9 million in 1987 and to 2.1 million in 1989 (SAIRR, 1990).

Within the manufacturing sector, significant wage increases have been negotiated by unions especially in the motor, chemical and metal sub-sectors, all of which feature powerful unions.

Table 1.13: Trade Union Membership, 1975, 1985

Group	1975	1985
Africans	-	511171
Whites	382525	458110
Coloureds and Indians	271169	295987
Total	713134	1265268

Source: SALDRU, 1986.
Note: Excludes unregistered trade union membership of 59000 in 1975 and 449000 in 1985.

1.5.4 INCOME DISTRIBUTION

South Africa has the unenviable reputation of being one of the most unequal societies. With a Gini coefficient of 0.68 in 1975 South Africa was said to have the "worst (income distribution) of any of the 57 countries for which such data was available" (Wilson & Ramphele, 1989:4).

From 1946 up until 1970, studies of income distribution in South Africa showed that the White share had remained roughly constant at around 70 per cent. Between 1970 and 1980, however, the White share fell dramatically to just over 60 per cent, while that of Africans rose from roughly 20 per cent to nearly 30 per cent

(Devereux, 1983:36). According to recent Bureau of Market Research, the White share of total income fell from 69 per cent in 1960 to 53 per cent in 1987 (quoted in The Sunday Times, 1991).

Table 1.14: Share of Personal Disposable Income by Race, 1960-1987

Race	1960	1970	1980	1985	1987
Whites	69.2	67.7	59.3	56.7	53.4
Africans	23.1	23.3	29.7	31.7	34.5
Coloureds	5.7	6.6	7.7	8.1	5.8
Indians	2.0	2.4	3.3	3.5	3.6

Source: Bureau of Market Research, cited in The Sunday Times, 3.3.1991.

Since there is no reason to suppose that the distribution of wealth changed significantly over this period, the change was the likely result of a redistribution of wage income. Between 1970 and 1984, the African share of the modern sector wage bill rose from 20 to nearly 30 per cent. The main reason for this was the rapid rise in African wages relative to those of Whites: over this period, African wages almost doubled in real terms, while White wages rose by only 9 per cent (Hofmeyr, 1990).

Also, according to the Bureau of Market Research study cited earlier, African incomes have risen almost three times as much as those of Whites. Real White disposable incomes rose 116% from 1960-1987, while that of Africans rose 318%. The percentage

increase in real personal disposable incomes for all four races for the period 1960-1987 were as follows:

All:	197.9
Whites	116.2
Africans	317.7
Coloureds	316.0
Indians	406.4

1.5.5 INFLATION AND UNEMPLOYMENT

The South African economy has been characterised by prolonged periods of stagflation. During the 1970s and 1980s, inflation has been consistently in double digits with an annual average rate of approximately 13 per cent for the period 1970-1988, although the figure has been closer to 20 per cent for most of the 1980s.

High unemployment rates have been an endemic feature of the South African economy with consistently rising figures throughout the 1970s and 1980s (Simkins, 1982).

The measurement of unemployment has long been dogged by controversy largely because of deficiencies in methodology of the official Current Population Surveys which attempt to measure unemployment on a regular basis and which are widely believed to produce severe underestimates of the problem. As a result, unemployment in South Africa has been measured as lying between 4 and 52 per cent, depending on how and where the measurement was

made (Wilson & Ramphele, 1989:88).

However, in recent years, there has been general consensus on the gravity of the situation. The President's Council (1987), a government advisory body, estimated that 3.3 million people or approximately 30 per cent of the labour force were "inactive". The Council for Scientific and Industrial Research estimated in May 1990 that unemployment was appproximately 38 per cent (SAIRR, 1990). Researchers at the University of Natal estimated that the unemployed numbered between 4 and 5 million (SAIRR, 1990). Furthermore, the National Manpower Commission (1989), an advisory body of the Department of Manpower, estimated that unemployment would reach 44 per cent by the year 2000. 350 000 jobs per year would be needed, eight times the present job growth rate.

In sum, the South African economy, at the time of the survey on which this thesis is based (1987), was characterised by low growth, high and growing levels of unemployment, double-digit rates of inflation but a narrrowing of the earnings differentials between Blacks and Whites largely as a result of relatively higher rates of real wage growth for Africans. It is against this background of a stagnating economy but one in which educational provision was expanding and statutory discrimination in the labour market had been repealed, that the analysis of the survey data from the manufacturing sector is conducted.

CHAPTER TWO

THE SURVEY

2.1 INTRODUCTION

The purpose of this chapter is to demonstrate that the data on which this thesis is based is reliable and to explain how the survey was designed and the information gathered.

This study is based on data derived from a survey conducted in firms in the manufacturing sector of the four major industrial areas of South Africa: Cape Town, Durban, the Johannesburg-Pretoria-East Rand complex (hereafter referred to as PJE) and the Port Elizabeth-Uitenhage region. In 1985 these four areas accounted for 53 per cent of the country's manufacturing labour force (CSS, 1988). The survey sample therefore represents a significant component of those in wage employment in the manufacturing sector.

Two questionnaires were used for the survey: one for employees and another for employers. The survey of employees was carried out in November 1987. The interviews with employers was conducted between April and July 1988.

The questionnaires were drafted in close consultation with Mr J B Knight of the Institute of Economics and Statistics, University of Oxford, who with Mr Richard Sabot had conducted a similar Education and Employment World Bank-sponsored study in Kenya and Tanzania in 1980.

The employee questionnaire was tested and improved by means of two pilot surveys, one each in Cape Town and Johannesburg.

2.2 STRENGTHS AND LIMITATIONS OF THE DATA

The undoubted strength of the data lies in the fact that the information it provides on the linkages between the educational process and the labour market are not available from official sources. Furthermore, as far as is known, no similar data set has been derived in independent studies of the South African labour market. All known analyses of the determination of earnings and of the linkages between education, employment and income have been conducted on data derived through household surveys of the national census, the Current Population Surveys of the Central Statistical Services or through Income and Expenditure Surveys such as those carried out by the Bureau of Market Research at the University of South Africa (for example, Louw, 1979; Human and Greenacre, 1987; Donaldson and Roux, 1990; Hosking, 1990; Archer and Moll, 1991).

The data gathered in this survey can throw light on such hitherto uninvestigated issues as the relationship between education and earnings, education and occupation, and family background and educational achievement.

A further strength of the survey is that it is establishment-based. The case for such surveys has been adequately described in studies resulting from the Knight and Sabot work in Tanzania and Kenya (De Beyer, 1987; Hazlewood et al, 1989). Firstly, because the concern of this study is with aspects of the relationship between education and the labour market, most educated workers would be expected to be in wage employment. Secondly, data on wages and occupations are likely to be more accurate when collected at the place of employment than when collected in the household because the information can be substantiated, if necessary, by the employer.

Thirdly, the employer can be (as in this survey) a source of data both to provide a check on information provided by the employees and to supply additional relevant information. Finally, given the economic constraints under which research surveys such as this one operate, a much larger sample of educated workers can be obtained from a survey of firms than from households.

One obvious limitation of the data is that because of cost constraints, it was confined to the manufacturing sector. The South African manufacturing sector is the largest employer after "Community, Social and Personal Services". In 1985, 15.9 per cent

of the labour force was in manufacturing compared to 22.6 per cent in the services category and 13.6 per cent in agriculture, the next largest employment sector (CSS, 1988).

However, although manufacturing is a major sector of employment, the relationship between education and the labour market may be fundamentally different in other sectors such as mining, finance and commerce as well as in public sector employment. Thus there may be limitations to the general application of any policy implications arising from this study. Nevertheless, an attempt is made in this study to correlate the findings with those resulting from studies of the broader economy.

The surveys were confined to the major metropolitan areas for reasons of efficiency and cost but also because of the dominance of these areas in manufacturing.

Further limitations, of a less serious nature, relate to the facts that the data refer only to the urban labour force in the manufacturing sector of the major cities, and not to employment in the smaller towns or in rural industry, to wage and salary earners only and not to the self-employed, and to the labour force in employment and not to the unemployed.

2.3 THE QUESTIONNAIRES

2.3.1 THE EMPLOYEE QUESTIONNAIRE

The employee questionnaire was a detailed document containing 107 questions. These questions were grouped under the following headings:

(i) Personal characteristics / Demographics;

(ii) Family Background/ Education levels of parents and spouse;

(iii) Education of respondent;

(iv) Earnings;

(v) Employment experience in the firm;

(vi) Previous employment experience;

(vii) Training; and

(viii) Education of children;

This questionnaire was available in both English and Afrikaans, with the interview being conducted in the preferred language of the interviewee. The questions were phrased as clearly and simply as possible. The pilot surveys were particularly useful for refining some of the questions and eliminating ambiguities, especially those that had cropped up in translating some of the questions into Afrikaans.

The questions were pre-coded with all expected answers listed and each of these answers being given a code. Such pre-coding was essential for easy transfer of the data from the questionnaires onto the computer for further analysis. An "other" category was

usually included for unanticipated answers. Details of these answers were recorded and additional codes subsequently created. As De Beyer (1987) states "precoding (reduces) the dangers of coding errors and problems that coders might have (with) the legibility of interviewer's handwriting. Precoding (also) helps avoid vague and imprecise answers and improve data consistency" (p.316).

All questionnaires were checked by the project co-ordinator at Research Surveys and the author to ensure that complete and precise information was provided. Occupational codes (Appendix D) were filled in by the author on the basis of notes made by the interviewer regarding the occupation of the respondent. The employee questionnaire is listed as Appendix A but some comments on the nature and purpose of some of the questions may be pertinent at this stage.

(i) Personal Characteristics/Demographics

Information elicited related to the gender, race, marital status, and residential status (African employees only) of the respondents. These variables, particularly, race and gender, are crucial for exploring the determinants of earnings and the extent to which labour market discrimination persists.

(ii) Family background

An attempt was made here to determine the level of education of

the respondent's father, mother and spouse. Questions were asked about the highest level of education attained and about the length of time spent in the formal education system. The latter question, understandably, produced unreliable data as many respondents could not provide accurate data about actual time spent in education of either their parents or their spouses. The importance of the questions on the educational attainment of parents lies in the fact that they can reflect the progress in educational development between generations.

(iii) Education of the respondent

Questions referred to the level of educational attainment, length of time spent in the education system and year of completion of formal education. The focus was also on whether respondents wanted to continue with formal education and the reasons for failing to do so if they had wanted to continue. Particular emphasis in this section was placed on the nature of the matric pass and post-matric education as these questions relate crucially to the issue of certification and its possible impact on earnings.

(iv) Earnings

Information was needed here regarding gross earnings, net earnings and receipt of fringe benefits such as medical aid, pension and housing allowances. Crucial to this study was the gross monthly wage/salary as it constituted the dependent

variable in most of the subsequent regression analyses. The determinants of earnings such as education, employment experience, occupation, and so on are the focus of the analysis and an accurate provision of gross earnings was of the utmost importance. A further issue that could be explored is the extent to which fringe benefits are related to earnings, employment, occupation, race and gender.

(v) Employment Experience

Formal education (schooling) and employment experience (or on-the-job experience) are regarded as the two basic human capital variables. In virtually all studies of the determinants of income, employment experience is a necessary ingredient. The questions relating to employment experience were grouped under two headings: (a) employment experience in the firm; and (b) previous employment experience. The latter group was further disaggregated into total previous experience, experience in "the last job" and experience in "job in 1977".

Employment experience in the firm is important not only because it is a component of total labour market experience but also because it provides insight into the role of seniority (measured by length of employment in the current firm) in determining individual earnings. This information is useful for determining the extent to which the nature of the labour market (for instance, through the existence of internal labour markets) rather than human capital is a determinant of earnings.

Information relating to previous employment experience was necessary for determining its impact on earnings but also for the analysis of labour mobility and turn-over. The aim here is to examine to what extent mobility and turn-over are related to such variables as education, race, gender, and occupation.

Questions relating to the year 1977 were intended to elicit information for a comparison of the period 1977-1987 to gain insights into the issue of occupational mobility by race and gender during an economically turbulent period in South Africa.

Questions relating to firm size, ownership sector in previous employment and type of enterprise, when coupled with the firm's location and sub-sector could shed some light on the effects of firm characteristics on earnings. This needs to be contrasted with the effects of individual characteristics such as education, race, gender and employment experiece.

(vi) Occupation

The usual classifications of occupations as provided by the national census were regarded as inadequate. These categories are either the standard classification of occupations by type of output or product, or functional classifications - clerical workers, production workers, sales workers, etc. They pay scant attention to the skill content of occupations. The classification of worker occupations used in this study, in contrast, is skill-

specific. Occupation is used to aggregate jobs utilising particular skills so that the resultant occupational hierarchy is a good proxy for the hierarchy of skills. In this survey, interviewers obtained as complete a description of the job as possible, using the guideline questionnaire in Appendix E. They asked what the job was called, and exactly what tasks it comprised. They asked what sort of machinery was used, (if any), whether it was automatic or manual, whether it was used for one operation only, and whether the respondent set it him/herself, operated it alone, or as an assistant. Respondents were also asked whether they supervised any other workers, and if so, how many, and who their own supervisor was. Finally they were asked how long it had taken to become proficient, and the nature and length of training that had been necessary for the job. These details were asked about the current job, the previous position (if relevant), the first job of workers who had changed employer more than once and for those who were in employment in 1977.

Once the questionnaires were completed, all the coding of occupations was done by the author. A set of criteria and characteristics for each category was derived together to ensure consistent coding. Five broad occupational categories were distinguished. White collar occupations were listed as lower non-manual or higher non-manual. Lower non-manual occupations were those that involved routine work, little or no supervision of other workers. The higher non-manual category workers included all those white collar workers involved in supervisory, administrative and managerial, and technical, professional and

semi-professional occupations. Blue collar workers were divided into three manual categories: skilled, semi-skilled and unskilled. White collar jobs were further disaggregated as follows: clerical, technical and semi-professional, managerial, professional, supervisory, sales and law and order.

Unskilled workers were those who had little or no formal training and performed simple repetitive tasks under close supervision. They might also assist a semi-skilled worker, and had become fully proficient at the job in a very short time - within two months. Semi-skilled workers operated a machine, or operated and set a very simple machine, and perhaps assisted a skilled worker. They might have had a short period of formal training, and taken perhaps as long as four years to become fully proficient in the job, but had no formal qualification, such as a trade test certificate. Skilled workers operated and set complex machines, and often supervised other workers. They had considerable formal training, for example, more than three months of full time training, and/or a long on-the-job learning period of four years or more. Workers with a trade certificate were classified as skilled. This careful coding precluded any confusion between occupation and skill level - skill level was used as a criterion by which to classify jobs. Education and earnings were not used at all in the classification so as not to cloud the analysis of the relationship between education, occupation and earnings.

(vii) Training

Earnings of workers rise over their lifetimes not only because of their formal education and labour market experience but also because of on-the-job training. Questions on training were included therefore, to determine the effects of on-the-job training on earnings. Questions were asked about whether respondents had received training, the nature of their training courses, whether it was part- or full-time, the length of the courses and whether workers received higher pay after training.

The training courses were divided into seven groups: technical, driving, clerical, safety, literacy, sales and supervisory. The "technical" category included a wide range of courses related specifically to the development of firm-specific skills. They included, for example, courses for the development of particular skills enabling semi-skilled workers to assist skilled manual workers as well as machine-familiarity courses.

(viii) Education of children

To determine inter-generational differences in educational attainment, questions were directed at determining the educational levels of respondents' children, education spending and the age and genders of their children.

It should be emphasised that not all data derived from this

survey are used in this thesis. The focus of this study is mainly on the role of individual characteristics, namely, schooling, employment experience, race, gender, occupation and training and firm characteristics, such as location, sub-sector, and size in the determination of earnings.

2.3.2 Employer Questionnaire

The employer questionnaire (Appendix B) was designed to elicit information that would throw light on some of the relationships between education and the labour market derived from the employee questionnaire data.

Questions were grouped under the following headings:

(i) Recruitment;

(ii) Education and Productivity;

(iii) The Determinants of Wages;

(iv) Training; and

(v) Turnover and Vacancies.

The results of the employer interviews are shown in Appendix C. These answers provided some insight into the operation of the labour market and they form part of the analysis of several following chapters.

The reasons for the inclusion of the various questions are listed below.

(i) Recruitment

The aim here was to determine what the recruitment criteria were, whether the method of recruitment varied by occupation, and the specific role of education in recruitment policy. This was crucial to the issue of determining whether education acts as a screen to sift out potentially productive employees from those that are not perceived to be productive on the basis of their lack of or poor quality education. It was also hoped that these questions might shed light on whether employers were continually raising the educational qualification for entry to a particular occupation without any increase in basic productivity.

(ii) Education and Productivity

Information was sought on the perceived relationship between education and productivity, how productivity was assessed, the relationship between quality of schooling and productivity and time comparisons of education and productivity.

The relevant employer answers to sections (i) and (ii) above are analysed in Chapter Six.

(iii) Determinants of Wages

Discussions centred around the factors determining wages, namely the role of unions, the supply of and demand for labour, government legislation, and profits. Also probed were the reasons

for occupational differentials and their linkages to such factors as education, race, age, gender and employment experience. Employer answers relating to the determination of wages are discussed in Chapter Five.

(iv) Training

Similar questions as in the employee questionnaire were asked about who received on-the-job training, the length of training, and whether employees received higher pay after training. The relevant employer answers are analysed in Chapter Nine.

(v) Turn-over

Questions related to the extent of turn-over in particular occupations, the average rate of vacancies, and the policies of the enterprise with regard to ensuring stability of the work-force. The replies given by employers are evaluated in the section on labour turnover in Chapter Seven.

Five major employers were interviewed between April and July 1988. These interviews were occupation-specific. The sectoral and geographical distribution of these employers and the occupations around which the interviews were structured are listed in Table 2.1.

All five firms interviewed employed more than 500 workers. Smaller firms were excluded from this survey mainly because they did not have similarly well-developed apparatus (e.g. personnel departments) for providing information on such issues as recruitment practices and wage determination.

Table 2.1: Employer Interviews: City, Sub-sector and Occupation

City	Sub-sector	Occupation
Cape Town	Food and Beverages	Clerical Semi-skilled manual
Johannesburg	Food and Beverages	Clerical Semi-skilled manual
Pretoria	Motor	Skilled manual Semi-skilled manual
Cape Town	Clothing	Skilled manual Semi-skilled manual
Johannesburg	Paper	Semi-skilled manual Unskilled manual

2.4 INTERVIEWERS

Interviewers used by "Research Surveys" were university students fluent in either English or Afrikaans and in an African language. All had been employed previously by the company and had proved to be reliable and competent. A one day workshop was held by the author to explain the nature and purpose of the survey. Details of the questionnaire were discussed. The importance of obtaining accurate and comprehensive data was stressed.

2.5 DRAWING THE SAMPLE

Two major constraints faced during sampling were the absence of official data on enterprises by size and the uncertainty about whether employers would be agreeable to their employees being interviewed. Information on firm size is available from the Census of Manufacturing (CSS, 1985) but the data are grouped by number of establishments, workers and sub-sectors without a listing of individual firms. Therefore, an informal "Research Surveys" index of firms in the manufacturing sector designating firms as "small", "medium" and "large" was used initially to draw up three lists of potential firms. The initial list of 477 firms was made up equally of small, medium and large firms.

In attempting to draw a representative sample, every effort was made to approximate the actual geographical and sub-sectoral distribution of the manufacturing labour force.

In each of the three lists, 10 firms were initially randomly chosen and the employers approached for their consent. A refusal was followed by re-sampling. A relatively large proportion of small employers refused participation and a smaller number of medium size employers acted likewise. None of the large employers refused. Therefore smaller employers may be under-represented in the sample.

Sixty one firms were sampled. Within each firm a random sample of

employees was drawn from registers provided by employers. Sampling fractions were not used. A relatively arbitrary measure was used to decide the number of employees to be interviewed in each enterprise. It was hoped that this would provide a relatively representative spread of workers in this sector. This formula was:

Firm Size	No. of respondents
< 50	6-10
50-100	10-15
101-500	20-30
> 500	30-40

The number of employees interviewed ranged from 6 in the smaller firms to 40 in the largest. The smallest firm in the sample employed 30 workers and the largest 900. A list of the participating firms by location, size and sub-sector is provided in Appendix E. Table 2.2 shows the number of firms sampled by firm size and number of respondents and Table 2.3 shows the number of respondents by sub-sector.

Table 2.2: Number of Firms Sampled, Firm Size, Number of Respondents

Firm Size	No.of Firms	No. of Respondents	Mean
Less than 50	4	28	7
51 - 100	18	220	12
101 - 500	24	480	20
More than 500	15	477	32

Table 2.3: Employees Grouped by Sub-sector and City of Employment

Sub-sector	City				
	CT	PE	Dbn	PJE	Total
Textile	36	0	43	14	93
Food & Beverages	86	0	106	150	342
Printing & Paper	29	6	13	100	148
Motor	0	56	0	46	102
Leather & Footwear	0	45	0	0	45
Clothing	91	38	0	0	129
Plastics & Rubber	0	0	0	41	41
Machinery	0	0	0	118	118
Chemical	28	0	0	62	90
Metal	13	0	0	84	97
Total	283	145	162	615	1205

Note: CT - Cape Town; PE - Port Elizabeth; Dbn - Durban; PJE - Pretoria-Johannesburg-East Rand

2.6 DATA COLLATION AND CODING

Interviews were completed during a four week period in November 1987. Each questionnaire returned from the field was checked by the project co-ordinator at Research Surveys and incomplete forms were returned for completion if possible or rejected.

The questionnaires were received by the author in early December 1987. Each questionnaire was checked and coded by the author. The data was then transferred from each questionnaire onto a Lotus spreadsheet. Several checks were conducted to ensure values of each variable fell within the range permitted by the coding scheme. These rather tedious, painstaking but essential tasks

took over twelve months to complete.

The data was then transferred onto the University of Cape Town's mainframe computer into the BMDP (Biomedical Data Processing) system files. Numerous cross tabulations of the data were produced. The data was then transferred to the statistical package SAS as this was deemed to be more appropriate for the kinds of analysis that were used in this study.

2.7 COMPARATIVE REPRESENTATIVENESS OF THE DATA

Some idea of the representativeness of the data can be derived from a comparison of tables listing official data on the one hand and survey data on the other. Such tables are shown below for:

(i) the racial and gender distribution of employment in manufacturing:

(ii) the geographical distribution of manufacturing employment; and

(iii) the sub-sectoral distribution of employees in manufacturing.

Table 2.4: Racial and Gender Distribution of Employment in Manufacturing, 1987 (percentage distribution)

Group	Survey data	Official data
African	43.2	53.3
White	25.8	22.1
Coloured	26.0	18.0
Indian	5.0	6.6
Male	61.7	71.5
Female	38.3	28.5

Source: Official data - CSS, 1988.

As is evident from Table 2.5, Africans and Indians are under-represented while the other two races are over-represented. Males are also under-represented. The geographical distribution of the sample closely approximates the official data (Table 2.6).

Table 2.5: Geographical Distribution of Manufacturing Employment (percentage distribution)

City/Region	Survey data	Official data (weighted)
Cape Town	23.5	21.2
Durban	13.5	15.9
Port Elizabeth	12.0	9.6
Pretoria-Johannesburg-East Rand	51.0	53.3

Source: Official data - CSS, 1988.

The sub-sectoral distribution of the sample differs to some degree from the official data with some sectors under- and others over-represented (Table 2.7). However, these distribution differences should not be regarded as serious deficiencies

because the merit of the survey data lies not in whether their distribution exactly replicates that of the official data but in its quality.

Table 2.6: Percentage Distribution of Employees by Manufacturing Sub-sector

Manufacturing sub-sector	Survey Data	Official data (weighted)
Textiles	7.7	9.7
Food and Beverages	28.4	20.7
Paper and Printing	12.2	7.9
Motor	8.5	9.1
Leather and Footwear	3.7	3.8
Clothing	10.7	11.1
Plastics and Rubber	3.4	4.3
Machinery	9.8	13.2
Chemicals	7.5	9.5
Metal	8.0	10.7

Source: Official data - CSS, 1988.

In spite of the differences in the distribution of employees within the survey sample and the official data, the sample can be regarded as representative of the labour force in the South African manufacturing sector. There are two factors which may account for the slightly distorted distribution within the survey sample. Firstly, as stated earlier, several employers, randomly selected, refused to participate in the survey. Re-sampling often meant a departure from rigid, stratified sampling on a sub-sectoral basis. Secondly, many sub-sectors, for example, motor, metal, paper and printing and machinery comprise a wide range of small and large firms making a variety of products. It is difficult to provide an accurate representation of such sub-

sectors in a limited sample size.

2.8 Concluding Comments

In this chapter an attempt was made at explaining the nature and methodology of the survey on which this thesis is based. It was pointed out that while there are some disadvantages to having an establishment survey based only on the manufacturing sector, these are outweighed by the advantage of having obtained information on the labour force in the light of the complete absence of non-government-derived data in this field. Furthermore, it was shown that the survey was conducted only after careful consideration was given to the designing of questionnaires, selection and training of interviewers, and sampling. Such care and consideration was extended to the checking of completed questionnaires and the transfer of the data onto computer for further analysis. The end result is that what the survey produced was a set of reliable, qualitatively-rich data unique in academic research in the South African context.

CHAPTER THREE

EARNINGS AND EARNINGS DIFFERENTIALS: AN OVERVIEW OF LABOUR MARKET THEORIES

3.1 INTRODUCTION

In the most general terms, labour market theories are explanations of how wages are determined and workers allocated to different jobs. They provide explanations of why one group of workers, such as skilled workers, earns more than another group, such as the unskilled. They also provide a basis for our understanding of such labour market problems as discrimination, poverty, and unemployment, and suggest policies that could alleviate them. That there are currently a number of theories reflects both the complexity of the labour market and the different theoretical and political perspectives used as the starting point of their analyses. Consequently, a number of conflicting interpretations and conceptualisations of the labour market and how it operates have been developed.

One particularly important area of dispute is the relationship between education and labour market behaviour. This arises primarily because of the crucial role education plays in the

current neoclassical theory of the labour market. This has constituted the mainstream approach to labour market analysis since the 1950s, though in recent years it has been challenged by alternative explanations of how the labour market operates and the role of education in determining labour market outcomes. The most significant challenge to the neoclassical orthodoxy has come from economists who propose theories of labour market segmentation and from advocates of the screening and job competition models.

Three major approaches may be identified. First there is an approach grounded on an argument that the educational system operates in such a way that it directly adds to an individual's cognitive abilities. These abilities range from basic numeracy and literacy at one end of the scale to a greater capacity for logical and analytical reasoning at the other. These increased abilities lead to higher individual earnings. This view is reflected in the human capital theory as developed by Becker (1964), Mincer (1974) and others.

A second approach also maintains that schools are effective in changing a person but that the important changes are not those of cognitive abilities. Class background is here seen as the major determinant of occupation and income and the educational system is said to operate in such a way that it develops different sets of productivity-related personality traits among children from different social classes. This both legitimises the distribution of jobs, which simply perpetuates the existing structure of

social class, and also increases the productivity of all classes in their ascribed occupations. Traits produced by schools in those individuals who will fill low-paying jobs include punctuality, obedience, and respect for authority, while those for high-status occupations include self-reliance and the ability to make decisions (Bowles and Gintis, 1976; Reich et al,1973).

Finally, there is a set of approaches which directly questions the view that through the development of either cognitive abilities or personality traits, schools increase the potential productivity of individuals. Rather, the educational system is said to act simply as a selection mechanism to sort out those who possess non-school-related characteristics, such as intelligence and motivation, which are in some way connected to productivity. Schooling itself does not affect productivity. This view is reflected in the screening hypothesis espoused by among others, Arrow (1973), Stiglitz (1975) and Spence (1976).

These views of education are discussed further below in the context of the wider labour market theories to which they are related.

During the late 1950s and the early 1960s the current neoclassical theory of the labour market emerged with the development of human capital theory. According to human capital theorists, differences in personal characteristics, such as education, between individuals result in differences in their

productivity. For example, the more educated or those who do not suffer from ill health will, other things equal, be able to produce more output than the less educated and those who suffer from ill health. Since firms pay workers a wage that reflects their productivity, those workers who possess the more favourable personal characteristics will have a higher earnings potential than workers with less favourable characteristics. In order to explain how these characteristics cause one worker to be more productive than another, economists such as Becker (1964) coined the term "human capital" to represent those characteristics that are related to productivity. Individuals are assumed to be able to choose the optimum amount of improvement in human capital by "investing" or acquiring additional amounts of particular characteristics up to the point where the costs of further additions to human capital equal the discounted value of the expected future income to which it gives rise.

Since the early 1970s a wide range of labour market theories has been developed at variance with the orthodox neoclassical/human capital school. These theories have emerged largely in response to a number of empirical observations of the labour market in the United States of America, which have been said to be at odds with the implications of orthodox theory. These include the persistence of poverty and income inequality, the failure of education and training programmes to raise the incomes of the poorest groups, continual upgrading of the qualifications required for jobs, continuing discrimination against sections of the labour force and widespread worker alienation (Cain, 1976).

The interpretations of labour market functioning which have come to compete with orthodox theory may be divided into labour market segmentation, screening and job competition models. Each of these contains variants and there is often a degree of overlapping between variants of all three theoretical approaches.

3.2 NEOCLASSICAL MODELS OF HUMAN CAPITAL ACCUMULATION

The human capital approach, which has dominated the neoclassical literature on earnings determination for the last two decades, is based upon the theoretical models presented below[1]

3.2.1 The Ben-Porath Model

The key assumption in human capital models of earnings determination is that the individual can trade earnings today for increased earnings in the future. This concept forms the core of the early work of Mincer (1958) and Becker (1975) and is the basis of one of the most well-known models of human capital accumulation - the Ben-Porath (1967) model. In this model, an individual has a human capital stock of k_t as of time t. This stock measures the number of "efficiency units" that are available for rental to the labour market. The competitive market pays a constant rental rate R for each of these skill units. The

Ben-Porath model makes no distinction among the different kinds of abilities or human capital (e.g. physical or mental) a single individual may have, nor is the model concerned with the differential value the market may place on these various abilities. In addition, by assuming R constant and predetermined, the model ignores the role of labour demand in the earnings determination process.

The individual is able to adjust his stock of human capital by allocating time to learning activities. Let s_t be the fraction of time the individual allocates to these learning activities. The potential earnings of the individual are given by RK_t, while observed earnings are given by $RK_t(1- s_t)$. The individual's objective is to maximise the present value of lifetime earnings. This quantity is given by :

$$W = \int_0^T e^{-rv} RK_t(1 - s_t)dv \qquad (3.1)$$

where T is the (fixed) age of retirement from the labour market, and r is the individual's rate of discount.

The human capital accumulation process is described by the equations:

$$\dot{K}_t = Q_t - \delta K_t \qquad (3.2)$$

$$Q_t = f(s_t, K_t) \qquad (3.3)$$

where $\dot{K}_t = dK_t/dt$; Q_t is the flow of human capital accumulation at time t; and δ is the depreciation rate. Equation (3.2) states the simple fact that the net change in the human capital

stock, $\dot{K}_t$, is equal to the new accumulation minus any depreciation of the existing stock. Equation (3.3) is the human capital production function.

The maximisation of (3.1) subject to equations (3.2) - (3.3) has been found to be mathematically intractable (Borjas, 1988:23). The key stumbling block is the specification of the production function in (3.3). For purely technical reasons, it is necessary to make an important mathematical and substantive assumption about the functional form of the production function. This "neutrality assumption" specifies the production function as:

$$Q_t = f\ (s_t.K_t) \qquad (3.4)$$

so that only the "effective" amount of human capital used in learning ($s_t.K_t$) enters the production process, and not the time input and the level of the human capital stock separately. The substantive content of the neutrality assumption lies in the fact that an increase in the capital stock - given neutrality - raises both the observed wage rate and the amount of "effective" time used in the learning process by the same percentage. Thus increases in K_t have a neutral impact on both the market wage and on the value of the capital stock used as an input in further learning. The neutrality assumption, in effect, makes the flow of human capital investments, and hence the marginal costs of human capital investments at time t independent of the level of the capital stock.

Using the neutrality assumption the solution to the model can be illustrated as in Figure 3.1. At any point in time the neutrality assumption ensures that marginal costs of investments depend only on Q_t, the actual amount "learned" in that time period. Hence marginal costs are constant over calendar time (i.e. are not a function of t). The marginal revenue of a rand's worth of investment at any point in time T^* is given by $\int_t^{T^*} Re^{-rv}dv$, and hence can be graphed as a horizontal line in Figure 3.1. At time T^* the optimal investment of human capital is given by the intersection of marginal costs and marginal revenue, and since marginal revenue declines with calendar time, the flow of human capital investments will similarly decline over time. In addition, it can be shown that if Q_t declines over time, it is necessary that the amount of time allocated to human capital investments, s_t, also decline over time. The main theorems of the Ben-Porath model are, therefore, given by:

$$\frac{\partial Q}{\partial t} < 0 \text{ and } \frac{\partial s}{\partial t} < 0 \qquad (3.5)$$

The Ben-Porath model explains earnings inequality amomg individuals in terms of differences in the parameters of the model; namely, the initial capital stock, the discount rate, the length of the working life, and the depreciation rate. In addition, the model generates inequality due to the ageing process. That is, individual earnings will follow a systematic life-cycle pattern, and thus even otherwise identical individuals

will have different earnings at different ages. This, in a sense, is one of the fundamental insights of the human capital model: the relevant unit of observation in earnings distribution studies is not annual earnings but lifetime earnings.

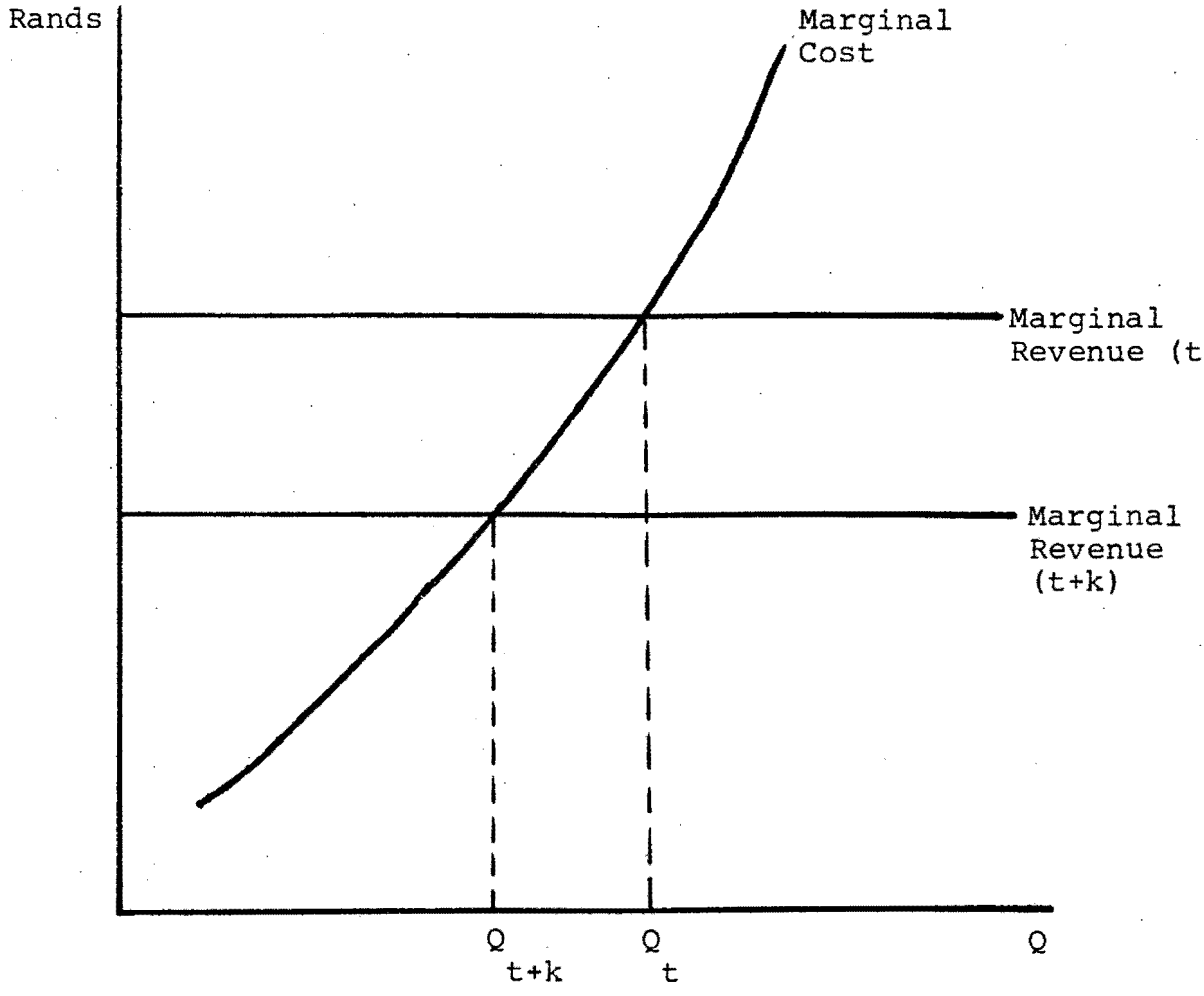


Figure 3.1 The Ben-Porath Model

(Source : Borjas, 1988)

3.2.2 The Supply and Demand for Human Capital

The Ben-Porath model focuses on explaining how the accumulation of human capital (and thus the rate of earnings growth) changes over the life cycle. A related model by Becker (1975) provides a more direct link between the total stock of human capital and earnings inequality among individuals. In the Becker framework, the supply and demand functions for human capital determine the individual's optimal total accumulation of "learning". Figure 3.2 illustrates the content of the model. The supply curve S plots the rate of interest the individual must pay to finance human capital investments against the amount of human capital investment incurred. It is upward sloping because the individual would obviously exhaust the cheaper sources of finances (e.g. parents, government subsidised student loans) before continuing his investment. The more human capital investment the individual wishes to obtain, the higher the marginal cost of the investment.

The demand curve D plots the marginal rate of interest received on the investment as a function of how much investment is accumulated. The assumption that human capital investments are subject to the law of diminishing returns ensures that the marginal rate of return to human capital investments declines with the amount of investment.

The individual's optimal investment of human capital, q*, is given by the intersection of the supply and demand schedules,

while the individual's earnings are defined by:

$$W^* = \int_0^{q^*} [D(q) - S(q)]\, dq \qquad (3.6)$$

Note that the equilibrium condition in the model is the familiar first-order condition from any investment model: the (marginal) rate of return to human capital investment is equated to the rate of return in alternative investments.

In this framework income inequality is caused by shifts in the supply and demand schedules. Becker identifies the key source of variation in the demand curve as ability, and that of the supply curve as the family's financial resources. In addition, Becker proves the important theorem that if the variation in ability exceeds the variation in the supply schedule, the amount of earnings inequality in the economy will be less than the inequality in human capital stocks, while if the variation in ability is less than the variation in family backgrounds, the amount of inequality in earnings will exceed the inequality in human capital stocks.

This model illustrates the role by which observable variables measuring family background and/or the individual's ability can generate differences in earnings across individuals. Although these types of variables are often included in "reduced form" earnings equations, little attempt has been made in the literature to directly estimate the structural equations underlying Becker's model. Obviously, the lack of data on the rates of interest and return on human capital and other

investments (as well as the volumes of such investments) forms a major obstacle in the estimation procedure.

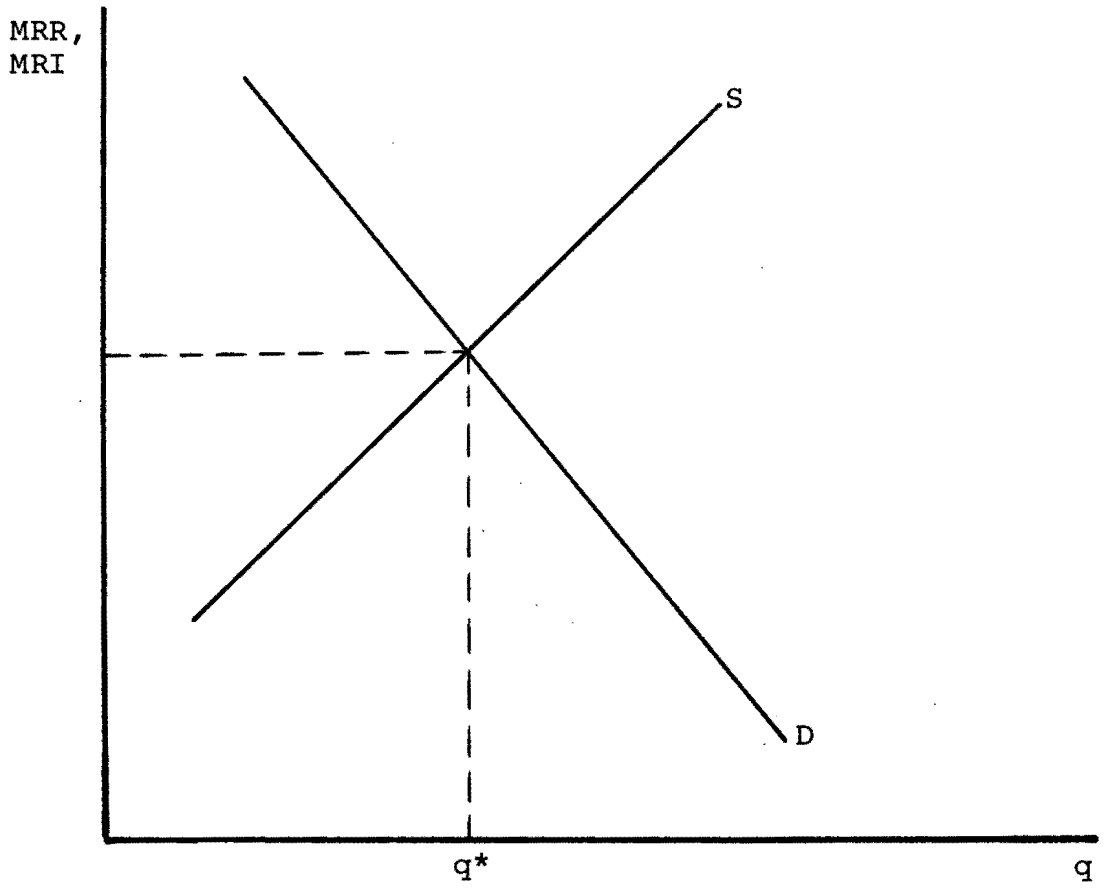


Figure 3.2 The Becker Model

MRR : Marginal Rate of Return
MRI : Marginal Rate of Interest

(Source : Borjas, 1988)

3.2.3 The Human Capital Earnings Function

The main empirical use of the aforementioned theoretical models has been the derivation of earnings functions that can be used to understand the role played by human capital accumulation in the generation of observed age/earnings profiles. A successful approach to the study of earnings distributions is that of Mincer (1974). Mincer ignores the various assumptions and functional form restrictions that are implicit in the empirical applications of the Ben-Porath model and only uses the key substantive result of the model: individuals are more likely to invest in human capital at younger ages than at older ages.

The human capital theory as formulated by Mincer (1974) is illustrated in Figure 3.3. The earnings stream over the lifetime of workers due to a schooling level Y_0, is represented by the graph AA, where OA is the period of no income while the worker is at school; he then earns a positive amount Y_0 for the entire period of N years of his working life. With a higher level of schooling S, the period of no earnings is extended from OA to OB, but the level of earnings in each year of his working life is higher, as shown by the line BB. The individual choosing between the two levels of schooling will compare the cost of longer years of forgone earnings with the extra income he gets for each year that he will be working. The following assumptions are made:

(a) The level of schooling does not affect the length of the working life.

(b) The rate of discount (r, reflecting the cost of waiting for

future income) is the same for all workers.

(c) There is no risk aversion for the different groups of workers.

(d) There is no "rationing" in the labour market for the more highly educated, so that all workers who manage to get the level of education S are able to have an earnings stream corresponding to that level of education.

The potential worker will decide on what to invest in schooling by comparing the two income streams AA and BB, that is,

$$\ln Y_s = \ln Y_o + rS \qquad (3.7)$$

The semilog earnings function defined as (3.7) above ignores any role of post-school investment in augmenting the individual's earning capacity. Mincer has, however, stressed the importance of on-the-job training in skill formation. The scope for the latter depends on the length of time that the worker is in the labour market. This is measured by his "experience", which is his age minus the time spent in schooling. The productivity of experience can, however, be expected to decline with age, since both firms and workers reduce the amount of on-the-job training undertaken as the period over which the returns to such investment can be enjoyed diminishes and retirement age approaches. Thus the standard earnings function adds a quadratic in experience (E) to equation (3.7):

$$\ln Y_s = \ln Y_o + rS + aE + aE^2 \qquad (3.8)$$

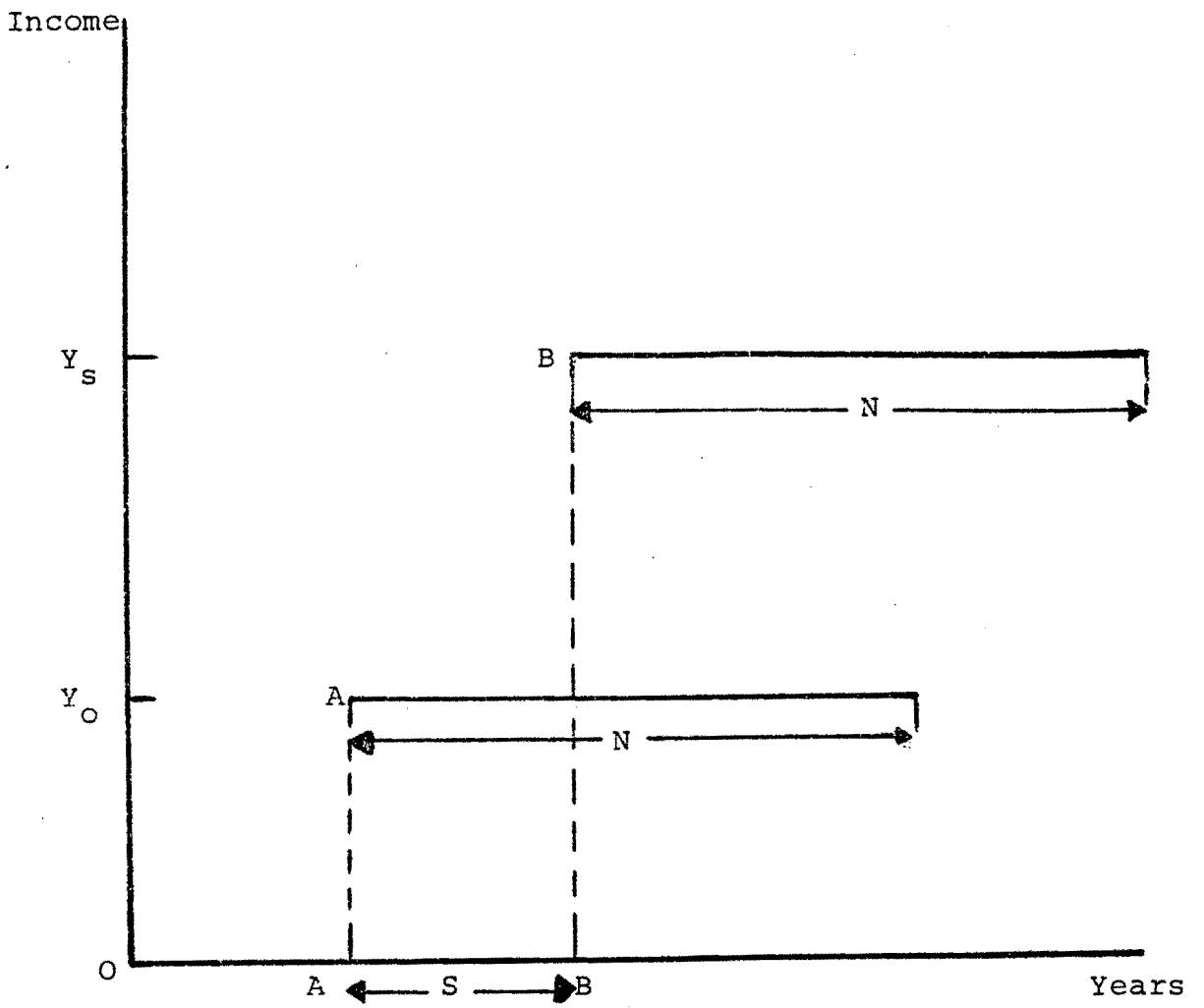


Figure 3.3 Earnings Profile with Different Levels of Schooling

Note: Expected Income at Y_o with no schooling and at Y_s with S years of schooling, with a work life of N years independent of S.

(Source : Behrman & Birdsall, 1983)

Log earnings are thus a linear function of years of schooling and a quadratic function of years of experience. The coefficients of these variables have the interesting interpretation of rates of return to school and postschool investments, and of the volume of human capital investments (in time-equivalents) accumulated by individuals. It is important to note, however, that in this simple formulation of the Mincer equation the model is underidentified. That is, a restriction must be imposed on the parameters (e.g. the rates of return to school and postschool investments are the same) in order to identify all the parameters in the equation.

An interesting insight provided by the model is obtained by comparing the earnings path where postschooling investment exists with the earnings path of an individual who does not have postschool investments. These two alternative earnings profiles are illustrated in Figure 3.4. At the time of school completion, the individual's earning capacity is given by E_s($E_s = E_o e^{rs}$). Positive levels of on-the-job training imply that an individual on leaving school will earn less than his "true" earnings capacity, but that over time his earnings will grow (as he captures the returns from the postschool investment). Postschool investments, therefore, have the important effect of steepening age/earnings profiles. Note that at t years of labour market experience the individual "overtakes' his earnings potential after the completion of school. Using the basic model summarised above, Mincer shows that overtaking occurs at most 1/r years after the completion of schooling. Hence if r =.10, overtaking

can be expected to occur within the first decade in the labour market.

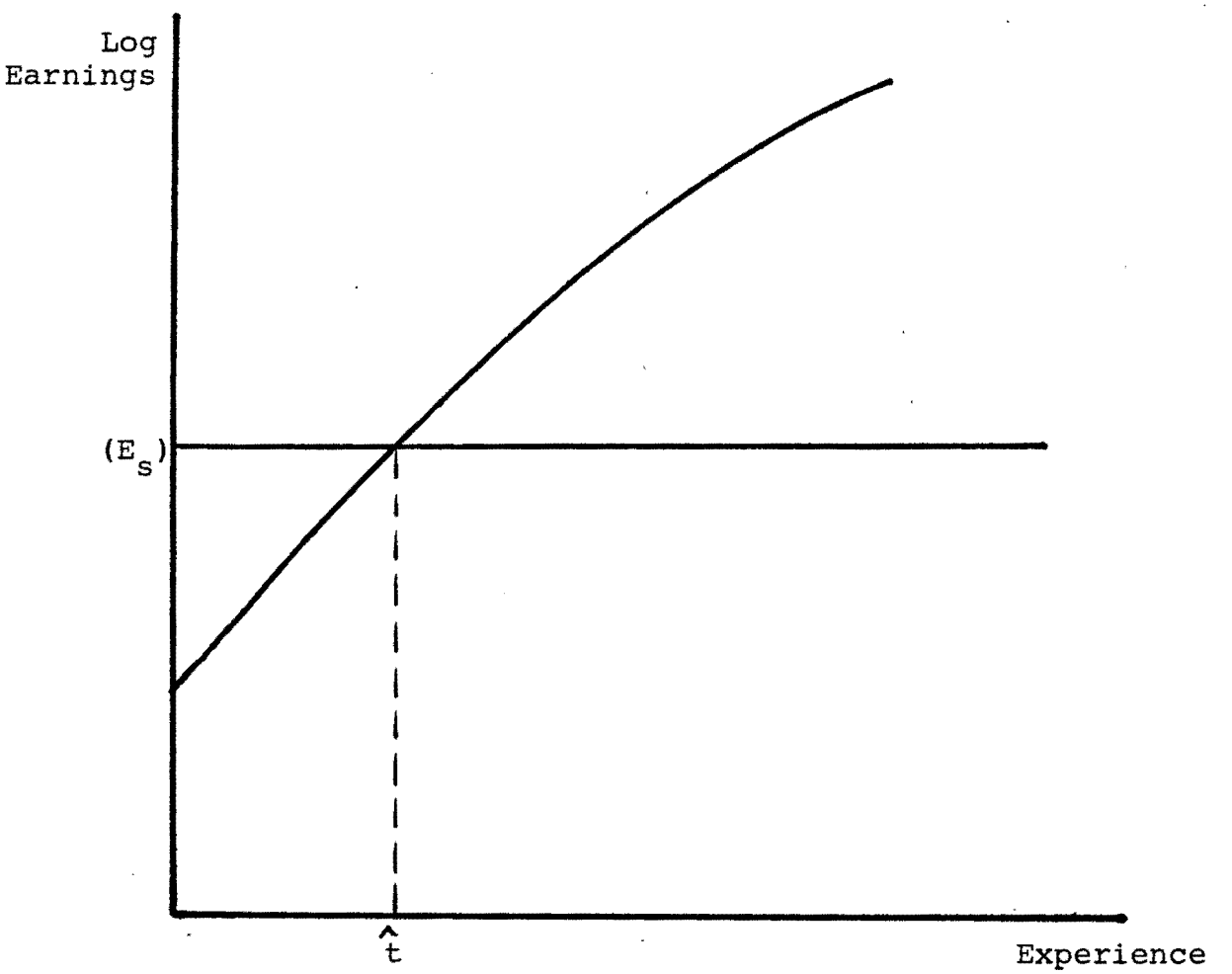


Figure 3.4 Effect of Postschool Investments on Earnings Path
(Source : Borjas, 1988)

This important insight leads to a major prediction of the human capital model: observed earnings and schooling will be more closely related at around the time of overtaking. Prior to t the

costs of on-the-job training contaminate the correlation between earnings and schooling, which therefore does not reflect the full impact of schooling on earnings. After t the returns from on-the-job training "contaminate the correlation" (Borjas, 1988:30). Thus if individuals differ in their rates of return the correlation between earnings and schooling will be maximised at around the mean age of overtaking. This prediction differs radically from that provided by a simple "luck" model of earnings determination, where prior events matter less as time elapses. It also differs significantly from predictions derived from models where schooling is only a signal allowing individuals to enter "good" jobs. Presumably as the employer observes the actual productivity of individuals the value of the schooling signal would decrease, and again the correlation between education and earnings would decline over the working life.

The Mincer earnings function has, without doubt, become the most widely used empirical tool in labour economics - probably because this equation provides a simple, robust, and intuitive way of summarising or describing data on earnings differences by schooling and experience.

Thus far investment in human capital has been depicted as either an essentially once-and-for all investment or as a fixed series of investment possibilities in which the individual chooses when to stop investing and to enter full-time employment. In the case of education, this can perhaps be justified by supposing that the educational system tends to predetermine the ages at which

various levels are taken so that the individual is faced effectively with a `take it or leave it' situation. If, however, all human capital investments were made by taking formal qualifications then we would observe all individuals with similar educational and other qualifications earning similar wages at any moment in time. Similarly, in the absence of any general real wage growth, each individual's age earnings profile would be flat over his working lifetime once his qualifications had been obtained. In fact, this is not the case as age-earnings profiles derived from both cross-section and time series surveys show wages first rising according to experience and then flattening off later in one's career. This tendency is however, more pronounced the higher the educational level of the individual.

This systematic curvature in the age-earnings profile would suggest, in the absence of costless learning or improvement, therefore, that individuals make further post-education investments in human capital, presumably in the form of on-the-job training.

Based on the pioneering work of Becker (1962, 1964), a distinction is made between "general" and "specific" on-the-job training. General training is defined to be equally useful in all firms and industries. Specific training is defined to be of use only in the firm that provides it. Most training, of course, provides elements of each type. A skill may be particularly useful in the firm in which it is learned but is unlikely to be

of absolutely no use anywhere else. Also, it is unlikely that many skills are equally valuable no matter where they are put to use.

After a worker completes general training, firms perceive that this person is more valuable to them than he or she was previously. If this training is truly general, the perception should be shared uniformly by all firms. The result is that, subsequent to the training, the wages of the worker will be higher than they would have been if the worker did not receive training. In fact, the worker's wage will be greater by precisely the amount by which firms value the difference in productivity between the trained and untrained worker.

Because every firm believes that the worker's productivity has increased by an equal amount, should one firm offer a wage increase that is less than this increment, it will be profitable for another firm to offer a slightly greater amount in order to hire the worker and take for itself the difference between the productivity increase and the wage increase. As long as the increase in wages is less than the increase in the value of the worker's product, it will always be worthwhile for some firm to offer a slightly higher wage to gain the worker's services. This process of competitive bidding will stop only when the wage rate rises to the value of the skilled worker's enhanced productivity.

Because of this tendency for wage and productivity increases to

equalise, it will rarely be advantageous for employers in a competitive labour market to invest in general training for their employees. If this happened, the employer would be spending training funds but would have no way of capturing the returns, because after training the firm must match the offers of its competitors and pay a salary equal to the revenue the worker adds to the firm.

If the firm will not pay for general training, then someone else must. Since it is the firm that usually provides on-the-job training, general training will most likely be financed by the worker in the form of receiving less than would be earned by remaining unskilled. Typically, the worker bears these costs of training by working at a series of jobs offering an opportunity to learn general skills. Because part of the day is spent learning as well as producing, the worker earns less than he or she could potentially earn at full-time production.

The important difference between general and specific training lies in whether the skills are specific to particular jobs or whether they are readily transferable. Specific training, by definition, is of use only in the firm that provides the training. Therefore, under ideal conditions, the competitive bidding for the services of the trained worker, which forced employers to pay the worker the value of the marginal product in the case of general training, is absent with specific training. If no bidders offer a higher wage for the services of the specifically skilled worker, why should the employer pay that

worker any more than the unskilled wage? This being the case, a worker has no incentive to finance his or her own specific training and it would appear that the cost must be borne entirely by the firm. Because the worker neither receives the returns to specific training nor pays the costs, the wage of the specifically trained worker should remain equal to the unskilled wage throughout the working life. What varies, however, is the worker's productivity. During the training period, the worker produces less than an equally able unskilled worker who is producing full time. The value of what the unskilled worker produces is equal to the market wage. But because this is also the wage that must be paid to the worker receiving specific training, firms invest the difference between what the worker is paid and the value produced during training. When training is completed, the worker's productivity is above that of the unskilled worker, but the worker's wage remains the same because there are no competitors for his or her services. The benefits of increased productivity therefore accrue to the firm and consist of the difference between the value the worker produces and the wage the specifically trained worker receives.

Firms will receive these returns only as long as their specifically trained workers remain in their employ. Thus firms have a stronger interest in the continued employment of their specifically trained workers than in their other workers. However, the wage paid to trained workers will have to lie above the trained worker's alternative wage in order to discourage

quits. What happens, in effect, is that the firm and the worker set the final wage so as to share the returns generated by specific training. These issues are explored in the chapter on the relationship between seniority and earnings (Chapter Seven).

3.3 SCREENING, CREDENTIALISM AND QUEUEING

3.3.1 The Screening Hypothesis

In the models discussed so far it has been assumed that formal investments in human capital, such as in education, provide returns to an individual by increasing the quality of his embodied labour services and hence the wage that he can command. An alternative view, which has generated a great deal of attention is that rather than increase individual productivity, education is simply a screening device used to identify those individuals whose productivity would have been higher than that of others even if education had not taken place. Thus, the empirical observation that educated persons earn more on average than those with less education may simply mean that the former have innately higher productivity than others and have either been assigned to education on this basis or have self-selected themselves.

An issue surrounded by fierce controversy is whether the level of education influences productivity and the effect is reflected in

earnings, or whether it merely identifies workers with superior ability and personal attributes (such as motivation and attitudes to work, authority, or modernisation) and thus is used as a convenient screening device. Critics of the concept of human capital have argued that education may identify productive capacities without necessarily enhancing them. If education does not directly improve workers' skills and productivity, then education may be a profitable private investment, but society derives much less benefit from it.

In the human capital model the association between schooling and earnings represents a fundamental relationship between the individual's productivity and his educational attainment. Models developed by Arrow (1973), Spence (1976) and Stiglitz (1975), amongst others, provide an alternative view of the positive correlation between schooling and earnings. According to this version of the screening approach, firms use educational attainments as a selection mechanism of low cost for screening more able, potentially-productive employees. Education "thus identifies pre-existing productive abilities rather than creates them" (Ziderman, 1990:266). A pure "credentialism" effect is also said to work when firms offer higher earnings and better jobs to educational certificate holders, even though these individuals are not more productive than others that do not possess such certification (Berg, 1971; Dore, 1976). The screening approach is analysed in Chapter Six with reference to the matriculation certificate and earnings of employees.

3.3.2 The Job Competition Model

Several attempts have been made to describe in detail the interrelations between schooling and the labour market based on the simple concept of screening. One of the most widely discussed is the job competition model associated with Thurow and Lucas (1972) and developed by them to counter the wage competition view of the United States labour market.

The job competition model is based on the uncertainty which surrounds the hiring of labour. Given the problems of accurately predicting the future performance of job applicants and the fact that most job-specific skills are learned on the job, the employer uses educational qualifications as a proxy for those characteristics which facilitate training. In the model, two sets of factors determine an individual's income. One set determines the job structure in the economy and the other an individual's relative position in the queue for jobs. Job structure is regarded as technologically determined and a central feature of the model is that productivity is seen as an attribute of jobs rather than people. Consequently wages are based on the characteristics of jobs rather than the characteristics of people in them. Workers are distributed across job opportunities according to their position in the queue.

Potential workers come onto the labour market with a variety of background characteristics, the most important of which is the

amount of education. While these are insufficient to allow the worker immediately to perform in the production process, they do affect the cost of training, which is usually acquired formally or informally on the job. Potential workers are then ranked in a labour queue according to their expected training costs. Based on such a queue, jobs are distributed with employers offering high-productivity jobs to those at the head and working down. In contrast to the wage competition model, which sees the labour market as a market for matching demands and supplies of job skills, the job competition model sees it as a market for matching trainable individuals with training ladders.

Given the variations in skills required over the job structure, the amount of training will vary between jobs. Once a worker has landed a job and received the training to raise his productivity to that of the job, the time required for further training for a higher productivity job is likely to be less than that required for someone recruited from outside the firm. As a result, highly structured internal labour markets develop within the firm. As Blaug (1976) argues, it is the addition of the concept of internal labour markets to the simple screening effect of schooling which is used to counter those critics who argue that screening can account, at most, for education-related differentials in starting salaries but not for the often stronger correlation between schooling and earnings which continues through working life. There is, however, another explanation as well. If we assume that employers know little about individual workers when they recruit but learn about the qualities of such

employees only later during employment (that is, they recruit on the basis of the average relationship between education and productivity) over time they would find, for instance, that educated person A is more productive than educated person B. Thus over time there would be a greater earnings dispersion between groups but the mean or average relationship would not change. This relationship would hold through the individual's working life. In effect what happens is that the mean earnings for particular groups of educated workers do not change but the standard deviation around the mean does.

The theories of job competition and screening, in their various forms, have important implications for educational policy. As high-productivity jobs become scarce, competition to get to the head of the labour queue intensifies and the amount of education required increases. A leapfrogging process develops whereby the demand for education by individuals increases the more difficult it becomes for each education group to secure jobs. The effect of educational expansion is neither a fall in occupational wages nor an increase in jobs. What does result is that educational qualifications for jobs lower in the hierarchy rise and the more highly educated are then recruited to jobs that would have been filled in the past by the less educated. While the surplus of a particular educated labour group does not affect occupational wage levels, it does result in a lower average wage for the group. However, since the "bumping" process, once triggered, will extend right down the occupational ladder, wage differentials and

hence the incentive to acquire further amounts of education may not decrease. However, if jobs are performed no differently by those with different levels of education, the social returns to this educational expansion are zero. If, on the other hand, all job entrants are not perfect substitutes in this sense and either levels of productivity within particular jobs can be affected by the individual or training costs do vary between individuals in line with their educational qualifications, the social returns to investment in education may be positive. In this case the returns result more from an occupation selection mechanism than from an increase in the quality of labour.

3.4 THEORIES OF ECONOMIC DISCRIMINATION IN THE LABOUR MARKET

The emphasis thus far has been upon individuals' decisions whether or not to acquire income-generating characteristics such as education and training. Innate characteristics such as strength, inherited intelligence, etc. have so far been simply compressed into a single background variable, namely innate ability. Earnings differentials arising from non-acquired characteristics were assumed to be strictly in accordance with related differences in individual productivity. This view is implicitly challenged, however, by the persistent income differentials observed in many countries between the different sexes, different ethnic groups and even different religions. Differentials of this type can be explained by

(i) different work attitudes of different groups;

(ii) differences in productivity related characteristics, e.g. formal qualifications, between groups; and

(iii) differences in wages given identical productivity related characteristics.

Of these, (i) is least obviously due to discriminatory causes, although the attitudes of, for example, minority groups are not unrelated to their acceptability or otherwise by other sections of society; (ii) is plausibly related to pre-market forms of discrimination such as prejudiced educational admissions procedures, but may also reflect historically rooted racial/ethnic attitudes; while (iii) reflects pure labour market discrimination. In this section the emphasis is on (iii) as being more directly relevant to wage determination, although this does not imply any disregard for the more general importance of (i) and (ii). The theories are surveyed under three general headings: taste-based theories of discrimination, labour market monopsony and monopoly and institution-based theories.

3.4.1 Taste-based theories

The central assumption in Becker's (1957) pioneering contribution to this area was that the utility levels of some or all of the relevant actors in the analysis are affected by transactions or association with members of other identifiable groups. Becker's examples are mostly confined to Black and White workers in the

United States, although clearly there is no a priori reason why the analysis cannot be extended beyond race to other areas of potential or realised prejudice such as sex, social class and religion.

To illustrate this theory, suppose, for example, that White employers dislike employing Blacks. If the White wage is W_w and the Black wage is W_b, where $W_w > W_b$, then the ith White employer, facing an implicit aversion cost to paying wages to Blacks, perceives the corresponding wage costs as W_w and W_b $(1 + d_i)$ respectively. The term $W d$ is thus the aversion cost per Black worker employed. If Black and White workers are perfect substitutes, then the employer will employ all Blacks if

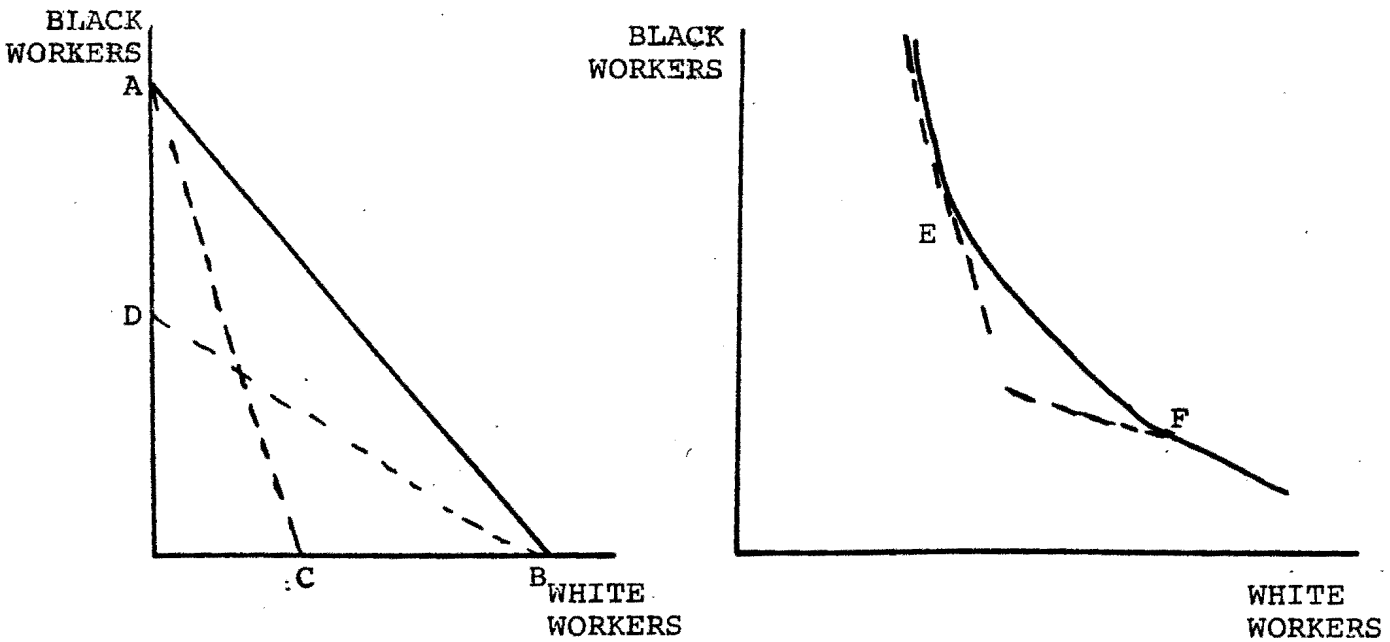
$$W_w > W_b (1 + d_i) \qquad (3.9)$$

and he will employ all whites if

$$W_w < W_b \; 1 = d_i \qquad (3.10)$$

For any given pair of wages, highly discriminatory employers, i.e. those with high values for d_i, will therefore tend to employ all Whites, while less discriminatory employers will employ all Blacks. If Black and White workers are imperfect substitutes which would be the case if, for example, all Whites possessed skills, while all blacks were unskilled, then firms will employ a mixture of both worker types. However, except in the special case where Blacks and Whites are required in fixed proportions, discriminatory employers will employ higher ratios of White to Black workers than non-discriminatory employers. These two cases

are illustrated in panels (a) and (b) of Fig. 3.5. Panel (a) shows the cost minimising positions for a pair of non-discriminatory and discriminatory employers where Black and White workers are perfect substitutes in production. Given the same linear isoquant AB, the non-discriminatory employer will cost minimise at point A where his lowest budget line, AC, just touches this isoquant. In contrast, the discriminatory employer faces a higher perceived Black/White wage ratio as given by the slope of DB and cost minimises at point B. Panel (b) correspondingly illustrates the imperfect substitutes case where the two employers cost minimise at points E and F respectively.



(a) Perfect Substitutes (b) Imperfect Substitutes

Figure 3.5 Discriminatory and Non-Discriminatory Employment

The final equilibrium will now depend upon the product market structure. The critical point here is that unit production costs will be larger the greater the value of the employer's discrimination coefficient, since discriminatory employers face a higher perceived cost per unit of one of their inputs, namely Black labour, than do less discriminatory employers. Given free entry in the product market, competition between firms will thus ensure that discriminatory firms are eventually driven out of the market, thus leaving only employers for whom, $d_i = 0$, or at least those with the minimum d_i existing among the entrepreneurial White population. An important corollary of the non-discriminatory equilibrium is that in the absence of monopoly labour power by either worker group, white and black workers with the same skills must also earn the same equilibrium wage rates. Suppose, for example, White wages are greater than those of Blacks as assumed earlier. In the non-discriminatory equilibrium, employers will also prefer Blacks to Whites with the same skill levels. Competition in the labour market will thus ensure that Black wages will increase until equality is achieved. Similarly, if Blacks and Whites have different skills then their equilibrium wage differentials will only reflect true differences in their marginal products. Finally, one should note that given this long-run equilibrium position, it makes no difference if both discriminatory White and Black employers existed during the pre-equilibrium states, since ultimately both must be driven out of the market.

The situation is rather different if the market structure is one of monopoly or oligopoly, since excess profits can still be earned even if employers incur discrimination costs. Even here, however, discriminators may still disappear in the long run, as there remains an incentive for non-discriminators to buy out discriminatory firms and earn even higher future profits. Whether or not this actually happens, will depend upon the transferability of the franchise and the state of the capital market.

The most important empirical prediction of the analysis is that discrimination will be more prevalent in highly concentrated industries in so far as the latter possess a less competitive structure. If industries face perfectly elastic supply curves of labour of various types, the concentrated industries will tend to employ high wage favoured groups while less concentrated industries will employ more of the disfavoured groups.

The second type of discrimination considered by Becker is that of employee discrimination, i.e. where different groups of workers dislike working with each other. Suppose, for example, that White workers dislike working with Blacks. The wage perceived by a White worker is then W_w if he works with other Whites alone and $W_w(1-d_i)$ if he works with Blacks, where d_i is the discrimination coefficient of the ith worker. If the supply price of a White worker to White-only employment equals W_w, then the employer must therefore compensate him with a wage, $W_w/(1-d_i)$, for mixed employment. One can similarly define a two-wage supply price

regime for Blacks if they also have aversion to working with Whites. The market equilibrium in such a model is a fairly obvious one. If Blacks and Whites are identical as workers then completely segregated all-White and all-Black establishments will arise with both sets of workers being paid identical wage rates. If Black and White workers cannot be segregated because, for example, of complementarity of skills, then both will be paid at higher wages with a corresponding reduction in the employment levels of both groups.

3.4.2 Labour Market Monopsony and Monopoly

If firms possesss monopsony power in the labour market and the supply of one group of workers is less elastic than that of another, then profit maximisation will imply that different wages will be paid in equilibrium. Figure 3.6 presents a simplified version of this argument in which we assume, for the sake of an example, that the supply of males, S_m, is perfectly elastic, while the supply of females, S_f, is less elastic. A situation like this would arise if male workers enjoyed greater geographical mobility than females. Since the female supply curve is upward sloping, the marginal cost of female labour must be greater than the female supply price. If the firm can discriminate between the two groups, then it will employ a total number of workers such that marginal revenue product, MRP, is

equated to the male wage, W_m. For females, however, MRP will be equated to their marginal cost, MC_f. The female wage, W_f, will then be set equal to the supply price of female workers at this level of female employment and will be less than the male wage. Female and male employment will be equal to OF and FM respectively. Although Fig. 3.6 incorporates the special assumption that male and female labour supply to the firm are perfectly elastic and less than perfectly elastic respectively, a similar argument holds as long as male labour supply is more elastic than that of females.

Although the theoretical case for monopsonistic discrimination is beyond dispute, the empirical status of the model is more questionable. On one side, there is the fact that although profit maximising monopsonists do exist they are nevertheless unrepresentative of the labour market as a whole; while on the other side, it is not obvious that supply elasticities to those monopsonies that do exist differ in the systematic fashion assumed by the model.

The other possibility is that discriminatory power is exercised from the other side of the labour market, i.e. by trade unions. Clearly there is no obvious reason why unions should exercise discrimination in any one direction rather than another.

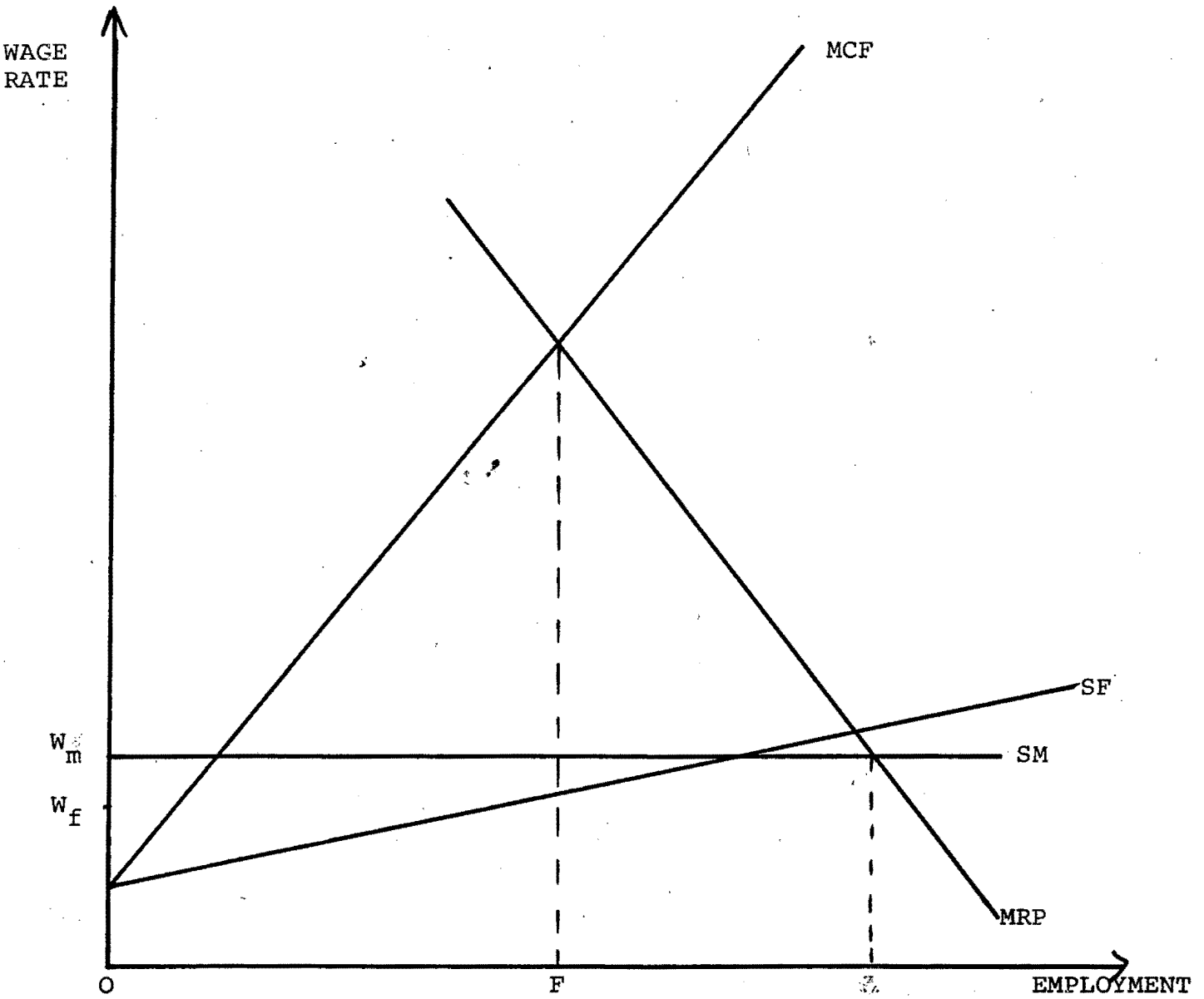


Figure 3.6 Monopsonistic Discrimination

3.4.3 Institutional Approaches

3.4.3.1 Dual Labour Markets

In recent years a number of economists have developed in various forms the hypothesis that the labour market has over time become fragmented into self-contained submarkets or segments (Doeringer & Piore, 1971, Gordon, 1972). One such theory of labour market segmentation is the dual labour market (DLM) theory, in which a distinction is made between "primary segment" and "secondary segment" workers and jobs. In the primary segment wages are high, there are good working conditions, stable employment, and job security. Moreover, the rules and procedures that determine worker allocation, promotion, and so on are well-defined. The secondary segment, on the other hand, contains jobs that involve low wages, low status, poor working conditions, instability in employment, and no opportunity for advancement or training.

Primary segment jobs are usually found in capital-intensive industries in which there exist a few powerful firms. These firms face a stable product demand and are highly unionised. Secondary segment jobs are more likely to be found in industries that are more labour-intensive and competitive, and where product demand is unstable or declining.

The importance of this distinction between different parts of the labour market is not simply that there are good and bad jobs. Rather, the importance lies in the fact that each segment has its

own wage and employment determination mechanisms in which the human capital factors that form the central focus of the neoclassical theory of the labour market are of secondary importance. It is also argued that the interaction of job and worker characteristics over time has fostered different kinds of worker behaviour and personality traits because of which mobility between the segments is limited.

The DLM theory developed as a reaction against the alleged inability of neoclassical economics to adequately explain why some groups of workers do badly in the labour market. Its proponents question in particular the validity of the view that "supply side" policies, such as those which attempt to reduce inequalities in the provision of education, can alleviate the problems faced by the disadvantaged in the labour market. They similarly reject the view that labour market outcomes, such as the wage a person receives, emerge from individual worker choice about the amount of education to be undertaken. Instead these theories focus on the way labour market institutions have developed over time to restrict the options open to certain workers, especially those in disadvantaged groups such as women and Blacks.

DLM economists explain the separation of segments in the labour market by two sets of hypotheses as follows:

(a) Wage Determination and the Allocation of Workers

The dual labour market theory's attack on the neoclassical explanation of wage and employment determination is two-fold. First, DLM economists reject the view that one particular economic relationship can be applied to all workers or jobs. Secondly, they argue that the emphasis placed on the role of education and other forms of human capital in determining wages and allocating labour is unwarranted. DLM economists put most emphasis on institutional or "demand side" determinants of wages and employment. In the primary segment this involves an analysis of structured internal labour markets (ILMs). The ILM is the labour market within the firm itself which defines the position of each job in the firm in terms of relative wage rates and mobility paths. It is an administrative unit distinct from the external market where the forces of competition determine wages and employment. In fact, the internal wage structure operates primarily to eliminate competition within the firm so that formal instruments and procedures of wage administration can be established in such a way as to reduce the cost and conflict of competitive individual wage determination. For employers this involves the reduction of turnover costs and the ability to maintain a stable workforce, whilst the ILM provides workers with security and enhances opportunities for promotion. Within the internal labour market, wages and employment are thus determined by institutional or administrative rules and procedures rather than by economic variables.

The wages determined in the ILM will, moreover, be attached to individual jobs and not to individual workers. Over time the firm establishes a wage structure which becomes unresponsive to market forces. This wage structure will reflect, instead, social custom and historically determined precedents and norms. The importance of custom stems from the stability of employment generated by structured ILMs. Stability of employment in turn gives rise to workers forming social groups as they come into regular and frequent contact with one another. As these groups develop they generate their own rules on what is acceptable behaviour at work, and of the conditions they expect. One feature of this development is the establishment of wage relativities. Changing individual wages within this structure, for example, in response to the shortage of a particular type of labour, would prove both difficult and costly to the firm since it will lead to the demand for wage increases from other groups of workers whose relative position has worsened.

Because wage rates are attached to the job and not to the person who fills it, and since wage relativites are not very responsive to shortages of particular groups of workers, variations in education and other related productivity-associated characteristics among individuals need not therefore be reflected in differences in earnings. Nor will the level of human capital change in response to changes in the work content of jobs. Rather changes in the educational requirements of jobs will be made to reflect movements in the average levels of educational attainment

to enable firms to select workers from the same social groups. Even the introduction of new technology need not give rise to adjustments in the standard of schooling firms require, although they may initially increase them. However, over time new methods of vetting workers for the particular technology will be developed and level of educational standards required will fall. Similarly, the allocation of workers within the firm will also be determined by the same kind of institutional rules and procedures. An example of this is where seniority rules based on age and not productivity govern promotion, and which operate independently of efficiency considerations.

This does not mean, however, that education is unimportant in the ILM. Employers in the primary segment require a reliable and stable work force to carry out production, yet these characteristics are not readily identifiable when the firm is hiring labour. The firm, therefore, sets hiring standards that specify the particular characteristics a worker must have for the job. These characteristics are believed to be good proxies for reliability, stability, etc. One such characteristic is education. According to DLM economists, therefore, education is a screening device through which workers with particular sets of attitudes and behavioural traits can be identified. Education is not a means of increasing a worker's productive potential, but rather provides workers with access to particular types of jobs. Even in this context, however, the importance of education should not be overemphasised. Education is only one of a number of screening devices used by employers and as noted above, is not

one that is changed in response to changes in technology or economic conditions.

In the secondary segment of the labour market the work force is characterised by a much higher level of instability reflected in higher turnover rates, quits, and absenteeism. Moreover, employers in this segment are not interested in developing the structured ILMs that characterise primary segment employment. In fact, an unstable work force is more consistent with the production requirements in the secondary segment. In the secondary segment, therefore, employers will be indifferent to variations in the characteristics of their workers, to the extent that they will not reward workers with favourable characteristics, but act as if they are all of equal productivity. Wages in the secondary segment are consequently assumed to depend solely on the aggregate balance of supply and demand in the segment. It is suggested that wages will thus gravitate towards some common level. Nevertheless even this theory predicts overall a positive relationship between education and earnings although not so much within the secondary labour market.

In the same way that an individual's earnings or employment position within each segment is generally independent of education and other productivity-related characteristics, so too is the intersegment allocation of workers. Since there is little mobility between the segments the type of work a person does

early in his or her working life will provide an accurate indication of which segment the individual is currently in. The probability of starting one's career in either of the segments is not, however, random. Certain groups of workers face a much greater chance of being in the secondary segment not because they are "bad" workers but because they face discrimination.

Studies by DLM economists of ghetto labour markets lead them to argue that discrimination against certain groups, such as Blacks and women, had meant that some workers who have the educational qualifications necessary to work in the primary segment had ended up in dead-end secondary segment jobs. Colour and gender are used by firms to screen workers in the same way that education is used to identify workers with particular behaviour traits. In this case the relationship is one that has its origins in social custom and values. Particular groups of workers have traditionally been considered inferior by employers and other workers. The ability of discriminated groups to gain access to primary segment jobs has thus been hindered by, on the one hand, workers who feel their social position is being challenged by the employment of workers who traditionally have undertaken low-status work, and on the other, by employers who consider that Black and female workers do not have the characteristics of stability and dependability necessary for employment in the primary segment.

That discrimination has continued despite the overall improvement in the educational standards of, for example, Black workers in

the U.S.A., is seen as evidence of labour market segmentation and the view that discrimination represents an institutional barrier unresponsive to economic forces.

DLM economists also put considerable emphasis on the way an individual's social environment determines his or her educational attainment. Variations in the social conditions between areas reflects the nature of jobs available to people who live in them. Consequently people in low-income areas will have poor-quality housing and schools, as well as values and attitudes that inhibit educational attainment. Individuals and their families are not, therefore, seen as free agents who choose between various human capital investments on the basis of returns and costs. For many people that choice is determined and constrained by an environment and the type of work opportunities that exist in it.

(b) Job Stability and Job Mobility

The inability of secondary segment workers to improve their economic position through individual action (such as acquiring additional education) is of fundamental importance in the dual labour market theory. According to dual labour market economists the inability of secondary workers to be upwardly mobile results from the different behavioural requirements each segment imposes on its work force. Because of the type of work and the lower rewards workers receive in the secondary segment, workers employed there develop characteristics that are inconsistent with

those required by primary segment employers. Confinement to the lower segment reinforces the particular work habits found there so that the dichotomous nature of employment gives rise to very distinct patterns of worker behaviour that are inconsistent with each other, consequently ruling out the possibility of intersegment mobility.

Instability, according to the DLM theory, is inherent in the job. Certain occupations involve boring and menial tasks and as a result have high quit rates as workers quickly become dissatisfied with their work. Workers then move from one dead-end job to another, broken up by frequent spells of unemployment. It is also argued that stability is not technologically determined. Most of the jobs can, in fact, be performed in either segment. What is important is the institutional structure or ILM in which the job is placed. For these reasons, once a worker is in the lower segment it becomes very difficult to move into a primary segment job. Even acquiring additional education will not overcome necessarily the barriers that restict entry into the upper segment.

3.4.3.2 The Radical Theory of Segmentation

An alternative approach to segmentation has been developed by those economists who see segmentation as an outcome of the development of monopoly capitalism and the resultant class conflict. This approach draws heavily for its methodology and

general hypotheses on a Marxist analysis of modern capitalism (Reich et al, 1973).

In the radical theory, segmentation in the labour market is seen as a way in which employers are able to maintain control over production. First, dividing the labour force into self-contained identifiable groups, which differ in social status, income, and so on, prevents unification of the working class and the development of a class consciousness amongst workers. Dividing workers and redefining class groups is thus seen as a way of forestalling the ultimate threat to the capitalist mode of production.

Secondly, segmentation enables employers to control workers in that it provides a way of maintaining production. In the early stages of capitalism, firms were able to maintain production by a system of direct control. Employers were in frequent and close contact with workers and so were able to exert their power directly. The development of monopoly capitalism meant, however, that direct control has become more difficult. Senior management have become remote from the production process with the introduction of hierarchies of administrative and supervisory staff. The importance of direct control was further reduced by the complexity of work tasks in large-scale companies, which made the evaluation of workers' performances more difficult, and the cost of traditional sanctions if imposed in large-scale companies. Such sanctions typically involve layoffs and sackings,

and were particularly arbitrary.

In order to exert control over their work force, therefore, large firms developed ILMs which isolated their workers from outside competition, and which could be used to encourage and reward the type of behaviour required for production in these large-scale operations. The particular behaviour traits that are important are: a commitment to following the rules that control work tasks, dependability, reliability, predictability, and loyalty. By rewarding these types of behaviour firms are able to ensure a stable work force and maintain uninterrupted production.

Education plays two important roles within the radical framework. First, education develops sets of attitudes and personality characteristics that are consistent with and reflect those required in large-scale bureaucratic firms. Schools encourage discipline and reward those students who respond positively to the norms and values of the system. Those who do well at school will, thus, have the "right" personality and behavioural traits necessary for working in the primary segment.

Second, education is used to reinforce class differences between workers. It is argued that schools in low-income areas develop in their students attitudes and types of behaviour that are different from those developed by schools in high-income areas. In this way education can be used to reflect the types of behaviour consistent with particular types of jobs.

Education is thus one of the principal ways in which the existing social order is justified and maintained, by producing certain attitudes that are compatible with the existing structure of social relationships. These attitudes reflect, in particular, the *worker* requirements of bureaucratic organisations, such as "discipline", "motivation according to external rewards", and so on.

3.5 CONCLUSION

The labour market theories into which the various views of education have been placed have been formulated essentially for analysing the labour markets of developed market economies. In the labour markets of the less developed countries there is a major difference. Employment in the formal wage sector is very much proportionately smaller and within this, the public sector has a more important place. It is this dominant role of the public sector in the LDCs which has often been used in the argument that the screening and particularly the job competition model is even more appropriate to use in these countries than the wage competition one. In virtually all LDCs, the public sector is the largest single employer and for secondary-school leavers and above, the majority employer. Public sector employment is strongly sought not for the level of wages offered - which while offering large differentials at the highest levels may be below

those in the private sector - but for the long-term security. Wage levels in the public sector are set administratively by commisssions sitting every few years and the criteria adopted rarely allow supply factors much influence. The result tends to be inflexibility with respect to wage levels and differentials. In addition, in order to appear impartial and as a way of coping with the selection of recruits from a large number of potential applicants, emphasis tends to be predominantly placed on formal educational qualifications for recruitment. As a result of both these factors, the problem of surpluses of educated labour is not resolved by wage changes (as implied in the wage competition model), but is rather thrown back onto the educational system to solve by continuously expanding qualifications (as implied in the job competition model).

The job competition model and its variants offer rival interpretations of the demand side of the labour market to that offered by the human capital school or wage competition school. Job competition models say little, however, that disagrees with the human capital interpretation of the supply side. Both wage and job competition models reject the earlier view of education as consumption and adopt the position that demand for post-compulsory levels of education is related to the direct and indirect costs of that education and the earnings differentials associated with it.

Whilst the human capital literature has highlighted a number of productivity-related characteristics, human capital theorists

give most emphasis to the importance of education as the main component of productivity. Education, it is suggested, provides the basic skills of reading and writing, cognitive skills, and the "ability to learn" which will increase an individual's productivity in all jobs, whilst vocational education, on the other hand, will increase an individual's productivity in a narrower range of jobs by providing more specific skills.

Since there is a close relationship between particular educational programmes and the type of occupation a person can go into, the human capital theory also provides a model of occupational choice. Occupations that offer high wages will, other things equal, encourage people to invest in the particular educational programmes associated with them. Choosing the quantity and type of education to be undertaken, therefore, involves simultaneously making an occupational choice.

The labour market theories presented above provide very different policy prescriptions to deal with labour market problems, such as poverty and the distribution of income. The neoclassical theory of the labour market puts emphasis upon the supply side of the labour market and workers' personal characteristics. Increasing a worker's earning potential requires an improvement in his or her productivity, which in turn can be achieved through improvements in the provision of education and other human capital factors for low-income workers. Similarly, since the distribution of income reflects the distribution of labour productivity, the former can

be made more equal by any policy that reduces the inequality of schooling. Neoclassical economists also recommend policies that improve the operation of the labour market, such as better information channels, and legislation against discrimination.

It is the alleged failure of these human capital oriented policies that has provided DLM and radical economists with evidence aganst the neoclassical theory of the labour market. Both alternative theories reject the view that marginal adjustments to education and other components of human capital can have an impact on workers' productivity and earnings. Within the lower segment, education has no significant impact on wages or employment so that improving the level of education of workers would not improve their incomes in secondary segment jobs or employability in the primary segment. The main difference in earnings is between the segments, yet the barriers that separate these are so high that the changes necessary to overcome them with traditional policies would be too extensive and costly. It is argued that it is in the interests of both secondary and primary segment employers and primary segment workers that the secondary segment remains low wage, low status, and characterised by instability. This reduces the potential for breaking down the institutional barriers that restrict mobility. The only policies that would have a significant impact on improving the position of low-wage workers would, therefore, require the creation of primary segment jobs in the public sector and discrimination in favour of disadvantaged groups.

Radical economists doubt the effectiveness of traditional policies since segmentation in the labour market and the education system are both used to maintain the existing social hierarchy. It is unlikely, therefore, that educational policy of the sort that governments are likely to introduce will change this. The position of the disadvantaged in the labour market, and indeed workers in the upper segment as well, can only be improved through a heightened class consciousness.

The labour market theories outlined above have been used to interpret the structure of the labour market in South Africa (Knight and McGrath, 1977; Cassim, 1982). Knight and McGrath suggested that wage discrimination in South Africa could be explained through "job discrimination" and therefore pointed to the segmentation theories as being more relevant. They also suggested that the job competition model was relevant. (See Chapter Five).

Cassim proposed a racially structured dual market hypothesis with Whites comprising the primary segment and Blacks the secondary segment. This oversimplistic classification is open to several criticisms. How for instance do you categorise Black workers in public service employment where job stability and relatively high wages are distinctive feature of employment? The situation of White skilled manual workers is also problematic: these workers are usually highly paid but they are also often amongst the most mobile (that is, they display high turnover characteristics) .

Are they part of the primary or the secondary labour market? These criticisms point to a general problem with the institutional approaches, that is, they are exceptionally diffficult to test. In subsequent chapters these labour market *theories* are evaluated in relation to the analysis of the survey data.

Notes

1. The Ben-Porath and the Supply and Demand models are adapted from Borjas, 1988, pp.21-28.

CHAPTER FOUR

EARNINGS AND EDUCATION

4.1 INTRODUCTION

It is a well-established fact that educated workers earn higher wages or salaries than those who are illiterate or those who have completed less education. In both industrially advanced and less developed economies there is such a relationship between education and earnings. As Woodhall (1988) comments, the linkages between education and earnings have been extensively analysed in order "to throw light on the relationship between education and growth, to measure the social and private returns to education, to evaluate education as a form of investment in human capital, and to examine the links between education and the distribution of income" (p.209).

For many developing countries, including South Africa, the analysis of the relationship between education and earnings is also important on distributional grounds because the distribution of educational opportunities will have an impact on the future distribution of income. Therefore, governments committed to long-term redistribution of income must consider the role of

education. However, this is still a matter of considerable controversy, with some economists arguing that there are strong links between education and earnings and others pointing to the importance of inherited characteristics, family background and pure luck in determining an individual's earning power.

The links between education and earnings are also of crucial importance in decisions about the efficient allocation of resources, since it is argued that the higher earnings of the educated reflect their superior productivity. However, others argue that the pattern of wages and salaries reflects many other factors, apart from the education of workers. Not only the individual's natural ability, family background and other personal characteristics, but also historical and institutional factors and trade union bargaining all help to determine the pattern of earnings differentials.

Thus there is considerable disagreement between economists who argue that education is a form of investment in human capital, and that techniques such as cost-benefit analysis should be used as a guide to resource allocation, and those who argue that education simply acts as a screening device, allowing employers to identify the most productive workers. As described in Chapter Three, an alternative objection to the notion of human capital is put forward by those who point to the existence of dual or segmented labour markets, with educated workers tending to concentrate in the primary sectors, and other workers, including the less educated, but also including women and workers who are

likely to be discriminated against on grounds of race or background, confined to secondary labour markets, where different factors determine earnings.

For a variety of reasons, therefore, the relationship between education and earnings is important but controversial, and disagreement centres on the question of what determines an individual's earning capacity, whether the existence of earnings differentials reflects differences in the productivity of workers, and how information about earnings differentials should be used to guide educational planning decisions. The one point of general agreement is that education and earnings are closely related.

In this chapter estimates of the rate of return to investment in education are derived for workers in the South African manufacturing sector. Before this is attempted the theoretical background on rates of return and a review of the relevant literature are provided. Section 4.2 provides an overview of frequently used measures of the rate of return in the economics of education. This section also provides a synopsis of rates of return computed for advanced and developing countries in the 1960s and 1970s. Section 4.3 updates this research with emphasis on rate of return studies in less developed countries in the 1980s. In section 4.4 the relevant rate of return literature on South Africa is evaluated. Section 4.5 then provides the estimates and analysis of the returns derived for the South

African manufacturing sector.

4.2 MEASURING THE RATE OF RETURN TO INVESTMENT IN HUMAN CAPITAL

When economists refer to expenditure on education and training as investment in human capital they are suggesting that it is possible to measure the profitability of investment in human capital using the same techniques of cost-benefit analysis and investment appraisal that have been traditionally applied to physical capital.

The profitability, or rate of return on investment, is a measure of the expected yield of the investment, in terms of the future benefits, or income stream generated by the capital, compared with the cost of acquiring the capital asset. Cost-benefit analysis is designed to express all the costs and benefits associated with an investment project in terms of a single figure, the rate of return, which shows the rate of interest at which the present discounted value of future income is exactly equal to the present discounted value of costs. This enables different projects to be compared with an optimum investment strategy consisting of identifying and investing in projects offering the highest rate of return, or profitability.

If funds allocated to education, training, or health care are regarded as investment in human capital, since they raise the

lifetime earnings of workers who are better educated and trained or more healthy than other workers, then techniques of cost-benefit analysis can be used to compare the economic profitability of different types or levels of education, of on-the-job compared with off-the-job training, or of different types of medical treatment. It should also be possible to compare rates of return to investment in human capital and physical capital, in order to discover whether it is more profitable to invest in men and women or machines.

Investment in human capital produces benefits both to the individual and to society as a whole. The individual who takes part in education or vocational training benefits by increasing his or her chances of employment and by increased lifetime earnings. These additional earnings, after allowance for payment of taxes, can be compared with the direct and indirect costs of education that must be borne by the individual, including fees, expenditure on books or equipment, and earnings forgone while in school, college, or university. This provides a measure of the private rate of return to investment in education or other form of human capital.

Both the costs and benefits of education also affect society as a whole, since society benefits from the increased productivity of educated workers. Throughout the world this is recognised by governments who pay some or all of the costs of education. The costs and benefits to society can be compared by means of the

social rate of return.

4.2.1 Estimating The Rates Of Return To Investment In Human Capital

Three main methods have been identified for estimating the rate of return to educational investment: the so-called elaborate method, earnings function analysis and the short-cut method[1] (Psacharopoulos, 1981:321-326). The first two are described here because they are relevant to the analysis in later chapters.

The elaborate method is based "on the exact algebraic definition of the rate of return, which is the discount rate that equates a stream of benefits to a stream of costs at a given point in time" (Psacharopoulos, 1981:322). For example, in estimating the private rate of return to investment in higher education as in Figure 4.1, if Y stands for labour earnings, and h and s subscripts for higher and secondary education, respectively, the rate of return (r) in this case is found by solving the following equation for r:

$$\sum_{t=1}^{n} (Y_h - Y_s)_t (1 + r)^{-t} = \sum_{t=1}^{c} (Y_s)_t (1 + r)^{-t} \qquad (4.1)$$

The recent availability of data on labour market earnings along with information on other characteristics of the individual has resulted in numerous empirical studies attempting to test alternative hypotheses about the determinants of personal

earnings. Such earnings functions attempt to answer questions regarding the relationship between earnings and variables such as education, ability, age, and experience.

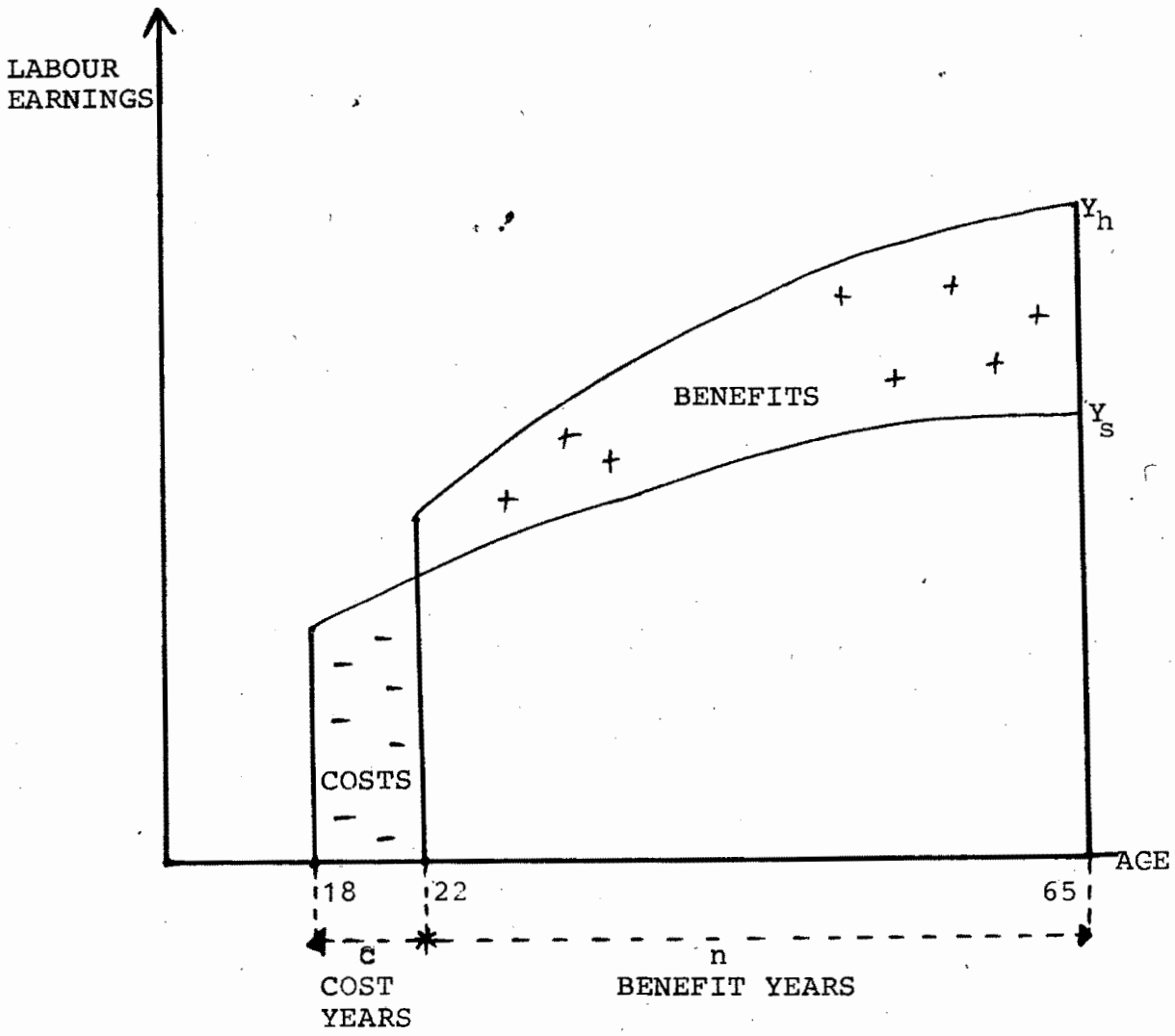


Figure 4.1 Rate of Return Estimation
According to the Elaborate Method

Note: Discounted Benefits to AGE 22 = (+++ Area)
Cumulated Costs at AGE 22 = (--- Area)

(Source : Psacharopoulos, 1981)

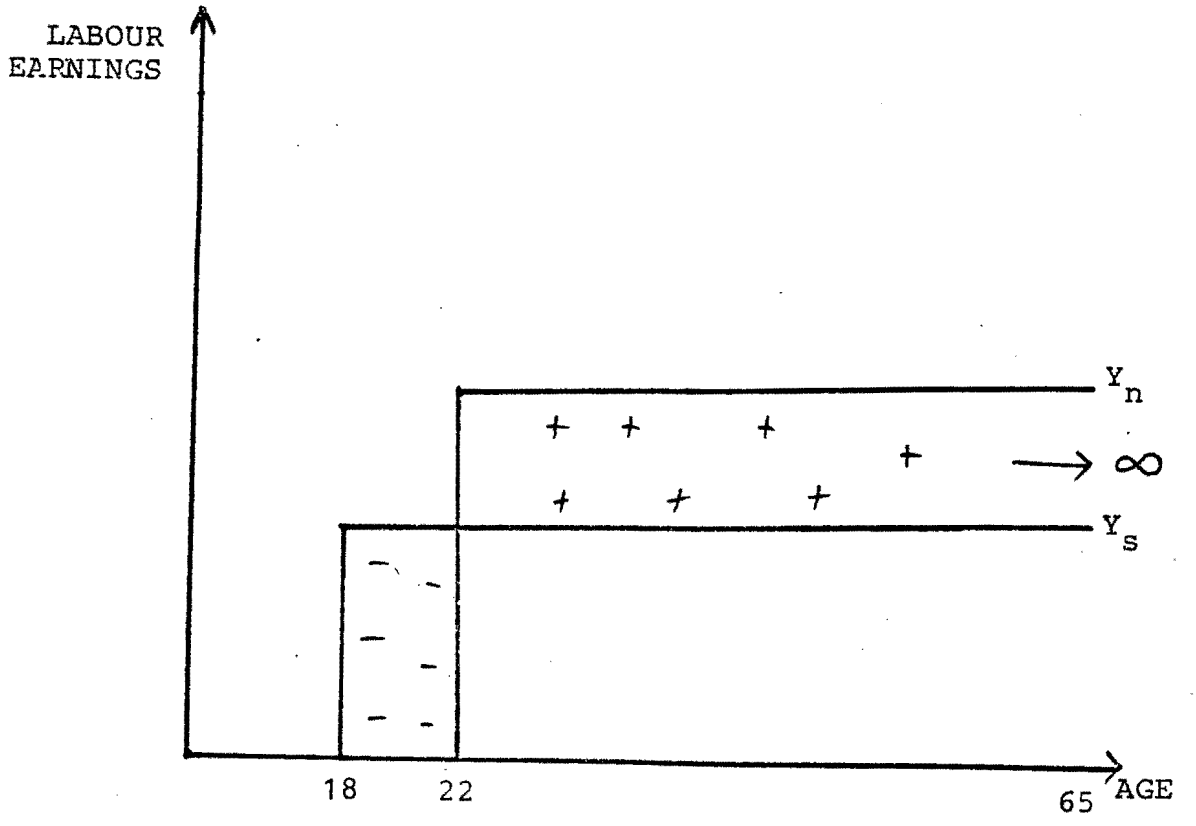


Figure 4.2 Rate of Return Estimation
Implicit in the Short-Cut Method

(Source : Psacharopoulos, 1981)

The earnings function method involves a regression of the basic form

$$\ln Y = a + b.S + c.Ex + d.Ex^2 \qquad (4.2)$$

where S is the number of years of schooling of the individual and Ex his years of labour market experience. Equation (4.2) is based on human capital theory where b = r, that is, the estimated regression coefficient (b) is interpreted as the average private rate of return to one extra year of schooling (Psacharopoulos, 1981 : 323).

This suggests that $b = \frac{\ln Y}{S} = r \qquad (4.3)$

earnings. Such earnings functions attempt to answer questions regarding the relationship between earnings and variables such as education, ability, age, and experience.

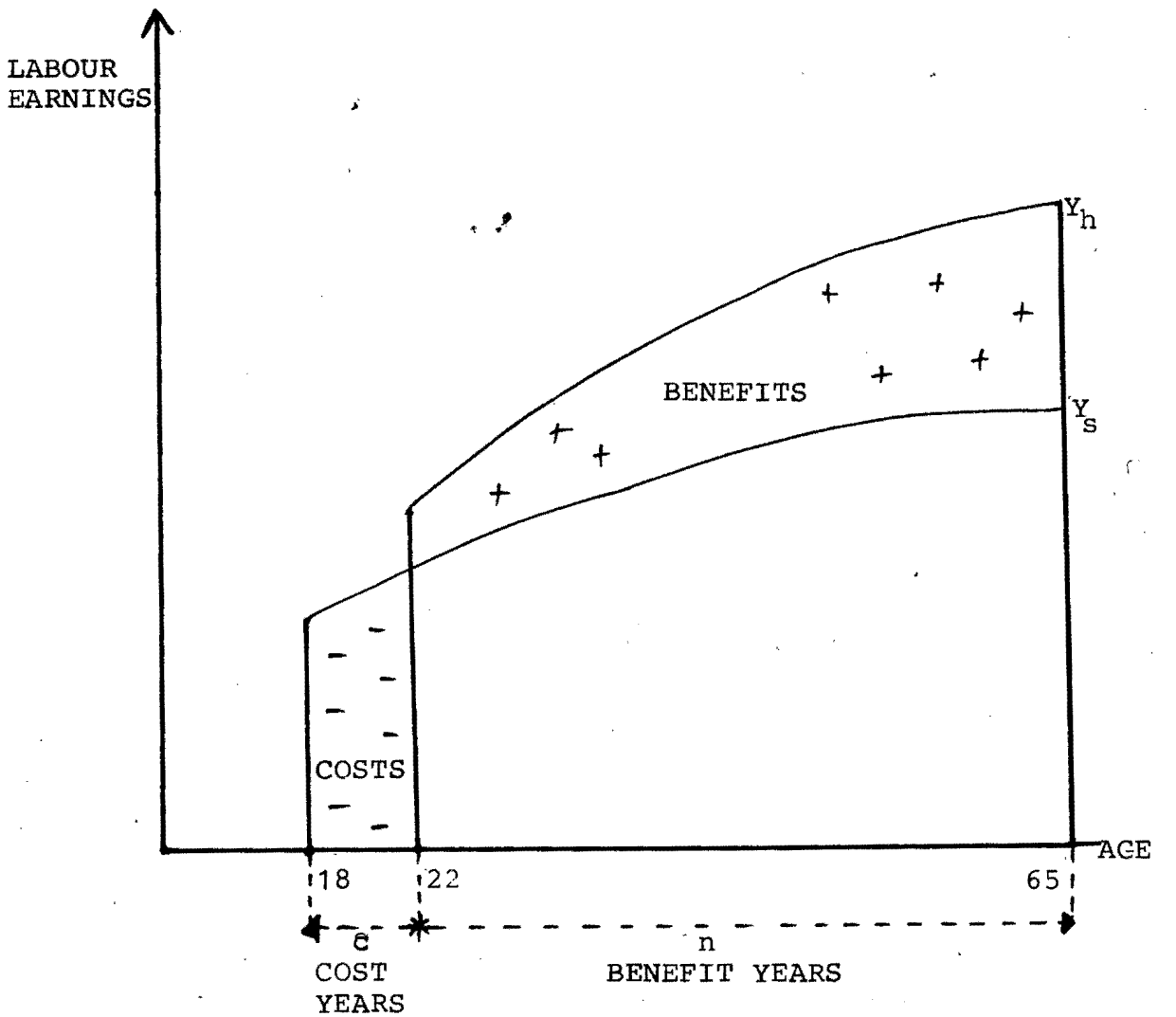


Figure 4.1 Rate of Return Estimation
According to the Elaborate Method

Note: Discounted Benefits to AGE 22 = (+++ Area)
Cumulated Costs at AGE 22 = (--- Area)

(Source : Psacharopoulos, 1981)

that is, the rate of return reflects the relative change in earnings (∂ ln Y) following a given change in schooling (∂S).

However, there are also certain problems with the earnings function approach. These relate to the fact that the rates of return are estimated on the basis of the following implicit assumptions:

(i) the age-earnings profiles are either flat or equidistant between adjacent educational levels throughout their range;
(ii) the age-earnings profiles last for ever (to infinity); and
(iii) the only cost of schooling is the forgone earnings of the individual (see Figure 4.2).
A further problem with this method is that one cannot readily incorporate cost data in order to estimate social rates of return.

Nevertheless, as Psacharopoulos (1981) states, "These assumptions are not as damaging or unrealistic as they seem and they have been sufficiently defended (and debated) in the earnings function literature. For example, the fact that age-earnings profiles are assumed to last for ever makes little difference to the discounted present value and hence the estimated rate of return." (p.325).

4.2.2 Returns to Education in Industrially Advanced and Developing Countries

The question of the profitability of different types and levels of education and training, and the question of the relative yield of investment in human capital and physical capital have attracted a considerable amount of research activity since the 1960s.

Psacharopoulos (1973) reviewed attempts to measure the social and private rate of return to investment in education in 32 countries and then updated this survey of research by analysing the results of the cost-benefit analysis of education in 44 countries (Psacharopoulos, 1981). Estimates of social and private rates of return to educational investment, based on surveys of the earnings of workers of different educational levels in these countries in the period from 1958 to 1978 reveal, according to Psacharopoulos (1981 : 326), four underlying patterns:

(a) The returns to primary education (whether social or private) are the highest among all educational levels.
(b) Private returns are in excess of social returns, especially at the university level.
(c) All rates of return to investment in education are well above the 10 per cent generally accepted measure of the opportunity cost of capital.
(d) The returns to education in developing countries are higher

relative to the corresponding returns in more advanced countries.

The rates of return that are reviewed by Psacharopoulos are summarised in Table 4.1, which shows the average private and social rate of return for primary, secondary, and higher education in less developed, intermediate, and economically advanced countries.

Table 4.1: The Returns to Education by Region and Country Type (per cent)

Region or Country Type	N	Private			Social		
		Prim	Sec	High	Prim	Sec	High
Africa	(9)	29	22	32	29	17	12
Asia	(8)	32	17	19	16	12	11
L. America	(5)	24	20	23	44	17	18
LDC Average	(22)	29	19	24	27	16	13
Intermed.	(8)	20	17	17	16	14	10
Advanced	(14)	-	14	12	-	10	9

Source: Psacharopoulos, 1981.
Note: L. America - Latin America. Prim - Primary Education; Sec - Secondary; High - Higher or Post-secondary.

Table 4.2 shows rates of return derived from earnings functions. In most cases, the reported coefficient is the partial derivative of the logarithm of earnings with respect to years of schooling, years of labour market experience or age being held constant.

Three important points about Table 4.2 should be noted:

(a) the rates of return are private and refer to the average year of schooling;

(b) the rates of return do not refer to any particular educational level; and

(c) returns decline with the level of economic development.

Table 4.2 : The Returns to Education Irrespective of Educational Level, Country Group Averages

Region or Country Type	N	Rate of Return (per cent)
Africa	(3)	13.4
Asia	(5)	12.8
Latin America	(3)	18.2
LDC average	(11)	14.4
Intermediate	(3)	9.7
Advanced	(6)	7.7

Source: Psacharapoulos, 1981.

Psacharopoulos' 1985 paper updated evidence on the returns to investment in education by adding estimates to bring the total number of country cases to over 60. These estimates confirmed earlier evidence that returns are highest for primary education, the general (as opposed to vocational) curricula, the education of women, and countries with the lowest per capita income (Table 4.3).

Table 4.3 : Average Returns to Education by Country Type and Level (per cent)

Region/ Country Type	Social			Private		
	Prim	Sec	High	Prim	Sec	High
Africa	26	17	13	45	26	32
Asia	27	15	13	31	15	18
Latin America	26	18	16	32	23	23
Intermediate	13	10	8	17	13	13
Advanced	n.a.	11	9	n.a.	12	12

Source: Psacharopoulos, 1985.
Note: n.a. - not available because of a lack of a control group of illiterates.

Table 4.3 confirms the declining rate of return pattern by level of education. It shows that primary education is the most profitable educational investment opportunity, followed by secondary education. This decline is the result of the interaction between the low cost of primary education (relative to other levels) and the substantial productivity differential between primary school graduates and those who are illiterate.

The declining rate-of-return pattern is also observed across levels of per capita income. For example, the private returns to any level of education are highest in Africa and lowest in the advanced industrial countries. This is explained by the relative scarcity of human-to-physical capital within each group of countries.

Table 4.4 provides means of the regression coefficient on years of schooling in a semilog (Mincer-type) earnings function in

which log earnings is a function of years of schooling, years of experience, and years of experience squared. The figures are interpreted as private returns to the typical year of education. Again, the declining pattern of the returns across country type is largely maintained.

Table 4.4: Mincer-type Returns to Education by Country Type

Region/Country Type	N	Coefficient on Years of Schooling (per cent)
Africa	4	13
Asia	9	11
Latin America	8	14
Intermediate	4	8
Advanced	8	9

Source: Psacharopoulos, 1985.

The results of all these studies confirm that expenditure on education does represent investment in human capital, and that it is a profitable investment, both for the individual and for society, although some critics deny that the earnings of educated workers provide an adequate measure of the economic benefits of education. It is difficult, however, to answer the question of whether human or physical capital represents the more profitable form of investment.

4.3 RECENT RESEARCH ON THE RETURNS TO EDUCATION

The proliferation of studies on the returns to education especially in developing countries continued during the 1980s. Table 4.5 provides brief details of some of the work during this period. while Table 4.6 presents evidence on the returns to education emanating from these studies.

Table 4.5: Returns to Education - Country Analyses, 1980s

Author/s	Country	Sample
Jamieson & van der Gaag (1987)	China	Household Survey of urban and rural dwellers, N.W. China, 1985.
Psacharopoulos (1987)	Brazil	Decennial Census, 1980.
Al-Qudsi (1989)	Kuwait	National Labour Survey, 1983
Knight & Sabot (1987a)	Kenya & Tanzania	Urban Labour Market Survey, 1980.
Kugler & Psacharopoulos (1989)	Argentina	Buenos Aires Household Survey 1985.
Psacharopoulos & Steier (1987)	Venezuela	Household Survey 1985.
Gomez-Castellanos & Psacharopoulos (1990)	Ecuador	Household Survey 1987.

Table 4.6: Returns to Schooling, Various Countries, 1980s

Country	Returns to Schooling (per cent)
Brazil	15.0
Argentina	9.1 (males) 10.3 (females) 9.2 (both)
Venezuela	11.2 * 10.7 **
Ecuador	11.4 (males) 10.7 (females) 11.0 (both)
Chile	9.6**
Colombia	11.0**
Mexico	15.0**
China	4.5 (urban males) 5.5 (urban females)
Kuwait	8.2
Kenya ***	16.0 (average private return) 13.0 (marginal private return) 10.0 (average social return) 8.0 (marginal social return)
Tanzania ***	19.0 (average private return) 18.0 (marginal private return) 11.0 (average social return) 12.0 (marginal social return)

* From Psacharopoulos & Steier, 1987.
** Quoted in Gomez-Castellanos & Psacharopoulos, 1990.
*** Knight & Sabot, 1987a: Average private return is conventionally estimated. According to Knight and Sabot (1987a:261) "The average private return is conventionally estimated. However, this overstates - by between one and three percentage points - the marginal private return derived from the assumptions of wage stickiness and filtering down. The estimate of the marginal retun is based on the occupational distribution of the cohort which entered wage employment during the period 1975-1980 (i.e.the most recent cohort). It is somewhat lower than the average mainly because, although both recent primary and secondary school-leavers had to filter down into lesser occupations, the secondary school-leavers filtered down relatively further."

The most important features of the 1980s research on rates of return reflected may be summarised as follows:

1. The Mincer-type returns to education for the Latin American countries shown in Table 4.6 are lower (with the exception of Mexico) than the average estimated for the continent by Psacharopoulos (1985, Table 4.4). In most of the analyses, the returns to education declined, although not substantially, with the expansion of education.

2. The returns decline by level of education although investment in higher education seems to be more profitable to the individual relative to secondary education.

3. In spite of the fact that females earn substantially less than males in absolute terms, the rate of return to investment in education is sometimes higher for females (e.g. Argentina, China). This has been attributed to the lower forgone earnings of females (Kugler and Psacharopoulos, 1989: 356).

4. Returns to schooling are generally higher for those employed in the private sector than for those in the public sector (e.g. Venezuela, Kuwait, Brazil and Argentina). This suggests that education has a productivity-enhancing role since wages in the more competitive private sector are assumed to reflect productivity or it could be due to the fact that the public sector compresses the wage structure as in Tanzania (Knight and Sabot, 1987b).

4.4 RATES OF RETURN TO EDUCATION : SOUTH AFRICAN RESEARCH

One of the earliest analyses of the returns to human capital in South Africa was conducted by Louw (1979). In an analysis of the earnings, education and occupations of 9800 "non-whites" in the metropolitan areas he concluded that "a reasonable rate of return to education for all the races exists, and that education could be used to increase the income of non-whites of South Africa" p.391).

Using data obtained from income and expenditure surveys conducted by the Bureau of Market Research he derived rates of return using a Mincerian earnings function of the form:

$$\ln Y = f\ (S,\ S^2,\ Ex,\ Ex^2,\ Ex.S)$$

Louw's analysis showed that the explained portion of the variance ranged between 17 (African males) and 41 per cent (Indian males). The coefficient on years of schooling (taken as the private return to a typical year of schooling) according to Louw's estimates, by race and gender, were as follows:

African males:	8.2%
African females:	8.7%
Coloured males:	20.3%
Coloured females:	12.7%
Indian males:	22.3%
Indian females:	51.1%

Louw provides no explanations for the high rates of return to schooling for Indian males and females and Coloured males. However, he went further and derived the marginal rates of return

by taking the derivative of income with respect to schooling.

Using the formula $\frac{d(\ln Y)}{dS}$

marginal rates of return were derived for the three races at different levels of education. His results shown in Table 4.7 assume that experience remains constant at 10 years. One interesting finding of this study was that the marginal rates of return of African males were comparable with those of the other two male groups only in the higher education categories. Louw suggested that this could be attributed to the fact that a large proportion of the African metropolitan population did not attain an education of more than about 6 years. Therefore he reasoned that almost all Africans were competing for similar kinds of jobs and hence their low rate of return. In other words, what Louw was attempting to show was that Africans with up to 7 years of education were competing for unskilled and semi-skilled jobs in which education was not rewarded. But for Africans achieving more than the average level of education, there was a comparable rate of return relative to the other races as the supply of educated manpower was relatively small.

Table 4.7: Marginal Rates of Return to Education for Blacks

Schooling	Africans		Asians		Coloureds	
Equals	Male	Female	Male	Female	Male	Female
0 years	9.5	8.0	17.5	41.3	19.0	10.5
7 years	10.7	9.2	15.7	22.0	15.5	13.7
12 years	11.6	10.1	14.3	8.3	13.0	15.9
16 years	12.3	10.8	13.3	2.8	11.0	17.8

Source: Louw, 1979, Table 4.

Human and Greenacre (1987) attempted an analysis of labour market discrimination by examining income differences at various age and education levels. Their study was based on a 5 per cent sample of the 1980 census data provided by the Central Statistical Services. The analysis was conducted on a sample size of 38000 in the manufacturing sector of the four main industrial areas.

The percentage of the variance explained by the regressions was not particularly high. It ranged from 39 per cent (Whites) to 32 per cent for Coloureds and Indians to 12 per cent for Africans.

Their findings may be summarised as follows:

(i) For Whites, income was highly non-linearly related to age, having the typical parabolic profile, with income tailing off with age. For Coloureds and Indians it was not as strongly non-linear although there was a significant quadratic component which fitted the decline in income in the later years. For Africans,

income did not appear to be related to age.

(ii) For all groups there was a significant non-linear relationship of income with education. In all groups except White females there was an accelerated increase in income per year of education. The different pattern of income in the White female group with respect to education (and age) was ascribed to the mixing of full- and part-time workers and to differing child bearing patterns.

(iii) In the "non-white" groups although the increases in absolute terms were much less than for Whites, the increases in relative terms were higher. Thus percentage wise, the income differences between Whites and non-Whites were narrowing with increasing education.

(iv) There was very little difference between African males and females.

(v) No variables involving gender were significant. Where differences did exist between the sexes they appeared to be age- and/or education related.

(vi) White, Coloured and Indian males had a much higher increase per year at an age up to their early 40s but then also had an earlier and more rapid tailing off and decline of income than females.

(vii) White males had an extremely high return on education which became even higher than that of White females at the higher

education levels.

(viii) White females showed a relative constant return on education at all levels. In other population groups the differences in return on education between males and females were not as accentuated. (Human and Greenacre, 1987:162-164).

In spite of (iv) and (v) above, Human and Greenacre's concluded that race and gender played "a pivotal role in income determination" (p.164).

Hosking (1990) used a 5 per cent sample from 1980 census data to compute social rates of returns to African primary and secondary schooling. Table 4.8 below shows his marginal social rates of return for African males and females at both the secondary and primary levels. Returns are relatively high at the higher secondary level for both groups in comparison with both primary and lower secondary education.

Hosking suggests on the basis of his findings "that a human capital rationale (exists) for increasing government expenditure on Black schooling" (p.33). Hosking's findings differ from Trotter's (1984). The latter derived internal social rates of return for males in the Durban metropolitan region for males of all races using 1980 census data. Trotter 's results show that the internal rate of return to African males was less for secondary schooling (3.4% for standards 6-7 and 12.4% for

standards 8-10) than it was for primary schooling (17.2%). This finding was true also for Coloureds and Indians. In Hosking's analysis the average internal rate of return to African schooling for both males and females increases when the impact of secondary schooling is taken into account. However, Hosking's findings are not unambiguous and conclusive. At low levels of schooling males have higher returns than females. However, females with Std. 8-10 education have higher returns than males with these qualifications. Furthermore, the returns to those attaining a Std. 5 level of education, especially of males, is considerably higher than for those with Stds. 6-7 and even than for those males with Std. 8-10.

Table 4.8: Marginal Social Rates of Return to Schooling for Africans, 1980

Level of Schooling	Gender	Internal rate of return (per cent)
Sub A - Standard 1	Male (M)	8
	Female (F)	5
	Male & Female	8
Std. 2 - Std. 4	M	16
	F	4
	M & F	12
Std. 5	M	63
	F	24
	M & F	40
Std. 6 - Std. 7	M	16
	F	10
	M & F	11
Std. 8 - Std. 10	M	24
	F	28
	M & F	25
Primary	M	14
	F	8
	M & F	11
Primary & Secondary	M	18
	F	14
	M & F	16

Source: Hosking (1990), Tables 10, 11, 12, 13, 14.

Archer and Moll (1991) derived several estimates of the rate of return to educational investment for Africans and Whites using 1980 census data. Using the "elaborate method", they derived private rates of return for secondary education of 26 per cent for Whites and 15 per cent for Africans. The rate of return to primary education for Africans was 35 per cent. They note that "the rate for secondary schooling for Whites is higher than the

international average, while that for Africans is much lower. It is also worth noting that the rate for primary schooling for Africans is also high by international comparisons, though lower than the equivalent for Africa as a whole" (p.17). Archer and Moll also estimated social rates of return for Africans of 19% (primary) and 11% (secondary) and 12% (secondary) for Whites. Using Mincerian earnings functions they also computed overall private rates of return to an average year of schooling of 10 and 5 per cent respectively for Whites and Africans.

An interesting feature of the Archer-Moll study is that the analysis of age-earnings profiles shows that the profile for Whites is very similar for those of other countries but that the curve for Africans is much flatter except for individuals older than 25 years with a matriculation qualification (p. 18). The authors conclude that" a human capital interpretation would be along the lines that the positive gain in earnings power for a matriculant is the reward for literacy and numeracy skills acquired in preparing for the examination leading to that credential. Conversely, the screening hypothesis would emphasise the role of the examination system in identifying the learning abilities of successful candidates" (p.18). What is ignored by Moll and Archer is occupational distribution of individuals, especially Africans. It could be that the type of jobs Africans are occupying have little scope for the rewarding of human capital investment in numeracy and literacy skills.

Donaldson and Roux (1990) used data from the Current Population Survey (CPS) of May 1985. (The CPS provides information on a regular basis from a stratified sample of households throughout South Africa excluding the the independent homelands.) Their analysis was on a sample size of 26588 Africans.

The findings of the Donaldson-Roux study were that "education is not an important determinant of black (African) men's economic participation in aggregate nor of the probability of finding work" and that "education is positively associated with lifetime incomes but this relationship is weak for primary schooling" (Donaldson & Roux, 1990:1). They further concluded that "the data are consistent with the view that primary education is internally inefficient, making for poor quality of black schooling". The rates of return computed by Donaldson and Roux using the "elaborate method" are shown in Table 4.9.

Table 4.9: Internal Private Rates of Return, Africans, 1985
(per cent)

	Males	Females
Basic primary	6.9	4.7
Senior Primary	8.7	14.0
Incomplete secondary	6.2	11.0
Std 8 - 10	11.0	13.9
Total Primary	7.1	7.6
Total secondary	8.9	12.0
Total	8.4	10.0

Source: Donaldson & Roux, 1990, p.12.

It is evident that the rate of return studies on South African data vary widely and no firm conclusions can be drawn from the them.

4.5 THE RETURNS TO EDUCATION: THE MANUFACTURING SECTOR SURVEY DATA, 1987

The rates of return to investment in education were derived initially on the basis of the classic earnings function (Mincer, 1974) of the basic form:

$$\ln Y = a + bS + cEx + d\ Ex^2$$

where Y stands for gross monthly labour market earnings, S for the number of years of schooling of the individual, Ex for actual labour market experience and Ex^2 which results in the parabolic shape of the age-earnings profile.

The logarithm of earnings, rather than earnings, was used because it has a higher F-value, R^2 and percentage error and contains more coefficients significantly different from zero. Also it has been suggested that the logarithmic form of earnings is preferred because "for empirical analyses of the relationship between earnings and individual worker characteristics, based on strict human capital theory, the dependent variable has to enter in a log form (because) it is relative earnings that relate to time

investments in schooling and post-school training" (Psacharopoulos, 1977:40). The coefficient on years of schooling, "b", is usually taken as the private rate of return to a typical year of schooling.

Table 4.10 provides some selected descriptive characteristics of the entire sample and Table 4.11 the same characteristics broken down by gender and race.

Table 4.10: Selected Descriptive Characteristics of the Survey Sample

Characteristic		Mean or Proportion	Std. Deviation
Income (Rands/month)	Y	1059.52	864.60
Years of Schooling	S	9.56	3.31
Years of Labour Market Experience	Ex	13.90	10.54
Educational Level			
Illiterate	(S1)	2.9%	
Primary Schooling	(S2)	21.3%	
Lower Secondary Schooling	(S3)	39.5%	
Higher Secondary Schooling	(S4)	23.8%	
Tertiary Education	(S5)	12.5%	

Note: Primary Schooling - up to Standard Five (7 years); Lower secondary - Std. 6, 7 or 8 (i.e. 8,9 or 10 years); Higher secondary - Stds. 9-10 (i.e. 10-12 years).

The structure of earnings reflected in Table 4.11 shows that females earned only 73 per cent of male mean earnings although they had, on average, slightly more schooling. African, Coloured and Indian mean earnings were respectively 30%, 31% and 62% of

the White mean earnings.

Mean earnings by race rise monotonically with years of schooling although the discrepancy between White and Indian mean earnings is much greater than their differences in mean years of schooling.

Table 4.11: Mean Income (Y), Years of Schooling (S) and Labour Market Experience (Ex) by Gender and Race

	Y	S	Ex	N
Males	1184.03	9.40	14.81	743
Females	859.28	9.80	12.45	462
Africans	640.55	8.35	15.65	520
Whites	2123.05	12.20	12.77	311
Coloureds	652.64	8.63	12.28	314
Indians	1307.27	11.25	13.40	60
Africans:				
Males	670.60	8.26	15.92	413
Females	524.60	8.72	14.57	107
Whites:				
Males	2415.60	12.19	13.77	191
Females	1657.50	12.23	11.21	120
Coloureds:				
Males	884.00	8.97	12.59	113
Females	522.60	8.18	12.10	201
Indians:				
Males	1596.60	10.50	14.46	26
Females	1086.00	11.82	12.59	34

Within each race, significant earnings differentials appear between the sexes in spite of females having more schooling (except in the case of Coloureds). Female Africans, for instance, earned 78 per cent of male Africans, White females 69 per cent, Coloured females 59 per cent and Indian females 68 per cent of their respective male counterparts.

Amongst males, Indian, Coloured and African earnings were respectively 66%, 37% and 28% of the White mean earnings. In the case of the females, the corresponding proportions were 65% (Indians) and 32% (Africans and Coloureds).

The largest earnings differentials were thus between

(i) Whites vs Coloureds and Africans;

(ii) White vs other males

(iii) White vs other females.

The earnings function was fitted to the entire sample as well as to different classifications of the sample with respect to gender and race. Tables 4.12 to 4.15 show the results of these alternative specifications of the classic earnings function.

Table 4.12: Basic Earnings Function, Manufacturing Sector, 1987

Variable	All	Male	Female
S	0.1009	0.0945	0.1077
	(18.41)	(15.08)	(20.55)
Ex	0.0531	0.0621	0.0388
	(9.82)	(12.86)	(5.91)
Ex^2	-0.0008	-0.0010	-0.0004
	(7.98)	(8.54)	(2.46)
C	5.026	5.119	4.892
R^2	0.295	0.265	0.343
N	1205	743	462

Note: Figures in parenthesis in this table and Tables 4.13-4.15 are t-ratios.

The basic human capital variables, schooling and experience, explain only approximately 30% of the variance in earnings for the entire sample, 27% for males and 34% for females.

The coefficient on the years of schooling, representing the private return to a typical year of schooling is 10 per cent. Females (10.8 per cent) show a higher private rate of return than males (9.5 per cent).

The earnings functions specified by race in Table 4.13 produce some interesting findings. In the case of Africans, the basic human capital variables explain less than 9 per cent of the variance in earnings while for Whites, Coloureds and Indians the explained proportion is respectively 48%, 46% and 31%.

Table 4.13: Basic Earnings Function, Manufacturing Sector, 1987, By Race

Variable	Africans	Whites	Coloureds	Indians
S	0.0422	0.1531	0.1552	0.0424
	(5.13)	(11.28)	(11.10)	(3.48)
Ex	0.0469	0.0438	0.0645	0.0578
	(6.44)	(5.49)	(8.92)	(3.19)
Ex^2	-0.0002	-0.0003	-0.0010	-0.0001
	(2.09)	(0.99)	(5.13)	(2.42)
C	6.032	5.985	4.902	6.426
R^2	0.088	0.477	0.456	0.310
N	520	311	314	60

The average rate of return to schooling is much higher for Whites (15.3%) and Coloureds (15.5%) than it is for Africans (4.2%) and Indians (4.2%). The low rates of return for these latter groups are partly explained by the extremely low rates of return for African and Indian females (Table 4.15). In fact, the rate of return for African females is negative. Given the comparable levels of schooling and labour market experience of African and Indian females against their respective male counterparts (Table 4.11), this implies substantial gender discrimination.

Table 4.14: Basic Earnings Function, Manufacturing Sector, Males, By Race

Variable	Africans	Whites	Coloureds	Indians
S	0.0513	0.1432	0.1611	0.1390
	(6.12)	(13.60)	(8.67)	(3.46)
Ex	0.0574	0.0588	0.0715	0.0977
	(3.47)	(2.46)	(6.32)	(2.40)
Ex^2	-0.0002	-0.00002	-0.0012	-0.0012
	(2.17)	(0.12)	(3.69)	(1.81)
C	6.040	6.229	5.153	5.591
R^2	0.091	0.470	0.482	0.597
N	413	191	113	26

The variance in earnings explained by schooling and experience ranges from a low 9 per cent in the case of African males to 60 per cent for Indian males. The private rate of return for White (14 per cent), Coloured (16 per cent) and Indian (14 per cent) males are considerably higher than those for Africans (5 per cent).

With females, schooling and experience explain only 7 per cent and 9 per cent respectively of the variance amongst Africans and Indians compared to 49 per cent for Whites and 44 per cent for Coloureds. The rate of return for African females is negative [$|t| = 0.4$ (<1.96)] and for Indians it is relatively low (3 per cent). For Whites and Coloureds, the rates of return were respectively 16 and 14 per cent.

Table 4.15: Basic Earnings Function, Manufacturing Sector, 1987, Females, By Race

Variable	Africans	Whites	Coloureds	Indians
S	-0.0082	0.1630	0.1430	0.0324
	(0.40)	(7.29)	(8.91)	(1.04)
Ex	0.0249	0.0140	0.0596	0.0055
	(1.92)	(1.29)	(7.09)	(0.35)
Ex^2	-0.0005	-0.0001	-0.0009	-0.0001
	(1.41)	(3.50)	(3.79)	(0.19)
C	6.013	6.054	4.982	6.602
R^2	0.075	0.489	0.441	0.091
N	107	120	201	34

The results of the earnings functions shown in Tables 4.12 to 4.15 may be summarised as follows:

(a) The private rate of return to schooling for the entire sample is 10 per cent with females having a slightly higher return than males.

(b) Africans have a substantially lower return than the other races with African females showing a negative return. Indian females also have a low return.

(c) Amongst males Africans have a significant lower return and amongst females, it is Africans and Indians who have a markedly lower return to schooling.

It is necessary to explore possible explanations for the low returns to Africans (males and females) and Indian females. The

obvious explanation is that there is a substantial degree of racial and gender discrimination in the labour market. The relevant questions then are: why are Indian males and Coloured males and females receiving relatively high returns?

It may be useful to begin exploring the low returns to schooling for some groups by examining the returns by educational level and race to see whether there are any differential returns according to such sub-sampling (Table 4.16).

Table 4.16: Private Rates of Return to Education by Educational Level and Race

Race	Level of Education			
	Primary	Lower Sec.	Higher Sec.	Post-sec.
Africans	1.2	2.8	10.2	-
Whites	-	6.2	19.2	6.9
Coloureds	1.2	11.3	18.2	8.4
Indians	-	9.6	19.6	3.2

Note: Lower Sec. - Lower secondary; Higher Sec. - Higher Secondary; Post-sec. - Post-secondary.

The returns to primary and lower secondary education are low for Africans. It could thus be argued that the returns to Africans are low because a large proportion of this group is concentrated in these education levels. But a large proportion of Coloureds are also in these educational levels. However, the returns to lower secondary education are high for Coloureds (see also Figure 4.3) although primary education is not rewarded even in this

group. On the other hand, the returns to higher secondary education are higher than for lower secondary education for all four races. One conclusion that can be drawn at this stage is that employers do not reward primary and lower secondary education of Africans because of the perceived poor quality of such education but they do reward the attainment of higher secondary education. In the case of Coloureds they do not reward primary education but reward increasingly for higher levels of school education. Post-secondary education shows lower returns than for higher secondary education.

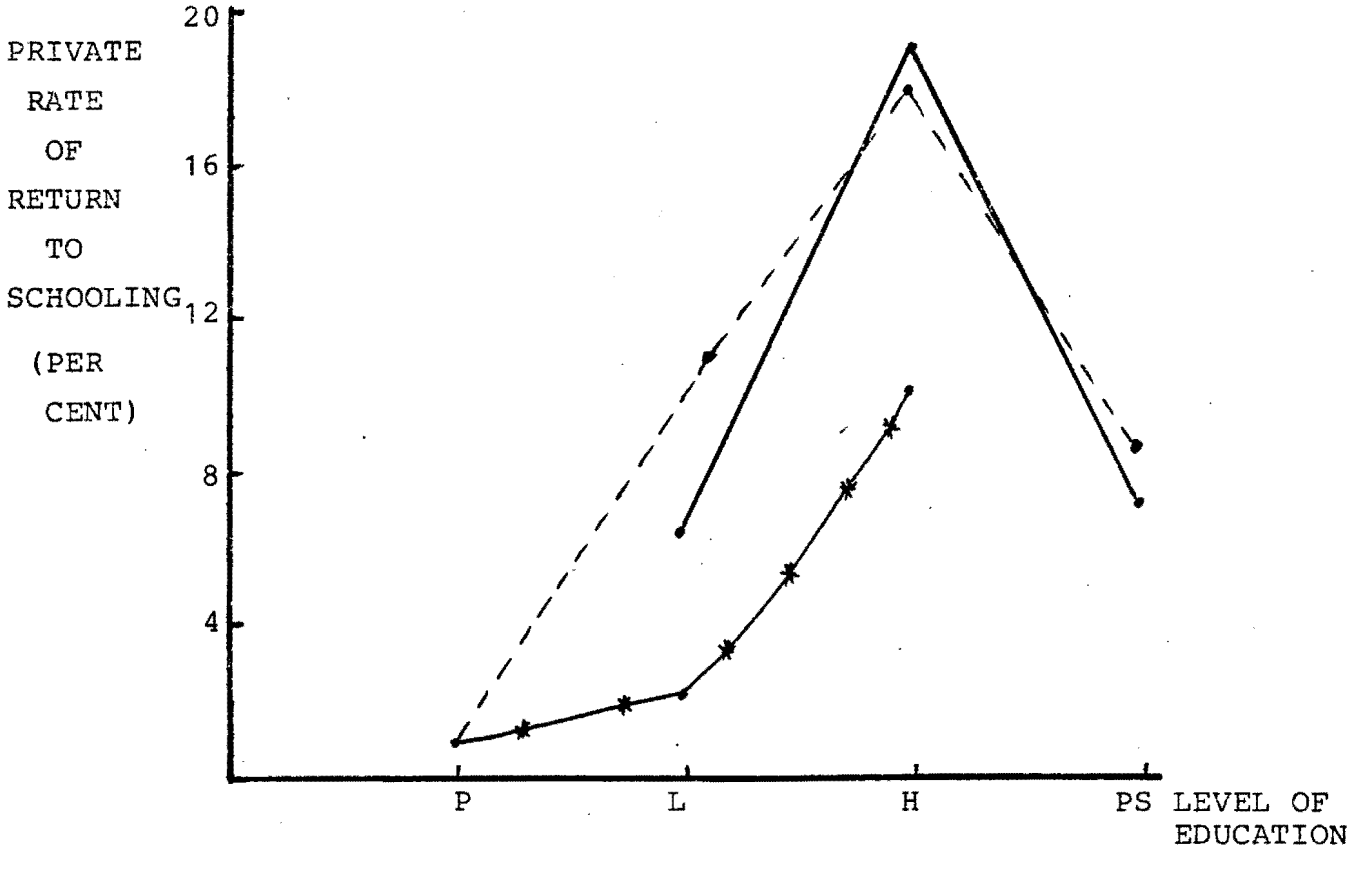


Figure 4.3 Rate of Return by level of Education

P : Primary Schooling H : Higher Secondary
L : Lower Secondary PS: Post-Secondary

** African ---Coloured ——White

Two important statements should be emphasised at this point. The first is that it is apparent that employers are able to distinguish between quality of education by race at the lower education levels. Secondly, higher secondary education provides larger returns for all races but even here Africans reap the lowest returns. It would appear therefore, that education provides only a partial explanation for the low rates of return to Africans.

A further possible explanation could be found in the nature of jobs performed by different individuals. The sample was thus stratified by occupation to determine what the returns to different occupations were. The results are shown in Table 4.17.

Amongst manual occupations there is a monotonic relationship between skill level of the occupation and the rate of return to schooling. Similarly the higher non-manual occupations also have a higher return than the lower non-manual occupations.

Table 4.17: Private Rates of Return to Schooling by Occupation

Occupation	Rate of Return (per cent)
Unskilled Manual	1.1
Semiskilled Manual	2.4
Skilled Manual	12.8
Lower Non-manual	6.7
Higher Non-manual	7.9

The statistics of Table 4.17 provide a possible explanation for the low returns to Africans. It appears that Africans are reaping low economic returns to education because a large proportion of them are concentrated in unskilled and semi-skilled manual occupations. The nature of these jobs is such that there is little scope for human capital investment to be rewarded. Indian females, on the other hand, possess relatively high educational qualifications but they are concentrated in the low-paying non-manual occupations. Occupation thus seems to be an important determinant of earnings and higher economic returns. (This issue is explored further in Chapters Five and Eight.)

A further distinction was drawn between manual occupations and non-manual occupations to discern whether there were differential returns by race, specifically between Africans and Whites. These results are presented in Table 4.18. This table also shows the returns in non-manual and manual occupations for Whites and Africans who have obtained some degree of higher secondary education. In both manual and non-manual occupations, the rates of return to Whites, on average, are higher. But comparing individuals from both groups with higher secondary education shows that Africans receive higher returns in both the manual and non-manual categories.

The conclusion from Table 4.18 is that rates of return to education for Africans are high if such individuals manage to obtain some higher secondary education and are in occupations in

which such investment in human capital is rewarded. The overall return to Africans is low because a large proportion of them have only primary or lower secondary schooling and they are furthermore concentrated in unskilled and semi-skilled manual occupations. A possible explanation is that employers are not rewarding lower levels of education because of the perceived poor quality of such education but the full explanation for the low rates of return to Africans must be in terms of access to occupations that receive higher rewards for investment in human capital. It is the combination of poor quality schooling and "crowding" into low-paid unskilled and semi-skilled manual occupations that accounts for these low returns.

Table 4.18: Private Returns to Schooling by Occupation and Race

Occupation	Group	Rate of Return (per cent)
Manual	African	1.5
	White	8.4
Non-manual	African	11.9
	White	17.3
Manual	Africans with HS education	6.2
	Whites with HS education	4.8
	All with HS education	9.2
Non-manual	Africans with HS education	11.5
	Whites with HS education	5.3
	All with HS education	14.4

Note: HS - Higher Secondary.

Another factor which could further lower the rate of return to schooling is the extent to which students repeat grades or drop out of school. Behrman and Deolalikar (1991) show that ignoring grade repetition can lead to an overstating of the returns to schooling. They say that "if grade repetition and school dropouts are common (as is the case in much of the developing world), the standard practice of equating the number of grades necessary to complete a given level of schooling with the number of years spent in that level may understate the private and social costs of schooling and thus overstate the private and social returns to schooling" (pp.467-8). Behrman and Deolalikar show further that standard procedures for estimating the rate of return to schooling overstate substantially the economic returns to schooling in Indonesia (for example by 38 to 78 per cent for primary schooling).

The manufacturing survey data contains a measure of schooling which incorporates years spent repeating grades. In addition to grade or level of education passed, respondents were asked about length of time (number of years) spent in the education system. School repetition is extremely significant especially in African and Coloured education. The estimates of the economic returns to schooling using this measure of schooling are shown in Table 4.19.

Table 4.19: Private Returns to Schooling

Group	Rate of return (actual time spent in formal education)	Mean years (Time spent in education)	R.o.r. (Grade achieved)	Mean years (Grade achieved)
All	8.85	10.77	10.09	9.56
African	2.45	10.28	4.22	8.35
White	14.83	12.70	15.31	12.20
Coloured	13.66	9.47	15.52	8.63
Indian	4.19	11.80	4.24	11.25

Thus the inclusion of a measure of schooling which ignores repetition overstates the rate of return to schooling by approximately 14 per cent for the entire sample but by about 72 per cent for Africans, 12 per cent for Coloureds, 3 per cent for Whites and 2 per cent for Indians.

4.6 CONCLUSION

The rates of return derived in this chapter indicate that the education of Africans, male and female, and that of Indian females is not being rewarded. The analysis suggests that while employers are partial to the quality of African education, occupational distribution is also a major explanatory factor of the low rates of return to some groups. African males and females as well as Indian females are all concentrated in low-paying occupations. In the case of Africans, rates of return comparable

with Whites are achieved by those with higher secondary education. The inclusion of a measure incorporating repetition substantially decreases the rate of return to Africans.

It is useful to compare the rate of return estimates for the South African manufacturing sector with the international data as well as with other research findings in the country.

How then do these estimates compare with those of developing and advanced countries? The rates of return of approximately 10 per cent obtained for the entire sample are comparable with rates being attained in intermediate countries such as Argentina and Kuwait and the industrially advanced countries. However, in these countries the education systems are well-developed and they are relatively well endowed with educated manpower. This suggests that it is not quantity of schooling, but poor schooling quality, occupational distribution and/or discrimination that are contributing to the low rates of return to schooling in South Africa.

The rates of return for Whites, Coloureds, White males, Indian males and Coloured females are comparable with the average for the African and Asian countries in Table 4.4 and some of the Latin American countries in Table 4.6

In comparison with the research in South Africa, there is firstly little correlation with Louw's 1979 study at the lower education levels although the rates of return to schooling may well have declined during the 1980s as suggested by Moll (1991). However, there is some correlation with the Louw study at higher education levels.

Furthermore the private rates of return estimated by Archer and Moll on the 1980 census data are reasonably close to the findings of this survey. Both the Hosking and the Donaldson-Roux studies confirm the lower returns to primary schooling relative to secondary education for Africans. These comparisons suggest that the rates of return to the manufacturing sector may be representative of the entire economy.

This chapter focused on the returns to education. Chapter Five takes this analysis further by examining other posssible determinants of earnings.

Notes

1. In the short-cut method the returns to education are estimated on the basis of the simple formula

$$r = \frac{\bar{Y}_k - Y_{k-\Delta s}}{S.\ (\bar{Y}_k - s)}$$

where $\bar{Y}$ refers to mean earnings of employees with the subscripted educational level and S to the number of years of schooling. The advantage of this formula is that "one can use already tabulated information on the earnings of workers by educational level in order to estimate the private rate of return. Also, it is rather easy to add the resource cost of schooling in the denominator in order to estimate the social returns" (Psacharopoulos, 1981:325-26). Therefore, it is useful in cases where information on individual earnings is not available.

CHAPTER FIVE

THE DETERMINANTS OF EARNINGS : FURTHER ANALYSIS

5.1 INTRODUCTION

Chapter Four explored the results of alternative specifications of the classic Mincerian earnings function in order to explain the variations of earnings in the sample by means of differences in the human capital characteristics of individuals. The purpose of this chapter is to analyse further the earnings determination process. In particular an attempt is made to ascertain whether or not there are statistical differences in the structure of earnings functions among workers in the South African manufacturing sector.

The analysis is taken further through the specification of earnings functions containing a series of dummy variables for education, employment experience, gender, race, occupation, and on-the-job training. The reason for including schooling and experience as explanatory variables is that they are usually taken to represent "productive human capital which is rewarded in the market place" (Knight & Song, 1990:10). The gender and race

variables may represent gender and race discrimination respectively. Occupation may contain an element of human capital in the form of occupation-specific skills (De Beyer & Knight, 1989). The other variable included, receipt of on-the-job training, may also be a determinant of income differentials.

In this chapter the emphasis is firstly on the further analysis of the returns to schooling, and secondly, on the determination of the returns to labour market experience.

Various aspects of labour market discrimination by race and gender in the South African economy have been analysed by several social scientists (Cassim, 1982; James, 1984; Human and Greenacre, 1987; Pillay, 1986). In sections 5.2.4 and 5.2.5 the roles of race and gender in the determination of earnings amongst manufacturing sector workers is analysed in the light of the human capital, institutional and discrimination theories described in Chapter Three.

Although the role of occupation in the determination of earnings is the subject of analysis in Chapter Eight, some preliminary analysis is provided section 5.2.3.

Table 5.1 presents the variables related to earnings with mean values and standard deviations.

Table 5.1: Sample Data, Manufacturing Sector - Income and its Determinants

Variable		Proportion of sample (per cent)	Mean Income (rand/month)	Std. Deviation of Income (rand/month)
Income (Y)			1059.52	864.60
Education				
Illiterate	(S1)	2.9	576.83	201.57
Primary	(S2)	21.4	583.00	182.21
Lower Secondary	(S3)*	39.4	778.04	504.05
Higher Secondary	(S4)	23.8	1282.06	861.06
Post-secondary	(S5)	12.5	2461.74	987.06
Race				
African	(R1)	43.1	640.55	229.83
White	(R2)*	25.8	2123.05	962.25
Coloured	(R3)	26.1	652.64	473.04
Indian	(R4)	5.0	1307.27	533.77
Gender				
Male	(G1)	61.7	1184.03	936.07
Female	(G2)*	38.3	859.28	690.52
Employment Experience				
< 2 years	(E1)*	11.4	879.63	708.24
2-5 years	(E2)	15.7	1018.46	954.83
6-10 years	(E3)	21.0	1208.46	781.06
11-15 years	(E4)	14.6	1242.27	921.79
16-20 years	(E5)	11.9	1363.75	932.80
> 20 years	(E6)	25.2	1529.79	890.92
Occupation				
Unskilled Manual	(O1)	26.5	476.12	164.60
Semi-skilled Manual	(O2)	35.4	670.81	233.04
Skilled Manual	(O3)*	7.1	1708.16	699.89
Lower Non-manual	(O4)	18.0	1164.36	331.57
Higher Non-manual	(O5)	13.0	2785.38	875.23
Training				
Yes	(T1)	19.4	842.21	502.25
No	(T2)*	80.6	1099.01	912.65

* Omitted variable in regression analysis. The omitted variables in regression analyses of this type are usually the illiterate group in the case of education and unskilled manual workers in the case of occupation. However, in regressions in this thesis, the omitted variables in the education and occupation categories are lower secondary education and skilled manual workers respectively. The reason for this is that there were no White and Indian illiterates and unskilled manual workers in the sample.

5.2 EARNINGS FUNCTION ANALYSIS

Table 5.2 presents alternative specifications of the earnings functions for the full sample. It differs from the earnings functions depicted earlier in that it introduces dummies for the independent variables, namely, schooling, labour market experience, race, gender, occupation, and training. As with earlier specifications the natural logarithm of earnings is the dependent variable.

The introduction of dummy variables permits the estimate of the earnings premium associated with each successive dummy variable. The values of the coefficients can, with adjustments as noted by Halvorsen & Palmquist (1980: 474-75), be interpreted as denoting percentage changes in income.[1]

Table 5.2: Earnings function analysis of Full Sample: Manufacturing Sector, 1987

Variable		Coefficients	
Illiterate	S1	-0.293*	-0.095**
Primary Schooling	S2	-0.202*	-0.058**
Higher Secondary	S4	0.105*	0.028
Post-secondary	S5	0.528*	0.195*
2-5 years experience	E2	0.060*	0.024**
6-10 years	E3	0.124**	0.059**
11-15 years	E4	0.146**	0.088**
16-20 years	E5	0.162*	0.098*
> 20 years	E6	0.219*	0.115*
Males	G1	0.165*	0.097*
Africans	R1	-0.403*	-0.192*
Coloureds	R3	-0.327*	-0.154*
Indians	R4	0.209*	0.063**
Unskilled Manual	O1		-0.531*
Semi-skilled Manual	O2		-0.302*
Lower Non-manual	O4		0.032
Higher Non-manual	O5		0.589*
Training	T1	0.075*	0.023**
Constant		6.827	6.883
F		239.475	266.455
R^2		0.738	0.826
N		1205	1205

* Indicates significance at the 1% level and ** indicates significance at the 5% level in this and all subsequent regressions in this thesis.

The earnings functions in Table 5.2 explain a large proportion of the variance in earnings of the survey data. The earnings function shown in Column 1 explains almost 74 per cent and with the inclusion of the occupation variable (column 2), the

explained portion increases to nearly 83 per cent. Each independent variable is examined in turn below.

5.2.1 Schooling/Formal Education

The rate of return analysis conducted in the previous chapter established that an unclear relationship exists between education and earnings with race and gender appearing to be crucial determinants of earnings. For African males and females and Indian females, particularly, the rates of return to schooling were low both in absolute terms and in relation to the other groups within the country and with other developing countries.

However, while the earnings premium on education appears to be low and is, in fact, negative for African females, the demand for education is, nevertheless, exceptionally high as reflected, for instance, in high and increasing enrolment ratios (Chapter One).

Table 5.1 shows that, as expected, mean earnings rise monotonically by educational level. However, earnings differentials by educational level are substantial. Illiterates, on average earn 23 per cent of those with post-secondary education, those with primary schooling 24 per cent, lower secondary schooling 32 per cent and higher secondary schooling 52 per cent. Thus a large gap exists between those without and those with post-secondary education. An unexpected finding is that there is virtually no earnings differential between those with

primary education and illiterates.

The earnings function analysis shown in column 1 of Table 5.2 confirms the monotonic relationship between level of education and earnings, with all schooling coefficients significant. An illiterate receives, on average, 25 per cent less than individuals with lower secondary schooling (S3, the omitted variable), those with primary schooling 18 per cent less, those with higher secondary schooling 11 per cent more and those with post-secondary education 70 per cent more. Post-secondary education thus receives disproportionate rewards.

The inclusion of the occupation variable (column 2) reduces the value of all coefficients. Also, the coefficient on higher secondary education is no longer significant. The inclusion or exclusion of the occupation variables has a powerful influence with not only the schooling coefficients but all others also affected. This points to the important role of occupation in the earnings determination process.

There is a strong correlation between years of education and earnings in almost all economies. This relationship is usually stronger in developing countries which are often characterised by having an abundance of unskilled labour and a scarcity of educated and skilled labour. In the South African manufacturing sector, as represented by the survey data, more education means more earnings but the magnitude of the earnings premium to the

different education levels varies significantly, especially between those receiving post-secondary education and the others.

5.2.2 Employment Experience

In almost all economies, a strong non-linear relationship is found between earnings and length of employment experience. Age-earnings profiles show that earnings first rise according to experience and then flatten off later in one's career. This systematic curvature in the age-earnings profile suggests that individuals make further post-school investments in human capital through on-the-job experience.

This theory assumes that workers are paid wages equal to their marginal products in competitive labour markets. The South African manufacturing sector, however, is a diverse mixture of monopolistic, oligopolistic, and competitive enterprises. It is quite likely that in this situation other factors such as seniority and institutional mechanisms such as internal labour markets as well as total labour market experience, influence earnings. The relationship between seniority and earnings and the role of internal labour markets are analysed in Chapter Seven.

Table 5.1 shows an unusually narrow earnings spread by labour market experience. However, the usual positive relationship between experience and earnings is evident. Individuals with 2 to 5 years experience earn, on average, 6 per cent more than the

newest labour market entrants (< 2 years experience, the omitted category). The monotonic relationship between earnings experience shows further that employees with 6-10 years experience earn 13 per cent more than the omitted category, those in the 11-15 year group earn 16 per cent more, the 16-20 year group 18 per cent more and the most experienced group 25 per cent more.

Although all empirical estimates within the human capital framework include a variable for experience in the earnings function, few studies report its estimated coefficient, as most have been concerned with the return to additional years of schooling. Table 5.3 recalls the coefficients on labour market experience in the earnings functions specified in Chapter 4. (See Tables 4.12 - 4.15).

In all cases, the Ex coefficients are positive and except in the cases of White (t-ratio = 1.29), Indian (0.35) and African (1.92) females, highly significant and the Ex^2 coefficients are negative and significant. This implies that each earnings-experience profile rises steeply and then declines with age. The different pattern for White and Indian females is similar to that determined for White females by Human and Greenacre (1987) and could be attributed to the intermittent labour force participation of this group, as a result of the mixing of full- and part-time work and of child-bearing patterns that differ from those of the other races.

Table 5.3: Coefficients on Labour Market Experience (Ex) and Labour Market Experience Squared (Ex^2)

Group	Ex	Ex^2
All	0.053	-0.0008
Males	0.062	-0.0010
Females	0.039	-0.0004
Africans	0.047	-0.0002
Whites	0.044	-0.0003
Coloureds	0.065	-0.0010
Indians	0.058	-0.0001
African males	0.057	-0.0002
White males	0.059	-0.00002
Coloured males	0.072	-0.0012
Indian males	0.098	-0.0012
African females	0.025	-0.0005
White females	0.014	-0.0001
Coloured females	0.060	-0.0009
Indian females	0.006	-0.0001

There are however, significant differences in the returns to experience by race and gender. Females on the whole, have a lower return to experience (0.039) compared to males (0.062). This is generally due, as stated earlier, to the intermittent labour force participation rates of females and particularly in this sample, of White and Indian females.

On-the-job experience brings slightly greater rewards for Coloureds and Indians. While the size of the premium on labour market experience cannot be compared directly with results for other developing countries which have used a proxy for experience (Age minus 6 minus Schooling), the coefficients for the South African data in general, are comparable (Table 5.4).

The only comparative analysis in South African research is

Louw's (1979) study where the experience proxy was also used together with an experience-schooling interaction term. The experience coefficients in that study were similar to those obtained in this study for African males and females, larger for Coloured males and Indian females and smaller for Indian males and Coloured females:

	Ex	Ex^2	Ex.S
African males	0.0601	-0.0008	0.0013
African Females	0.0294	-0.0004	-0.0007
Coloured males	0.0936	-0.0012	-0.0032
Coloured females	0.0369	-0.0005	-0.0021
Indian males	0.0811	-0.0006	-0.0028
Indian females	0.1432	-0.0012	-0.0098

Louw suggested that the negative coefficient of the interaction term (Ex.S) described the apparent convergence of all experience profiles, with the exclusion of African males, whose positive coefficient indicated that the experience profile for this group was diverging. This result implied that with more education, experience seemed to be more worthwhile to African males in terms of income (Louw, 1979:396).

Knight & Sabot (1981) have shown that the schooling and experience coefficients fall when experience-interaction terms are introduced into the earnings function. In their study of Tanzania, the interaction term coefficients showed that the earnings of educated workers rose more rapidly over time in employment. They suggested that this was due to the "filtering down" effects -i.e. younger cohorts unable to enter occupations

involving as much skill and earnings as earlier labour force entrants with the same level of education. Therefore, they earn a lower return on their years of schooling because of their poorer prospects for acquiring vocational skills-on-the-job.

Earnings functions containing interaction terms for experience and schooling were estimated for the survey data. However, neither the coefficient on labour market experience nor the explanatory power of the regression changed significantly.

In order to make a direct comparison of the experience coefficients with those estimated for a range of developing countries, the proxy variable (Age-6-school) was constructed for the survey data and the earnings function re-estimated. The coefficient for this variable, its square and those for other developing countries are shown in Table 5.4. This table also shows the earnings premiums between new labour market entrants and those with 10 and 20 years experience.[2]

Using the proxy for experience it is evident that the range of experience coefficients is wide and the earnings premium between new labour force entrants and those with 10 years experience is of the order of between 34 and 89 per cent. For those with 20 years experience, the implied earnings differentials ranged between 56 and 176 per cent. The estimates for the South African manufacturing survey data reveal that the respective earnings premiums are 52 per cent (10 years) and 88 per cent (20 years).

When the actual experience coefficient is used there is a decline in the Kenyan and Tanzanian differentials (De Beyer, 1987). In the South African case, the coefficient on actual experience is also lower and earnings premiums decrease to 45 per cent (10 years) and 74 per cent (20 years).

Table 5.4: Experience Coeffficients and Earnings Premiums for a Range of Developing Countries and the South African Manufacturing Sector Survey Data

Country	Coefficients Ex	Ex^2	Earnings Premium (%) 10 yrs.	20 yrs.
(a) Experience Proxy				
Brazil	0.09	-0.0001	89	176
Argentina	0.04	-0.0006	34	56
Ecuador	0.06	-0.0008	52	88
Venezuela	0.08	-0.0001	79	156
Kenya	0.06	-0.0008	59	88
Tanzania	0.06	-0.0008	59	88
S.A. (manf.)	0.06	-0.0008	52	88
(b) Actual Experience				
Kenya	0.05	-0.0008	42	68
Tanzania	0.04	-0.0006	34	56
S.A. (manf.)	0.05	-0.0008	45	74

Sources: Table 4.6; De Beyer, 1987.

It is clear from the evidence presented thus far that labour market experience is an important determinant of earnings in the South African manufacturing sector. However, the effect of on-the-job experience varies by race and gender. The experience coefficients reveal that there is a weaker relationship between

earnings and experience for females, Africans and Whites. To illustrate these relationships further, the earnings premiums for 10 and 20 years experience were estimated for each racial and gender category (Table 5.5). For instance, with labour market experience equal to 10 years, female earnings would increase by 35 per cent over new labour market entrants while for males the premium is 52 per cent. Similarly for Whites the earnings premium after 10 years is 41 per cent and for Africans it is 45 per cent but for Coloureds it is 55 per cent and for Indians it is 57 per cent.

Table 5.5: Earnings Premiums to 10 and 20 Years Labour Market Experience, by Race and Gender

Group	Earnings Premium (per cent)	
	10 years	20 years
All	45	74
Males	52	84
Females	35	61
Africans	45	86
Whites	41	76
Coloureds	55	89
Indians	57	112
Males		
African	55	107
White	59	117
Coloured	60	95
Indian	86	147
Females		
African	20	30
White	13	25
Coloured	51	83
Indian	5	7

The relationships between education and experience and occupation and experience were also examined. Table 5.6 shows the experience coefficients by educational level and Table 5.7 the same by occupation. The relationships are also illustrated in Figures 5.1 - 5.5 which show respectively the experience-earnings profile by educational level for the whole sample, for Africans, Whites, and Coloureds and the experience-earnings profile by occupation for the entire sample. The experience-earnings profile by education for Indians was omitted because of the small sample size.

Table 5.6: Experience Coefficients by Educational Level and Earnings Premium to 10 and 20 Years Experience

Educational Level	Coeff.on Ex	Coeff.on Ex^2	Earnings Premium (%)	
			10	20
Primary	0.022	-0.0003	19	32
Lower Secondary	0.065	-0.0010	55	90
Higher Secondary	0.054	-0.0006	48	84
Post-secondary	0.019	-0.0003	16	26

These tables show first that individuals with some secondary education receive greater returns to experience than either those with primary or those with post-secondary education. Secondly, in terms of occupation, although the coefficient on Ex is highest for skilled manual workers the addition of the coefficient on Ex^2 shows that in the long-term (20 years) semi-skilled manual workers receive the highest rewards to experience followed by

higher non-manual, skilled manual, and lower non-manual and unskilled manual workers.

Table 5.7: Experience Coefficients by Occupation and Earnings Premium (per cent) to 10 and 20 Years experience

Occupation	Coeff.on Ex	Coeff.on Ex^2	Earnings Premium 10	20
Unskilled Manual	0.048	-0.0005	43	76
Semi-skilled Manual	0.059	-0.0001	58	114
Skilled Manual	0.072	-0.0015	57	84
Lower Non-manual	0.040	-0.0001	39	76
Higher Non-manual	0.048	-0.0002	46	88

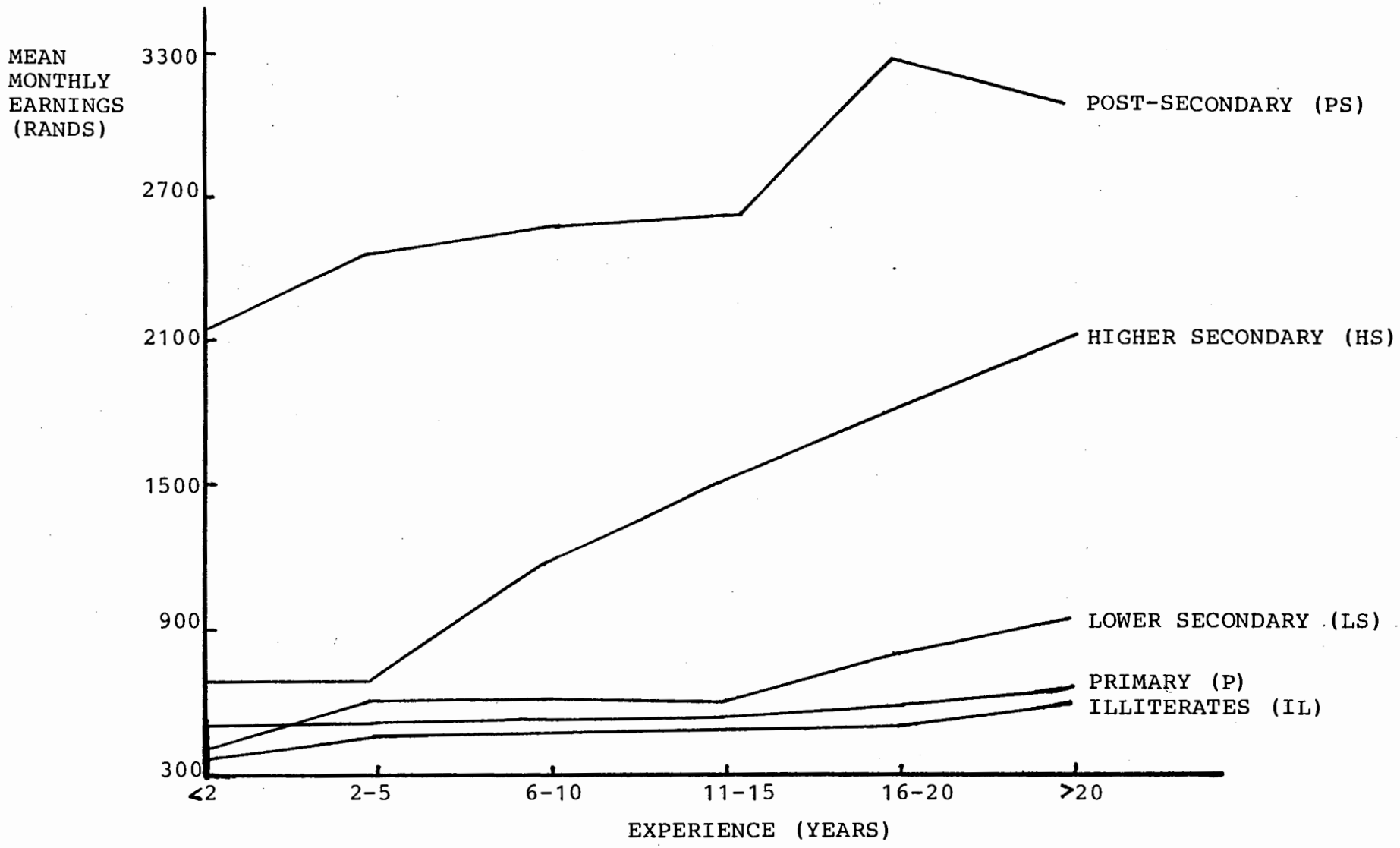


Figure 5.1 Experience-Earnings Profile by Education Level

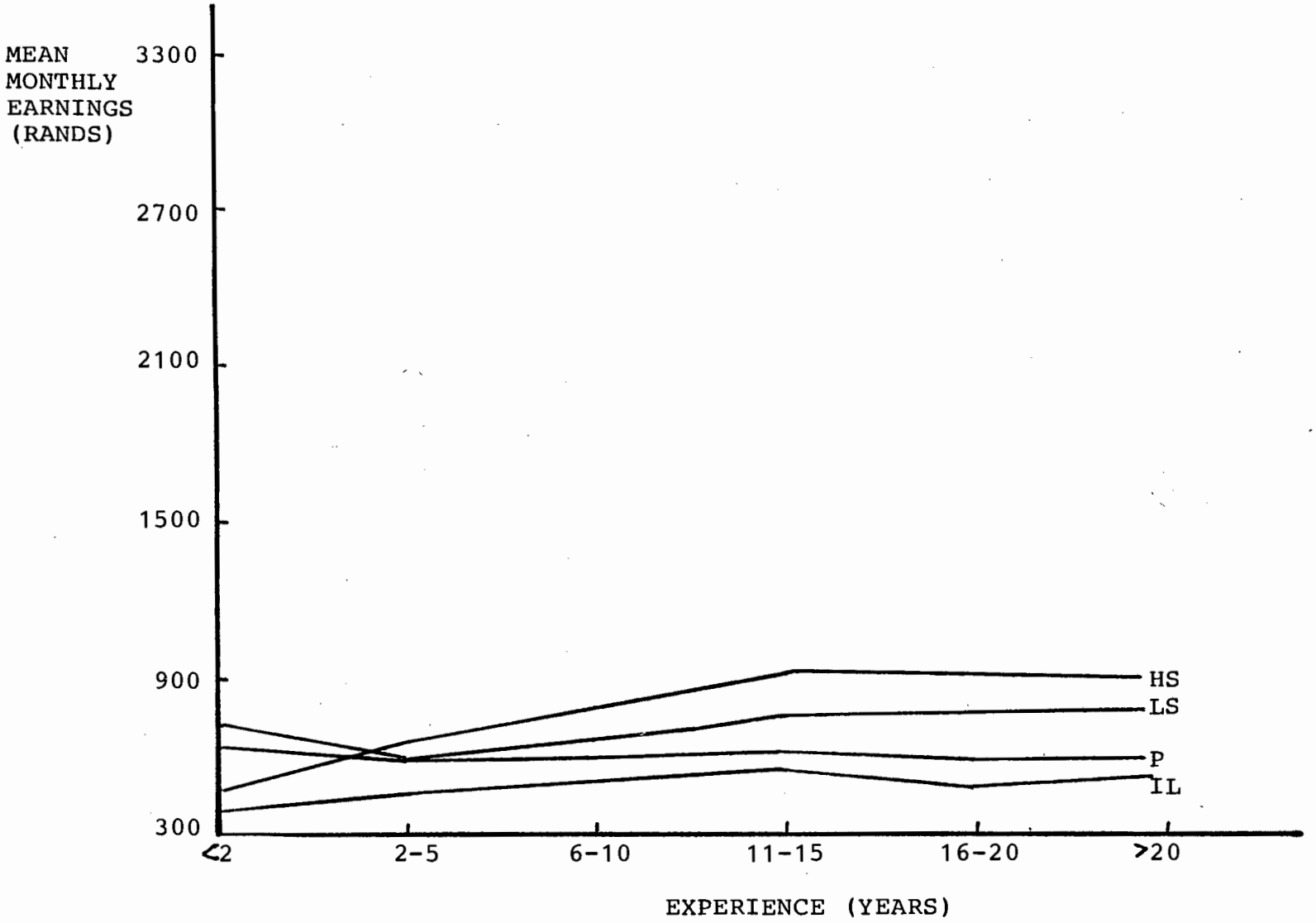


Figure 5.2 Experience-Earnings Profile by Education Level - Africans

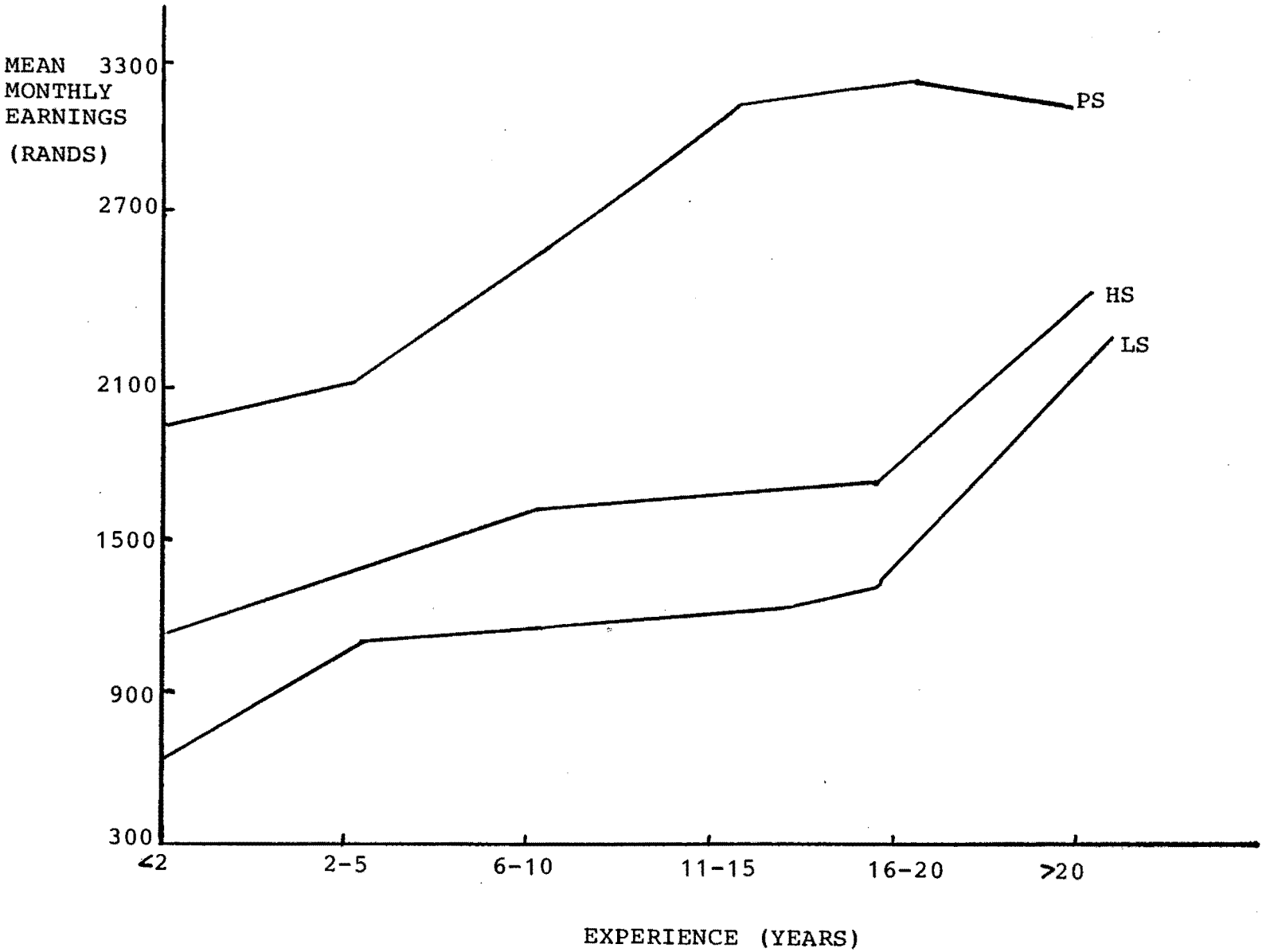


Figure 5.3 Experience-Earnings Profile by Education Level - Whites

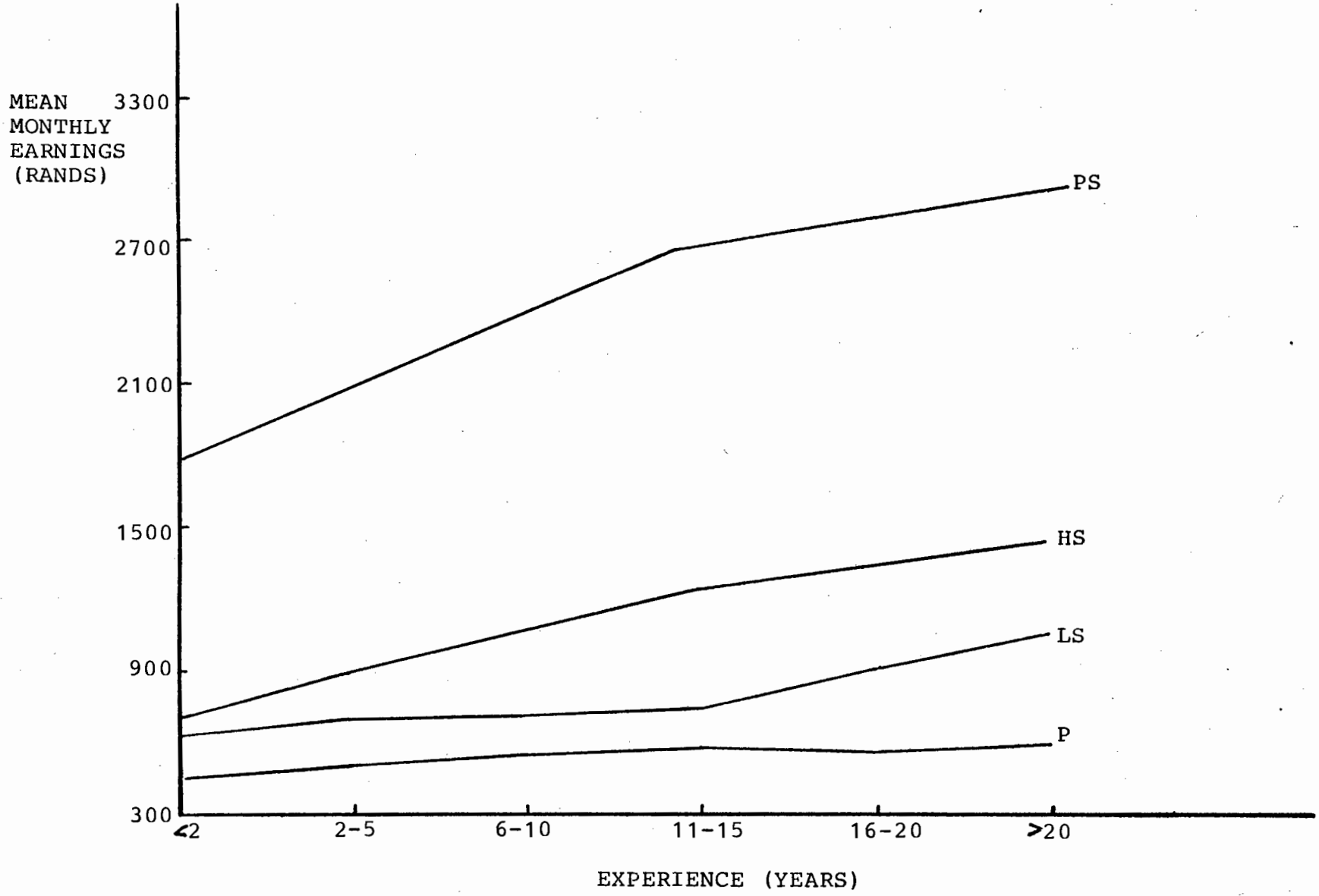


Figure 5.4 Experience-Earnings Profile by Education Level - Coloureds

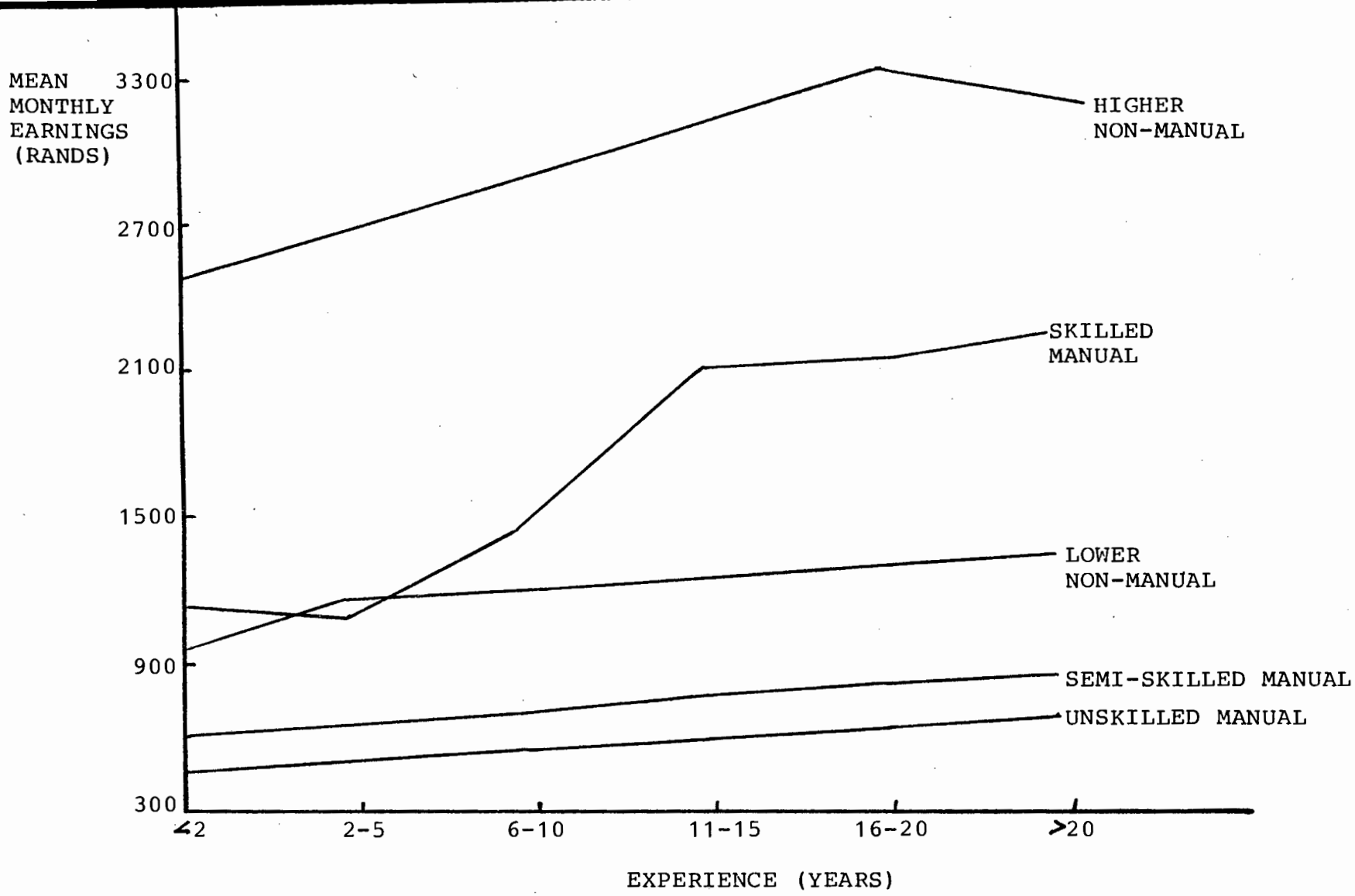


Figure 5.5 Experience-Earnings Profile by Occupation

In conclusion, the groups for whom employment experience brought greater rewards were males, Coloureds, Indians, those with secondary education and skilled, semi-skilled manual and higher non-manual workers.

5.2.3 Occupation

Although the role of occupation in the determination of earnings is the subject of Chapter Eight, a brief introductory analysis is provided here.

In many sub-sectors of manufacturing, particularly for manual occupations, wage systems are occupation-based. This should make occupation an important determinant of earnings. However, it is also possible for earnings to be attached to individuals rather than jobs. In some sub-sectors workers may increase earnings and achieve mobility through grades in their occupations as their years of service increase irrespective of the precise occupation and its skill level. This suggests that the determinants of the initial allocation to a particular occupation and the corresponding wage systems can be important determinants of earnings. This is a way in which education and in particular, higher education, through its "allocative effect", can influence earnings.

The survey data show that individuals in the higher occupations

tend to have higher levels of education. However, a surprisingly large proportion of unskilled and semi-skilled manual occupations are filled by individuals with secondary education (Table 5.8).

Table 5.8: Employees Grouped by Occupation: Distribution by Level of Education

Occupation	Level of Education (%)				
	No educ.	Primary	Secondary Lower	Secondary Higher	Post-Sec.
Unskilled Manual	7	37	50	6	0
Semi-skilled Manual	3	31	46	19	0
Skilled Manual	0	4	47	27	22
Lower Non-manual	0	1	35	50	14
Higher Non-manual	0	0	7	30	63

Earnings are positively correlated with level of occupation. However, sharp differentials exist between occupations (Table 5.1). Those in unskilled manual occcupations earn, on average, only 17 per cent of the highest paid category, the higher non-manual occupations. For those in semi-skilled occupations, this ratio was 24 per cent, for skilled manual occupations 61 per cent and for lower non-manual 42 per cent. Amongst manual occupations the earnings spread was also substantial with the unskilled earning 28 per cent and the semi-skilled 39 per cent of the skilled.

Column 2 of Table 5.2 shows that the inclusion of the occupation variables raises the explanatory portion of the regression to 83 per cent. The earnings spread between blue- and white-collar

occupations is quite significant. Earnings rise monotonically from occupations 01 to 05, although the coefficient on the lower non-manual occupation is not significant.

Unskilled manual occupations earned 41 per cent less than skilled manual occupations (03, the omitted variable) while the semi-skilled received 26 per cent less and those in higher non-manual occupations 80 per cent more.

A comparison of Columns 1 and 2 sheds further light on the relationship between education, occupation and earnings. In column 1, the omission of the occupation variables from the earnings function shows the combined effect of formal education and employment experience on income. Therefore, the coefficients are larger in column 1 and the spread of earnings by educational level widened. For instance, in column 2 with the inclusion of occupation variables, higher education now commands a premium of only 3 per cent (11 per cent in column 1), post-secondary education 22 per cent (70 per cent), primary schooling -6 per cent (-18 per cent) and illiterates -9 per cent (-25 per cent). (Note that all these differentials are measured with reference to lower secondary education.)

It seems therefore, that education raises the income of a worker not only directly but also indirectly by improving his or her chance of allocation to a higher paying occupation. In Chapter Eight, the role of occupation in the determination of earnings is examined in greater depth.

5.2.4 Gender

In most economies, there is some element of gender discrimination as reflected in lower earnings, occupational segregation and reduced occupational mobility for females. The earnings function analysis presented in Chapter 4 suggested the possibility of substantial gender discrimination especially against Black females. Female mean earnings in the sample data are approximately 73 per cent of male mean earnings.

Table 5.9: Mean Earnings by Gender - Specific Occupations

Occupation	Mean Earnings (rands per month) Male	Female	Female Earnings as % of male
Clerical	1373	1227	89
Unskilled Manual	539	418	78
Semi-skilled Manual	725	538	74
Managerial	2882	2600	90
Professional	3370	2026	60

Note: Non-manual occupations further disaggregated. See Chapter2, 2.3.1 (vi).

In virtually all occupations substantial earnings differentials by gender exist. No clear pattern is discernible and women are equally likely to be discriminated against in lower occupations (e.g. unskilled manual) as in higher non-manual occupations (e.g. professionals).

Table 5.10 provides data for the examination of the relationship between education and earnings by gender. No clear pattern emerges between education and earnings differentials by gender. At all levels males earn a premium. There are no significant racial differentials with the premium for White males (against White females) just as large as that for African males (against African females) but female earnings as a proportion of male earnings are lower for Whites than for Africans.

Table 5.10: Mean Earnings by level of education, gender and race

Level of education	Group	Mean Earnings	Female Earnings as % of male
No education	AM	584	
	AF	400	68
Primary	AM	648	
	AF	564	87
Lower Secondary	AM	680	
	AF	492	72
	WM	1757	
	WF	1211	69
	CM	776	
	CF	496	64
Higher secondary	AM	721	
	AF	538	75
	WM	2275	
	WF	1587	70
	CM	915	
	CF	668	73

Note:Group codes: African-A; Coloured-C; White-W; Female-F; Male-M.

The position of women in the labour market has been explained in terms of labour market theories. Within neoclassical theory two approaches can be distinguished. On approach advocates that women

are crowded into certain occupations because of the "distaste" of employers for female employees (Fawcett, 1918; Edgeworth, 1922: Becker, 1957; Bergmann, 1971 and 1974). In other words, employers' tastes and preferences account for much of the discrimination against women. Employers who have a taste for discrimination against female workers will hire them only when the wage differential between male and female labour is large enough to compensate for the "disutility" they incur by hiring women.

The major point of the second approach, that based on human capital theory, is that men and women are not perfectly substitutable for one another: women accumulate less human capital through work experience because they spend proportionately fewer years in the labour force than men (Mincer and Polachek, 1974; Becker, 1964). Thus productivity differentials between men and women will appear. This school argues that, because of the traditional role of women in child rearing and home care, women's labour force involvement is markedly different from that of men and is subject to lengthy disruptions. In order to explain occupational segregation, human capital theorists then predict that women "choose" to exclude themselves from occupations requiring expensive and lengthy periods of general training for the professions. Meanwhile, they are also excluded from in-plant training programmes for various positions by employers with experience of higher turnover rates for women.

Segmented labour market economists argue that sex inequality takes the form of "job discrimination" (equally qualified groups of workers are not, on average appointed to equally remunerative jobs) rather than "wage discrimination" (equally qualified groups of workers are paid differently for the same work). In an extension of the dual labour market concept Blau and Jusenius (1976) presented an "institutional model" to explain occupational segregation and lower pay for women. They emphasise the widespread phenomenon of the internal labour market (ILM) whereby although certain jobs are filled from outside an organisation by new recruits, others are exclusively filled from the ILM through well-defined promotion and job-upgrading ladders. The opportunities for advancement are generally determined by the job for which the employee is recruited. Within certain limits this earliest assignment is largely in the hands of the employer, who evaluates the candidates for a "primary" or "secondary" job.

Blau and Jusenius argue firstly, that within the internal labour market, group treatment of workers is the norm. Clearly, sex could be a basis for such differentiation, due to employers' taste for hiring women in male occupations and/or real or perceived quality differences between male and female labour.

Furthermore, while prejudice and stereotyping may cloud employers' decisions regarding occupational assignments for men and women, this does not prevent considerable differentiation within the group of female workers (that is, on the basis of

characteristics such as race, age, education and marital status). Lower earnings for females cannot be explained by differentials in education. Females had, on average, a higher level of schooling than males (9.8 years against 9.4). Lower female earnings could, however be ascribed to lower labour market experience and the relative lack of access to the higher paying occupations.

There is thus a need to explore further the reasons for wage discrimination against women. Conventional explanations of lower wages for women are posited in terms of lower human capital acquisition by women because of their shorter and more intermittent participation in the labour force. This tendency towards intermittent labour force participation may also mean that females do not acquire suffficient levels of firm-specific skills which as shown in Chapter Seven reap relatively higher rewards than does the acquisition of general skills.

When the virtual equality of the educational levels of males and females is set alongside the difference in mean earnings between them, the comparison is suggestive of discrimination. Such wage discrimination by gender can be best assessed through an analysis of the occupational distribution of women.

The extent of wage and job discrimination against women in South Africa has been documented in Pillay (1986). Within the manufacturing sector, for example, women have been crowded into

those sub-sectors that are the lowest paying. In 1980, for instance, 55 per cent of all women were in three such sub-sectors, clothing, textiles and food (Pillay, 1986:10). Although gender discrimination in both wages and jobs was outlawed in the 1980s, there have marginal changes in the distribution of occupations by gender. Within the survey data, the gender distribution by occupation confirms the concentration of women in the lower occupations. 91 per cent of women were in the unskilled manual, semi-skilled and lower non-manual occupations as opposed to 73 per cent of men in these occupations.

Table 5.11: Employees Grouped by Gender: Distribution by Occupation (per cent)

Occupation	Males	Females	Total
Unskilled Manual	22	33	26
Semi-skilled Manual	41	27	35
Skilled Manual	11	1	7
Lower Non-manual	10	31	18
Higher Non-manual	16	8	13

Table 5.2, Column 1, shows that, on average, women are paid 18 per cent less than men (Column 2, 10 per cent). Furthermore, the existence of a positive and significant coefficient on the dummy variable denoting male gender (Table 5.2) suggests that men and women with the same personal characteristics and type of job do not receive the same pay.

Estimates of separate earnings functions for males and females are presented in Table 5.12. One major difference between the two

regressions is that the schooling coefficients vary with gender. Column 1, for males, shows that most of the explanatory variables are significant. More education means more earnings with all the S coefficients significant. A similar relationship between education and earnings exists for females but only one of S coefficients (higher education) is significantly different from S3 (the omitted category).

As most of the coefficients on education are significant only for men, the impression therefore is that, in marked contrast to men, women in general are not rewarded for human capital acquisition. However, as no fewer than 91 per cent of women are in unskilled manual, semi-skilled and lower non-manual jobs where rewards are lower than in skilled manual and higher non-manual occupations, it would appear that occupational segregation is the major factor explaining earnings differentials by gender. In other words the "crowding" of women into particular occupations may explain wage discrimination against females.

Racial discrimination within both groups was widespread with all the coefficients (except those for Indian males) negative and highly significant. However, the earnings differentials relative to Whites were greater within the male group, with Africans earning, on average 35 per cent less than Whites (R2, the omitted category), Coloureds 21 per cent less but Indians rather surprisingly 30 per cent more. Within the female group, Africans earned 27 per cent less, Coloureds 30 per cent less and Indians 13 per cent less than White females.

Table 5.12: Earnings Functions by Gender

Variable	Male	Female
S1	-0.304*	-0.268
S2	-0.237*	-0.135
S4	0.098*	0.088
S5	0.560*	0.493*
E2	0.085*	0.078
E3	0.145*	0.095
E4	0.166*	0.103*
E5	0.189**	0.133*
E6	0.209*	0.264**
R1	-0.424*	-0.321*
R3	-0.230*	-0.360*
R4	0.266*	-0.145*
C	6.971	6.614
F	185.695	80.225
R^2	0.753	0.682
N	743	462

Given the evidence of educational attainment, the differences in occupational distribution reinforce the impression of labour market discrimination. Qualifying this impression, however, are some other differences in personal characteristics, specifically formal training, experience, seniority in the firm and previous wage employment.

It is possible that gender differences in the personal characteristics of the sample may themselves be the result of sex discrimination. The main differences in the average values of characteristics concern current and previous employment experience, age, and training. The occupations which women attain affect the amount of human capital that they can accumulate in

employment. Exclusion of women from the more skilled manual and supervisory jobs might explain why a smaller proportion of women than of men receive formal training. In the survey data, only 32 per cent of individuals who had received formal training were women.

Lack of reward for employment experience could deter women from staying with an employer or even in wage employment. The response of employers in their hiring and promotion decisions would in turn contribute to a "vicious circle". It is difficult to assess the relative importance of the effects of discrimination and the effects of non- discriminatory social factors, such as child-rearing, in explaining why women are at a disadvantage in the possession of these productive characteristics. Females in the survey data did show lower job duration in previous employment. The mean year of employment per previous employer was 2.9 years for females and 4.0 years for males, reflecting frequent job changes amongst females.

A further possible explanation for lower female earnings in the data is that only 15 per cent of the female sample was located in the Pretoria-Johannesburg-East Rand region, the highest paying area in the survey (Chapter Ten). In contrast, 36 per cent of the male sample was located in this region.

Wage discrimination against females cannot be explained in terms of formal schooling differentials. The other human capital variable, employment experience, can only provide a partial

explanation in terms of on-the-job experience, acquisition of training and firm specific skills. Furthermore, it is difficult to measure the extent to which employers have a "taste for discrimination" against female employees.

Wage discrimination must be explained in terms of job discrimination. Female earnings are lower because women are allocated to lower paying occupations. The occupational distribution differences between men and women may, to some extent, reflect employer decisions to exclude women from certain entry-level positions and their associated promotion ladders and/or to promote and upgrade women more slowly than men. An assessment of occupational mobility by educational level reveals that only 19 per cent of females with secondary education were able to move from unskilled manual occupations whereas 39 per cent of similarly qualified males achieved the same goal. Thus the structure of the jobs typically open to women is very likely to reflect employer perceptions regarding the average characteristics of female workers. Predominantly female occupations may be characterised by fewer possibilities for promotion and more numerous "ports of entry" than comparable jobs.

5.2.5 Race

Substantial earnings differences between races exist in South Africa. The rate of return analysis suggests that poor rates of return to schooling for Blacks, especially Africans, may result from poor quality of schooling. However, occupation also may be an important determinant of earnings. Blacks in general and Africans in particular have been denied access to higher paying occupations because of racial discrimination in educational provision and in the labour market. Wage and job discrimination in the South African labour market have been well documented (Knight, 1964; Knight & McGrath, 1977; Lipton, 1985; Devereaux, 1984).

5.2.5.1 Theories of Wage Discrimination in South Africa

Knight (1964) explained inequality in income distribution in South Africa in terms of the rigid racial segmentation of the labour market. Knight posited that the labour market is segmented into two non-competing groups: skilled labour, entirely White, and unskilled labour, entirely Black. The Black wage is determined by the supply curve of labour in Black agriculture, assumed to be perfectly elastic at a subsistence level over the relevant wage. Skilled White labour on the other hand, is in perfectly inelastic supply and fully employed. There is scope for substitution between the two factors. The equilibrium employment

condition (the amount of Black labour which is combined with the fully employed White labour force) is that the marginal rate of substitution between the two factors equals the ratio of the White wage rate to the constant Black wage rate. The White wage can be seen both as a reward for higher productivity at the margin and as a scarcity rent secured from the White monopoly of skills. Capital accumulation and technical progress are shown to benefit White labour by increasing employment. Within the institutional and political framework which keeps Black labour unskilled and plentiful and White labour skilled and scarce, the market mechanism "acts as a malevolent invisible hand to produce increasing racial inequality of income (Knight and McGrath, 1977:248) . In the light of the rapid growth of the South African economy in the 1960s and 1970s, the subsequent shortages of skills, the expansion of the Black education system and the moves to eliminate statutory labour market discrimination a new model of wage discrimination was proposed by Knight and McGrath in the 1970s (Knight and McGrath, 1977).

In this model it was argued that a "taste for discrimination" by Whites in the form of physical aversion was unimportant. More important was the concern of Whites about the loss of status which results from the sharing of an occupation with Blacks. Knight and McGrath say : "While it would be foolish to deny that many Whites posssess some form of racial prejudice, we suggest that their pursuit of economic self-interest may well be the main cause of discrimination. Even if employers regard Blacks as no less able than Whites, they may still be willing to restrict

Black access to jobs" (p.265). The main reason for this they suggested was the power of White workers, manifested through informal pressures or formalised collective bargaining and the need for employers to keep on good terms with their White employees. For these reasons they suggested it was possible for Blacks of equal productive potential to be paid less than Whites without the Whites being replaced.

Knight and McGrath proposed an explanation of wage discrimination based not on the neoclassical theories of wage discrimination but in terms of the labour market segmentation theories. They suggested that wage discrimination could only be explained through job discrimination. The job competition model was also deemed to be relevant: White workers take precedence in the job queue and in access to on-the-job training. Through selection for jobs and subsequent training on-the-job, some White workers have higher productivity than Black workers who were initially of the same productive potential.

The internal labour market concept was also considered relevant: given the formalised or informal power of White workers a set of administrative rules - reflecting a compromise between employers and White employees - is commonly established. This offers the White workers preferential access to jobs and it makes Black advancement into previously White jobs a matter not for the market but for negotiation. On the other hand, most African workers form the supply side of an external labour market in

which, owing to the lack of job security and the impediments to effective unionisation, employers are able to harness market forces.

Knight and McGrath conclude, however, by stating that the most valid concept for explaining wage discrimination in South Africa is that of "crowding". The crowding approach "can be used not only to explain why Whites are generally skilled and high paid, and Blacks generally unskilled and low-paid, as in the theory of non-competing groups; it can also explain why Blacks are paid less than Whites of the same ability and human capital" (p.266).

5.2.5.2 The Survey Data

The survey data show substantial earnings differentials by race. African mean earnings were 30 per cent of White mean earnings, Coloured mean earnings were 31 per cent and Indian mean earnings were 62 per cent (Table 5.1).

The distribution of occupations within each race (Table 5.13) and by race (Table 5.14) shows to some extent the virtual monopoly that Whites have on the higher paid occupations.

Table 5.13: Employees Grouped by Race: Distribution by Occupation (per cent)

Occupation	African	White	Coloured	Indian
Unskilled Manual	36.6	0.0	40.8	0.0
Semi-skilled Manual	54.5	4.8	39.2	8.3
Skilled Manual	3.3	16.1	4.1	10.0
Lower Non-manual	5.6	34.1	12.7	68.4
Higher Non-manual	0.0	45.0	3.2	13.3
	100.0	100.0	100.0	100.0

91 per cent of Africans and 80 per cent of Coloureds are "crowded" into unskilled and semi-skilled manual occupations. On the other hand only 4.8 per cent of Whites and 8.3 per cent of Indians are in these occupations. 61 per cent of Whites are in the two highest paying occupations, namely, skilled manual and higher non-manual. Only 3.3 per cent of the African and 7.3 per cent of the Coloured samples are in these occupations. Africans comprise 60 per cent of all unskilled manual and 66 per cent of all semi-skilled manual occupations (Table 5.14).

Table 5.14: Employees Grouped by Occupation: Distribution by Race (per cent)

Race	USM	SSM	SM	LNM	HNM
African	60	66	20	13	0
White	0	4	58	49	89
Coloured	40	29	15	19	6
Indian	0	1	7	19	5
	100	100	100	100	100

Note: USM-unskilled manual; SSM-semi-skilled manual; SM-skilled manual; LNM-lower non-manual; HNM-higher non-manual.

In the South African context the crucial links appear to be not between more education and more earnings, but between better quality education, occupation and earnings. Whites are concentrated in the higher-paying occupations and Blacks, especially Africans, in the lower-paying ones. Even within specific occupations wage differentials occur.

Table 5.15: Mean Earnings by Race and Occupation

Occupation	African	White	Coloured	Indian
Unskilled Manual	532	-	400	-
Semi-skilled Manual	672 (55)	1211	587 (48)	-
Clerical	702 (47)	1481	1154 (78)	1137 (76)
Tech & Semi-prof	904 (48)	1882	1277 (68)	-
Supervisory	1116 (42)	2648	1388 (52)	1850 (70)
Professional	-	2698	2700 (102)	-
Managerial	-	2847	2435 (86)	2560 (90)

Note: Figures in parenthesis show earnings as a percentage of White earnings.

Racial wage discrimination thus exists at all levels. Consider for example, the clerical and semi-skilled occupations. In both these occupations (in fact, in virtually all occupations shown in Table 5.15) Whites receive the highest earnings. However, there is virtually no difference in the African proportion of White earnings irrespective of occupation.

Table 5.16: Earnings by Level of Education and Race

Level of Education	African	White	Coloured	Indian
Lower secondary	638 (40)	1608	608 (38)	1132 (70)
Higher secondary	690 (43)	1884	792 (49)	1424 (89)
Post-secondary	-	2594	2406 (93)	1232 (47)

Note: Figures in parenthesis show earnings as a percentage of White earnings.

Wage discrimination is also evident in relation to education. Table 5.16 suggests very considerable racial discrimination among people of the same educational level. However, this conclusion must be qualified in various ways. First, the number of years is a poor indicator of education received. African education is characterised by its low quality. Secondly, it is possible that Whites have more experience, on-the-job training, fluency in official languages, self-confidence and initiative and that these characteristics contribute to wage differences. Nevertheless, the earnings differences shown in the table are enormous, and they are very likely to reflect an element of wage discrimination.

An examination of the race coefficients in Table 5.2 shows substantial differences in the earnings premium associated with race. From column 1, Africans earn, on average 33 per cent less than Whites, Coloureds 28 per cent less but Indians 23 per cent more. Inclusion of the occupation variables changes the coefficients to respectively -17 per cent (Africans), -14 per cent (Coloureds) and 6 per cent (Indians).

Table 5.17 sets out the coefficients in the earnings functions for sub-samples stratified by race.

The variables in Table 5.17 explain only 13 per cent variance of earnings for Africans but 55 per cent for Coloureds, 48 per cent for Whites and 42 per cent for Indians. Furthermore, low F-values were found in the African and Indian specifications.

Table 5.17: Earnings Functions by Race

Variable	African	White	Coloured	Indian
S1	-0.239**		-0.307	
S2	-0.091		-0.386*	
S4	0.038	0.045	0.025	0.042
S5		0.341*	0.970*	0.230**
E2	0.100**	0.049**	0.045**	0.124**
E3	0.139**	0.129**	0.086	0.085
E4	0.185**	0.156	0.183	0.163
E5	0.211	0.194	0.203**	0.266**
E6	0.267**	0.272*	0.399*	0.237**
G1	0.125*	0.176*	0.195*	0.189*
C	6.400	7.457	6.600	7.103
F	7.694	34.493	37.046	6.427
R^2	0.131	0.478	0.550	0.424
N	520	311	314	60

With respect to schooling, there were few significant coefficients. At the higher education level, however, the earnings premiums were large for all groups but especially for Coloureds. A similar effect emerges in the case of labour market experience. Long labour market experience brings substantial rewards.

The gender coefficients are all positive and significant. Discrimination is greater amongst Coloureds, Indians and Whites than amongst Africans.

The inclusion of occupation variables raises the F-values and R^2 (Table 5.18). Estimates could not be derived for Africans and Indians because of small numbers in some occupational categories but an interesting relationship emerges within the White and Coloured groups. In the case of Coloureds, unskilled manual occupations earn 43 per cent less than skilled manual occupations (the omittted category), semi-skilled occupations 28 per cent less, the lower non-manual occupations 23 per cent more and the higher non-manual occupations 116 per cent more. Amongst Whites, the semi-skilled earned 57 per cent less than the skilled and the lower non-manual category 53 per cent less. Schooling was significant at the post-secondary level for both groups. In the case of Whites, less experienced workers received slightly higher rewards relative to the newest labour market entrants (the omitted category). Amongst Coloureds the non-manual occupations derived significantly high rewards.

Table 5.18: Earnings Functions for Whites and Coloureds

Variable	Whites	Coloureds
S1	-	0.047
S2	-	-0.108
S4	0.026	0.010
S5	0.114*	0.213*
E2	0.024	0.016
E3	0.056**	0.042**
E4	0.082	0.067
E5	0.127**	0.145**
E6	0.162**	0.199*
G1	0.059**	0.156*
O1		-0.567*
O2	-0.852*	-0.322*
O4	-0.764*	0.207*
O5	0.115	0.768*
C	7.937	6.776
F	61.598	51.048
R^2	0.713	0.705
N	311	314

The evidence presented in this section indicates substantial wage discrimination by race. Although Whites do possess higher educational qualifications than the other race groups, earnings differentials cannot be explained solely in terms of human capital. It is clear from the analysis presented above that, in spite of educational expansion in the 1970s and 1980s, large numbers of Blacks are still confined to low-paying occupations. The analysis of wage discrimination in terms of job discrimination as applied by Knight and McGrath is still valid. The majority of Black workers are crowded into lower occupations while Whites and to a lesser extent Indians have a virtual monopoly on the higher paying occupations, many of which may well comprise internal labour markets to which access by Blacks has

been limited especially in the light of the lack of economic growth and employment creation opportunities during the 1980s.

5.3 CONCLUSION

In this chapter an attempt was made at an in-depth exploration of the determinants of earnings. Without a complete evaluation of other possible explanatory variables, the tentative conclusions at this stage are that formal education, on-the-job experience and occupation are, to varying degrees, important determinants of earnings. Furthermore, the influence of schooling varies by race and gender. Race and gender are therefore particularly important but it is not clear to what extent the lower earnings of Blacks and females are due to lower acquisition of human capital, the acquisition of "inferior" human capital or to labour market discrimination.

The interviews with employers included as one of the topics, the determination of wages. For semi-skilled and skilled manual occupations, an important determinant of earnings, employers felt, was the relative surplus or shortage of labour. For all occupations, the level of formal education and previous labour market experience were important factors. The quality of formal education for skilled manual workers was regarded as important. Gender was a determinant of wages in the view of a few employers

but race was discounted by all.

Given the diverse nature of the enterprise structure within the manufacturing sector, the role of seniority (employment in the current firm), previous employment experience, labour turn-over and the impact of firm characteristics needs to be examined. Chapter 7 looks at seniority, job mobility and turn-over. Chapter 8 analyses the role of occupation. The coefficient on formal training, 7.5 per cent (Column 1, Table 5.2) suggests that training appears to have little effect on earnings. This may indicate that employers are bearing the costs and appropriating the benefits of increased productivity due to formal training (De Beyer, 1987: 92). However, the returns to training has to be analysed in relation to the length of formal training provided.

Thus in Chapter 9, the effects of on-the-job training on earnings are evaluated fully. Finally, in Chapter 10, the effects of the characteristics of the firm, such as size, sub-sector, and location are analysed.

Notes

1. The coefficient of the dummy variable is given by $c = \ln (1+g)$ where g is the relative effect on earnings of the presence of the factor represented by the dummmy variable. The relative effect on earnings is given by $g = \exp(c) - 1$ (Halvorsen and Palmquist, 1980, 474).

2. The earnings premium (EP) to experience is derived from the formula: $EP = a(Ex) + b(EX^2)$ where a and b are the respective coefficients on experience and experience squared.

CHAPTER SIX

QUALITY OF SCHOOLING, CERTIFICATION AND EARNINGS

6.1 INTRODUCTION

Education is regarded as being of great importance in the less developed countries. Many commentators have emphasised the important role of schooling in increasing productivity, equalising income distribution, improving health and nutrition, and reducing fertility. (See for instance, The World Bank, 1980, 1981; Colclough, 1982; Psacharapoulos, 1981, 1985; Woodhall, 1988; and Psacharopoulos and Woodhall, 1985)

Thus considerable resources have been devoted to schooling in recent decades in the less developed countries (LDCs). There also have been numerous studies that attempt to evaluate what determines investment in schooling and what are the rates of return to schooling. As Chapter Four shows, these studies generally find that such returns are fairly high, suggesting that expanding schooling should be a high priority for governments.

A related question is the extent to which improved educational quality advances economic growth. It is becoming increasingly clear in many developing countries that not only quantity but

also the quality of the schooling individuals obtain is important in determining the benefits received. However, most of the literature on educational impact focuses on quantity of education as measured by years of attainment. The consensus seems to be that the amount of education makes a significant contribution to economic growth. The impact of schooling quality on student achievement and on individual earnings has so far merited little attention.

In South Africa the issue of educational quality is particularly pertinent. It is generally accepted that the quality of education varies considerably between and within the numerous racially-defined education systems. The education system for Whites is usually perceived as providing education of the highest quality and the African education systems the lowest. Race may thus be taken as a proxy for quality in education. The rates of return derived in Chapter Four show the influence of the quantity of education as reflected in years of schooling and the probable impact of qualitative differences in education as manifested in the racially-structured education system. This is reflected particularly in the extremely low returns to African education, the quality of which is generally acknowledged to be considerably inferior to that of the other races.

The rate of return analysis in the earlier chapters also shows relatively high returns to secondary and tertiary education. This suggests that in the case of Africans and Coloureds especially,

where qualitative deficiencies in educational provision are most clearly evident, the possession of a matriculation or school-leaving certificate may be a necessary condition for higher earnings. This chapter explores the earnings and earnings differentials of matriculants and seeks to identify the determinants of the income of matriculants through regression analysis. The crucial issues are whether employers are rewarding matriculants equally, whether racially-specific qualitative differences in education persist even though individuals possess a matriculation certificate or whether there is some measure of labour market discrimination at the upper end of the education spectrum. These issues are addressed in section 6.5

However, in the next section, some attention is given to the relevance of educational quality, especially for developing countries. Section 6.3 looks at how educational quality, conventionally measured through per capita pupil expenditure, teacher-pupil ratios, teacher qualifications and attrition rates, has been changing in South Africa. Section 6.4 describes one analysis that has incorporated educational quality in estimates of the rates of return and another that has examined the importance of certification in raising earnings. Finally, section 6.6 provides some concluding comments.

6.2 DEFINING SCHOOL QUALITY

For many social scientists a proxy for quality of educational inputs is money spent per student. The implicit assumption is that where more money is available, smaller classes, more books, and better teachers are utilised. However, the question which has not been resolved "is whether the greater availability of these inputs leads to greater learning, greater productivity from former students once they enter the labour market and, in the aggregate, greater national income or economic growth when the results of higher quality education are summed for all those who have attended school" (Solmon, 1985: 274).

Educational quality has sometimes been measured through an analysis of the products or outcomes of the educational institution (e.g. scores on tests given at the conclusion of an educational experience, percentage of graduates from high school going on to college, university, etc.). But unless inputs are controlled, these types of measures say nothing about how effective the educational experience was, or the role of the education in determining the outcome.

Economists, however, have described quality differences in measures of institutional characteristics, which have a price attached to them. For example, at the primary or secondary level, quality has been measured by school facilities (buildings, laboratories or books), teacher qualifications (training and experience), and academic programmes, salary levels, class size,

social composition of student body and per- pupil expenditures.

However, even if educational outcomes or school effectiveness vary depending upon resources available and upon a variety of school characteristics, there is a serious question of whether or not per-pupil expenditure measures adequately reflect such differences in schools. In general, one would expect that where there was more money per student, each student would have more access to "more" resources. However, it is more accurate to say that more money per student would, on average, enable students to have more access to more expensive resources. That is, more money does not necessarily imply that all students are getting a better education. The reasons for this are listed below (Solmon, 1985:275-76) and many of them are particularly relevant to the South African situation.

(1) High average expenditures per student in a country or in a particular region may mean that a small number of students are obtaining a huge proportion of resources while a large number are getting a very small proportion.

(2) There might be greater variations in non-market-priced inputs to schooling. Highly educated parents may contribute services in schools located in rich neighbourhoods, whereas the parents in poor neighbourhoods may be able to contribute only much less skilled labour or no labour at all if they are forced to work at other jobs. Yet, expenditures per pupil may reflect equality for the two schools. In addition, certain families, particularly

those with educated parents, can provide more at-home complements to in-school training.

(3) More highly paid teachers may not represent more resources than do less highly paid teachers. If younger teachers are more effective than older teachers, but more experienced (i.e. older) teachers get paid more (because of, for example, seniority wage scales), the regions that show higher per-pupil expenditures may in fact have less effective resources. Similarly, if teachers with more years of education get paid more, the resultant higher expenditures represent more effective resources only if more years of education add to teacher productivity.

(4) If highly skilled and highly paid teachers do not have access to textbooks, blackboards or classrooms, effectiveness of expenditures will be low, and so will educational quality.

(5) The evidence seems to show that there are substantial diminishing returns to per-pupil expenditures (Solmon, 1985:275). After some point a certain percentage increase in expenditure will lead to a smaller percentage increase in quality (output). Thus, for instance, if expenditures are, say, five times greater, quality is not necessarily five times as high. This issue relates to the thinking on educational equality in South Africa where equality is invariably discussed in terms of equal per capita pupil expenditure for all races without consideration of the quality of education that needs to be provided.

One important way that improved school quality could stimulate economic growth is by improving student achievement. Studies show that improving school quality through the increased provision of textbooks and improved teacher quality produces significant increases in academic achievement (Heyneman, 1982; Heyneman & Loxley, 1982; Loxley, 1983; Husen et al, 1978).

Many LDCs, where the quality of schooling available to most children is very poor, and where a large proportion of the lowest classes attend only very briefly, if at all, face a choice between increasing access to places in schools characterised by minimal resources and limited places or providing more or better resources for existing schools. If it matters not only how long one is in school, but also what type or quality of education one gets, then to ignore quality is a serious problem. At the primary and secondary levels the problem is compounded if policymakers are unable to define what quality is.

The literature is abundant in proving that more years of schooling provides many private and social benefits in both the developed and less developed countries. It is also empirically established that most benefits derived from low-quality schooling can be achieved in less time if school quality is higher. To carry this argument further, if quality is as low as it is in some LDCs, it is possible that improved quality could result in more benefits in fewer years.

It is clear that educational quality has many dimensions. In the very poorest countries qualitative changes may simply mean "more" resources. As more resources become available, the types of goods and services available in the school must be considered: the many dimensions of teachers, their basic abilities, education, and professional training ; textbook availability; availability of other support materials; physical plant; and so on. Quality is also a function of how students and others spend their time, both in school and doing things complementary to in-school learning.

Improvements in the quality of schooling provided in developing countries may be more important for the future economic prospects of these countries in the long run than will expanded access to poor-quality education. Thus the equity-efficiency predicament will have to be addressed in these countries as well as in South Africa.

6.3 Educational Expansion and School Quality in South Africa

There is widespread evidence that school quality is declining in South Africa, especially as a result of the rapid expansion of Black education that has taken place since the mid-1970s. An analysis of the traditional measures of educational quality such as teacher qualifications, teacher-pupil ratios, pupil per capita expenditure and attrition rates indicates that the situation is

one in which "more" resources has clearly not meant "better quality" education.

Per capita expenditure on all four racial groups has increased consistently and in the case of African and Coloured pupils dramatically in the 1980s. In real terms, per capita expenditure on African pupils increased at an average annual rate of 9 per cent, that on Coloured pupils by 3 per cent per annum and that on White pupils by 0.3 per cent between 1978/79 and 1988/89 (Table 6.1).

Table 6.1: Pupil Per Capita Expenditure by Race, constant 1985 rands

	Africans	Coloureds	Whites
1978-79	176	561	1797
1983-84	223	690	1610
1986-87	401	858	2108
1988-89	422	786	1855

Source: Pillay, 1990; SAIRR, 1990. Excludes the "independent" homelands

The rapid increases in education expenditure and enrolment ratios (see Chapter One) have contributed to a serious qualitative crisis in the availability of teachers and facilities with a consequent impact on student achievement.

This decline in quality is reflected in, inter alia, teacher-pupil ratios and a grave shortage of qualified teachers. Teacher-pupil ratios for Africans, Coloureds and Whites in 1987 were

respectively 1:41, 1:25 and 1:16. In the homelands the situation is even more serious. Transkei had a primary teacher-pupil ratio of 1:60 and Kwazulu 1:53.

While all White teachers have a matriculation school-leaving pass, only 46 per cent of African teachers had this qualification in 1986. 32 per cent of White teachers had a university degree. The figures for Coloured and African teachers were respectively 12 and 7 per cent in 1986 (Pillay, 1990; SAIRR, 1988)[1]. It is unlikely that quality of Black education can improve significantly unless the serious deficiencies in teacher provision are addressed.

The quantitative expansion of Black education has had a negative impact on student achievement. As a result of inadequate facilities (overcrowded classrooms, lack of libraries, laboratories and recreational facilities) and the poor quality of teaching, Black education is characterised by a high attrition rate, especially at the primary level. Some statistics on the attrition rates were provided in Chapter One. In addition it can be stated here that in 1983 it was estimated that 46 per cent of Coloured and 58 per cent of African chidren drop out of school after four years (Pillay, 1990 : 35). According to estimates provided by the Research Institute for Education Planning at the University of the Orange Free State (RIEP,1989), 440 400 (60 per cent) of school leavers in 1988 were in primary school. Of these, 227 000 or 31 per cent were in their first two years of

schooling.

The school attrition rate is exacerbated by the high opportunity costs for poor households of keeping children in school. The survey data provides evidence. In response to a question about whether they wanted to continue their formal education 62 per cent of the respondents (749) answered in the affirmative. Of these 92 per cent cited financial reasons for their inability to continue formal education. Of those who expressed a desire to continue with formal education, 48 per cent were African, 17 per cent were White, 30 per cent Coloured and 4 per cent Indian. In absolute terms, African males comprised the biggest group (277), followed by Coloured females (142). These results show some interesting relationships with respect to race, gender and educational level (Table 6.2).

Most of those who expressed a desire to continue had completed part or all of their secondary education. Within this group Africans comprised the largest segment (45 per cent) with males most seriously affected. Africans, again disproportionately males, made up the largest proportion of primary school leavers wanting to continue. A significant proportion of those respondents wanting to continue their post-secondary education was White.

Table 6.2: Employees Grouped by Level of Education Completed, Race, Gender and Desire to Continue Formal Education (per cent)

Race	Level of Education		
	Primary	Secondary	Post-secondary
African	69	45	-
White	-	16	93
Coloured	31	33	4
Indian	-	6	3
Race & Gender			
Male			
African	53	34	-
White	-	11	69
Coloured	5	15	2
Indian	-	4	-
Female			
African	16	11	-
White	-	5	24
Coloured	26	18	2
Indian	-	2	3
N	200	494	55

Source: Survey Data.

The impact of school quality on student achievement is reflected in the output of the educational system. While educational expansion has resulted in a rapid increase in the number of matriculants from Black, especially African education (see Chapter One), the proportion of matriculants gaining a university entrance pass has remained disproportionately low. In 1989, only 10 per cent of African and 18 per cent of Coloured candidates in the matriculation examination obtained a university entrance pass (SAIRR, 1990 : 829). The comparative figure for Whites and Indians was 42 per cent.

Table 6.3: Employees Grouped by Type of Matric Pass: Distribution by Race and Gender

Race	Gender	Type of Matric Pass VSL	ASL	UE	Total
African	Male	2	31	15	48
	Female	0	4	1	5
	Total	2	35	16	53
White	Male	16	39	86	141
	Female	2	35	63	100
	Total	18	74	149	241
Coloured	Male	0	15	8	23
	Female	0	6	2	8
	Total	0	21	10	31
Indian	Male	4	6	5	15
	Female	0	13	14	27
	Total	4	19	19	42
Grand Total		24	149	194	367

Source: Survey Data.
Note: VSL: Vocational School-leaving Pass; ASL: Academic School-leaving Pass; UE: University Entrance Pass.

Racial inequality in matriculation passes is also evident in the survey data. From Table 6.3 it can be inferred that, of the total matric passes in the sample, 14 per cent were African, 66 per cent were White, 8 per cent Coloured and 11 per cent Indian. Females made up 38 per cent of this group and the overwhelming proportion of them (71 percent) were White. Of those obtaining university entrance passes, 77 per cent were White, 8 per cent African, 5 per cent Coloured, and 10 per cent Indian. Again, females were in a minority, with White females comprising 79 per

cent of this group.

The skewed racial distribution of higher education access and achievement is also reflected in the sample from the manufacturing sector. Of those who had attained some tertiary education, Whites comprised 85 per cent (128), Coloureds 6 per cent (9), Indians 8 per cent (12) and Africans 0.6 per cent (1 respondent).

6.4 MEASURING THE EFFECTS OF SCHOOL QUALITY ON EARNINGS

Most analyses of the benefits of investment in human capital relate earnings to years of attendance in school. The largest cost to the individual obtaining education is the alternative use of the time spent in school. The importance of forgone earnings depends upon available options of youth. In many LDCs, children may begin work at a very early age. In advanced countries minimum work age laws and compulsory schooling regulations serve to reduce opportunity costs of schooling, usually for those below 16 years of age.

In the conventional human capital model, an individual's human capital increases as he or she spends more time in school, and this in turn leads to increases in an individual's productive capacity, which is then reflected in higher earnings. Thus,

time in school ⟶ human capital ⟶ productivity ⟶ earnings

It was soon recognised that time, particularly years, in school is an inadequate measure of the amount of education obtained because schools may vary in quality across regions.

This human capital model can be re-drawn as follows to incorporate schooling quality :

time in school ↘
human capital ⟶ productivity ⟶ earnings
school quality ↗

(Adapted from Solmon, 1985:279)

The conventional earnings function analysis of rates of return to schooling has been criticised by Behrman (1987) for its "failure to control for family connections, ability and motivation that may affect schooling and earnings, the failure to distinguish between the years (or quantity) of schooling and the quality of schooling; the failure to control for geographical aggregation biases such as regional price variations or combining relatively poor areas with limited physical capital and low schooling together with relatively well-off areas with extensive physical capital and high levels of schooling into one sample" (p.120).

The level of income stream obtained from S years of schooling is shown in Figure 6.1 to vary with the level of quality available,

$Q_3 > Q_2 > Q_1$. Thus the private rate of return to a given number of years of schooling is a direct function of the level of quality. Each individual would still wish to invest in years of schooling until the point where the private rate of return is equal to his rate of discount, but this now depends on the quality of education that is exogenously given. For example, in societies where discrimination is significant, the favoured groups will be offered schooling of superior quality. Similarly, school quality would be higher in more prosperous or developed regions. An individual from a favoured group or region would thus invest in more years of schooling than an identical individual from a disadvantaged group or area. This suggests that regions or groups that start with disadvantages in the quality of education tend to fall further and further behind in the accumulation of human capital (Mazumdar, 1989).

Since there is a positive association between the quantity and quality of schooling, an earnings regression that omits the quality variable will give an upward biased estimate of the private returns to years of schooling. Unless the cost of providing schooling is also adjusted to take into account varying qualities of schooling, the social return to education will also be biased upward. This is another reason why simple estimates of rates of return to education provide imperfect guides for policies concerned with expanding investment in education. In fact, investment in the quality of education (through better teacher-pupil ratios, or better training of teachers) is often an alternative to investment in the capacity to provide more

schooling years per capita. There is clearly a tradeoff between increase in quality and quantity. In extreme cases, expansion in quantity may be offset by decreasing quality so that the marginal productivity of investment in quantity falls to zero and the only way to increase the returns to education is to increase quality.

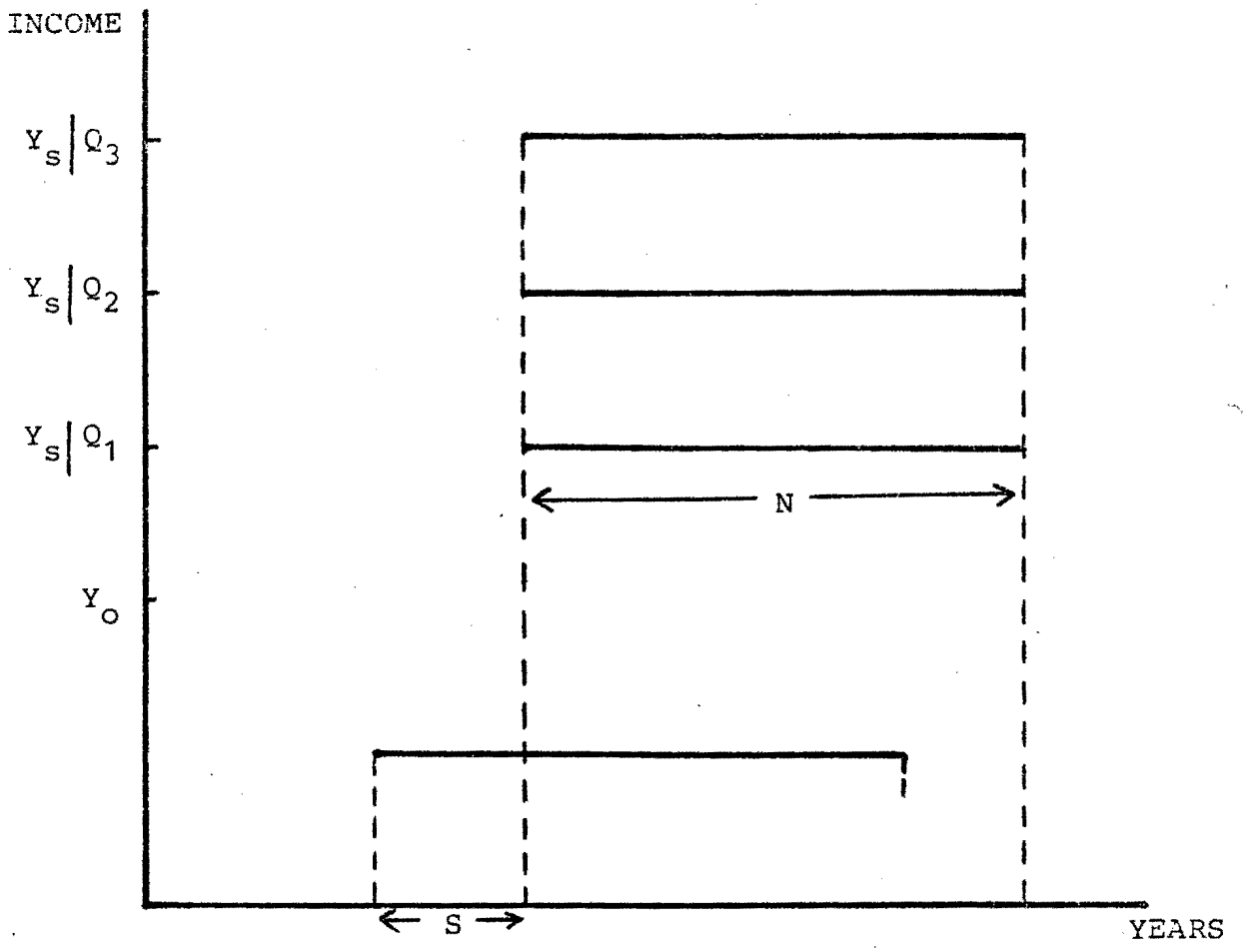


Figure 6.1 Earnings Profiles for Schooling levels with Different Qualities of Education

Note: For "s" Years of School, expected income is conditional on school quality with $Q_3 > Q_2 > Q_1$

(Source : Behrman & Birdsall, 1983)

Behrman and Birdsall (1983) have tried to estimate earnings functions for Brazilian males by incorporating a measure of quality in the schooling variable. The work is interesting both because it shows the difficulties of extending the standard human capital model and because it gives some idea of the relative magnitudes involved when quality is incorporated. They adopt a measure of school quality that is easily constructed from relatively large data sets: the average schooling of teachers in the area in which an individual obtained his schooling.

An earnings function incorporating the quality variable was compared with the estimate of the standard human capital model for a sample of Brazilian males aged 15-35 in 1970. An upward bias of about three-quarters was found in the standard estimates of the private return to years of schooling owing to the omission of the quality variable. Accordingly, any recommendations to increase investment in schooling at existing quality levels based on a standard calculation of the rate of return to schooling could be misguided. In fact Behrman and Birdsall found that the estimated internal social rate of return to investment in school quality for their sample was significantly larger than the return to investment in school quantity. That is to say, productivity increased more with deepening than with widening of schooling.

This implies a sharp equity-productivity tradeoff in investment decisions in education. Since the return to investment in schooling quality is higher, the economy benefits from

concentrating a given total of resources among fewer children, and increasing the quality of education. The higher return to quality would not exist for all levels of quantity. As the mean level of quality increases relative to quantity, the differential in the rates of return to the two types of schooling investment will alter. The point is that at the existing mean levels there is a significantly higher social benefit to be derived from increasing quality and curbing expansion in numbers.

The screening hypothesis holds that employers may use educational attainment as a selection mechanism of low cost for screening more able, potentially productive employees. Alternatively, a pure "credentialist effect" is also said to work when firms offer better jobs and higher earnings to certificate holders even though these individuals may not be more productive than others who do not possess such qualifications. Ziderman (1990), using census data for secondary school completers in Israel, examined the role of certification in raising earnings. His results suggest that certification may exert an independent positive influence on earnings over and above the investment effect of human capital. Using age-cohort regression, he shows that possession of a matric certificate for individuals in their twenties raises their earnings more than for older groups. He concluded that "this erosion of the certificate effect with age could be interpreted as evidence more consistent with the screening model than with pure credentialism" (Ziderman, 1990:270). That is to say, screening may assist employers in

obtaining potentially productive workers.

6.5 ANALYSIS OF MATRICULANT EARNINGS

Moll (1991) analysed 1980 South African census data for Africans using a model similar to that used in the Behrman-Birdsall study. He found that the social return to quantity of schooling in 1980 was 6.0 per cent while the social return to investment in education quality was 7.9 per cent. The conclusion therefore was that a growth-equity tradeoff in education spending existed with growth being defined as improved quality and equity as the extension of schooling to as great a proportion of the population as possible.

An analysis along the Behrman-Birdsall lines is not attempted here for two reasons. First, data on teacher quality as used by Moll was not available for respondents in this survey. In the Moll study, quality of schooling was proxied by the proportion of African teachers with post-school qualifications in the district of birth of the individual in the sample. For 1980 61 per cent of African teachers were deemed to have a degree or diploma. This measure of quality is problematic because it assumes teacher qualifications changed little between 1960 and 1980. Furthermore, some individuals presently in the labour force would have gone to school earlier than 1980. To counter this problem, the sample in the Moll study was restricted to the group aged 16-30.

Second, the rates of return estimated in Chapter Four represent in part the return to schooling quality. The fact that the rate of return to Africans is low may reflect, in part, the fact that employers are not rewarding poor quality of education. Occupational segregation can also be explained in terms of the quality of African education.

What is attempted instead is an analysis of the factors influencing the earnings of those individuals who attained a matriculation pass. The purpose of this exercise is to discern the effects of certification. A relevant question here is: To what extent do employers differentiate between the quality of the matric certificate by race? The analysis of the earlier chapters showed that there are differential rewards to education by race. This could be attributed to the differential quality of education provided by the various education systems. The issue here is whether employers detect differences in the quality of matriculation qualifications by race. Matriculant earnings and earnings differentials are therefore analysed to determine whether employers are rewarding unequally the attainment of 12 or more years of schooling.

The structure of matriculant earnings in Table 6.4 shows large differentials between those who have a matric pass and those without one. Non-matriculant (that is, all individuals in the survey not attaining matric) mean earnings were only 32 per cent of those with a university entrance matric and 47 per cent of

those with an academic school-leaving matric. Amongst all matriculants, those with university entrance passes showed the highest earnings. Those individuals possessing a vocational school-leaving pass earned 83 per cent of the university entrance group and the academic school-leaving group only 68 per cent.

Table 6.4: Mean Earnings of Matriculants by Type of Matriculation Pass (Rands/month)

Type of Matric	N	Mean
Matriculation Exemption	194	2187.56
Vocational School Leaving	24	1806.92
Academic School Leaving	149	1488.42
Non-matriculants	838	700.59

Source: Survey Data.

The matric pass is further disaggregated by aggregate matric symbol. Tables 6.5 and 6.6 show the familiar racial distribution pattern. For instance, excluding the "don't know category", in Table 6.5 it is evident that Whites have attained better quality matric passes. 95 per cent of Whites (167 out of the 176 shown in Table 6.5) had a "D" symbol or better while 66 per cent of Africans (35 out of 53 in Table 6.5) had an aggregate symbol lower than "D". These results are an accurate reflection of the output of the racially-structured education systems. With males, 75 per cent had a "D" symbol or better while for females this figure was 90 per cent (not shown in Table 6.5).

Table 6.5: Employees Grouped by Race: Distribution by Aggregate Matric Pass

Aggregate Matric Pass	Race				
	African	White	Coloured	Indian	Total Post-Matric
A	0	0 (11)	0	0	11
B	0	36 (15)	0	3	15
C	5	75 (32)	13 (5)	15 (4)	41
D	8	56 (38)	6 (2)	8 (6)	46
E	35 (1)	9 (8)	10 (2)	2 (2)	13
?	5	54 (23)	2	14	23
Total	53 (1)	241(127)	31 (9)	42 (12)	149

Source: Survey Data.
Note: Figures in parenthesis are those of individuals with some post-matric education. ? - "don't know and "could not remember" category.

A disproportionately large number of Whites have some post-matric education reflecting the inequalities in educational provision in South Africa. More than one-third of the White sample had gone beyond matric compared to 0.2 per cent Africans, 2.9 per cent Coloureds and 20 per cent Indians. Slightly more males (13 per cent) gained post-matric education than females (11 per cent) (Table 6.6).

Table 6.6: Employees Grouped by Gender: Distribution by Aggregate Matric Pass

Aggregate Matric Pass	Gender: Male	Female	Total
A	11 (11)	0	11 (11)
B	25 (14)	14 (1)	39 (15)
C	56 (16)	52 (25)	108 (41)
D	40 (26)	38 (20)	78 (46)
E	45 (7)	11 (6)	56 (13)
?	51 (23)	24	75 (23)
Total	228 (97)	139 (52)	367 (149)

Source: Survey Data.

Earnings differentials are much sharper when disaggregated by aggregate matric symbols. Table 6.7 shows that mean earnings increase monotonically with a higher grade of pass. Those with a "E" aggregate earned, on average, only 28 per cent of those with an "A" aggregate and those with a "B" aggregate 62 per cent.

The distinctive feature of Table 6.7 is that individuals with some post-matric education receive higher rewards. This goes some way towards explaining the relative higher earnings of Whites as this group comprised the largest proportion of those with post-secondary education (85 per cent).

Table 6.7: Mean Earnings of Matriculants and Matriculants with Post-matric education by Aggregate Matric Symbol

(Rands / month)

Matric Symbol	All Matriculants	Matric + Post-matric
A	3621.82	3621.82
B	2240.13	2776.00
C	1997.27	2117.44
D	1980.82	2518.37
E	1001.02	1972.38
"Don't know"	1876.21	2397.00

Source: Survey Data.

Table 6.8 provides a racial and gender analysis of matriculant earnings for those attaining "C" and "E" aggregate passes. (These groups were chosen because of adequate sample sizes for comparative analysis).

Table 6.8: Mean Earnings by Aggregate Matric Symbol (C and E), Gender and Race, Matriculants and Matriculants with Post-matric education (rands)

Group	Matric Symbol C		Matric Symbol E	
	Matric	Matric +	Matric	Matric +
All	1997	2117	1003	1972
Males	2289	2355	967	2347
Females	1684	1965	1137	1535
Africans	1276	-	711	-
Whites	2131	2231	1882	1897
Coloureds	1767	2191	1106	-
Indians	1770	1119	1580	-

Source: Survey Data.
Note: - not provided because sample size less than five.

In general, the C symbol earned higher rewards but the earnings were not distributed equally across race and gender. Africans in both categories earned substantially less, as did Coloureds in the "E" category. However, females with E matric symbols earned, on average, more than males.

It is necessary, however, to further distinguish between the earnings of matriculants with no post-matric education and those with some, as the earnings of the latter group could have been influenced by their higher education. The mean earnings for these two groups are presented in Tables 6.9 and 6.10.

For those with no post-matric education, female mean earnings were 91 per cent of male mean earnings. African, Coloured and Indian mean earnings as a proportion of White mean earnings were respectively 38 per cent, 54 per cent and 74 per cent.

For those individuals with some post-matric education, females earned, on average, 64 per cent of male earnings. Coloureds earned 94 per cent of Whites and Indians only 48 per cent. (There were no Africans in this group.)

Table 6.9: Mean Earnings of Matriculants with no Post-matric Education (Rands/month)

Group	N	Mean Earnings
All	218	1505.81
Males	131	1563.37
Females	87	1419.14
Africans	52	749.25
Whites	114	1952.68
Coloureds	22	1058.68
Indians	30	1452.87

Source: Survey Data.

Table 6.10: Mean Earnings of Matriculants with some Post-matric Education (Rands/month)

Group	N	Mean Earnings
All	149	2425.24
Males	97	2768.98
Females	52	1784.04
Whites	127	2552.09
Coloureds	9	2406.11
Indians	12	1232.08

Source: Survey Data.

The analysis of matriculant earnings thus shows that :

(i) earnings differentials between males and females were narrower in the group with no post-matric education;

(ii) Coloured-White differentials are substantially lower in the tertiary education group;

(iii) somewhat unexpectedly, Indian-White differentials are significant for those with some post-secondary education. This finding suggests the possibility of gender discrimination as a large proportion of the Indian sample in this group (74 per cent)

comprised females. However, all Indian females in the post-secondary group were "crowded" into the lower non-manual occupations in which earnings are considerably lower than in the higher non-manual occupations.

The main finding so far is that individuals with a matriculation pass are rewarded more than those without such a qualification. For instance, African mean monthly earnings for the full sample was R641 but for matriculants with a "C" aggregate it was R1276 and for those with an "E" aggregate it was R711. Thus the quality of the matric pass seems important. No comparisons can be made for Africans in the post-matric sub-sample because only one individual had attained this qualification. For Coloureds the quality of the matric pass was also important. Those with a "C" aggregate pass and no post-matric education earned on average, R1767 per month while those with an "E" aggregate earned R1106 per month. Earnings differentials by quality of matric pass are also evident in the case of Whites (Table 6.8) and Indians in the no post-matric education category. Post-matric education raises the mean earnings of all groups except Indians.

To control for the influence of schooling, employment experience, race, gender and aggregate matric pass, a Mincerian-type earnings function was specified. Table 6.11 presents the results of two regressions with the dependent variable in one being the natural logarithm of the earnings of matriculants with no post-matric education and in the other the natural logarithm of earnings of

matriculants with some post-matric education. The independent variables (specified in dummy form) are employment experience, race, gender and aggregate matric symbol.

In the "no post-matric education" regression, the independent variables explain 72 per cent of the variance in earnings while in the "some post-matric education" regression the explained portion was slightly higher, at 75 per cent. The returns to schooling were positive and significant for both groups with the coefficient on those with no post-matric education higher by just over 1 per cent.

(a) Employment Experience

For those with no post-matric education, only one of the coefficients was not significant. The expected monotonic relationship between employment experience and earnings is evident, except for those in the > 20 year category relative to those in the 16-20 year group. For those with post-matric education, all the experience variables are significant. The positive relationship between employment experience again applies. Both less and more experienced post-matric workers receive higher rewards to experience.

Table 6.11: Earnings Functions of Matriculants with and without Post-matric education

Variable		No Post-matric Education	Some Post-matric Education
Years of Schooling	S	0.088**	0.073**
Employment Experience			
< 2 years	E1***		
2-5 years	E2	0.069*	0.100**
6-10 years	E3	0.137**	0.149**
11-15 years	E4	0.174	0.182**
16-20 years	E5	0.217**	0.217**
> 20 years	E6	0.200*	0.265**
Race			
African	R1	-0.378*	
White	R2***		
Coloured	R3	-0.125**	0.407**
Indian	R4	0.136**	0.013
Gender			
Male	G1	0.134*	0.204*
Female	G2***		
Matric Symbol			
A	P1	0.362	0.240**
B	P2	0.299	0.048
C	P3	0.289	-0.055
D	P4	0.006	0.055
E	P5***		
"Don't know"	P6	0.056	-0.189
C		6.162	7.176
F		35.889	11.122
R^2		0.7271	0.7546
N		218	149

*** omitted variable

(b) Race

For those with no post-matric education, the coefficients were negative and highly significant for Africans and Coloureds. Africans, on average, earned 31 per cent less than Whites, and

Coloureds 12 per cent. For Indians, the coefficient was positive and significant, earning, on average approximately 15 per cent more than Whites. The discrimination coefficient for Africans in the "no post-matric" group (0.378) is slightly smaller than for the entire sample (0.040, Chapter 5, Table 5.2). For Coloureds it considerably smaller (0.125 against 0.327). In the case of Indians, it was also smaller (0.136 against 0.209).

In the post-matric education group, the coefficient for Coloureds was positive and significant at the 5% level, with an earnings premium of 50 per cent. The coefficient for Indians was positive but not significant.

The contrast in the coefficients for Coloureds may be particularly significant. It implies that employers do not reward secondary schooling but that possesion of some post-secondary education is rewarded highly. This may be a response to the perceived poorer quality of school education. This finding must be qualified by the fact that the sample size in this category was only nine and these results may not be entirely representative of the actual situation.

(c) Gender

The male coefficients for both groups were significant and positive. The extent of gender discrimination was greater in the higher education group where males earned approximately 22 per

cent more. In the group without post-matric education, males earned 14 per cent more than females. There was less discrimination against females with no post-matric education than against females in the full sample (discrimination coefficient 0.165, Table 5.2) but more against females with some-post matric education.

(d) Aggregate Matric Symbol

Only one of the coefficients, the "A" symbol for the higher education group was significant. Those individuals who attained this matric pass earned approximately 27 per cent more than those with an "E" aggregate symbol (the omitted variable).

The earnings function analysis suggests that race and gender are important determinants of matriculant earnings. Furthermore, labour market experience appears to be crucial for both groups. However, the aggregate matric symbol appears not to have an important influence on earnings. In the final analysis, the earnings functions shed little light on the higher earnings of individuals with post-secondary education.

6.6 CONCLUSION

The main finding of this chapter is that matriculants receive higher earnings than those without a matriculation pass. Employers thus appear to reward certification. It is not clear whether employers are using the matric pass as a screening device or whether employers find matriculants more productive. The latter position may be plausible as new labour market entrants are not receiving disproportionately high earnings, a factor which would confirm the screening hypothesis. The quality of the matric pass as reflected in the aggregate symbol is important for all races.

The employer interviews may shed some light on this issue. As Appendix C shows, in response to a question about the criteria used in recruiting for various occupations, formal education was either the main or second most important criterion for unskilled manual occupations, and the most important criterion for unskilled and skilled manual, and clerical occupations. For the employment of semi-skilled and unskilled manual occupations an important requirement was the quantity (years) of schooling received while for skilled manual occupations it was the quality of schooling that was important. For clerical occupations, both quality and quantity of schooling were relevant. Employers were unanimous about the contribution of education to productivity. Educated workers were more productive because they were more literate, numerate and adaptable. Furthermore employers did not

appear to be concerned about the quality of examination passes as reflected in results and could not determine whether this was a factor in productivity. With one exception (the employer in the semi-skilled occupation interviews) employers agreed that training and experience were not substitutes for formal education but rather that they should be regarded as complements. Finally, they were ambivalent about why they may insist on minimum education requirements for particular occupations. In the case of unskilled and semi-skilled manual occupations there was general agreement that education provided the necessary skills. However, in the case of skilled manual and clerical occupations, employers stated that in addition to providing skills, education also helps to "screen" individuals with the required qualities. From these interviews it appeared that education may have both productivity-enhancing and screening roles.

In summary, the overall results indicate that employers reward possession of a matric certificate. In the case of all groups, but especially Africans, the matric symbol or the quality of the pass is an important factor. For Whites and Coloureds post-matric education raised earnings significantly although this was not true for Indians in the sample. Substantial earnings differences persisted between Africans and the other races. This could reflect labour market discrimination or it could be interpreted that employers do not perceive the quality of the African matric to be on a par with that of the other groups. The fact that African matriculants especially those with better quality matric

passes receive higher earnings raises important questions about educational policy especially with regard to the equity-productivity tradeoff in investment decisions in education. If the return to schooling quality is higher as it seems from the evidence presented here, the economy may benefit from concentrating resources among fewer pupils and increasing the quality of education.

Notes

1. Because of the racially-structured education system, with few but increasing exceptions, pupils are taught by teachers of the same race.

CHAPTER SEVEN

SENIORITY, LABOUR TURNOVER AND EARNINGS

7.1 INTRODUCTION

Two of the most firmly established empirical "facts" in the study of earnings are (1) a positive (and concave) relationship between earnings and labour market experience, and (2) holding experience fixed, a positive relationship between earnings and current job tenure. The oldest and most popular explanation for the experience effect is based on optimal life-cycle policies for investing in general human capital (Ben-Porath, 1969): workers forgo potential earning while young in order to augment earning capacity. The association with job tenure is similarly rationalised, except that human capital investments are assumed to be specific to a job or employer.

Chapter Five demonstrated a positive relationship between experience and earnings although the intensity of this relationship varied by race and gender. This chapter looks specifically at the increase in earnings with employment tenure. It would be expected that earnings will be positively related to tenure or

seniority because employers will reward employees who have had the benefit of firm-specific skill training so that turnover costs are reduced. This chapter also examines the extent and determinants of labour turnover in the manufacturing sector data.

Section 7.2 provides a description of the human capital theorists' exposition of the seniority-wage relationship. Human capital theory explains this relationship through its distinction between general- and firm-specific skills. Section 7.3 examines several other theoretical models of the relationship between seniority and earnings. Section 7.4 tests the validity of the firm-specific / general skill distinction against the survey data. Earnings functions are estimated in which prior and current job experience are entered as separate independent variables. Such earnings functions are specified for the whole sample as well as for the four races. The coefficients on current job experience are further compared across sub-samples stratified by prior experience. Similarly the coefficients on prior job experience are compared across samples stratified by current experience. In section 7.5 labour turnover is analysed through measures of mean current and previous employment experience, employment experience per previous employer and employment experience per all employers. The data are analysed for variations by race, gender, occupation and level of education. A mobility function is also specified to analyse the impact of worker characteristics on mobility.

7.2 HUMAN CAPITAL THEORY AND THE SENIORITY-WAGE RELATIONSHIP

There is ample evidence that wages tend to rise with seniority in the firm. A worker frequently enters the firm at one wage level and through a sequence of promotions and raises attains a higher real wage.

The most widely accepted neoclassical explanation for the seniority-wage relationship comes from the theory of human capital. The theory distinguishes between two types of on-the-job training: general and specific. General training increases the worker's productivity in the current firm and in other firms. Specific training only increases the worker's productivity in the current firm. The theory is formulated under the assumption that, in the absence of either type of training, competitive forces ensure that wage equals marginal product at all points in time.

The case of workers who invest in general on-the-job training is illustrated in Figure 7.1 for a two-period case. During the first period, workers have a value of marginal product equal to MP_1 and obtain general training which is not productive until the beginning of the second period. During the second period workers obtain no training and have a marginal product of MP_2 in the current firm as well as other firms. Since training is productive, MP_2 is greater than MP_1. According to Becker (1962, cited in Hutchens, 1989:51), workers reimburse the firm for its outlays on training by accepting a first period wage, W_1,

In the case of firm-specific training, workers neither bear the full cost nor do they reap the full return from such training. Because specific training is only productive in the current firm, workers cannot behave as they do with general training: that is, to bear the full cost of training and then receive a wage equal to the value of post-training marginal productivity. This would mean risking lay-offs. As a result what happens is that the firm bears part of the cost of specific training and the worker receives a wage that is less than the value of the post-training marginal product (Hutchens, 1989:51).

Figure 7.2 again illustrates this with a two-period case. Here, however, it is specific training received during the first period that causes marginal product to rise from MP_1 to MP_2 . Becker (1962) has argued that the second period wage lies below the value of marginal productivity in the second period. This differential ensures that the firm does not lay off trained workers, and encourages workers to participate in the training programme. If the wage is less than the value of marginal product, then both firm and workers lose if there are lay-offs. Becker has also argued that the wage will lie above the trained worker's alternative wage, thereby discouraging quits (in Hutchens, 1989:52). What happens in effect, is that the firm and the worker set the second period wage so as to share the returns generated by specific training. Thus, as in the case of general training, specific training causes wages to increase with seniority because it increases productivity. Unlike general

training, however, employers and employees share in the costs and benefits of the training.

Therefore, the implication of the distinction between general skills, which raise productivity in many firms, and firm-specific skills, which raise productivity in only one firm, is that additional years in current employment (that is, acquisition of firm-specific skills) will be associated with higher earnings increments than years in previous employment. When a worker changes jobs, the general skills he has acquired can be applied in his new job but this is not the case with firm-specific skills acquired in previous jobs.

In the case of general skill acquisition, wages are equal to marginal product. But in the case of firm-specific training, "wages bear a positive but complicated relationship to marginal product" (Knight and Sabot, 1982:206). The existence of disruption, search and hiring costs associated with turnover may influence employers to institute wage structures that deter employees from quitting. This again means that some employers might pay a higher wage premium on current employment experience than on previous employment experience.

The "disruption cost" of turnover - the difference between the output of a new recruit and that of a worker who has already spent some time in his job - rises with the acquisition of firm-specific skills. This may mean that the wage structure could be adjusted to include incentives which tie workers with more firm-

specific skill to the firm. A wage profile which maintains the discounted present value of the expected earnings stream, but pays a lower wage on recruitment than in jobs without skill acquisition, and a seniority premium which raises and maintains the skilled job wage above the unskilled wage after some years, locks the worker into the firm at a lower cost than if firms tried to deter their employees from quitting by raising wages above what workers could earn in alternative employment. In effect, earnings are deferred, and the worker will not wish to leave before these are paid (Knight and Sabot, 1982). The result is a seniority-based wage structure, the purpose of which is to provide an incentive to trained workers not to quit, rather than to share the costs and benefits of training with workers.

There is sufficient evidence in the literature of significant seniority payments over and above increases in earnings associated with additional employment experience. The studies by Borjas (1981), Mincer and Jovanovic (1981), Mellow (1983) and Hashimoto and Raisan (1985) all provide empirical support for these ideas in industrialised countries, specifically Britain, Japan and the United States. For example, the results in Mincer and Jovanovic (1981) show that in the United States labour market, for a man with 18 years of experience in the labour market and 7 years with his current employer, an additional year of work in the same firm implies a wage increase of 3.5 per cent. More than half of this increase (2 per cent) is attributable to the additional tenure, while the remainder is due to the

additional labour market experience. (It should be noted that the Mincer-Jovanovic results also indicate for example, that for a man with 38 years of experience in the labour market and 27 years with his current employer, additional tenure and/or additional experience lead to a decreased wage. That is, the experience-wage and tenure-wage relationships ultimately level-off and turn downward.) These results fit in neatly with human capital theory, which holds that wages rise with seniority for two reasons: first, greater seniority means greater investment in general human capital, thereby explaining why wages rise with labour market experience and second, greater seniority means investment in specific training, which explains why, even after controlling for experience, wages rise with tenure.

7.3 ALTERNATIVE THEORETICAL MODELS OF THE WAGE-SENIORITY RELATIONSHIP

Recent research on the wage seniority relationship in developed countries has emphasised explanations other than in terms of human capital (Hutchens, 1989). For instance, delayed payment systems may solve problems of monitoring employees by discouraging behaviour which would terminate their employment early. Lazear's (1981) theory explained the wage-seniority relationship in terms of contracts that "discourage employee shirking and malfeasance" (cited in Hutchens, 1989:55). This theory argued

that employers and employees may enter into implicit contracts whereby workers are paid a wage less than marginal product at the beginning and greater than marginal product at the end (Figure 7.3). Such contracts, it is argued discourage shirking and misconduct in situations where it is difficult for the employer to monitor worker effort. A worker "who shirks or steals runs the risk of being caught and fired before obtaining the wage premium that comes at the end of the contract. In contrast, the honest and diligent worker stays with the firm until retirement and thereby reaps the reward of a high wage and perhaps a pension" (Hutchens, 1989:55-56). This model suggests that wages grow with seniority, even in situations where productivity falls with seniority.

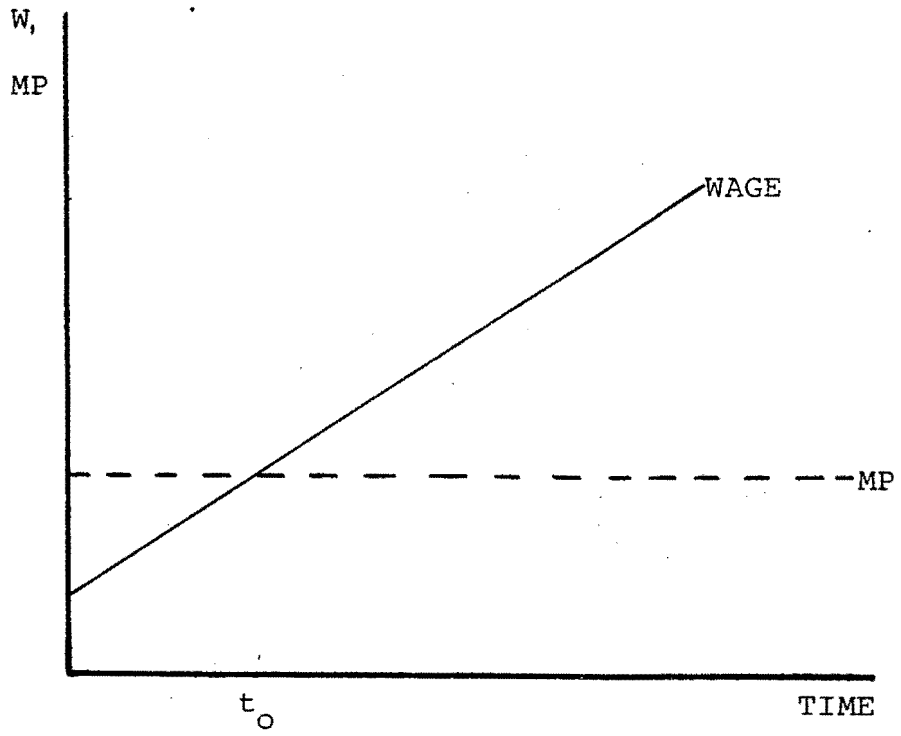


Figure 7.3 Lazear's Model of Delayed Payment Contracts

(Source : Hutchens, 1989)

Some recent studies (Abraham and Farber, 1987; Altonji and Shakotko, 1987; Marshall and Zarkin, 1987) claim that regression estimates of the relationship between wages and firm tenure suffer a positive bias. This bias arises from the suggested positive correlation between tenure and unobserved heterogeneity in worker quality or the quality of the match between worker and job. If workers with comparatively high (low) wages tend to remain in (depart from) their jobs, then this self-selection process will impart a positive bias to the tenure coefficient. These studies for the United States indicate that when controls are introduced for the unobserved heterogeneity, the regression estimates are not only close to zero but often statistically insignificant. Unlike the human capital and the delayed payments model which both predict a positive relationship between time on a particular job and wages, this theory suggests that what is important are explanations that focus on the positive relationship between wages and total labour market experience.

Adverse-selection models suggest that seniority wage scales can be used to deal with an asymmetry of information between employers and workers about the propensity to quit, which is assumed to differ among workers. Workers who expect not to remain long in a job will avoid steeply-sloped wage structures. Steeper wage profiles will have higher present values than flatter ones, as a "reward" to workers who reveal themselves to have low quit propensities, and who lower the turnover costs faced by the firm. Expectations become self-fulfilling as workers who choose

flatter, lower wage structures have little incentive to stay in their jobs (Nickell, 1976).

The relationship between earnings and current employment experience may have an institutional basis. Internal labour markets, for instance, can be seen as the employers' institutional response to the problems of retaining the benefits of firm-specific training (Williamson, Wachter and Harris, cited in Knight and Sabot, 1982:209). The defining characteristics of internal labour markets (ILMs) are threefold (Doeringer and Piore, 1985, Chapters 1-4). First, there must be a substantial degree of permanency to the attachment between employer and worker, which is reflected in the length of the typical job. Second, there must be substantial opportunities for advancement within the firm through internal training and promotion, with a corresponding restriction of hiring from the outside market into higher-level jobs. Hence there are only a limited number of "ports of entry" into the ILM. Third, the allocation of tasks and rewards, as well as the imposition of sanctions, must be subject to a well-defined framework of rules prescribing the rights and obligations of employer and workforce. These will normally include an internal wage structure, so that the pattern of wage determination is laid down by administrative procedures in isolation (to a greater or lesser extent) from the influence of the external labour market. Thus seniority scales within ILMs can have the effect of reducing labour turnover. This suggests that earnings are likely to increase with seniority to reflect the employer's valuation of the skills acquired.

However, as Knight and Sabot (1982) point out, ILMs are not necessarily designed to serve only the interests of the employer. Where trade unions are predominant, the ILM may reflect the "balance of interests and power between employer and workers, with workers possibly placing emphasis on job security, promotion according to strict seniority, and notions of 'fairness' in wage structure" (p.210).

7.4 THE IMPACT OF CURRENT AND PRIOR EMPLOYMENT EXPERIENCE ON EARNINGS IN THE MANUFACTURING SECTOR

Before assessing which of the theoretical models outlined in sections 7.2 and 7.3 are relevant to the South African situation it is necessary to determine what evidence there is of seniority wage scales in South Africa. The presence of such institutional measures could explain a positive relationship between seniority and earnings.

The major wage determination mechanism for manual occupations is through the Industrial Council system (Chapter 1). An analysis of these wage agreements shows no evidence of seniority wage scales. The wage scales negotiated between employers and trade unions through this system is occupation-based. However, recruits to a particular occupation usually spend 1 or 2 years at a lower wage than the minimum wage for that occupation. Furthermore, some wage

agreements may provide for the inclusion of seniority bonuses; for example, workers with ten years experience may get a small premium on their wages. However, this is not a common occurrence.

There appears to be no published evidence of seniority wage scales for non-manual occupations. However, the employer interviews on clerical occupations (Appendix C) suggested that such scales are not uncommon for non-manual occupations.

With the survey data it is possible to distinguish between years in current employment (EC) and years in prior employment (EP) so that EC + EP = Total labour market experience.

A premium will be earned on EP years if the current employer values skills acquired under previous employers. By definition, only general skills acquired in previous jobs raise productivity in the present job. A year's experience prior to the current job (EP) should therefore raise productivity in the current job by less than an additional year of tenure (EC), if workers acquire both general skills and firm-specific skills in their current jobs. In regressions containing both EC and EP as independent variables, the acquisition of firm-specific human capital should raise the coefficient on EC above that on EP.

Earnings functions with both EC and EP as independent variables as well as schooling, race, gender and occupation were specified. The results are shown in Table 7.1.

Table 7.1: Earnings Function with Current Employment Experience and Prior Employment Experience as Independent Variables

Variable		Coefficients	
Schooling	S	0.004**	0.005**
Current Experience	EC	0.034*	0.055*
Current Experience Squared	EC^2		-0.0005*
Prior Experience	EP	0.024*	0.038*
Prior Experience Squared	EP^2		-0.0004*
Africans	R1	-0.206*	-0.209*
Coloureds	R3	-0.236*	-0.231*
Indians	R4	0.122*	0.121*
Male	G1	0.108*	0.112*
Unskilled manual	O1	-0.578*	-0.572*
Semi-skilled manual	O2	-0.312*	-0.319*
Lower non-manual	O4	0.033	0.041
Higher non-manual	O5	0.642*	0.650*
C		6.753	6.680
F		442.431	389.651
R^2		0.809	0.816

With the exception of the lower non-manual occupational category, all the coefficients are significant and have the expected signs. Inclusion of the squared experience terms raises the explanatory power of the regression marginally from 80.9 per cent to 81.6 per cent.

With the squared experience terms excluded, each year of current employment adds 3.4 per cent to earnings whereas each year of prior employment adds 2.4 per cent. These coefficients imply that general skill acquisition adds 2.4 per cent per annum to earnings and firm-specific skill acquisition a further 1.0 per cent per annum.

With the inclusion of the squared EC and EP terms, the difference between the coefficients on EC and EP increases from 0.010 to 0.017. If each has a value of 10 years, current employment (EC) raises earnings by 50 per cent and prior employment (EP) raises earnings by 34 per cent. If each has a value of 20 years EC raises earnings by 90 per cent and EP by 62 per cent. The results are thus consistent with the analysis based on human capital theory. Firms are rewarding the acquisition of firm-specific skills in current employment over and above the acquisition of general skills in prior employment. That is to say, employers are paying a premium on EC because the acquisition of firm-specific skills raises productivity in the current firm more than the general skills previously acquired. Employers are thus recognising the productivity-enhancing capacity of firm-specific skill acquisition.

Regressions with the same independent variables as in Table 7.1 were specified for each race. The relevant results are shown in Table 7.2.

Table 7.2: Coefficients on Current Employment Experience and Prior Employment Experience by Race

	EC	EC^2	EP	EP^2	R^2
African	0.051**	-0.0002*	0.036**	-0.0002*	0.303
White	0.045*	-0.0005*	0.034**	-0.0003*	0.729
Coloured	0.070*	-0.0013*	0.046*	-0.0010*	0.739
Indian	0.068*	-0.0008*	0.042*	-0.0015	0.764

Note: Dependent variable is the logarithm of monthly earnings and independent variables not shown are schooling, race, gender and occupation, the last three being dummy variables.

The results confirm the earlier analysis, namely that firm-specific skill acquisition through current employment raises earnings by a greater proportion than general skill acquisition through prior employment. This relationship holds for all races. For Africans, with 10 years experience in each category, EC raises earnings by 49 per cent and EP raises earnings by 34 per cent for Africans. For Whites, EC increases earnings earnings by 40 per cent and EP raises it by 31 per cent. In the case of Coloureds, EC increases earnings by 57 per cent and EP by 36 per cent. For Indians the premium on EC after 10 years is 60 per cent and that on EP is 27 per cent.

There is another consideration in comparing the returns to EC and EP. The EP years precede the EC years in time. Human capital theory predicts that more skill acquisition takes place in the early years of working life than in later years. This results in the quadratic form for the earnings function using total labour market experience as the experience independent variable. This working life cycle effect might make the return to EP larger than the return to EC even if both general and firm-specific skills are acquired and rewarded in the current job. It is possible to get around this by stratifying the samples by EP and estimating a regression which contains EC as the only experience term. This allows the return to experience in the current job to vary with differences in the amount of prior experience. Similarly a regression can be estimated which contains EP as the only experience term and allows the return to experience in prior

employment to vary with differences in the amount of current experience. The relevant results of these regressions are shown in Table 7.3.

The returns to prior experience are significantly positive among workers with little seniority in the firm. New employees are rewarded substantially more for general skills acquired elsewhere. However, after ten years of current employment such skills count for less. It seems that workers without prior experience are able to catch up over this period and to obtain most of the general skills that other workers possessed before joining the firm. On the other hand if these skills had been acquired earlier their value would have declined after ten years.

The positive and significant coefficients imply that firm-specific skill acquisition continues to occur even after ten years of employment in the firm. It also suggests a self-selection bias in that those whose who stand to gain from firm-specific skills have little incentive to move to another firm after 10 years with one employer.

The returns to current experience are all positive and significant but no systematic pattern is evident with respect to number of years in prior employment.

Table 7.3: The Effect of Experience on Earnings: Interaction between Prior and Current Employment Experience

	Years in current employment (EC)		
	0.1-5.9	6.0-10.0	10+
Coeff. on EP	0.044**	0.040**	0.026**
R^2	0.859	0.817	0.749
N	612	319	274

	Years in prior employment (EP)			
	0	0.1-5.9	6.0-10.0	10+
Coeff. on EC	0.060*	0.042**	0.078*	0.055*
R^2	0.800	0.702	0.913	0.794
N	45	665	188	307

Note: The dependent variable is the logarithm of monthly earnings and other independent variables not shown are race, gender, occupation (all dummies) and schooling.

A disaggregation of the earnings function by occupation may help to explain why the returns to EC are greater than the returns to EP. Table 7.4 shows that this is true for all occupations except skilled manual labour. The coefficients for all occupations are significant and positive. The coefficient on EC for unskilled manual workers is suprisingly positive and significant. Earnings increase by 3.4 per cent for every year he/she spends in the firm. When EC and EP are set equal to 10 years, the increase in earnings attributable to current employment is 28 per cent in the case of unskilled workers and that to prior employment is 19 per

cent. However, for skilled manual occupations, the situation is reversed with the increase being 49 per cent (EC) and 54 per cent (EP). This implies that in the case of skilled manual workers, employers value general skills obtained elsewhere.

Table 7.4: Coefficients on Length of Current and Prior Employment Experience by Occupation

Coefficient	USM	SSM	SM	LNM	HNM
EC	0.034*	0.040*	0.055*	0.034*	0.047**
EC^2	-0.0009*	-0.0004**	-0.0011**	-0.0002**	-0.0002
EP	0.024**	0.016*	0.064*	0.027	0.017
EP^2	-0.0007**	-0.0009*	-0.0010**	-0.0012	-0.0003
R^2	0.309	0.341	0.786	0.332	0.231

Note: USM-Unskilled Manual; SSM-Semi-skilled Manual; SM-Skilled Manual; LNM-Lower Non-manual; HNM-Higher Non-manual

For semi-skilled workers each year of current employment raises earnings by 4 per cent. With EC and EP set equal to 10 years, earnings increase by 26 per cent with current employment and by 7 per cent with prior employment.

In the case of non-manual occupations, the rewards to current employment experience are positive and significant and those to prior employment positive and insignificant. The earnings premium after 10 years of current employment is 32 per cent for lower

non-manual workers and 45 per cent for higher non-manual workers. The fact that EC is rewarded but not EP in the case of non-manual workers points to the existence of internal labour markets for these occupations.

The key finding of this section is that the general predictions of human capital theory are borne out, that is, firms reward experience in the current firm (acquisition of firm-specific skills in the current firm) against general skills acquired in prior employment. This is due to the fact that by definition, firm-specific skills raise productivity only in the current firm but general skills raise productivity in many firms. Thus additional years in current employment will be associated with higher earnings increments than years in previous employment. There is therefore a positive relationship between earnings and seniority for all races and all occupations, although in the case of skilled manual occupations prior experience receives larger rewards.

In the absence of intitutionalised seniority wage scales, particularly for manual workers, it is not clear why unskilled manual workers are being rewarded for current employment experience given that in this category there should be limited firm-specific skill acquisition. If seniority wage scales were operative, rewards to current experience could be attributed to collective bargaining agreements; trade unions, for example, could specify seniority payments even for unskilled manual

workers on the grounds of "fairness".

In the absence of seniority wage scales it is likely that even in the case of unskilled manual workers, there is a productivity explanation; that is, unskilled manual workers may need to "learn the ways of the firm" and when they have done so, contribute to productivity. A "self-selection" explanation is also plausible: good, reliable workers last in the firm or may be encouraged to stay. In any employment contract there are incentives for the employer to keep workers and for the employee to stay. In the case of unskilled manual workers in the survey data a possible explanation is that seniority rewards are being freely developed by the employer to minimise turnover of good, reliable workers and hence reduce the disruption costs attached to turnover.

In the case of semi-skilled workers it is not unreasonable to expect employers to reward current employment experience as firm-specific skill acquisition is crucial for this category of workers. The skilled manual category however, receives lower rewards for current experience. This implies that such workers bring general skills from prior experience valued by the current firm. This is not an unexpected situation given the relative homogeneity of this group and often uniform formal educational requirements of all employers. In the case of non-manual workers, it is likely that internal labour markets are operating with firm-specific skills being rewarded and earnings being determined in isolation from the external labour market. These ILMs are characterised by seniority wage-scales and well-defined promotion

ladders. It is also likely that jobs in these ILMs are rationed according to race and gender with White males at the top of the queue. In times of economic crisis very few new "ports of entry" are created and employers hold on to workers through their seniority-wage scales and firm-specific training.

7.5 LABOUR TURNOVER

7.5.1 Introduction

The years immediately following a young worker's initial entry into the labour market form a key phase of career development. During this period, the typical career shows frequent job-changing activity that evolves gradually into the long-term employment relations that are known to characterise older workers, while earnings grow more rapidly than in any other phase of the life cycle. The life-cycle pattern of job mobility is particularly remarkable: roughly half of the 11 jobs that the typical worker will hold in his/her career occur during the first 10 years of participation in the market, and approximately 60 per cent of all new jobs held by young workers end during the first year (Hall, 1982; Topel, 1986).

The aim in this section is to measure the extent of labour turn-over in the survey data and provide an explanation of the likely

determinants of such turnover. Section 7.5.2 provides a description of the extent of labour turnover in the broader South African economy gleaned from the little published information there is on this subject. Section 7.5.3 examines the extent of turnover in the manufacturing sector using the survey data. The fourth sub-section introduces mobility functions to provide some indication of the possible determinants of mobility.

Labour turnover in South Africa cannot be understood without a description of the historical factors which have contributed to this phenomenon. In the 1960s and 1970s the perennial complaint of employers was that labour turnover of African employees particularly, was unacceptably high. The contributory factors to this situation were legislative barriers that prevented the free movement of labour. Influx control restricted the movement of labour into the modern sector. In some sectors, as Hofmeyr (1990) shows, serious shortages even of unskilled labour developed. In a tight labour market high rates of labour turnover can be expected. The migrant labour system, moreover, forced large numbers of workers to return home periodically. There was thus little incentive for employers to train unskilled Africans and enhance occupational mobility of such workers. In addition, job reservation legislation prevented Blacks from gaining access to certain occupations. This meant that there was thus little incentive for Africans to obtain skills and hence stability in employment.

What then are the likely determinants of mobility in the 1980s? The situation has changed considerably since the 1970s in that educational provision for Blacks has increased and statutory discrimination in the labour market has been repealed although the effects of some of these measures were still being felt at the time of the survey. The 1980s, however, have been characterised by long and frequent periods of declining economic activity. Under such conditions, on the one hand, employees may well want to hold onto their jobs and, on the other, employers, faced with deficient aggregate demand, would want to get rid of them. In contrast to the 1960s and 1970s in which there was a large measure of voluntary quits, the 1980s were probably characterised by a large proportion of involuntary quits due to discharges and retrenchments.

7.5.2 Labour Turnover in the South African economy

Official statistics on labour turnover in South Africa are available only for the manufacturing and construction sectors. Labour turnover is defined as average monthly labour turnover per 100 employees. These statistics are shown in Table 7.5 for 1975 and 1987. No distinction is made between voluntary and involuntary quits. The table also shows the proportion of labour employed ("Engagements") during this period.

Table 7.5: Average Monthly Turnover per 100 employees in the South African Manufacturing and Construction Sectors, by Race

Sector	Labour Turnover					Engagements				
	All	A	W	C	I	All	A	W	C	I
Manf.										
1975	4.7	4.3	5.3	6.0	3.9	4.9	4.7	5.6	6.4	4.3
1987	1.6	1.4	1.8	2.1	1.3	2.0	1.4	1.8	2.6	1.4
Constr.										
1975	5.7	4.6	6.2	8.0	5.9	5.6	4.6	7.0	7.7	5.6
1987	5.4	5.4	3.1	6.7	4.5	5.0	5.0	3.5	5.4	4.1

Source: S A Labour Statistics, 1989.
Note: Manf-Manufacturing; Constr-Construction; A-African; W-White; C-Coloured; I-Indian.

The distinctive features of the table are the declining trends in both turnover rates and employment in the manufacturing sector during the 1980s. The construction sector, on the other hand, was characterised by high turnover rates during the entire period. In the manufacturing sector, labour turnover dropped dramatically for all races. Although individual characteristics are not available, a plausible explanation is that this is due to the stagnation characteristic of the South African economy in general and the manufacturing sector in particular during the 1980s. Given the high levels of unemployment and the low levels of employment creation, workers tended to hold onto jobs.

The best known study of labour turnover in the South African economy is that by Miller (1987) on secondary industry in the Port Elizabeth-Uitenhage area. This study was based on data

submitted by 29 firms in the area. The total average employment of the 29 companies participating in the survey in 1986 was 22632 and this figure represented nearly 60% of all manufacturing employment in the area (Miller, 1987:3). Similar surveys had been conducted since 1972.

Miller distinguishes between "controllable" or "avoidable" turnover comprising voluntary separations (V) or quits and dismissals (D) on the one hand and "unavoidable" turnover such as illness, death and retirement. Retrenchments are also excluded from the conventional definition of turnover as they relate to a specific event such as an economic recession. The labour turnover rate is defined as :

$$\frac{\text{number of leavers in a period } (V + D)}{\text{average number employed in the period}} \times 100$$

Voluntary separations (quits) imply a different leaving situation from dismissals and the ratio of quits (V) as a percentage of controllable turnover, that is,

$$\frac{V}{V + D} \times 100$$

is a useful one as a high percentage of voluntary separations indicates that workers are dissatisified with the job; a low percentage of V (i.e. a high percentage of dismissals) suggests that management is not satisfied with the performance of persons

in the job (Miller, 1987:11-12).

Miller's main finding is that labour turnover declined dramatically in 1986 relative to 1985 and the 1970s. This was attributed to the recessionary conditions which were particularly acute in the Eastern Cape which is characterised by higher than average national unemployment levels. The labour turnover rate for 1986 for various groups is indicated in Table 7.6.

Table 7.6: Labour Turnover Rates (LTR), Port Elizabeth-Uitenhage 1986

Group	LTR (% p.a.)	Median Length of service of leavers (months)	% Voluntary separations
White males	10.6	26.4	80.5
Coloured males	11.6	18.0	34.6
African males	8.2	48.3	24.3
Coloured females	10.1	11.1	72.6
African females	4.5	36.8	80.0

Source: Miller, 1987.

Low labour turnover during 1986 was attributed to the prolonged recession and disinvestment, both factors leading to increased unemployment and scarcity of jobs. This led to the low levels of turnover, characteristic of the region since 1982 being maintained. In fact, for all races and for the entire sample, "labour turnover rates were lower than in 1985 and were the lowest ever recorded since the beginning of the survey in 1972" (Miller, 1987:38-39).

7.5.3 Labour Turnover - The Manufacturing Sector Survey Data

Mean employment experience for the survey data is 13.9 years with a mean employment experience in current employment of 7.4 years and mean employment experience in prior employment of 6.6 years. The last figure says nothing, however, about the frequency of job changes. Hence, the measures of job duration provided here are mean current employment experience and mean previous employment experience while the measures of job mobility used are the average time spent per employer in previous employment and average time spent in all employment. These measures are evaluated with a view to determining whether there are crucial differences by race, gender, educational level and occupation.

Table 7.7: Job Duration by race and gender (years)

Group	Mean Employment Experience			
	Current Employment	Previous Employment	Per Previous Employers	Per All Employers
All	7.4	6.6	3.6	6.8
Males	7.7	7.2	4.0	7.0
Females	7.0	5.6	2.9	6.5
Africans	8.8	7.0	3.7	7.3
Whites	5.6	7.3	3.9	6.4
Coloureds	7.3	5.0	2.9	6.7
Indians	5.2	8.2	3.9	6.1

It is evident from column 3 of Table 7.7 that significant job mobility differences occur between the sexes and between Coloureds and other races. The low job duration figure observed

for females would be expected given the intermittent nature of female labour force participation. It is not clear why Coloureds should have a significantly higher mobility but it is probably due to the sample bias as females make up the majority in the Coloured sample. However, an examination of mobility rates within the male group (not shown in Table 7.5) shows first, large differences and second, Coloured males also have the lowest measure. Mean employment experiences for males by race were Indians 5.7 years, Whites 4.5, Africans 3.9 and Coloureds 2.9. A possible explanation for the low job duration of Coloureds lies in the Coloured Labour Preference Policy which prevented employers in the Western Cape from employing Africans if Coloured workers were available. With influx control rigidly controlled in this region, there could have developed in the 1970s and early 1980s, before this legislation was repealed, a shortage of unskilled and semi-skilled manual labour enabling Coloured workers to change jobs frequently.

While turnover is highest amongst females, the differentials within the female group were not substantial - that is, all female groups were almost equally prone to frequent job changes in prior employment. When current employment experience is added (Column 4) the male-female differentials narrow considerably. Within the male group (not shown in Table 7.7) the differential is 0.8 years and within the female group it is 2.0 years. Indian females had the highest overall mobility and African females the lowest.

The significant disparity between the figures of columns 1 and 2 shows that there is substantial stability in current employment for all groups except Whites and Indians. As these two groups are those with the highest level of educational attainment, it could mean that education is positively related to mobility.

Age is an important determinant of mobility with younger workers more likely to change jobs than older, more established employees. This is confirmed by the survey data which show that that the mean previous employment experience and experience per previous employers for workers under age 35 are considerably lower than for those aged over 35 (Table 7.8).

Table 7.8: Job Duration by Age Group

Age group	Mean Employment Experience			
	Current Employment	Previous Employment	Per Previous Employers	Per All Employers
Under 35	4.3	3.2	2.0	4.4
Over 35	11.7	11.5	6.2	10.3

Table 7.9 shows how job duration varies by occupation. Somewhat surprisingly skilled manual workers were the most stable in prior employment. Given the skills shortages and higher wages commanded by this group it would be expected that job changes would be more frequent. The racial analysis of this group shows that White skilled manual workers were the most stable (8.4 years) with

Africans (3.2 years) and Coloureds (4.4 years) the least. For these two latter groups, it seems that once suitable jobs are found, stability improves. Hence, the "mean employment experience per all employers" figure for these groups rises respectively to 6.1 years (Africans) and 8.6 years (Coloureds).

Mobility depends to some extent on the nature of the contract between employers and employees. Both must have incentives; in the case of employees to stay and in the case of employers to keep their employees. In the case of skilled manual workers employers may be holding onto such workers because they value the general skills which they possess.

Table 7.9: Job Duration by Occupation (years)

Occupation	Mean Employment Experience			
	Current Employment	Previous Employment	Per Previous Employers	Per All Employers
Unskilled Manual	6.7	6.4	3.4	6.3
Semi-skilled Manual	8.4	6.5	3.5	6.6
Skilled Manual	5.7	9.9	6.7	7.1
Lower Non-manual	8.4	4.9	2.6	8.3
Higher Non-manual	6.0	8.0	3.7	6.4

A similar situation occurs with respect to lower non-manual workers. Frequent job changes occur until individuals find the

"right" job. In the case of Africans, for instance, mean employment experience per previous employer was 1.2 years, and mean employment experience per all employers was 10.8 years. For Coloureds the corresponding figures were 2.4 and 12.8, for Whites 2.5 and 6.7 and for Indians 3.8 and 6.4.

Table 7.10 shows mean employment experience per employer by educational level and race. It is clearly evident from this table that the frequency of job changes increases with the level of education. This is to be expected as the more educated would have more opportunities for better paid employment especially in an economy characterised by a general shortage of educated labour. However, this positive relationship between mobility and education is evident not only for Whites and Indians who have received better quality education but also for Africans whose education has been deficient both quantitatively and qualitatively.

Table 7.10: Employment Experience per Employer by Educational Level and Race (mean years)

Level of Education	Race				
	African	White	Coloured	Indian	All
None	10.2	-	-	-	10.2
Primary	8.3	-	6.2	-	7.7
Lower Secondary	7.5	8.4	7.4	11.3	7.7
Higher Secondary	4.4	7.8	4.8	4.9	5.9
Total	7.4	5.6	6.7	6.0	6.8

7.5.4 Mobility Functions

In order to determine why some groups are more mobile than others and to examine the characteristics of workers which influence their mobility, a mobility function was estimated. In such a regression analysis, the rate of mobility was set as the dependent variable and a range of worker characteristics as the independent variables.

The rate of mobility is defined as

$$M = \frac{j - 1}{k}$$

where k is length of employment experience and j is the number of jobs held.

Two notes of caution should be sounded here. First, current characteristics of workers may be a poor guide to their characteristics at the time at which they moved. As Knight and Sabot (1982:217) state: "For instance, a highly mobile individual aiming for a job in manufacturing may cease to be mobile on achieving his objective". This problem can be partly overcome by not including current wage as an independent variable so that of the independent variables used, only occupation poses a potential problem. Second, there is a problem in attempting to apply ordinary least squares regression methods when the dependent variable has zero as its most common or frequent value. It has been suggested in the literature that the dependent variable will

not be normally distributed and that the Poisson distribution would be the better approximation. However, subsequent analyses have shown that tests based on OLS estimates would not be misleading.

Table 7.11 shows the results of the specified mobility functions.

Table 7.11: Mobility Functions - Mobility Rate and Worker Characteristics

Variable		Coefficients	
Schooling	S	0.0008	0.0008
Experience:	E		0.003*
2-5 years	E2	-0.033**	
6-10 years	E3	-0.003	
11-15 years	E4	-0.006	
16-20 years	E5	-0.066*	
> 20 years	E6	-0.062*	
Occupation	O		
Unskilled Manual	O1	0.065*	0.062*
Semi-skilled Manual	O2	0.057*	0.052*
Lower Non-manual	O4	-0.037**	0.041**
Higher Non-manual	O5	-0.048**	0.032**
Race	R		
African	R1	-0.062*	-0.065*
Coloured	R3	-0.008	-0.013
Indian	R4	0.023	0.033
Gender	G		
Male	G1	0.014**	0.013**
C		0.135	0.155
F		10.432	8.835
R^2		0.118	0.075

The mobility functions specified above explain only between 7.5

per cent and 11.8 per cent of the variation in mobility. Most of the variables are significant, however, at either the 1 or 5 per cent level.

Table 7.11 shows that schooling, unexpectedly, is not a significant determinant of mobility. It also indicates, as expected, that employment experience reduces mobility. In column 1 all the experience dummy variables have a negative value relative to the lowest, omitted category (E1, less than two years experience). Once workers have settled into jobs for several years mobility is less likely.

The mobility functions specified in Table 7.11 show that unskilled and semiskilled manual workers are more mobile than skilled manual workers (O3, the omitted category) while white collar workers are less so. The mobility of unskilled and semiskilled workers is surprising, especially of the former group, given their relative surplus in the South African economy.

Africans are less mobile than Whites (R2, the omitted category). Given influx control legislation (only recently repealed) which controlled the movement of Africans into the urban areas and the relatively high levels of African unemployment, it is to be expected that Africans would wish to change jobs less frequently than others. Coloureds are also less mobile than Whites but the coefficient for this group is not statistically significant (and neither is the positive coefficient for Indians).

Males are more mobile than females although the intermittent character of female labour force participation would suggest otherwise. The relative lack of female mobility is probably due to the employment stability of African females for reasons outlined above, namely, statutory barriers to movement and scarcity of formal sector employment.

What this analysis suggests is that age, occupation, race and gender are important determinants of mobility. Although not reflected in the mobility functions, education also appears to be an important factor. The extent of mobility, however, is dependent on the prevailing economic circumstances. All the indications in the South African economy are that the restrictive economic climate has hampered mobility for all groups, especially in the manufacturing sector. Against this economic background, the elimination of statutory barriers in the labour market has stimulated a freer movement of labour, especially African labour. Given the slow growth of employment in the modern sector this influx has swelled the ranks of the unemployed. Thus workers in formal employment will tend to hold on to their jobs under such circumstances.

The employer interviews revealed a lack of concern about turnover. All the employers interviewed believed that the rates of turnover in their enterprises were normal. In the interviews on skilled manual and clerical occupations, employers noted that their enterprises took active steps to discourage workers

leaving through higher than average wage scales and fringe benefits. This was so because of critical shortages (in the case of skilled manual workers) and to avoid wasted expenditure on training (clerical and skilled manual workers).

In conclusion, under the prevailing economic conditions of the 1980s, low labour turnover would be expected in the South African economy. The groups that were most mobile in the survey data are as expected the young, the educated and those in higher non-manual occupations. Somewhat unexpectedly males, and unskilled and semi-skilled workers, probably Coloured workers in the Western Cape, were also prone to relatively frequent job changes.

CHAPTER EIGHT

OCCUPATION, EDUCATION AND EARNINGS

8.1 INTRODUCTION

The role of occupation in the determination of earnings is rarely considered by economists. The usual approach is to explain earnings in terms of the individual characteristics of workers rather than of the characteristics of the work they perform. The apparent impact of occupation is often described as the indirect effect of education. This chapter demonstrates that occupation has a powerful and direct effect on earnings. To explain why this is so requires a clarification of the relationship between skill, occupation, productivity and earnings.

Earnings are linked to productivity through skill acquisition. Skill can be defined as the ability to perform specific tasks which can be learnt. Occupation plays an important role in the determination of earnings because it is an important determinant of skill acquisition. Some skills are learnt in formal schooling, others in on-the-job training programmes and others through experience on the job. Occupations differ in the minimum level of

skills required of new employees and in the opportunities they provide for workers to acquire more skills. The nature of a job thus determines the productivity level that a worker can achieve. The relation between skills and earnings therefore differs among occupations. Occupation is thus a determinant of skill and of productivity and hence of earnings.

The aim of this chapter is threefold: first, to illustrate the important role of occupation in the determination of earnings; second, to explain the effects of educational expansion on the educational composition of occupations and third, to examine the determinants of occupational mobility.

The next section, describes how economists conventionally explain the reasons for occupational wage differentials. In section 8.3 the relation between occupation, education and earnings is analysed with reference to the survey data. In section 8.4 occupational earnings functions are specified in an attempt to shed some light on the role of occupation in the determination of earnings. Section 8.5 examines the changing relation between education, occupation and earnings. The "filtering-down" of more educated labour into lower occupations and the impact of this process on earnings are analysed. Finally, in section 8.6 the extent to which occupational mobility has occurred is examined.

8.2 OCCUPATIONAL WAGE DIFFERENTIALS

Adam Smith (1776: 112-123) pointed to five reasons for differences in wages between occupations in the long run. The first was what he termed the "agreeableness" of the job. Compensatory differentials would be paid to those in dirty, dangerous, monotonous or stressful occupations. Second, came the "degree of constancy of employment" reflecting the incidence of unemployment in different occupations. Smith's third reason was the "probability of success". The dispersion of earnings within occupations will affect individuals' willingness to enter them, depending on their attitudes to risk and hence the average earnings between occupations. These two factors indicate that expected lifetime earnings, rather than pay in any one month or year, are relevant to rational occupational choice. Fourth came "the trust to be reposed in the worker", or the degree of responsibility of the work. Lastly, Smith introduced the theory of human investment by referring to the "cost of learning the trade".

This fifth factor suggests a simple human capital theory of occupational wage differentials in which the long run supply curves of labour to occupations are perfectly elastic at wage levels which equalise the marginal rates of return on the investments which each requires. In such a long run equilibrium, demand is irrelevant to the determination of relative wages. In the short run, however, supply curves will be upward-sloping

because the acquistion of skills takes time and wage differentials will be affected by shifts in demand.

Extending this neoclassical argument to allow for employer-financed training, the theory of labour hoarding predicts counter-cyclical fluctuations in occupational wage differentials. Skilled labour is more likely to be hoarded than unskilled. Thus in a recession the demand for skilled labour will fall less rapidly than that for unskilled workers and it will increase more slowly in the upswing (Oi, 1962). Similar conclusions can be drawn from a consideration of internal labour markets where higher level jobs are filled by promotion from within rather than through recruitment from the external market. In boom conditions, employers relax their promotion criteria, allowing less well-qualified workers to progress and increasing the supply of skilled labour relative to that of the unskilled. In a slump, standards are tightened and fewer workers are deemed to be skilled (Reder, 1955). Oi's argument focuses on cyclical shifts in demand for different levels of skill, while Reder's relies on changes in supply. Both are consistent with neoclassical theory.

Several other explanations can be added to Adam Smith's five determinants of occupational wage differentials. Trade union power may serve to create and maintain significant occupational wage differentials. Crowding of certain groups, for example, females and Blacks, in certain occupations will mean that gender and racial discrimination reduces the average earnings of all

workers in predominantly female or Black occupations. Smith also minimised the importance of innate ability required in different occupations, since he believed that most skills could in fact, be acquired through training and practical experience. In the few occupations for which this is not the case, the supply of labour will be more or less elastic. Finally, he attributed little significance to a variety of institutional factors which are often regarded as relevant, including custom, status, notions of fairness and the existence of socio-cultural barriers into particular occupations.

These explanations indicate that occupation may influence earnings in various ways. However, very few economists have gone further to spell out clearly the links between occupation, education and earnings. The pioneering work on these issues has been done by Knight (1979) and De Beyer and Knight (1989). In these studies it is clearly shown that the "occupation of a worker is an important intermediary between his education and his earnings" (Knight and Sabot, 1990: 115). De Beyer and Knight (1989) show further that education, which primarily represents cognitive skill, is an important influence on occupational attainment. However, because elements of human capital are occupation-specific, the occupation of a worker is an important determinant of the vocational skills that he acquires and therefore of his earnings.

While most economists explain earnings in terms of the individual characteristics of workers and not of the jobs they perform, De

Beyer and Knight argue that job-related as well as individual characteristics can be important and that the two are likely to interact.

In developing a theory of occupation-specific productivity and earnings, De Beyer and Knight (1989) suggest that earnings in one occupation may exceed that in another because "the job requires superior personal characteristics of incumbents" (p.595). Use is made of the occupational production function concept developed by Knight (1979) to show for each occupation a relation between education and productivity. The basis of the model (De Beyer and Knight, 1989: 596-599) is that the value of education differs between occupation for two reasons: (a) the cognitive skill acquired in education may be of more value in some occupations than others; and (b) education may itself be a factor in the production function of post-school human capital formation; some occupations may involve greater vocational skill formation than others. Thus the value of personal characteristics such as natural ability and cognitive skill can vary among occupations. Occupations are thought of as production processes with skills as inputs and productivity as output.

The essence of the OPF is that some occupations may involve greater skill formation on the job than others. Imperfections in the capital market work to ration education at the upper levels and raise occupational production functions for occupations filled by the educated. As shown by Knight and Sabot (1990,

Appendix F), in competitive markets there is no inconsistency between the concept of the OPF and the Mincerian relationship between education and productivity, which ignores occupation. It is when capital or labour markets are not competitive that the OPF is most useful as an analytical device (Knight and Sabot, 1990: 116).

The OPF suggests a close connection between formal schooling, training, employment experience and earnings. Some occupations involve more vocational skill than others and therefore offer workers higher wages once their skill acquisition is complete. Additional education is more valuable in some occupations than in others both because it raises productivity directly and because it facilitates formal and informal training. It is predicted, therefore, that current earnings vary by occupation when other measured inputs are standardised and that the response of earnings to additional education, to training, and to additional years of experience varies among occupations (Knight and Sabot, 1990:117).

8.3 THE RELATIONSHIP BETWEEN OCCUPATION, EDUCATION AND EARNINGS: EVIDENCE FROM THE SURVEY DATA

The relation between education and occupation was clearly evident in Table 5.8 (p.189). The average years of education of the employees in the different ocupations increases consistently through the order in which the occupations are listed. However, a surprising feature of Table 5.8 was that a relatively large proportion of unskilled and semi-skilled manual occupations is being filled by individuals with secondary education. The mean years of education for unskilled manual, semi-skilled manual, skilled manual, lower non-manual and higher non-manual occupations were respectively 8.20, 9.62, 11.17, 11.94 and 13.78. Higher non-manual occupations thus have an average level of education which is 1.7 times that of unskilled manual workers, which is considerably lower than that obtained in other developing countries such as, for example, Kenya (2.5) and Tanzania (3.6) (Hazlewood et al, 1989).

Table 8.1 shows a consistent, increasing relationship between earnings and occupation according to skill level. However, workers in lower non-manual (LNM) occupations earn, on average, less than skilled manual (SM) workers. These relationships are valid for the whole sample as well as for both sexes and all races.

Table 8.1: Occupational Wage Differentials (Mean Rand Earnings Per Month)

Group	Occupation					
	USM	SSM	SM	LNM	HNM	ALL
All	476	671	1708	1164	2786	1060
Males	534	724	1902	1116	2867	1184
Females	415	542	737	1221	2521	859
Africans	525	672	1061	848	-	641
Whites	-	1211	2167	1303	2826	2123
Coloureds	403	592	861	1097	2545	653
Indians	-	926	1556	1094	2450	1307
Males:						
African	548	691	1061	864	-	671
White	-	1211	2167	1376	2900	2416
Coloured	466	720	898	1215	2857	884
Indian	-	895	1556	1124	2450	1597
Females						
African	469	586	-	410	-	525
White	-	-	-	1286	2596	1658
Coloured	385	505	737	1001	1817	523
Indian	-	1050	-	1087	-	1086

Substantial earnings differentials exist between the highest and lowest occupations. Skilled manual workers for instance, earn on average, 3.6 times as much as unskilled manual workers and those in higher non-manual occupations earn 2.4 times more than those in lower non-manual occupations. Earnings differentials are narrower in manual occupations amongst females, Africans and Coloureds. It is the high premium paid to White male artisans that raises the overall differentials within manual occupations. Similarly, the high earnings of individuals in the higher non-manual categories reflect the relative scarcity of educated labour, particularly in managerial and professional occupations.

Substantial earnings differentials are also evident by gender and race within occupations. In all occupations except lower non-manual, women earn less than men with differentials being the largest in manual occupations. In terms of race, Whites receive the highest pay in all occupations with Africans, Coloureds or Indians (HNM) the lowest. There are also sharp earnings differentials between such lower non-manual occupations as clerical and technical occupations and the higher non-manual occupations (Table 5.15, p.206). In the following sections an attempt is made to explain occupational wage differentials through the use of occupational earnings functions.

To conclude this section it may be useful to examine the relationship between employment experience and occupation. This issue is particularly crucial to determining which groups of workers are occupying the better jobs. In the case of Africans, for instance, the relevant question could be: "Are better jobs being filled by younger, more educated Africans or older, more experienced Africans?" This question is addressed in subsequent sections. In the meantime, however, Table 8.3 shows that unskilled manual workers have the least experience and skilled manual workers the most, but the differential between these two groups is only 3.7 years.

Table 8.2: Mean Employment Experience by Occupation (years)

Occupation	Mean Employment Experience
Unskilled Manual	11.6
Semi-skilled Manual	13.8
Skilled Manual	15.3
Lower Non-manual	13.2
Higher Non-manual	13.3

8.4 OCCUPATIONAL EARNINGS FUNCTIONS

Studies which include occupations in earnings functions are rare (some exceptions are Stewart, 1982; De Beyer and Knight, 1989; Knight and Sabot, 1990). When occupation is excluded from earnings functions it is implied that occupation has no independent effect on earnings. The human capital model used in earnings functions almost always comprises education and experience as the basic human capital variables. In such models the coefficient on formal schooling will pick up all the effect of education, whether direct or indirect. When included the significant occupational coefficients, however, would suggest a powerful link between occupation and earnings. This could be a direct link, or occupation could be acting as a proxy for some excluded variable with which it is highly correlated and which affects earnings. If the excluded variable is unobservable, then there is a strong argument for including occupation as its proxy.

Although the internal labour market and job competition models allow that occupation has an independent effect on earnings because productivity is associated with the jobs and not in the workers, they deny any role to workers' characteristics except in determining access to more desirable jobs. On the other hand, the conventional human capital model focus includes worker characteristics and neglects occupational characteristics. The model developed here suggests that human capital variables interact with occupational characteristics to determine earnings.

One reason why occupation is not normally incorporated into the analysis of earnings is that information on occupation obtained through labour force surveys is often vague and/or crude. In this survey, specific attention was paid to the precise skill requirements of each occupation.

As described in Chapter Two and Appendix B, care was taken in classifying the occupation of the respondent according to skill content. Five broad categories were thus distinguished: unskilled manual (01), semi-skilled manual (02), skilled manual (03), lower non-manual (04) and higher non-manual (05). It is presumed that skill level ascends among the manual groups in the order of 01 to 03 and among the non-manual groups from 04 to 05. There is some uncertainty, however, about the skill rankings of 03 and 04.

An earnings function with the dependent variable being the natural logarithm of monthly earnings and independent variables

in dummy form for schooling, employment experience, gender, race, occupation and receipt of on-the-job training is shown in column 1 of Table 8.4. Column 2 shows an earnings function with the same variables except occupation.

Table 8.3: Earnings Functions with and without Occupation Terms

Variable		Coefficients	
Schooling			
Illiterate	S1	-0.115**	-0.263*
Primary	S2	-0.086**	-0.208*
Higher Secondary	S3	0.108**	0.167*
Post-secondary	S4	0.245**	0.520*
Employment Experience			
2-5 years	E2	0.057**	0.088*
6-10 years	E3	0.084**	0.144**
11-15 years	E4	0.104**	0.168**
16-20 years	E5	0.147**	0.224**
> 20 years	E6	0.195**	0.296**
Males	G1	0.106*	0.165*
Africans	R1	-0.193*	-0.405*
Whites	R3	0.319*	0.522*
Indians	R4	0.107*	0.210*
Unskilled Manual	O1	-0.570*	
Semi-skilled Manual	O2	-0.324*	
Lower Non-manual	O4	0.038	
Higher Non-manual	O5	0.669*	
Training	T1	0.035*	0.077*
Constant		6.894	6.836
F_2		333.408	238.464
R^2		0.808	0.737
N		1205	1205

Note: The omitted race variable in these regressions is the Coloured group. As this group was the only common one to all five occupational categories, it was used as the omitted category in this and subsequent regressions in this chapter in order to facilitate the comparative analysis.

The explanatory power of the regression containing occupation terms is in excess of 80 per cent. There is the expected monotonic relationship between the human capital variables (schooling and employment experience) and earnings with all coefficients significant at the 1 or 5 per cent level.

There is evidence of discrimination against females (discrimination coefficient of 0.106). Africans earn, on average, 18 per cent less than Coloureds (R3, the omitted category), Whites 38 per cent more and Indians 11 per cent more. It is possible that the race variables may simply be serving as proxies for unmeasured productive characteristics such as ability. On-the-job training also raises earnings.

The order of the occupation coefficients corresponds to the predicted order of occupations by skill level. The earnings spread between blue- and white-collar occupations is quite considerable. Earnings rise monotonically from occupations O1 to O5, although the coefficient on the lower non-manual occupation is not significant (see also Table 5.2, p.171).

The addition of occupation dummies to the earnings function is consistent with only a very simple version of the occupational production function, that is, one in which the coefficients on employment experience, on formal training, and on education in the earnings function do not vary among occupations. It is implicit in the general model that there are occupational

differences not only in the level of wages but also in the returns to education, to formal training, and to employment experience.

A comparison of columns 1 and 2 sheds further light on the relationship between education, occupation and earnings. In column 2, the omission of the occupation variables shows the combined effect of education and employment experience on income. Therefore, the coefficients are larger and the spread of earnings by educational level widened. For instance, with the inclusion of occupation variables, higher secondary education now commands a premium of only 11 per cent (18 per cent in Column 2), post-secondary education 28 per cent (68 per cent), primary schooling minus 9 per cent (-19 per cent) and illiterates minus 9 per cent (-23 per cent). Moreover, the omission of the occupation terms raises some of the other coefficients as well, namely, employment experience, males, Indians, Whites and those in receipt of formal training. This is because of the positive collinearity between each of these variables and occupations ordered by skill content (De Beyer and Knight, 1989:603). The better paying occupations tend to attract higher proportions of more educated workers, who are more likely to be male and White. The role of occupation might be exaggerated by the estimated coefficients because of unmeasured factors such as ability but it is unlikely that occupation is only acting as a proxy for ability.

Table 8.4 reports earnings functions for each occupation.

Table 8.4: Occupation-specific Earnings Functions

Variable		USM	SSM	SM	LNM	HNM
Schooling	S	0.003	0.003	0.052**	0.005	0.048*
Experience	Ex	0.048*	0.059*	0.072*	0.040*	0.058*
Experience Squared	Ex^2	-0.0005*	-0.0001*	-0.0015*	-0.0001	-0.0002*
Africans	R1	-0.060**	-0.252*	-0.211*	-0.308*	
Whites	R2		0.329*	0.359*	0.243*	0.078
Indians	R4		0.194**	0.138**	0.059	-0.052
Males	G1	0.099*	0.133*	0.160*	0.060	0.084**
Training	T1	0.080**	0.046**	0.042**	-0.029	0.003
Constant		5.903	6.495	6.001	6.833	7.006
F		19.835	24.165	33.033	11.092	6.177
R^2		0.289	0.326	0.777	0.300	0.230
N		319	426	86	216	158

The percentage of the variation in earnings explained is low in the unskilled manual occupations but tends to rise with occupational skill level in the manual occupations. The explanatory power of the earnings functions for the non-manual occupations is low. The coefficients on the education variables are significant only for skilled manual and the higher non-manual occupations. Coefficients on formal training are significant only for manual occupations.

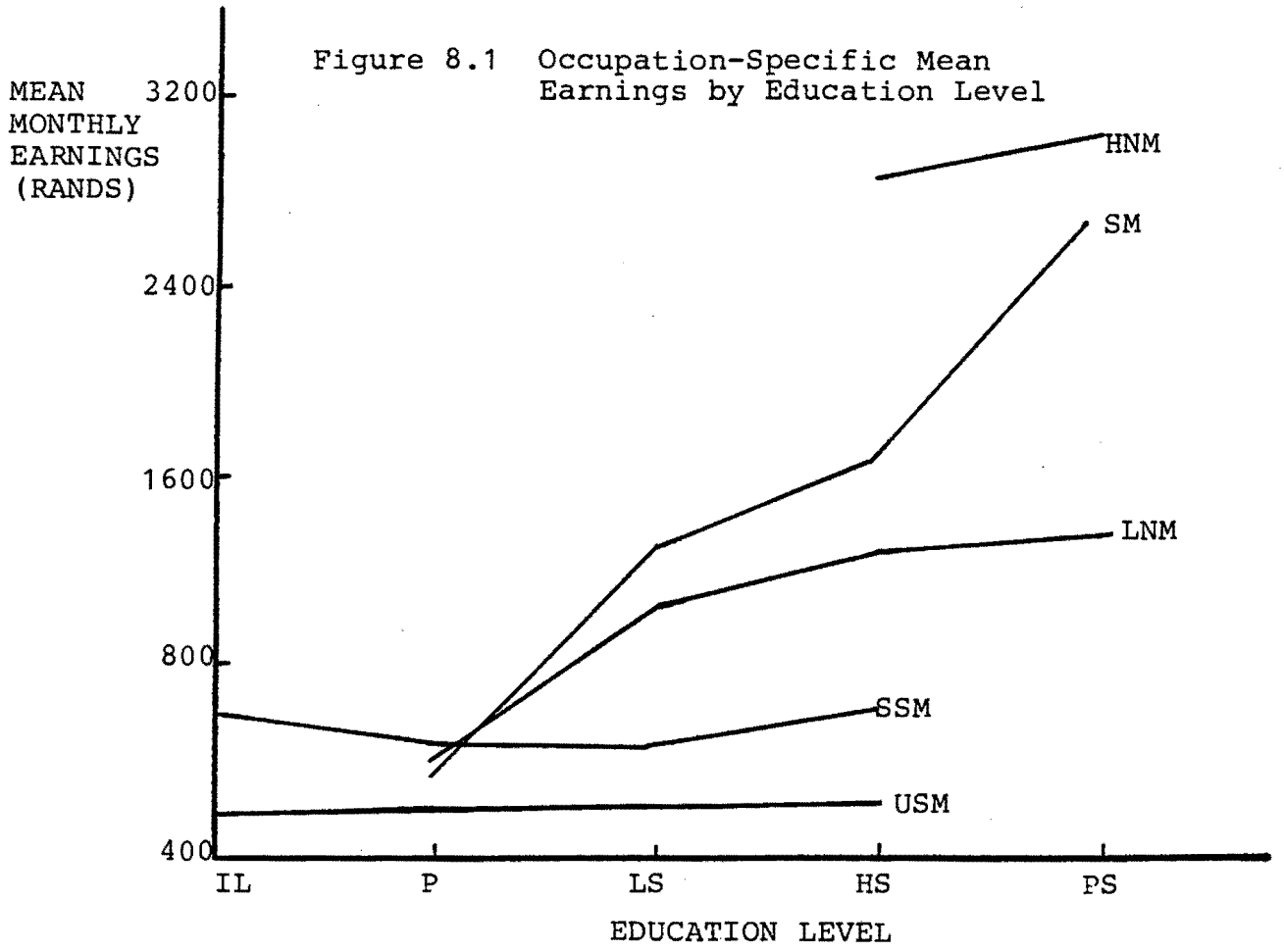
The returns to education, employment experience and training differ among occupations. Figure 8.1 shows how, within each occupation, earnings varies with educational level. Earnings are weakly responsive to education in unskilled and semi-skilled manual jobs but strongly responsive in skilled manual and higher

non-manual occupations. It is in these occupations that education pays off. It is apparent from Table 8.4 and Figure 8.1 that in general the less educated do not enter the more skill intensive occupations. On the other hand, the more educated are entering the less skill-intensive occupations (Table 5.8) as the supply of educated labour increases.

Figure 8.2 shows how the returns to employment experience vary among occupations through occupation-specific mean wage-experience profiles. There are positive returns to employment experience in every occupation. These returns are strong in the skilled manual, higher non-manual and semi-skilled manual occupations and only slightly weaker in the unskilled manual and lower non-manual occupations.

The returns to training are positive and significant for manual workers with unskilled manual workers unexpectedly receiving the highest returns. This issue is explored further in Chapter Nine.

Figure 8.1 Occupation-Specific Mean Earnings by Education Level



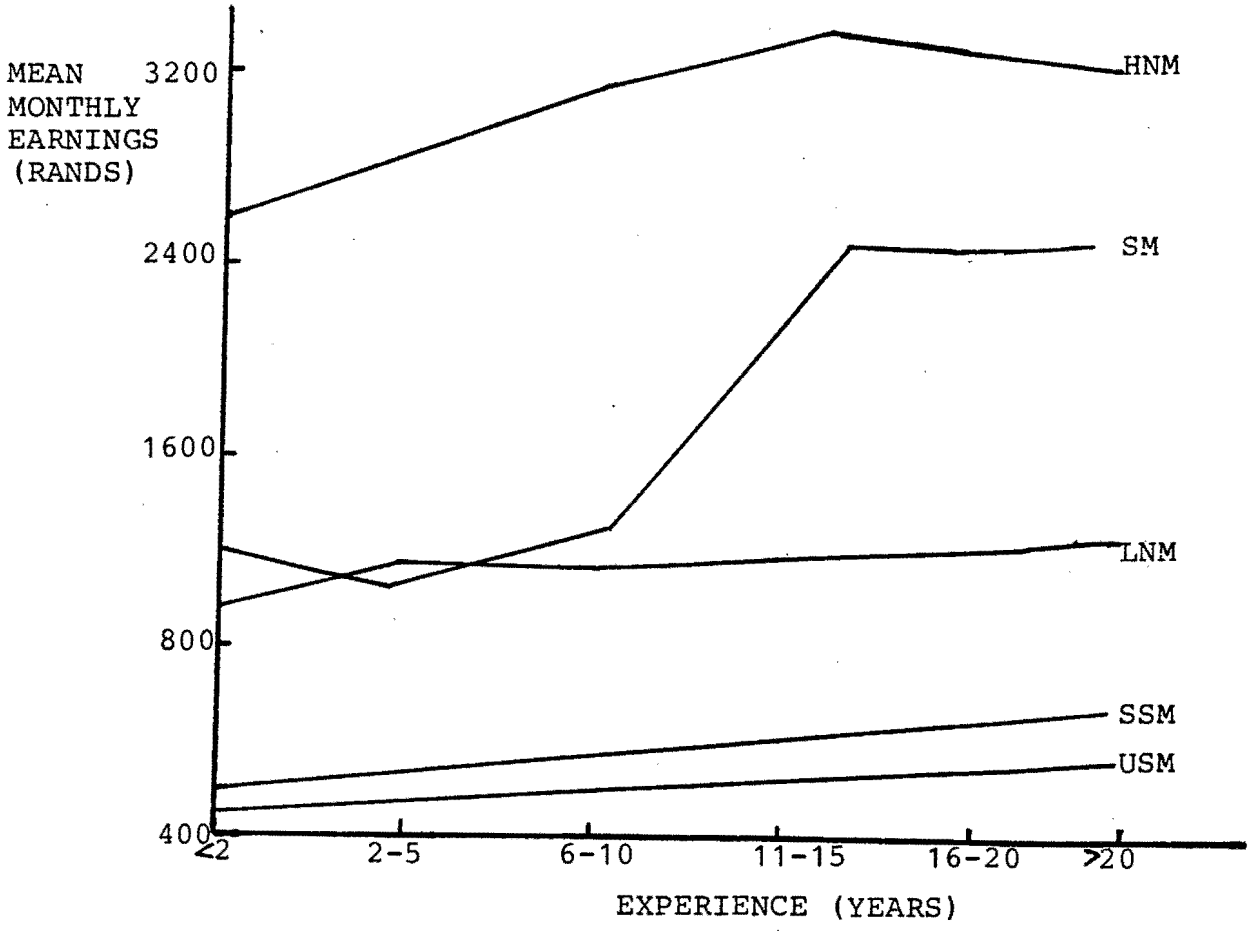


Figure 8.2 Occupation-Specific Mean Earnings by Employment Experience

8.5 THE CHANGING RELATION BETWEEN EDUCATION AND OCCUPATION: FILTERING DOWN

8.5.1 Filtering Down

A feature of the changing relationship between education and occupation over time, particularly in countries where education is expanding rapidly, is the so-called "filtering-down" process. In this process, as the supply of educated labour increases over time, so persons with a given level of education enter "lower level" occupations. In other words, the level of education attained by employees rises over time, so that for instance, an occupation filled ten or twenty years ago by people with primary education may now be filled increasingly by those with secondary education. Given the rapid rate of educational expansion in South Africa since the mid-1970s (Chapter One) this filtering-down process would be expected to occur.

Table 8.5: Employees by Date of Joining Labour Force - Mean Years of Education

Date of Joining Labour Force	Mean Years of Education	N
Pre-1952	6.5	51
1952-1957	7.4	63
1958-1963	7.4	92
1964-1969	8.9	176
1970-1975	8.9	214
1976-1981	9.8	279
1982-1987	10.3	292

Table 8.5 shows that the length of education of recruits to the labour force has risen consistently over time from a mean of 6.5 years in the period before 1952 to 10.3 years in 1982-1987. Consistently with this Table 8.6 shows a clear change over time in the occupational distribution of employees with each particular level of education. For every level of education, jobs lower in the hierarchy of occupations are more important for more recent entrants to the labour market than for earlier entrants. This is particularly evident in the post-1970 period in the primary, lower and higher secondary categories where there are adequate samples rather than in the "no education" category. 86 per cent of labour market entrants with primary education, for instance, went into unskilled manual occupations in 1982-87 compared to an average of 38 per cent between 1952 and 1969. Almost half of lower secondary school leavers are now entering unskilled manual occupations compared to between one fifth and a quarter in the 1950s and 1960s. Moreover, 60 per cent of higher secondary school leavers are going into unskilled manual and semi-skilled occupations.

Table 8.6: Employees by Education, Year of First Job and Occupation (percentages)

Education and Occupation	Year of First Job						
	Pre-1952	52-57	58-63	64-69	70-75	76-81	82-87
No education							
USM	100	50	25	100	60	0	67
SSM	0	50	75	0	40	0	33
	(4)	(2)	(8)	(2)	(10)	(0)	(9)
Primary							
USM	28	37	39	37	55	37	86
SSM	72	63	55	61	43	60	14
SM	-	-	6	-	-	3	-
LNM	-	-	-	2	2	-	-
	(25)	(30)	(31)	(41)	(49)	(35)	(22)
Lower Secondary							
USM	6	24	21	25	15	40	49
SSM	25	24	26	18	65	43	42
SM	40	29	9	17	8	7	2
LNM	29	5	35	35	12	10	7
HNM	-	19	9	5	-	-	-
	(17)	(21)	(34)	(83)	(74)	(130)	(110)
Higher Secondary							
USM	-	10	-	-	-	7	21
SSM	25	10	-	5	20	41	39
SM	-	-	-	15	17	4	6
LNM	-	10	38	39	50	43	32
HNM	75	60	62	41	13	5	1
	(4)	(10)	(16)	(39)	(46)	(75)	(94)

Note: USM - Unskilled Manual; SSM - Semi-skilled Manual; SM - Skilled Manual; LNM - Lower Non-manual; HNM - Higher Non-manual.

In Table 8.7 the same pattern of change appears as a rise in the level of education of employees in a particular occupation. Only 8 per cent of unskilled manual workers who entered wage employment before 1952 had some secondary education, compared with 75 per cent of the most recent cohort. A similar picture emerges in

the other manual occupations. 40 per cent of semi-skilled manual workers who entered employment before 1952 had some secondary education, whereas for the most recent recruits that figure is 92 per cent. For skilled workers, because of small sample sizes for the early periods, comparisons can be made usefully only between the 1960s and the 1980s. In this group the trend has been towards more recruits with some higher secondary education. In the 1964-1969 period only 24 per cent of those who entered employment possessed some higher secondary education whereas for the most recent cohort that figure is 75 per cent (although it should be noted that there are no recruits with post-secondary education for the most recent group). In the lower manual category the trend has been towards increasing requirements of higher secondary and post-secondary education. In the period 1958-63 this group comprised only 37 per cent of all lower manual workers whereas in 1982-87 that figure is 85 per cent. In the higher non-manual category there appears to be little access for workers possessing less than a post-secondary qualification.

Table 8.7: Distribution of Employees across Educational Levels by Occupation and Year of First Job (percentages)

Occupation and Education	Year of First Job						
	Pre-52	52-57	58-63	64-69	70-75	76-81	82-87
Unskilled Manual							
No education	33	6	10	5	14	-	5
Primary	58	61	57	39	61	20	19
Lower Secondary	8	28	33	55	25	80	55
Higher Secondary	-	6	-	-	-	8	20
	(12)	(18)	(21)	(38)	(44)	(65)	(98)
Semi-skilled Manual							
No education	-	4	19	-	5	-	3
Primary	60	73	53	60	26	19	3
Lower Secondary	37	19	28	36	59	52	51
Higher Secondary	3	4	-	4	10	29	41
Post-secondary	-	-	-	-	-	-	1
	(30)	(26)	(32)	(42)	(82)	(108)	(90)
Skilled Manual							
Primary	-	-	40	-	-	6	-
Lower Secondary	-	100	60	56	25	53	25
Higher Secondary	-	-	-	24	33	18	75
Post-secondary	-	-	-	20	42	23	-
	(0)	(6)	(5)	(25)	(24)	(17)	(8)
Lower Non-manual							
Primary	-	-	-	2	3	-	-
Lower Secondary	100	50	63	63	23	25	15
Higher Secondary	-	50	32	33	58	62	58
Post-secondary	-	-	5	2	17	13	27
	(5)	(2)	(19)	(46)	(40)	(52)	(52)
Higher Non-manual							
Lower Secondary	-	36	20	16	-	-	-
Higher Secondary	75	64	67	64	25	13	2
Post-secondary	25	-	13	20	75	87	98
	(4)	(11)	(15)	(25)	(24)	(32)	(44)

The data illustrate very clearly the process of filtering down as the supply of educated labour increases. With the expansion of education, a higher level of education comes to be required of entrants into a particular occupation than was required in the

past. There is no doubt that some part of the change will be the consequence of individuals rising in the occupational hierarchy, from unskilled manual to semi-skilled manual employment, for instance, during the course of their employment. However, as section 8.6 shows, while there was some occupational mobility in the survey data, this factor nevertheless can be discounted as the major explanation. Thus with the educational composition of the labour force changing and its occupational composition virtually stable over time, filtering down has occurred. The fact that recent cohorts with relatively high education have entered "lower" occupations reflects the job protection which incumbents have enjoyed against better-educated entrants to the labour market, or the skills which they have acquired on the job (Hazlewood et al, 1989:87).

8.5.2 Filtering Down and Earnings

This section examines the way in which the process of filtering down affects the earnings structure. There are considerable differences in average earnings by occupation at each educational level, as well as on account of educational differences between occupations. For instance, average earnings in the manual occupations rise from R476 per month in the unskilled manual category to R1708 per month in the skilled category. In the non-manual occupations, the lower category averages R1164 per month and the higher R2786 (Table 8.1). Table 8.8 shows, however, that

it is the job an individual is in rather than educational qualifications that determines earnings. Within the unskilled manual occupations, for instance, the expected monotonic relationship between education and earnings is not found. A similar situation exists in the semi-skilled manual and lower non-manual catgories. However, across occupations there are differing rewards to education. An unskilled manual worker with no education receives R463 per month on average whereas a semi-skilled worker at a similar educational status receives R696 per month. Such a relationship is to be found in all the educational categories of both manual and non-manual occupations.

Table 8.8: Mean Monthly Wage by Education and Occupation (rands)

Occupation	Education				
	No education	Primary	Lower Sec.	Higher Sec.	Post-Sec.
Unskilled Manual	463 (20)	479 (104)	414 (151)	440 (26)	-
Semi-skilled Manual	696 (14)	602 (124)	663 (191)	719 (80)	880 (1)
Skilled Manual	-	888 (3)	1530 (40)	1748 (22)	3010 (20)
Lower Non-manual	-	898 (2)	1040 (77)	1233 (108)	1188 (29)
Higher Non-manual	-	-	2821 (7)	2777 (45)	2842 (103)

Table 8.9 on the other hand shows that there is a tendency for average earnings to be relatively lower for the most recent cohort in the manual occupations. Wage compression of the most recent cohort probably derives from the filtering down of the more educated into lower occupations. Within non-manual occupations average earnings have fluctuated with lower non-manual occupations of the most recent cohorts earning on average 113 per cent of the mean while that for the pre-1952 figure was 79 per cent. The mean for higher non-manual occupations has stabilised at 295 per cent after falling to 218 per cent in the 1964-1969 period.

Table 8.9: Year of Joining Labour Force - Mean Wage for Each Occupation as Percentage of Mean Wage of Each Cohort

Occupation	Year of Joining Labour Force						
	Pre-1952	52-57	58-63	64-69	70-75	76-81	82-87
Unskilled Manual	61	48	45	43	47	42	40
Semi-skilled Manual	93	60	61	47	56	67	67
Skilled Manual	-	132	68	179	192	167	99
Lower Non-manual	79	142	116	89	101	117	113
Higher Non-manual	292	254	249	218	253	281	295

The fact that the relation between education and occupation has been changing raises important questions for educational policy. It leads to the question of which educational level is "best" for each occupation. One approach to this question is to examine the

relationship between educational level and earnings within an occupation. However, it is not certain that the higher earnings of the more educated necessarily reflect greater productivity resulting from their additional education. The higher earnings might instead reflect the superior ability of those selected to proceed to the higher level of the education system, so that wages and educational attainment are both the consequence of the same underlying determinant. Alternatively, higher wages might be paid to the educated for non-economic reasons, for instance reflecting a feeling that it is right and proper for the more educated to be more highly paid (Hazlewood et al, 1989:92). Although the data cannot point to a choice between these competing hypotheses, they do provide some evidence on the relation between educational level and earnings within an occupation (Table 8.8). While there is no clear relationship in the case of unskilled and semi-skilled manual workers, in the skilled manual and non-manual occupations, particularly the former, average earnings increase with educational level. The process of filtering down causes a decrease in wages within an educational level but an increase in wages within an occupation. This evidence is consistent with the view that filtering down brings with it gains in productivity within an occupation.

8.6 OCCUPATIONAL MOBILITY

8.6.1 The South African Economy

Since the 1950s the occupational structure of the South African economy has undergone substantial change. In the immediate decade following World War Two, the predominant occupations were unskilled and semi-skilled manual primarily in agriculture and mining and to a lesser extent manufacturing. With the development of the manufacturing and service sectors especially in the 1960s and 1970s the tendency has been towards greater numbers of skilled manual, lower non-manual (clerical and sales workers) and higher non-manual (professional and technical occupations) workers. Table 8.10 shows how the occupational distribution of the economically active population has changed during the period 1951-1985.

Table 8.10: Occupational Distribution in South Africa - 1951-1985 (percentages)

Occupation	1951	1960	1970	1985
Professional & Technical	3.0	3.9	4.7	9.1
Administrative & Managerial	2.1	1.3	1.2	3.3
Clerical	5.0	5.9	7.3	10.2
Sales	2.1	3.0	3.8	4.7
Service	17.8	16.9	16.6	18.6
Farm, Forestry & Fishery	33.9	32.5	33.1	15.4
Production	36.1	36.5	33.3	38.7
	100.0	100.0	100.0	100.0

Sources: National Manpower Commission, Annual Report, 1979; S.A. Statistics, 1990. 1985 figures exclude the "independent homelands" so that figures of farmworkers especially, would be underestimates as these regions are characterised by a large agricultural sector.

Changes in the occupational composition are most evident in the professional, clerical and sales categories (all of which have increased substantially) and in the agricultural sector, with the proportion of farm workers falling by a considerable margin. It is difficult to estimate the extent of occupational mobility within manual occupations because all these workers are lumped together as "production workers". The 1985 statistics showed that unskilled workers comprised 17 per cent and tradesmen and apprentices 15 per cent of this group but most workers were in a group described as "mining and quarrying worker, production foreman, supervisor, operator, production and related workers", that is, a mix of supervisory, skilled, semi-skilled and possibly unskilled workers as well. In the 1970 data, all production workers are lumped together in the one "production" category.

8.6.2 The Survey Data

The purpose of this section is to measure the extent of occupational mobility within the survey sample and to suggest reasons for the degree of movement between occupations. Various measures of occupational mobility are available. It is possible to get a picture of occupational mobility

(i) within the firm;

(ii) between the last job and the current job;

(iii) between first paid employment and current employment; and

(iv) between 1977 and 1987.

Table 8.11 indicates the extent of occupational mobility within the current firm by race. This table enables us to get a picture of what movement there has been within the firm and who has moved. The first current occupational category shows that very little downward mobility has occurred with only 12 out of 319 workers having been in non-unskilled manual occupations previously. The current semi-skilled manual category shows that a significant proportion of unskilled manual workers had moved into semi-skilled manual jobs within the firm. 22 per cent of African and 31 per cent of Coloured semi-skilled manual workers had previously held unskilled manual jobs in the firm (derived from Table 8.11). Similarly, within the skilled manual group, there was some occupational mobility for Africans and Coloureds. Six of the 17 African skilled manual workers had been in unskilled manual or semi-skilled manual jobs previously and 3 out of 19 Coloured workers had been in a similar position. Even amongst the lower non-manual category, African workers showed the greatest degree of mobility with 38 percent of workers having been previously in non-lower manual occupations (derived from Table 8.11).

Table 8.11: Employees Grouped by Race - Distribution by Current Occupation and First Occupation in Current Firm

Current Occupation	First Occupation	Race			
		African	White	Coloured & Indian	Total
USM	USM	188	0	119	307
	SSM	1	0	5	6
	SM	0	0	1	1
	LNM	2	0	3	5
	Total	191	0	128	319
SSM	USM	63	0	38	101
	SSM	211	15	85	311
	SM	1	0	4	5
	LNM	8	0	1	9
	Total	283	15	138	426
SM	USM	4	0	0	4
	SSM	2	0	3	5
	SM	10	50	15	75
	LNM	1	0	1	2
	Total	17	50	19	86
LNM	USM	2	0	0	2
	SSM	5	0	1	6
	SM	4	1	5	10
	LNM	18	101	75	194
	HNM	0	4	0	4
	Total	29	106	81	216
HNM	SM	0	7	0	7
	LNM	0	27	9	36
	HNM	0	104	9	113
	Total	0	138	18	156

The relatively high occupational mobility could be due to one or more of several reasons: education, employment experience, training and technology. It could be that that it is the more educated or more experienced African workers or those that have

received some formal on-the-job training that are upwardly mobile. Closely linked to the issue of on-the-job training, both formal and informal, is the changing capital-labour mix. As some firms are becoming more capital-intensive, it is likely that Africans and Coloured unskilled workers are moving into semi-skilled and other occupations.

In order to ascertain whether education or experience is the main determinant of occupational mobility, these characteristics were examined for Africans and Coloureds who moved from unskilled to semi-skilled manual occupations and for Whites from lower non-manual to higher non-manual occupations. Inadequate sample sizes in other occupations prevented similar analyses. Table 8.12 shows the labour market experience of the three sets of individuals who gained some occupational mobility within the present firm. Table 8.13 shows the educational status for these same groups.

Table 8.12: Employees Grouped by Employment Experience and Occupational Mobility in the Current Firm (percentages)

Race	Occupational Mobility	N	Employment Experience (years) <2	2-5	6-10	11-15	16-20	>20
Africans	USM-SSM	63	11	14	24	3	13	35
Coloureds	USM-SSM	38	8	24	21	21	11	16
Whites	LNM-HNM	27	0	4	11	11	15	59

Note: Occupational mobility indicated as USM-SSM, for example, shows mobility from unskilled to semi-skilled manual occupation.

Employment experience is an important factor in the occupational mobility of Africans from unskilled to semi-skilled occupations with 75 per cent of them having 6 years or more of labour market experience. Employment experience is less important for Coloured occupational mobility for the same occupational categories. Experience was a crucial factor in the occupational mobility of Whites from lower non-manual occupations to the higher non-manual occupations. Education, on the other hand, is an important factor for all three groups (Table 8.13).

Table 8.13: Employees Grouped by Race, Education Level and and Occupational Mobility(percentages)

Race	Occupational Mobility	N	Educational Level: No Educ.	Primary	Lower Sec.	Higher Sec.	Post-Sec.
Africans	USM-SSM	63	-	33	17	50	-
Coloureds	USM-SSM	38	-	24	24	53	-
Whites	LNM-HNM	27	-	-	22	52	26

Table 8.14 shows the extent of occupational mobility between the individual's previous job and his first job in the current firm.

Table 8.14: Employees Grouped by First Job in Current Firm - Distribution by Occupation in Last Job (percentages)

Occupation in last job	First Job in Present Firm					
	USM	SSM	SM	LNM	HNM	(N)
USM	66	27	2	5	0	(173)
SSM	19	74	7	0	0	(105)
SM	0	0	78	19	3	(32)
LNM	1	13	4	61	21	(112)
HNM	0	0	0	1	99	(25)

Most of the movement between jobs has been to the same occupations. The little upward occupational mobility that has occurred has been from the lower non-manual category and the unskilled manual to the semi-skilled manual category category. This suggests that most individuals have changed jobs either for higher pay within the same occupation or that the mobility has been involuntary through retrenchment which in the South African context is a plausible explanation given the poor performance of the economy during the 1980s. The fact that a significant proportion of semi-skilled manual and lower non-manual workers changed to lower occupations reinforces this argument.

Some evidence of longer-term occupational mobility is available from an analysis of Tables 8.15 and 8.18 which show respectively what mobility there has between the occupation in first paid employment and the current occupation and between 1977 and 1987.

Table 8.15: Employees Grouped by Current Occupation - Distribution by Occupation in First Paid Employment (per cent)

Occupation in First Paid Employment	Current Occupation USM	SSM	SM	LNM	HNM	(N)
Unskilled Manual (USM)	56	42	1	1	0	(433)
Semi-skilled Manual (SSM)	6	75	6	7	6	(197)
Skilled Manual (SM)	0	0	70	2	28	(80)
Lower Non-manual (LNM)	0	12	1	59	27	(198)
Higher Non-manual (HNM)	0	0	0	3	97	(30)

Considerably more upward occupational occurs, as expected, over the worker's career than within one firm. Especially in the unskilled manual category and to a lesser extent in the skilled manual and lower non-manual categories, significant upward mobility is evident.

Tables 8.16 and 8.17 show personal characteristics (employment experience and education) of three groups who achieved some degree of occupational mobility between their first paid employment and their current employment.

Table 8.16: Employees Grouped by Race, Occupational Mobility between First Paid Employment and Current Employment and Employment Experience(per cent)

Race	Occupational Mobility	N	Employment Experience <2	2-5	6-10	11-15	16-20	>20
African	USM-SSM	120	8	8	16	9	16	43
Coloureds	USM-SSM	59	7	22	17	19	7	29
Whites	LNM-HNM	42	2	2	31	26	7	31

In the manual occupations, employment experience is a more important factor in the occupational mobility of Africans than it is for Coloureds. As with occupational mobility within the firm, employment experience appears to be crucial for the movement of Whites to the higher non-manual occupations from the lower non-manual occupations. Education is a less important factor in the long-term occupational mobility of Coloureds and Africans (Table 8.17) but is a pre-condition for the upward movement of Whites in the non-manual occupations.

Table 8.17: Employees Grouped by Race, Occupational Mobility between First Paid Employment and Current Employment and Education Level(per cent)

Race	Occupational Mobility	N	Educational Level No Educ.	Primary	Lower Sec.	Higher Sec.	Post-Sec.
Africans	USM-SSM	120	<1	55	14	31	-
Coloureds	USM-SSM	59	-	39	22	39	-
Whites	LNM-HNM	42	-	-	-	-	100

Table 8.18 shows the extent of occupational mobility for the period 1977-1987.

Table 8.18: Occupational Mobility - 1977-1987 (per cent)

1977 Occupation	1987 Occupation					
	USM	SSM	SM	LNM	HNM	(N)
Unskilled Manual (USM)	67	31	2	-	-	(232)
Semiskilled Manual (SSM)	6	83	5	4	3	(199)
Skilled Manual (SM)	-	-	76	7	17	(70)
Lower Non-manual (LNM)	1	6	-	64	29	(170)
Higher Non-manual (HNM)	-	-	-	-	100	(17)

In spite of the decade 1977-1987 being a period of frequent and intense recessions, there was significant occupational mobility from unskilled manual to semi-skilled occupations, and from skilled manual and lower non-manual to higher non-manual occupations.

Table 8.19 shows the proportion of each race that has moved between occupations for the same period 1977-1987. During this period the group that was most upwardly mobile was White. While there was some upward occupational mobility for Africans and Coloureds from unskilled manual occupations, a significant proportion of Whites moved from skilled manual, semi-skilled manual and lower non-manual occupations to higher occupations.

Table 8.19: Occupational Mobility by Race - 1977-1987 (per cent)

1977		1987 Occupation					
Occupation	Race	USM	SSM	SM	LNM	HNM	(N)
Unskilled Manual (USM)	African	69	29	3	-	-	(161)
	Coloured	64	36	-	-	-	(70)
Semi-skilled Manual (SSM)	African	4	90	2	4	-	(132)
	White	-	-	-	14	86	(7)
	Coloured	10	76	12	2	-	(58)
Skilled Manual (SM)	African	-	-	100	-	-	(4)
	White	-	-	77	2	21	(56)
	Coloured	-	-	20	80	-	(5)
Lower Non-manual (LNM)	African	6	31	-	63	-	(16)
	White	-	4	-	55	41	(91)
	Coloured	-	-	-	81	19	(32)

Note: Indians omitted because of small sample size.

Using labour market theory it is possible to provide an explanation for the disproportionate occupational mobility of Whites. The possession of a greater level of human capital, in the form of schooling, than the other races is one reason. However, this differential access to higher occupations may also involve some measure of job discrimination, with employers' taste for discrimination and statutory barriers to upward mobility for Blacks ensuring that Whites were invariably promoted.

Low overall occupational mobility can be ascribed to the relative lack of economic growth during the 1980s. Moreover, growth of job creation, especially in the semi-skilled and skilled manual

categories, in manufacturing has been at a very low level, and in fact has been negative in some years.

8.7 CONCLUSION

Several important findings were made in this chapter. The first is that occupation has a powerful influence on earnings. Although occupation may be acting as a proxy for excluded variables such as ability, it is unlikely that occupation has a minor influence. The response of earnings to education varies by occupation. Earnings respond strongly to education in the skilled manual and higher non-manual occupations, that is, education pays off in these occupations. The returns to experience are stronger in the skilled manual, semi-skilled manual and higher non-manual occupations than in the unskilled manual and lower non-manual occupations.

Secondly, because of educational expansion, lower occupations are being filled increasingly by individuals with higher educational qualifications than in the 1950s and 1960s. The effect of this filtering down process has been to lower average earnings in manual occupations. Wage compression in manual occupations has been an added consequence.

Thirdly, there is evidence of some occupational mobility of

Africans and Coloureds from unskilled manual to semi-skilled manual occupations and of Whites from lower non-manual to higher non-manual occupations both within the current firm and durng the working career of employees. Both education and employment experience are determinants of mobility. In general, education or employment experience on its own appears to be inadequate for upward occupational mobilty.

CHAPTER NINE

FORMAL TRAINING

9.1 INTRODUCTION

Formal on-the-job training is an important (but relatively neglected) subject for economic investigation, since the skills on which an economy depends are largely created by the processes of education and training. Job training is therefore a fundamental part of the total educational system in any industrialised or industrialising economy, and the efficient provision of such training an important element in any comprehensive industrial strategy. In his classic study of on-the-job training, Mincer concluded with the remark, "It is probably correct to say that, in the male half of the world, on-the-job training - measured in dollar costs - is as important as formal schooling" (Mincer, 1962:63).

Historically, training for productive employment was a private matter. Individuals acquired skills through apprenticeship or on-the-job training, and financed their training through reduced wages during the learning period. The small enterprise sold training as well as a product. Not only blacksmiths and

carpenters, but also professionals such as lawyers, accountants and physicians learned their trades in this way. As the technological sophistication and scale of production increased, especially in manufacturing, jobs and occupations became more complex, and more formally organised according to levels of skill. Training needs became more complex as well, with a larger component of theory. In developed countries, these needs were met in larger enterprises through more formally organised training arrangements. And in many countries governments began to finance and provide training before employment in schools and centres, in some cases in partnership with industry.

Much training in developing countries has also been privately provided through apprenticeship and training on-the-job. But faced with limited private training capacity, governments have invested in pre-employment vocational education and training (VET) systems and institutions.

In recent years, significant issues have been raised regarding the efficiency of vocational education and training in both developed and developing countries. Long-held assumptions about the capacity of VET to stimulate economic growth and to ameliorate problems of unemployment have been questioned. Increasingly rapid economic change, and growing uncertainty in the process of development, raised further questions regarding the capacity of public VET systems conceived in an earlier era to respond effectively to the needs of economies and of individuals.

Training systems often were seen to be too large, poorly financed, inflexible and of low quality.

The paucity of analyses on the effects of training has been the concern of many education economists (Blaug, 1970, Metcalf, 1985). One of the main reasons for this neglect of training has been the disproportionate emphasis placed on formal education by governments in both developed and developing countries since Becker's (1964) exposition of human capital theory. Becker dealt explicitly with human capital acquired in school and on-the-job but the latter issue has received relatively little attention. Furthermore, the alternative approaches to human capital theory, as exemplified in the dual labour market and other labour market segmentation theories do not deal explicitly with the decision to train. Technological determination of the supply of training is implicit in segmentation and internal labour market hypotheses. Skills are held to be inherent in jobs, and workers simply have to be trained up to the demands of their jobs (De Beyer, 1987:209).

Attempts to study the effects of training have also been confronted by significant measurement problems especially in relation to the costs of training. While the direct costs of training - firm outlays on materials, instructors, training premises, and trainee wages and benefits - can be measured easily, it is much more difficult to measure or estimate the indirect costs of training. These include the opportunity cost of

resources diverted to training and forgone output.

In this chapter an analysis is provided of the effects of training in the enterprise. The data on on-the-job training in the survey data are not as comprehensive as one would like but they nevertheless permit an analysis the type of which is rare, if not non-existent, for the South African economy. The data enable something to be said about the incidence of training provided by employers and about its benefits, if any, for the trained workers. Section 9.2 examines some theoretical issues related to training including clarification of what is meant by training, an analysis of the costs and benefits associated with training and the financing of training. Section 9.3 reviews the literature on the impact of training especially in developing countries. In section 9.4 the extent of vocational training in South Africa is described and in section 9.5 the survey data is analysed with respect to the incidence and returns to training.

9.2 FORMAL TRAINING: THEORETICAL ISSUES

9.2.1 The Meaning of On-the-job Training

Bowman (1988) has provided various definitions of "on-the-job" training. First, the term on-the-job training may be used "to refer to organised instruction in the work place" (Bowman, 1988:24). This includes training sponsored by the employer or

required as a condition of promotion even when conducted on other premises and whether any direct outlays are covered by the individual or by the employer. Apprenticeship training may constitute an element of on-the-job training. In many countries training may comprise a combination of periods spent in the formal education system and in the labour force. The long-established German system of extended part-time vocational education for youth in their first jobs is such an example (Bowman, 1988:25). Another example is the Servicio Nacional de Aprendizaje (SENA) in Colombia and related programmes in Brazil, with some but not all of the students individually sponsored by firms that will employ them later or may be employing them at intervals during the training programme.

Another form of what is counted as on-the-job training is the inclusion of much of the wide range of activities sometimes termed "nonformal education". Much of this type of training is indistinguishable in practice from activities commonly called on-the-job.

The common element that brings together such a diverse array of activities under the broadly defined label on-the-job training is not, in fact, whether the training is received by an individual virtually as part of the job (whether in the workplace or elsewhere). Rather, what seems to be common to all cases is training of active members of the labour force with the purpose of improving career prospects. On-the-job training entails

investments in the human capital of individuals who have already joined the labour force.

Another convenient distinction between vocational education and training is simply to define education as the learning that takes place in the schools that make up the formal educational system. Training is then everything else. While training so defined is extremely diverse, in each case it is more narrowly focused on specialised tasks. However, some of the "training" institutions may be quite highly formalised, and long-term apprenticeships are sometimes set apart from "training" because they are less narrowly focused (Bowman, 1990:286). However, the more fundamental distinction is between "education" as involving learning with substantial breadth on the one hand and "training" as providing a more narrowly delimited, specialised learning on the other.

9.2.2 Training: An Investment Perspective

Training is an investment decision. The training process absorbs the worker's time as well as the time of co-workers and supervisors, various materials, and the indirect costs of mistakes made by the inexperienced worker. If the training is to be economically rational, these costs must be offset by the highest future productivity of the trained worker. Because these returns (and costs) are distributed over time, the financial

aspects of the transactions are important as well. The financing of intensive on-the-job training activities is often a serious obstacle to the efficient provision of a highly trained work force.

The on-the-job training decision is one of a broad class of human capital investment decisions (Mincer, 1962, 1974). The training activity typically involves a period in which the worker is not as productive as he or she might otherwise be. The training activity may involve other costs as well (see 9.2.3).

It will be useful to formalise the investment decision. Denote the workers' productivity flow in the absence of training as v_t, which when discounted at the interest rate r, promises lifetime income (Y) of[1]

$$Y \text{ (no training)} = \int_0^\infty v_t e^{-rt} dt \qquad (9.1)$$

If productivity is fixed forever at a level v, that is $v_t = v$ for all t, the income formula takes on the simple form

$$Y \text{ (no training)} = v/r \qquad (9.2)$$

Productivity is likely to decline at some point and indeed fall to zero at death or retirement, but the constant-productivity assumption underlying Equation (9.2) may still be a useful approximation, especially if retirement is many years in the future or if the interest rate is high.

The training alternative also involves a time flow of productivity, say v_t^*, and may include some direct costs of training at each instant, say d_t. The lifetime income implied by the training alternative is

$$Y\ (\text{Training}) = \int_0^{\infty} (v_t^* - d_t)\ e^{-rt} dt \qquad (9.3)$$

If, for example, the training period is of duration T, during which the worker's productivity is v_o^* and direct costs are d, and after which the worker's productivity is v_1^*, then the worker's lifetime income in the training regime is

$$Y\ (\text{Training}) = (1/r)[(v_o^* - d)\ (1 - e^{-rT}) + v_1^* e^{-rT}] \qquad (9.4)$$

The efficiency criterion is a simple one: the training activity should be undertaken if and only if the worker's productive income in the training equals or exceeds his or her productive income if untrained, where all income computations are undertaken at the social discount rate, say p. Formally this means that training is economically efficient if and only if

$$Y\ (\text{training} \mid r = p) > Y\ (\text{no training} \mid r = p) \qquad (9.5)$$

or in the special case represented by equations (9.2) and (9.4):

$$(1/p)\ [v_o^* - d - v)(1 - e^{-pT}) + (v_1^* - v)e^{-pT}] \geq 0 \qquad (9.6)$$

In the typical case in which $v_o^* < v$, and $d > 0$, the post-training productivity v_1^* must exceed the untrained productivity by an amount sufficient to cover the forgone earnings $(v - v_o^*)$ and

the direct training costs incurred during the training period T:

$$V_1^* \geq v + (v - v_o^* + d)(e^{pT} - 1) \qquad (9.7)$$

As with any investment that yields returns over an extended period, the present value of the investment (and its economic efficiency) is sensitive to the interest rate that must be paid to finance the investment.

9.2.3 The Costs of Training

Training involves costs. A study of training at the firm level in the late 1960s (Thomas, Moxham and Jones 1969) identified seven dimensions of the cost of training: initiating the training function; servicing and co-ordinating the training function; fixed training capital; working training capital; providing instruction; giving instruction; and wages of trainees, net of trained output value (cited in Metcalf, 1985).

Ryan (1980) suggested three cost categories in his study of an arc welding training programme at a major shipyard in the United States of America. Ryan's analysis is depicted in Figure 9.1. Job training is defined as comprising "all forms of learning which raise an individual from requisite general educational attainment towards the level of competence characteristic of experienced workers in the job in question" (p.334). The curve p.y (t) in

Figure 9.1 depicts the learning curve of trainee net output (valued at a price p) for a training programme consisting of an initial spell of formal training in a company school (Ot, periods) followed by a phase of informal training consisting of instruction and/or learning by doing on actual production work. The training period is defined not by the period of explicit instruction in job techniques but by the time (Ot)it takes a typical individual to obtain the plateau of output, y .

Ryan indicated that both the employer and trainee may bear the costs of job training. The individual bears costs in the form of forgone earnings. If his actual path of earnings is defined by w (t) then forgone earnings are represented by area bcd. The cost to the firm is trainee pay less (net) trainee output. In Figure 9.1, this is given by the area abef. Firm level case studies indicate that it is possible to get at the costs of formal training and at forgone earnings but very difficult to calculate the net costs of informal training. Problems with the latter include: (i) the price the output of the trainee is sold for; (ii) how to measure trainee output; and (iii) how to measure trainee usage of other resources such as equipment and instruction, and the value to the firm of alternative uses of such incremental resources.

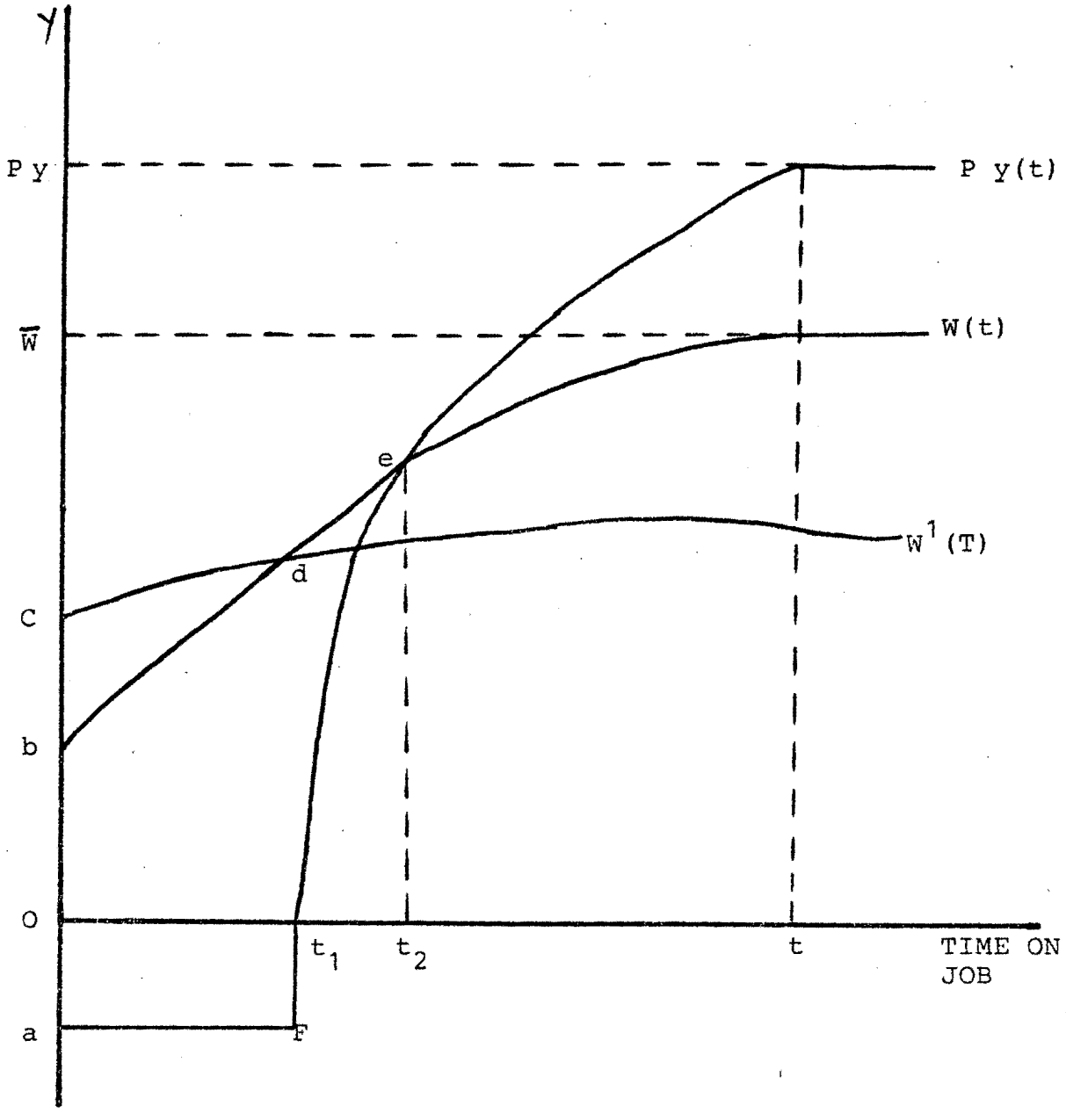


Figure 9.1 The Cost of In-Service Training

Note: P y(t) : Value of net output in period t
W(t) : Compensation of worker in period t
W^1(t) Best alternative income of trainee in period t

(Source : Ryan, 1980)

9.2.4 Subsidisation of Training

Government provision of training is often justified in the case of institutional failure, where enterprises and private training providers are unable to supply the quantity and quality of training that is socially optimal. In many developing countries, market and institutional failures have required a central role for government. As economies and enterprises develop, national training agencies have played an important role in increasing public/private cooperation, facilitating a transition for the government from direct financing and provision towards regulation, quality control and system guidance through incentives.

The basic purpose of government intervention in the training market in provision and financing, is to correct a tendency of the market to under-train, whether in terms of quantity or quality. Incentives have been used to encourage enterprise training in order to take advantage of its flexibility and efficiency. Training incentives have taken the form of government training grants to enterprises, wage subsidies for trainees, and tax exemptions for training. There is little evidence on which to base judgments about the effectiveness of these incentives. The studies that are found tend not to be encouraging (Standing, 1988; Ducci, 1988; Sako & Dore, 1988). The incentives tend to favour large enterprises and subsidise training that enterprises would be likely to undertake even without the subsidy. The result

The few studies which exist of the cost effectiveness or cost benefit of vocational training in LDCs are mainly for countries

of Latin America (Psacharopoulos, 1987; Psacharopoulos and Steier, 1987; Jimenez et al., 1989;). Studies of the economic impact of vocational training in sub-Saharan Africa, for instance, are virtually unknown.

Formal training can affect earnings in three ways which may be termed the participation, job access and pure wage effects (De Beyer, 1987). The participation effect is due to the fact that trained workers in whom the firm has an investment are less likely to be retrenched, and usually face better labour market conditions than do unskilled, untrained workers and so find jobs more readily. Access to jobs which are higher-paid and more-skilled can be improved by training for three reasons. The fact of having undergone some training may act as a signal to employers of a person's "trainability"; some training may be necessary for undertaking or learning how to perform more-skilled jobs; and trained workers may earn promotions because of their higher productivity. The wage effect of training relates to increased earnings. If training improves productivity, it can be expected to increase earnings or earning potential. Even if the training is firm-specific and if the employer has borne all training costs, the possible signalling effect of training to prospective employers may raise the wage the trained worker could earn in other firms and force the current employer to pay trained workers a premium to keep them.

The best known studies in Britain have been those on the National

Training Survey (NTS) which collected information on training of 50000 people surveyed in 1975/76. This data has been analysed by Greehalgh and Stewart (1982), Metcalf and Nickell (1981) and Nickell (1982), all of whom find a significant, positive relationship between training and earnings.

Greehalgh and Stewart (1982) attempted to separate the effect of training between its impact on occupational attainment, and on earnings differences within occupations. Their findings suggested that most of the effect of training on earnings was by improving access to higher paying occupations. The pure wage effect was argued to be much smaller.

Metcalf (1985) drew some tentative conclusions from a review of vocational training in Malaysia, Israel, India, Kenya, Brazil, Chile, Colombia and Peru. Rates of return were typically high enough to justify expansion of training facilities in most of the countries. Evidence in Brazil and Peru suggested that short courses had a greater payoff than longer courses of training. Third, training in industrial institutes and vocational secondary schools was less effective than more informal firm-based training, at least in Kenya, India and Israel.

Metcalf´s study showed further that in industrialised countries, the private labour market may fail to provide sufficient trained labour because of labour mobility among firms, borrowing difficulties for trainees or because trainees´ wages are set too high. These factors all provide justification for public

intervention in the training effort.

While it is not possible to generalise about the returns to the different forms of training there is some evidence suggesting that firm-based vocational training has a higher pay off than vocational training which mainly takes place in schools (Fuller, 1976; Borus, 1977; Godfrey, 1977).

A related issue is the timing of vocational training. There is some evidence that, for a given length and type of vocational training, there are diminishing returns to formal schooling. This raises the question: should vocational training come after primary or after secondary school? The major part of the evidence suggests that the returns to vocational training are lower for those who have taken secondary schooling than those who entered vocational training after primary school (Castro, 1979; Puryear, 1979). This suggests that extra formal schooling may be substitutable for formal institutional vocational training. Finally, the duration of vocational training is important. In general the evidence indicates that short courses of vocational training have higher returns than longer courses (Castro, 1979; Psacharopoulos, 1982).

The first systematic assessment of the Latin American apprenticeship programmes was the seminal work of Puryear (1974, 1979) in Colombia, which followed up graduates of a 3-year apprentice programme compared with a random sample of Bogota

males who were similar in terms of age and formal education but had not participated in the SENA apprenticeship or other explicitly vocational programmes. Even adjusting for a variety of background selectivity variables, completion of the SENA apprentice programme remained positively and significantly associated with earnings. While most of the participants in the SENA apprenticeship programmes were graduates of primary schools, some had had secondary schooling. For both groups, Puryear found both private and social rates of return to be high, although the independent contribution of SENA to earnings declined somewhat with rising levels of prior formal schooling. There was also an unexpected finding. While over four-fifths of the SENA graduates were still working in their field of study some 5 years later, over half had gone to formal secondary schooling as well after their SENA training. Puryear suggests that this reflected in part, at least, the fact that with SENA training and associated employment the SENA graduates were now in an economic position to pursue secondary education to strengthen their skills and range of competence.

The slightly less strong partial returns to SENA apprenticeship training for those with initially more formal schooling has been interpreted to suggest that such training was in part a substitute for more general formal schooling. This seems to reflect the importance of a balanced complementarity between general education, wherever obtained, and specialised training in close and direct asociation with employment and vocational

commitment.

More recent follow-up research on graduates of SENA-type programmes seems to have been primarily again, on SENA in Colombia, carried out by Jimenez and Kugler (1987) and by Jimenez et al. (1989). They grouped present Colombian SENA programmes in two categories: (a) long courses, averaging 2000 hours per course and (b) short courses averaging about 200 hours each. The long courses included apprenticeship programmes (skill training for young people with primary schooling), promotional programmes for advanced skill training after apprenticeships, and complementary programmes for adults who wished to upgrade their skills to apprenticeship levels. The short courses included "qualifying programmes", meant to introduce new but relatively low levels of skills. Jimenez et al (1989) estimated that both private and social rates of return exceeded 20% for the apprentice and promotional programmes, and they exceeded 10% even for social returns to the complementary programmes. The only social rates of return falling below 10% were on the short "qualifying" programmes, where private rates of return were extremely high because of low forgone earnings.

In Brazil postgraduate SENAI training yielded a minimum social rate of return of 12 per cent (Castro, 1979). One of the earliest internal World Bank rate of return studies showed a social rate of return to the INACAP training system in Chile as high as 50 per cent, but various qualifications by Arriazazzi (1972) cut

that exceptionally high figure by over half to 20 per cent.

Arriagada (1990) attempted to measure the participation and wage effects of non-formal training for Peruvian male and female workers. This study reported differences with regard to employment and earnings, both by gender and by sector of employment. Among males, training was not found to affect employment status, except for the public sector. Among women, and consistent with prior research in developed countries, non-formal training significantly increased their employment probabilities in all sectors. For those males in private sector wage employment, the main impact of training is on earnings. Training increases wage rates, after controlling for many other factors including formal schooling and the probability of having received training. When distinguishing among types of training institutions the results showed that training received from job-based programmes increased wage rates by over 10%; training received from post-secondary programmes increased wage rates by 20%; and training received from "academes" did not have any impact on wage rates.

In sum, the available evidence shows that the rates of return to training in developing countries are high. The little evidence on the types of training programmes suggests that training in firms appears to be more useful than that in training institutes outside the enterprise. Furthermore, some of the studies reviewed show that training can be regarded as a substitute for formal schooling.

9.4 VOCATIONAL EDUCATION AND INDUSTRIAL TRAINING IN SOUTH AFRICA

The aim of this section is to provide a comparative view of the training experience in South Africa. In particular the following questions are pursued:

(i) How much vocational education and training is provided in South Africa?
(ii) Given the racial disparities in educational provision, to what extent has the provision of vocational education and training changed during the 1980s?

It is only since 1979, with the appointment of the Wiehahn Commission to investigate labour issues and the appointment of the Human Sciences Research Council (HSRC) in 1980 to investigate education issues, that serious attention has been given to vocational education and training issues in South Africa.

The Wiehahn Commission emphasised the importance of industrial training for Blacks as a supplement to the improved system of Black education which the government had promised after the 1976 uprising.

Similarly, the HSRC investigation called attention to the need for technical training for economic development and severely criticised the "academic" (as opposed to technical) emphasis in South African education.

The recommendations of both commissions were in response to what has been perceived as a widespread and chronic skills shortages which was said to be constraining economic growth and development. While the exact nature and magnitude of the skills shortage has been difficult to determine, one measure that has been used frequently has been the number of vacancies in various occupations as provided by bi-annual surveys of the Department of Manpower (Table 9.1).

The number of vacancies is one indication of a shortage of manpower, but as an indicator it is subject to many shortcomings. It might, for example, simply measure labour turnover and not shortages; secondly, shortcomings in the quality of labour are not measured; and thirdly, employers might simply have given up searching for workers in short supply, that is, no vacancies are recorded (Barker, 1983:57-60). Bearing these shortcomings in mind, the available data indicated a vacancy rate in the region of 5.3% between 1983 and 1987 in professional and related occupations. In 1987, relatively high vacancy rates were recorded in the occupations of engineer (6.0%), technologist (8.2%), and engineering technician (7.4%).

Other more direct proxies of skills shortages, for example, salary increases in skilled occupations, labour turnover, job advertisements and the extent to which the problem of skills shortages gets media coverage, also point to a serious shortage in certain occupations (Barker, 1983: 193-207).

Table 9.1: Vacancies and Personnel Strength by Major Occupational Groups, 1987

Occupation	Personnel strength	Vacancies	Vacancy rate(%)
Prof., S/prof & Tech	595613	32978	5.2
Managerial	217942	7247	3.2
Clerical and sales	965950	22110	2.2
Transport and communication	357957	20348	5.4
Artisan, Apprentices	264659	11638	4.2
Mining operators, supervisors	1466397	20356	1.4
Service	689114	18821	2.7
Labourers	1165922	24952	2.1
Total	5723554	158270	2.7

Source: National Manpower Survey, 1987.
Note: Vacancy rate = Vacancies/Personnel strength x 100%
Abbreviation: Prof., S/prof & Tech - Professional, Semi-professional and technical.

9.4.1 Technical Education

The distinction between vocational education and industrialised training in South Africa falls neatly into the formal schooling/ non-formal institution dichotomy.

Statistics on student numbers and the provision of technical institutions from 1970 to 1985 indicate that there are

comparatively few facilities for Blacks, especially for Africans. Vocational education is offered in certain secondary schools. Pupils in these schools may study practical subjects (agriculture, arts, home economics), technical subjects (bricklaying, plastering, electrical work, motor mechanics, plumbing, welding) and commercial subjects. The number of black pupils studying technical subjects during various years is given in Table 9.2 (corresponding figures for Whites are not available).

Table 9.2: Pupils Receiving Technical Education in Secondary Schools

Year	African	Coloured	Indian
1984	9507	1987	n.a.
1987	18556	1166	1402
1988	25968	2021	1479

Source: SAIRR, Annual Surveys. National figures for Whites not available.

In addition, departmental technical centres, which form part of the junior secondary education programme of the Department of Education and Training (responsible for education of Africans in urban areas) are used to enable African pupils in Standards 5, 6, 7, and 8 to attend technical sessions once a week. In 1987 43506 pupils attended these centres (SAIRR, 1988/89).

Technical colleges provide theoretical training for apprentices and pre-service trainees. The enrolment in these colleges by

race is given in Table 9.3. In 1975 Africans comprised 12 per cent of total enrolment in these institutions and Whites 80 per cent. By 1987, the proportion of Africans had actually declined to 11 per cent while that for Whites fell to 75 per cent.

Table 9.3: Enrolment in Technical Colleges by Race

Year	Africans	Whites	Coloureds	Indians	Total
1975	4234	28926	3026	n.a.	36186
1987	7742	53064	3525	6711	71042

Source: S.A. Labour Statistics, 1989

Advanced vocational and technical education is provided by educational institutions called technikons. There are 2 technikons for Africans, 8 for Whites, and 1 each for Coloureds and Indians. Enrolment in these institutions is shown in Table 9.4 for 1975 and 1987. The trend in African enrolment at these institutions is an increasing one. In 1975 African enrolment comprised less than 1 per cent but by 1987 this had increased to 11 per cent. The proportion of Whites declined only slightly from 75 to 74 per cent.

Table 9.4: Technikon Enrolment by Race

Year	African	White	Coloured	Indian	Total
1975	373	36827	1008	5605	48813
1987	6387	41540	4375	3980	56282

Source: S.A. Labour Statistics, 1989.
Note: African, Coloured and Indian enrolment includes those at "White" technikons.

Despite the underprovision of technical colleges for African students in certain areas, their admission to White technical colleges remains an exception. The Coloured and Indian education departments have adopted a more flexible admissions policy whereby students from other race groups could be admitted, as long as Coloured and Indian students were not deprived of a place. In 1987 race quotas were abolished in Technikons. Technikons are now able to formulate their own policy concerning the admission of Black students but in consultation with the Minister of National Education.

Some of the problems relating to vocational education were identified by Bot (1988). These may be summarised as follows:

(i) the inconsistency of segregated theoretical education with integrated practical training and a non-racial labour market;
(ii) the variation in standards from institution to institution;
(iii) the wasteful expense of providing separate facilities for different race groups, compounded by a shortage of qualified staff;

(iv) where there were no facilities available to certain race groups in the surrounding area, employers either did not train workers or were forced to send trainees further away, which increased travel and accommodation costs; and
(v) the sometimes lengthy admission procedure for students of other race groups.

9.4.2 Industrial Training

Industrial training in South Africa has been the overall responsibility of the Department of Manpower. Its involvement in training falls into three categories, namely, the training of artisans, the training of unemployed persons and the training of other employees. The Department's approach is that the employer is primarily responsible for the training and re-training of his employees and that the department acts only in a supporting capacity (Department of Manpower-DMP-1989).

The Manpower Training Act, 1981, provides the legislative framework within which the Department of Manpower's labour training policy is implemented. The most important objects of the Act are:

(i) The establishment of a National Training Board (NTB) * The regulation of the training of apprentices
(ii) The conducting of trade tests and the issuing of trade

certificates

(iii) The training of trainees in artisan and other occupational fields

(iv) The registration of in-service training schemes and centres

(v) The training of work-seekers and others

(vi) Provision for the imposition of training levies by training boards or employers' organisations to promote training in specific trades

(vii) The provision of training advice to employers and training establishments

(viii) The provision of financial incentives for training (DMP, 1987a).

The National Training Board was established in terms of section 3 (1) of the Manpower Training Act, 1981 in order to advise the Minister of Manpower on policy matters arising from the Act as well as any other matters relating to training. The Board is also committed to the co-ordination, promotion and facilitation of training on a national basis. Regarding manpower training in South Africa, the wider objectives of the Board include the following:

(i) To give attention to the critical and strategic aspects of training;

(ii) to identify needs, deficiencies and restraints with regard to training;

(iii) to assist in developing the country's training system;

(iv) to co-ordinate, promote and facilitate training;

(v) to disseminate information concerning training (National Manpower Commission, NMC, 1986).

The government has recently passed a new law placing the control of training in the hands of employer and worker organisation. Whereas training was controlled previously by the state, the new industry training boards will be established to control training in each industry and they will consist of representatives from trade unions and employer organisations in the industry (Kraak, 1990).

9.4.3 Subsidies and Training

At the present time training incentives are offered to employers to encourage training. These consist of tax concessions and cash allowances. In terms of Section 11 of the Income Tax Act, 1962, as amended by the Income Tax Amendment Act, 1984, an employer could, apart from the normal deduction for training costs, deduct from his income an amount equal to 100 per cent of his training expenses up to 31 August 1984, and as from 1 September 1984, 50 per cent. At the present company tax rate this means a tax saving equal to 75 per cent of the employer's training expenses. In the case of industrialists in the decentralised industrial areas the tax concessions are higher because they can deduct from their income 125 per cent of their training expenses up to 31 August 1984 and as from 1 September 1984, 75 per cent. Since 1 September

1984 these allowances have not been applicable to persons whose gross income exceeds R15000 during their employer's year of assessment. The effect of this has been that enterprises have registered fewer courses (DMP, 1989).

In order to qualify for the tax concessions in-service training programmes must be approved by the Department and must be provided at a group training centre or a private training centre or under a training scheme registered in terms of the Manpower Training Act.

Cash allowances are payable to industrialists for training in decentralised industrial growth areas. These allowances are tax-free and are payable on the following conditions to industrialists who are entitled to decentralisation benefits: the allowances are based on 75 per cent of an industrialist's training expenses, calculated at the current rate of company tax. In addition to the allowance, the employer may still deduct his training expenses from his taxable income, on which he receives a tax rebate of 50% of the amount of such expenses. This means that an industrialist recovers an overall 87.5% of his training costs from the state (DMP, 1989).

Despite increased employer interest in training during the 1980s, the prolonged recession has led industry in many instances to cut spending on training, and many companies train for their immediate needs only rather than for long-term needs as they did

in the past. This is evident, for example, in the decline of apprenticeship contracts registered which decreased from a peak of 14497 in 1982 to 8185 in 1987 (Table 9.6).

9.4.4 The Extent of Training

On-the-job training takes place extensively in South Africa, but the exact extent of such training is not known. Information is available, however, about a number of specific and important training programmes.

The in-service training of African workers received special attention during the 1970s. The various training programmes are listed briefly in the following paragraphs.

(a) Public in-service industrial training centres established by the state in industrial complexes at which workers receive training in a variety of job categories. Operating costs are borne by the employers and the centres are operated by them.

(b) Private industrial in-service training centres for African workers.

(c) Private in-service industrial training schemes introduced by employers for their African employees with a view to obtaining tax concessions.

Table 9.5: Persons Trained According to Various Programmes

Type of training	1984	1987	1989
1. Artisan training			
Apprentices	37130	25689	26941
Trainees enrolled	836	491	357
2. In-service training			
Group training centres	12700	23038	54764
Private training centres and schemes	457145	251118	319749
Training schemes where levies apply	17266	5679	22552
Training schemes of industrial councils	13749	9982	8518
3. Training of the unemployed	9250	258517	198915
Total	548076	574515	631796

Source: National Manpower Commission, Annual Reports
Note: Details of training programmes for the 1970s are not available.

Table 9.6 shows the number of indentured artisan contracts for various years between 1975 and 1987. It is evident that a serious decline has occurred in the number of indentured artisans since the early 1980s. This has been due largely to the persistent recessionary conditions characteristic of the South African economy during this period.

Table 9.6: Artisans Indentured, 1975-1987

	1975	1982	1987
Newly indentured	11318	14497	8185
Current contracts	10527	36098	25689
Artisan status obtained	9688	8272	10686

Source: National Manpower Commission Annual Reports, 1980, 1989

Table 9.7 shows the racial distribution of newly indentured apprentices. In 1988 Blacks comprised a minority of 22 per cent, with African apprentices only 7.6 per cent of the total in spite of legislative barriers to registration for this group being repealed. The peak year of 1982 coincided with the economic boom conditions prevailing at that time.

Table 9.7: Apprentices Newly Indentured by Race

	1976		1982		1988	
African	-		741	(5)	601	(8)
White	9368	(84)	10659	(74)	6140	(78)
Coloured	1385	(12)	2219	(15)	819	(10)
Indians	464	(4)	878	(6)	359	(4)
Total	11217	(100)	14497	(100)	7919	(100)

Source: National Manpower Commission, Annual Reports, 1980, 1989
Note: Figures in parenthesis are percentages.

Table 9.8 shows the distribution of apprentices in the manufacturing sector. A similar racial distribution prevails.

Table 9.8: Apprenticeships Newly Indentured: Manufacturing Sector

Year	White	African	Coloured	Indian	Total	% of all apprentices
1980	4495	32	837	337	5701	54
1988	3526	392	525	288	4731	60

Source: S A Labour Statistics, 1989

When the information on all the programmes is combined an impression can be formed of the full extent of training in the South Africa. The picture that emerges is that a relatively small proportion of the labour force is being trained. According to the Department of Manpower (1986:88), 736 000 people or 7 per cent of the economically active population were engaged in some or other formal training course in 1986. There is some evidence that this number may have declined since 1986 (see Table 9.5). A partial explanation for this is that changes in the tax laws have made it less financially attractive for employers to train. It has also been noted that only 2 per cent of government expenditure is allocated to training whereas the norm for upper and middle income countries is around 5 per cent (HSRC/NTB, 1985).

An additional criticism of training in South Africa is that virtually no information is available on the quality of training programmes. The pass rate in the apprentice trade tests show that more than 40 per cent fail annually. In 1988, for instance, 6284 (58 per cent) out of 10845 candidates passed. This pass rate had

improved only minimally from the 56 per cent attained in 1980 (CSS, 1989).

While statutory racial barriers in the labour market have been removed and the educational system has been expanding, the provision of technical education at technikons and technical colleges is still largely conducted on a racially segregated basis.

It is generally acknowledged that the number of people receiving training technical training in South Africa is exceptionally small. One factor that has undoubtedly played a significant role in the creation of the industrial skills shortage is the legacy of earlier legislation which restricted training and certain categories of work for African workers. Despite the expansion of training facilities during the 1980s a large proportion of the current work force, especially those over age 30, had limited opportunities for training.

9.5 THE RETURNS TO TRAINING

The aim of this section is to analyse the economic returns to training for individuals in the survey data. The specific questions addressed are the following:

(a) Who receives training?

(b) Is training obtained by some groups and not others?

(c) What are the returns to training for these various groups?

9.5.1 The Incidence of Training

In response to the question "Has the firm given you a training course?", 231 or 19 per cent of the sample of 1205 workers replied in the affirmative. The majority of the trained workers were African (66 per cent) and male (68 per cent) - Table 9.9.

Table 9.9: Trained Employees by Gender and Race

Race	Male	Female	Total
African	112	40	152
White	14	4	18
Coloured	26	31	57
Indian	4	0	4
Total	156	75	231

Most of the workers who received on-the-job training were in semi-skilled manual occupations. There were relatively few trained workers in the unskilled and skilled manual occupations or in the white collar occupations (Table 9.10).

Table 9.10: Trained Employees by Occupation

Occupation	Number	Percentage	% of Total in occupation
Unskilled manual	18	8	6
Semi-skilled manual	164	71	38
Skilled manual	18	8	21
Lower non-manual	20	9	9
Higher non-manual	11	5	7
Total	231	100	19

Of the trained semi-skilled manual workers, 27 per cent had been in unskilled manual occupations in their first jobs in the firm. This implies that some occupational mobility may be possible for trained workers. No clear relationship between length of training received and occupational mobility was discernable. Furthermore, the numbers in the other occupational categories were too small for comparative analyses of mobility.

Most workers received training in what was called in the survey the "technical" category (175 or 76 per cent). Most of these workers were trained in skills directly related to production tasks in the firm, that is, firm-specific training. The rest (56 or 24 per cent) were trained in general skills including driving, clerical, safety, literacy, sales and supervisory skills.

Significantly more workers with secondary education than those with primary or no education received training. For the two groups with the largest number of trained workers, Coloureds and

Africans, 70 per cent and 56 per cent respectively of trained workers had obtained some secondary education.

Education is a factor in the production function of vocational skill formation. The evidence is consistent with the view that the more educated get more training. In other words, it appears that training cannot be a substitute for formal schooling but rather it acts as a complement to it. The lack of adequate sample sizes prevented further exploration of this issue by race and hence quality of education.

An interesting aspect of training in the manufacturing sector was that relatively few of the trained workers received higher pay after training. Only 33 per cent of unskilled manual, 32 per cent of semi-skilled manual, 35 per cent of lower non-manual and 36 per cent of higher non-manual trained workers received higher pay. Only in the case of skilled manual workers was this figure considerably higher (61 per cent). While it is possible that employers may be appropriating the benefits of training, it is also likely that employees could have been promoted to jobs with higher pay and then received training for it.

In an attempt to determine why trained workers were not being rewarded, the relationships between (i) firm size and payment after training and (ii) length of training and payment were examined (Tables 9.11 and Table 9.12).

Table 9.11: Employees by Firm Size: Distribution by Higher Pay

Higher Pay?	Firm Size			
	<50	51-100	101-500	>500
Yes	3	3	10	64
No	13	5	34	99

While the number of workers in receipt of training in the small firms was low, Table 9.11 shows that the largest firms (more than 500 workers) were somewhat better (39 per cent trained workers were rewarded with higher pay) than firms with 101-500 employees (22 per cent rewarded).

Table 9.12: Number of Employees by Length of Training Received: Distribution by Higher pay

Higher Pay?	Length of Training (months)				
	1-3	3-6	6-9	9-12	12-24
Yes	34	9	24	8	5
No	104	13	21	6	7

It is not clear from the data that length of training is important. A significant proportion of individuals in receipt of less than six months of training (54%, derived from Table 9.16) was rewarded with higher pay on completion of training than those with longer periods of training.

9.5.2 The Returns to Training

The data did not contain information on the nature of training provided by previous employers. Because such training is excluded, the total amount of on-the-job training is understated. This also means that only the earnings or wage effect can be measured.

Most of the empirical analysis in this section is confined to semi-skilled workers because only this group provides a sample of sufficient size. A brief analysis of skilled manual workers is also provided, albeit with a small sample size. As De Beyer (1987) has suggested, in the skilled manual group, given its relative skill homogeneity, productivity is likely to be strongly related to training provided by the employer.

Earlier analysis of the determinants of earnings showed that the returns to training were relatively low (Chapter Five). Table 5.2 showed the coefficient on the training variable to be of the magnitude of 0.075 (99 per cent significance). This implies that trained workers received, on average, 7.8 per cent more earnings than untrained workers. Inclusion of occupation variables reduced the training coefficient to 0.023 and 95 per cent significance. A rate of return to training of less than 8 per cent may seem low but it has to be viewed within the context of the extent of training provision.

Separate earnings functions were estimated firstly for trained and untrained workers (Table 9.13) to compare the personal characteristics of these two groups.

Table 9.13: Earnings Functions, Trained and Untrained Workers

Variable		Trained	Untrained
Schooling	S	0.044*	0.025*
Experience	E	0.044**	0.050*
Experience Squared	E^2	-0.0002	-0.0002
African	R1	-0.533*	-0.525*
Coloured	R2	-0.425*	-0.417*
Indian	R4	0.499*	0.269*
Male	G1	0.157*	0.174*
C		6.785	6.338
F		243.907	301.262
R^2		0.629	0.699
N		231	974

Note: Firm size was not significant and did not add to the explanatory power of the regression. Length of training period was not significant for those trained.

The explanatory power of the 'untrained worker' regression is seven points higher than that for trained workers. An unexpected finding also is that the rewards to experience are slightly higher for untrained workers. Also, trained Indian employees (vis-a-vis untrained Indian employees) received much more than trained White workers (the omitted category) - this should be ignored as only 4 Indian employees in the sample were trained and

such a sample size can hardly be regarded as representative! These earnings functions, however, do not provide any conclusive evidence about the characteristics of trained workers.

In order to obtain a clearer picture of the impact of training on earnings, an earnings function was estimated for largest group of trained workers, the semi-skilled manual sub-sample. Table 9.14 shows the results of this regression for all semi-skilled workers as well as for those with and without training.

Table 9.14: Earnings function, Semi-skilled Manual Workers

Variable		All	Trained	Untrained
Schooling	S	0.003	0.003	0.011
Experience	E	0.059**	0.068**	0.058**
Experience Squared	E^2	-0.0001	-0.0002	-0.0001
African	R1	-0.252*	-0.273*	-0.220*
Coloured	R3	-0.270*	-0.273*	-0.262*
Indian	R4	0.144**		0.217
Male	G1	0.134*	0.144*	0.127*
Training	T1	0.046**		
C		6.489	6.542	6.355
F		24.619	18.944	14.191
R^2		0.326	0.448	0.284
N		426	164	262
Average length of training (months)			1.8	

Column 1 shows that trained semi-skilled workers earned on average, 4.6 per cent more than those without training. The schooling, experience, race and gender variables explain a

greater proportion of the variance in earnings in the case of trained workers (almost 45 per cent) than in the case of untrained workers. The returns to experience are also slightly higher for trained workers. A closer analysis of the personal characteristics of this sample showed that those who did not receive training were more experienced workers. Firms are thus investing in the training of younger workers, possibly because of the poor quality of their formal education and the lack general skills from prior employment. On the other hand, older workers may be less in need of formal training as they may be acquiring skills through on-the-job experience. The earnings analysis also shows that although the average training period was less than two months, the returns were positive, although small.

A similar earnings function was specified for skilled manual workers (Table 9.15). On-the-job training for skilled manual workers in the sample was not necessarily firm-specific and involved supervisory and industrial relations courses.

Table 9.15: Earnings Functions - Skilled Manual Workers

Variable		All	Trained	Untrained
Schooling	S	0.051**	0.049**	0.062**
Experience	E	0.072*	0.072*	0.072*
Experience Squared	E^2	-0.0015*	-0.002*	-0.001*
African	R1	-0.291*	-0.287*	-0.294*
Coloured	R3	-0.287*	-0.087	-0.290*
Indian	R4	0.138	0.113	0.144
Male	G1	0.160		
Training	T1	0.042**		
C		6.001	6.188	6.000
F		33.033	12.538	20.483
R^2		0.777	0.898	0.695
N		100	18	82
Average length of training (months)			1.8	

Column 1 shows that the coefficient on the training variable is positive and significant. Furthermore, the explanatory power of the trained skilled manual regression is twenty points higher than that of the untrained sub-sample. For skilled manual workers, although the training was not of a firm-specific nature, it did lead to increased earnings.

Earnings functions specified for the other occupational categories showed that the independent variables, schooling, experience, race, gender and training explain a smaller proportion of the variance in earnings (Table 9.16). However, the coefficients on training were significant in all categories of manual workers. Moreover, these regressions showed that the rewards to trained unskilled manual workers (vis-a-vis untrained

skilled manual workers) were on average greater than those to trained semi-skilled and skilled manual workers (vis-a-vis untrained semiskilled and skilled manual workers). Trained unskilled manual workers earned on average, 8.3 per cent more than those with no training while trained semi-skilled workers received only 4.3 per cent more and skilled manual workers 4.0 per cent than their respective untrained counterparts.

In contrast to the manual occupations, returns to non-manual occupations were either negative (lower non-manual) or low (higher non-manual). Although training was obtained by a very small proportion of the sample, those in manual occupations do benefit. In non-manual occupations, neither coefficient was significant. This does not necessarily mean that training in non-manual occupations is not rewarded as the small sample sizes may not be accurately reflecting the actual returns to current or previous training.

Table 9.16: Coefficients on Training for Various Occupational Categories

	USM	SSM	SM	LNM	HNM
Coefficient on Training	0.080**	0.046**	0.042**	-0.029	0.002
R^2	0.289	0.326	0.776	0.300	0.230
N	18	164	18	20	11
Average length of training	1.0	1.8	2.9	1.7	2.9

Note: Dependent variable is the logarithm of monthly earnings. The independent variables were schooling, experience, experience squared (all continuous variables) and race and gender (both dummy variables).

A further earnings function was specified for two sub-samples: all workers who received "technical" or firm-specific skill training and semi-skilled manual workers receiving the same type of training. The results are presented in Table 9.17. In both regressions the explanatory power of the independent variables is greater than in the regressions for workers with general and firm-specific training. Column 1 of Table 9.17 should be compared with column 1 of Table 9.13. This shows that the explanatory power of the regression for firm-specific trainees is two points higher. Similarly, column 2 of Table 9.17 should be compared with column 2 of Table 9.14. Here again, the explanatory power of the firm-specific regression is higher, by six points. Thus firms appear to be rewarding the acquisition of firm-specific skills.

Table 9.17: Earnings Functions: Workers with Firm-specific Training

Variable	Coefficient	
	All	Semi-skilled
Schooling	0.044**	0.033**
Experience	0.045**	0.066**
Experience Squared	-0.0003	-0.0003
African	-0.524*	-0.294*
Coloured	-0.406*	-0.255*
Indian	0.507*	
Male	0.173*	0.138*
C	6.765	6.535
F	40.217	19.160
R^2	0.651	0.509
N	175	132

What the various regressions illustrate is that training of manual workers is rewarded in the form of higher earnings. It also appears that firm-specific training is rewarded although the extent of these rewards does not appear to be large.

However, the small training coefficient for all occupational categories and the non-significance of this coefficient in the white collar occupations may not be illustrative of the real impact of on-the-job training. There may be several possible explanations for the low and non-significant coefficients. The first of these is that training may not increase productivity and hence does not lead to increased earnings. On the other hand, training may generate increased productivity, but earnings may not reflect productivity increases so that the training coefficient is not picking up the increased productivity.

While it is unlikely that trained workers are no more productive than otherwise identical untrained workers, the South African case may be an exception. Given the racial variation in the quality of schooling, formal training is likely to be given, especially to African workers, to enable less productive workers overcome human capital deficiencies not present in the other groups with identical levels of schooling. This was confirmed in interviews with employers in which it was often stated that several on-the-job training programmes were implemented to "bridge-the-gap" between less productive, less able workers (usually African and to a lesser extent Coloured employees) and the rest of the work force.

It is also likely that, if employers are providing and paying for training, especially if it is firm-specific, they may well appropriate the benefits by not matching productivity rises with wage increases, particularly if they believe that the risk of trained workers quitting is very low.

The final possibility is that the training variable coefficient is failing to pick up earnings differences because it discriminates between those whose current employer has not provided training, but not between those with and those without any training at all. The earnings functions in Tables 9.13 - 9.15 provide some clarity in this area but the "no training" category also includes some workers who earn a return in the current job for previous training. This is less likely to be a problem the

smaller the amount of general skill training received from previous employers and the lower the mobility of trained workers. To explore this further, earnings functions were specified for workers for whom the current firm represents their first paid employment. These earnings functions contained schooling, employment, employment experience (continuous variables) and race, gender, and training (dummy variables). The returns to training for this group were 2.6 per cent. As the overall returns to training were 7.8 per cent, it means that workers with some prior experience and thus some general skill acquisition are reaping relatively higher returns to training in current employment than those whose current jobs represent their first paid employment.

The final earnings functions specified in this chapter were for respondents over- and under-35 years of age. The purpose of this specification was to examine the returns to these two groups in the light of the lack of training opportunities for older workers.

Table 9.18 : Earnings Functions for Employees Over- and Under-35 years of age

Variable		Over-35	Under-35
Schooling	S	0.039**	0.065*
Experience	E	0.036**	0.060**
Experience Squared	E^2	-0.0002	-0.0002
African	R1	-0.602*	-0.507*
Coloured	R3	-0.289*	-0.507*
Indian	R4	0.246*	0.228*
Male	G1	0.151*	0.190*
Training	T1	0.048**	0.094**
C		6.653	6.494
F		133.962	200.609
R^2		0.697	0.702

As expected the coefficient on training for younger workers is larger. This may be due to the lack of adequate training opportunities for older worker workers or it may reflect the need of younger workers for formal training on account of their poor schooling and/or lack of on-the-job experience.

9.6 CONCLUSION

The analysis of the survey data shows that a relatively small proportion of the labour force received training and that the returns to training are not very large. This finding has to be qualified in view of the fact that the questions in the survey

may not have picked up the full extent of on-the-job training, especially informal training.

The description of the training facilities in South Africa suggests that while provision of training has increased in the 1980s, it is still only a small proportion of the labour force that is benefiting from these programmes.

Formal training is regarded as an investment in human capital. There are incentives for both employers and workers in investing in formal training. Employers benefit through increased productivity and workers through both increased productivity and increased earnings.

With the available data it is difficult to draw any conclusions about whether training increases productivity. The general assumption is that training does increase productivity but the extent to which this happens may vary.

The returns to training for workers are apparently low. However, it is quite likely that the specified earnings functions do not demonstrate fully the effects of training. However, there are various ways of measuring the effects of training. Just as there are many alternative methods of production, so too there are a variety of ways to teach skills, and one technique can often be substituted for another. Training on-the-job can be formal or informal. In the former case it may involve formal training

courses and in the latter it may involve learning by observing or doing. Furthermore, the actual decision to pay may take place when the job changes. Formal training may come later.

Moreover, some training is occupation-specific. For example, the move from unskilled manual jobs to semi-skilled jobs requires training but in an earnings function analysis no direct return to training may be reflected. This is because training may take the form of learning on-the-job through observing, doing or "learning from nanny". In larger companies, training for semi-skilled manual occupations may involve large formal training courses. Thus it is likely that, in the survey data, the nature of the questions themselves did not pick up the true extent of training.

Skill acquisition, however, is the consequence of the combined effect of three sets of variables: formal training, occupational distribution, and employment experience, all of which are fairly substitutable. In other words, a worker can have formal training courses or he/she can imbibe information through occupational skill acquisition or through labour market experience. Therefore it may be difficult to distinguish skill acquisition directly related to training because firms can produce these skills in different ways. Thus while the provision of formal training by employers appears to be limited, there is a need to recognise that substitutes for skill acquisition on-the-job through occupational mobility and employment experience exist. In smaller companies especially, the role of these alternatives may be

crucial.

The employer interviews provided some information regarding the extent of training in the larger companies. In general, some formal training is provided for unskilled and semi-skilled workers. All of these programmes were enterprise- based. In these occupations, formal education has been seen to be inadequate for coping with the requirements of the work place. In the skilled manual and clerical occupations, formal training was less common as employers often regarded their formal schooling as adequate.

On the employer side there are costs and benefits to the provision of training. The most obvious costs are the costs of programmes and loss of worker time in production. The benefits of training are increased productivity. It could be argued in the South African context that the extent of formal training is low beacuse employers perceive the costs are too high especially in view of the reduction in the state subsidies. Alternatively, they may regard the productivity benefits accruing from training as too low to justify the costs of such programmes. This may be the result of the perceived low status of formal schooling of a significant proportion of the work force. Such a scenario suggest that a case can be made out for more, not less, government subsidisation of training.

Notes:

1. Equations in this section are adapted from Parsons (1990), pp. 58-59.

CHAPTER TEN

THE ROLE OF THE FIRM IN EARNINGS DETERMINATION

10.1 Introduction

Earnings are determined by the personal characteristics of individuals and by the characteristics of their employers. In this chapter an attempt is made at determining the extent to which the firm or the sub-sector influences earnings in the South African manufacturing sector.

In perfectly competitive labour markets, firm characteristics do not influence earnings. All workers with the same personal economic characteristics receive the same wage "irrespective of differences among groups of workers in goods produced, in the technology or organisation used to produce them, in the ownership or profitability of such production, its scale or its location" (Knight and Sabot, 1983:45). Differences in earnings arise only if employers discriminate among workers on the basis of personal non-economic characteristics. Implicit in theories of earnings determination that emphasise the influence of firm characteristics is the assumption of an imperfect labour market.

Section 10.2 outlines some of the reasons why firm characteristics could influence earnings. All of the empirical work thus far in this thesis involved the testing of hypotheses using personal economic characteristics. In section 10.3 both individual and firm characteristics are used in earnings function analysis. In this way the relative importance of employer and employee characteristics can be evaluated. The survey data is further stratified by firm size and location to assess the influence of these two employer characteristics.

10.2 The Role of the Firm in Earnings Determination

The neoclassical explanation of inter-industry wage differentials begins by assuming a perfect labour market with homogeneous labour in each occupation. All workers in a given occupation are paid the same, and average earnings will differ between firms or industries only because of variations in the skill-mix, or quality, of the labour force. Only the proportion of workers in the various occupational categories will matter. High-wage industries will be those which are relatively skill-intensive and vice-versa. Changes in an industry's relative pay will reflect variations in occupational wage differentials in the entire economy, or alterations in its particular skill mix. In the short run, occupational supply curves will be less than perfectly elastic, so that sectoral or firm wage levels will incorporate the influence of recent shifts in the demand for labour, and

changes in inter-industry or inter-firm differentials will be positively correlated with relative changes in employment.

In the 1950s, institutionalist empirical research in the United States cast doubt upon this neoclassical model (Slichter, 1950; Reynolds and Taft, 1956). Similar studies have been reproduced for the 1980s. Krueger and Summers (1987), for instance, found that controlling for differences in labour force quality between industries reduced the dispersion in their wage levels but did not significantly alter the wage-ranking of industries. In the United States, the 1984 league table of industry wages was quite similar to that reported by Slichter for 1923, and also closely resembled the wage structure in thirteen other advanced capitalist countries. One further common feature of some importance was the similarity in the ranking across occupations: high wage industries tended to pay all their workers well. What these studies demonstrated was that it was not only personal economic characteristics but also the characteristics of the industry/sub-sector/firm that influenced earnings. Thus one of these studies comments aptly in this regard: "These long-term, systematic discrepancies in pay between industries are a major source of wage differences among individual workers" (Dickens and Katz, 1987:48-49).

Among the characteristics of high-wage firms and industries are several which indicate ability to pay, including profits per worker; the capital-labour ratio and the proportion of labour

cost in the total cost of production; and the degree of product market concentration, reflecting the degree of competitive pressure. Ability to pay may be positively associated with the size of a firm. Large firms may benefit from greater economies of scale, have more monopoly power and can be more likely to be protected by government trade poliicies. In such cases, large firms have the ability to pay high wages both because of high profits and the ease with which they can sustain profits by passing on cost increases to consumers (Knight and Sabot, 1983:47). The lower the proportion of wage costs in total costs, the less sensitive are profits to a given wage increase. Thus firms with a high degree of capital intensity are more likely to pay higher wages than firms which are relatively labour intensive.

Unionisation is also positively correlated with earnings, but the nature of the causal relationship between them (if any) is uncertain. Unions tend to be better represented in capital-intensive oligopolies than in more competitive, labour-intensive industries, giving rise to problems of multicollinearity in econometric estimates of their significance. Moreover, in many countries most high-wage firms were high payers before the arrival of mass unionism and they tend to be so in others where the relative strength of unions may be much less pronounced (Krueger and Summers, 1987).

Dickens and Katz (1987) found the following factors to be important determinants of individual earnings: years of schooling, the proportion of the labour force which is female, trade union strength, and a number of factors associated with ability to pay, namely, the capital-labour ratio, profits per worker and plant size. Dickens and Katz concluded that three factors stand out: education, profitability and firm size. The first is clearly consistent with orthodox theory with its emphasis on personal economic characteristics; the second and third, which relate to firm characterisitics are not.

Neoclassical economists account for these patterns of inter-firm or inter-industry wage differentials with the argument that the characteristics which institutionalists regard as measures of ability to pay in fact reflect either unmeasured differences in the quality of labour; or compensation for non-pecuniary job attributes which serves to equalise net advantages between industries; or some combination of both. Consider, for example, the existence of wage differentials by firm size. Large firms pay higher wages, according to the neoclassical interpretation, to provide incentives against shirking in conditions where the monitoring of worker performance is relatively expensive, and also to reward workers for accepting the greater regimentation which is inevitable in larger and more bureaucratic workplaces.

There are many objections to this neoclassical defence (Krueger and Summers, 1987). Variations in education, age and employment

experience must capture a very large part of the differences in labour quality between industries, but controlling for these factors does not greatly reduce the dispersion in pay, holding occupation and gender constant. Longitudinal data are also hard to reconcile with orthodox theory: as workers move from firm to firm, their earnings change, while their individual endowments do not. What evidence there is on compensation for non-pecuniary job attributes lends no support to neoclassical analysis, and the same is true of fringe benefits (Mellow, 1982).

An alternative interpretation is that workers in high-wage firms are sharing in the monopoly rents which would otherwise accrue to the owners of capital alone. There are a number of variants of this "rent-sharing" hypothesis. Trade unions may play a central role by ensuring high wages for their members through the collective bargaining process. Or there may be "expense preference" on the part of management, who take advantage of the independence which they obtain from the separation of ownership and effective control: "the middle managers who set wages are likely to internalize the welfare of their subordinates as well as that of the stockholders" (Krueger and Summers, 1987:40).

The effect of rent-sharing on profits will be reduced if "efficiency wage" considerations are also relevant, and workers' inputs of effort are positively related to their earnings. Here motivational considerations are invoked by some neoclassical writers to explain wage rigidity. When the demand for labour

falls, employers may avoid wage reductions for fear of damaging employee morale, which would reduce effort, and increase labour turnover. According to the efficiency wage hypothesis, productivity varies directly with the wage rate. Employers are concerned to minimise the labour cost per unit of output, and this may require the payment of wage rates in excess of the market-clearing level (Yellen, 1984; Stiglitz, 1987).

Knight and Sabot (1983) also draw attention to the efficiency wage hypothesis as one of three productivity-related reasons why some employers may pay higher wages. The second theory they cite is the "labour turnover" hypothesis : higher wages can reduce labour turnover in the firm and hence reduce training costs. A third hypothesis is that, by raising wages relative to those in other firms, an employer can attract or "cream' the most productive workers (Knight and Sabot, 1983:47). Knight and Sabot go on to argue that "wage differences among firms (then) reflect differences in the productivity of their workers which are not captured by the personal variables in the multiple regression equations owing to the inevitable crudeness of the variables available as proxies for personal productivity. Because of differences in their characteristics firms are liable to differ in the extent to which they wish to raise the wage for efficiency wage reasons or for labour turnover reasons, and in the extent to which they find it profitable to `cream' workers. These differences are liable to be revealed by firm variables in the regression analysis. In the first two cases, labour market

segmentation exists among firms in the sense that there are no differences in labour productivity at the time of hiring, and there is no tendency for wage differences to be reduced through competition. In the creaming case, the labour market is not segmented in so far as the wage differences reflect differences in personal productivity" (pp.47-48).

10.3 The Effect of Firm Size, Sub-sector and Location on Earnings in the Manufactuirng Sector

In earnings function studies for developing countries the effects of firm characteristics are usually ignored because the data used in most such studies are obtained through urban or even national household surveys. With such samples, it is difficult, if not impossible to obtain a sample size sufficiently large to yield enough observations within individual enterprises for statistically significant results.

With the manufacturing survey data three earnings functions were initially specified: one containing only personal characteristics (schooling, employment experience, occupation, race, gender and receipt of on-the-job training), one with only firm characteristics (firm size, sub-sector and location) and one with both personal and firm characteristics. This makes it possible to distinguish between the relative importance of the two sets of

variables. The results are shown in Table 10.1.

It is evident that the firm and sectoral characteristics do not have a great influence on the structure of earnings. When added to the personal variables, the firm variables raise the explanatory power of the regression by only three percentage points. On their own the firm variables produce an R^2 of 0.21.

Table 10.1: Explanatory Power of Earnings Functions Specified for Individual and Firm Characteristics

Earnings Function	Independent Variables	R^2	F
Individual and Firm Characteristics	S, Ex, Ex^2, R, G, O C, SS, N.	0.824	212.905
Firm Characteristics	C, SS, N.	0.208	18.340
Individual Characteristics	S, Ex, Ex^2, R, G, O	0.790	545.290

Note: (i) Dependent variable is the natural logarithm of earnings;
(ii) S-schooling; Ex-experience; R-race; G-gender; O-occupation; C-city/location; SS-subsector; N-firm size. S, Ex - continuous variables, the rest are dummy variables.

To examine the influence of the firm dummy variables on earnings, the results of the regression comprising these variables are shown in Table 10.2.

The earnings function in Table 10.2 contains three firm variables: city/location, sub-sector and firm size. While these

variables do not have a great influence on the structure of earnings in the manufacturing sector, the firm dummy variables show substantial earnings differences with most of the coefficients statistically significant.

Regional Earnings Differentials

The city/location variable shows that there are significant earnings differentials. Workers in Cape Town earn on average, 8 per cent less than workers in the Pretoria-Johannesburg-East Rand (PJE) complex, the omitted variable. Durban workers earn 17 per cent less and Port Elizabeth employees 29 per cent less.

Table 10.2: Earnings Function - Firm Characteristics

Variable		Coefficient
City/Location		
Cape Town	C1	-0.082**
Port Elizabeth	C2	-0.349*
Durban	C3	-0.183*
Pretoria-Johannesburg-East Rand	C4 (omitted)	
Sub-sector		
Textile	SS1 (omitted)	
Food and Beverage	SS2	-0.201*
Paper and Printing	SS3	-0.038
Motor	SS4	0.355*
Leather and Footwear	SS5	0.105
Clothing	SS6	-0.413*
Plastics and Rubber	SS7	0.038
Machinery	SS8	0.274*
Chemical	SS9	0.370*
Metal	SS10	0.364*
Firm Size		
< 50 workers	N1	-0.124**
51 -100 workers	N2 (omitted)	
101 - 500 workers	N3	0.228*
> 500 workers	N4	-0.011
C		6.725
F		18.340
R^2		0.208

Neoclassical theory has attempted to explain regional wage differentials. Assume for instance, that in two regions, A and B, capital and labour are homogeneous, and that the technical constraints imposed by the production function are also the same. For historical reasons, however, region B has a much lower capital-labour ratio than region A. This means that the marginal product of labour is lower and that of capital is higher, in region B. Therefore, region B's labour is cheaper than region A's, and capital is more highly rewarded there. As a consequence,

capital flows to region B and labour moves to region A, until inter-regional equality is established in capital-labour ratios, marginal products, and rates of return on physical capital, and regional wage differences have been eliminated.

Orthodox economists have claimed considerable success in explaining the origins and narrowing of wage differentials particularly in the United States and the United Kingdom. In the USA, for instance, large wage differentials existed between the North and the South. However, migration of both capital and labour took place in accordance with the predictions of the theory. Any remaining wage gap was ascribed to differences in human capital endowments (Scully, 1969). In Britain, geographical wage differentials have broadly corresponded to regional discrepancies in the level of economic development which presumably were themselves associated with differences in the amount of capital per worker. In the eighteenth and again in the twentieth century, the South of England was relatively advanced, and paid the highest wages; in the nineteenth, the Midlands and the North had the advantages. Moreover, regional wage differences are very much less now than they were a century ago, implying that there has been migration of labour and capital in the expected directions (King, 1990:142-143).

There is however, some disagreement about the role of human capital in regional wage differentials. Human capital comprises both formal education and learning-by-doing while in employment.

Many skills are learned more readily on the job than in the classroom, and it is the lack of jobs which could be held primarily responsible for the poor development of skills in low-wage regions. In other words, human capital differentials could be more the result of regional underdevelopment than an independent cause of geographical wage differences.

The survey data reproduces geographical wage differentials found in the South African economy. The Pretoria-Johannesburg-East Rand complex is the highest paying region followed by Cape Town, and cities on the Eastern seaboard such as Durban, Port Elizabeth and East London. The PJE metropole is the region with the highest level of development, arising out of developments centred around the mining industry. It is characterised by a high demand for labour relative to the other regions. Hofmeyr (1990) for instance, reports that wage differentials between this region and Cape Town increased even during the largely recessionary 1980s.

Sub-sectoral Earnings Differentials

Table 10.2 also shows substantial earnings differentials within the manufacturing sector. The highest paying sub-sectors are the motor, machinery, chemical, and metal sub-sectors. Workers in the motor industry earn, on average, 43 per cent more than worker in the textile sub-sector (the omitted category), machinery workers 32 per cent more, chemical workers 45 per cent more and metal

workers 44 per cent more. While it is not easy to isolate the causal factors, firms in these high paying subsectors are characterised by the following features: the presence of strong unions; most of them are oligopolistic, that is, they have a considerable share of the product market; relative capital intensity; and many them are subsidiaries of multinational companies. All these factors suggest that these firms have the ability to pay higher wages. Moreover, the three productivity-related hypotheses may also be relevant, namely, the payment of efficiency wages, premiums to diminish labour turnover and the creaming of the most productive members of the labour force.

Earnings Differentials by Firm Size

The third firm variable, firm size, also produces significant earnings differentials, but the findings are not entirely in keeping with what is expected. Employees in the smallest firms (less than 50 workers) earn, on average, 12 per cent less than workers in firms with 51-100 workers (the omitted category). Workers in the third largest group of firms (101-500 workers) earn, on average, 26 per cent more. However, workers in the largest firms earn, on average 1 per cent less than the omitted group although this coefficient is not statistically significant. Thus the general expectation that workers in the largest firms are usually paid much more is not borne out by the survey data. This finding, however, needs to be qualified because of a possible sampling bias and because of the varying characteristics

of the firms within this category [see section (a) below].

However, the data does produce evidence of some segmentation in the manufacturing sector of labour market. Higher paid workers are more likely to be concentrated in large firms (100-500 workers) in the metal, machinery, motor and chemical industries in the Pretoria-Johannesburg-East Rand region. While the firm variables do not influence significantly the structure of earnings in the manufacturing sector, the use of firm dummy variables enables one to get some idea of the way this particular segment of the labour market is structured.

Two of the firm characteristics, location and firm size, were further stratified into sub-samples to determine the influence of various personal economic characteristics.

(a) Firm Size

Table 10.3 shows mean, minimum, maximum, and standard deviation of earnings by firm size. A positive relationship between earnings and firm size is not evident. In fact, the mean earnings of employees in the largest firms are lower than those in the two smaller firm size categories. A closer examination of the data shows that occupational composition of the workers from these firms differs significantly from those of the firm categories. Because of a sampling bias the largest firms provided a disproportionate number of unskilled and semi-skilled workers in

the survey data (Table 10.4).

Table 10.3: Earnings by Firm Size - Mean, Minimum, Maximum, Standard Deviation (rands per month)

Firm Size (no.of workers)	Mean	Minimum	Maximum	Std. Deviation	N (firms)
< 50	824	150	2850	466	4
50-100	1441	180	3700	812	18
101-500	1288	181	8500	1100	24
> 500	1000	180	5000	782	15

Table 10.4: Employees grouped by firm size and occupation (percentage distribution)

Occupation	Firm Size (no. of workers)			
	<50	51-100	101-500	>500
Unskilled Manual	24	18	22	25
Semi-skilled Manual	38	16	22	47
Skilled Manual	1	30	4	7
Lower Non-manual	35	14	30	10
Higher Non-manual	2	21	21	11

Furthermore, the fifteen firms sampled demonstrated significant differences in their "ability to pay". Of these firms one was a clothing manufacturer, one textiles, four food, one metal, two paper, four motor, one machinery and one chemical. The clothing, textile, two of the food, and one paper manufacturer paid mean wages that were extremely when compared to both the 50-100 and 101-500 categories and others in thelargest category. low. In

this sector the motor, machinery and chemical manufacturers were the highest-paying.

Table 10.5 shows the sub-sample stratified by firm size and earnings functions specified with a number of individual characteristics as independent variables. The smallest firm size (less than 50 workers) is excluded because of the relatively small sample size.

The schooling coefficients are small and positive in all three cases but statistically significant only for the 50-100 and 101-500 worker categories. The experience coefficients were all significant and of the expected signs.

Table 10.5: Earnings Functions by Firm Size

Variable		Firm Size (no. of workers) 50-100	101-500	>500
Schooling	S	0.028**	0.028**	0.003
Experience	Ex_2	0.048**	0.061**	0.047*
Experience Squared	Ex^2	-0.0004**	-0.0002**	-0.0002**
Unskilled Manual	O1	-0.808*	-0.548*	-0.528*
Semi-skilled Manual	O2	-0.365*	-0.378*	-0.243*
Lower Non-manual	O4	0.126	0.002	-0.012
Higher Non-manual	O5	0.698*	0.637*	0.589*
African	R1	-0.219*	-0.057	-0.239*
Coloured	R3	0.077	-0.299*	-0.195*
Indian	R4		0.065	0.065
Male	G1	0.072*	0.084*	0.084*
C		7.100	6.474	6.728
F		125.611	174.547	161.706
R^2		0.938	0.857	0.782

Occupational earnings differentials were characteristic of all three firm types, but these differentials were greatest in the case of the small firms (50-100). In these firms unskilled manual workers earned 55 per cent less than skilled manual workers, the omitted category while higher non-manual workers earned, on average, 101 per cent more than those in the omitted category. In the largest firms, on the other hand, unskilled manual workers earned on average, 41 per cent less and higher non-manual workers 80 per cent more than skilled manual workers. The extent of racial discrimination varied between size of firm and the extent of gender discrimination was virtually the same in all three categories. Africans experienced the greatest level of wage discrimination in the 50-100 and more than 500 firm categories while for Coloureds the discrimination coefficient was the largest in the two larger firm categories.

A further exercise was conducted on this sub-sample to measure the coefficients on current and prior employment experience. The purpose of this exercise was to determine the extent to which firms differed in their rewards to general skill acquisition (prior employment experience) and firm specific skill acquisition (current employment experience). (Table 10.5)

Table 10.6: Coefficients on Current Experience (EC) and Prior Experience (EP) by Firm Size

Variable	Firm Size (no. of workers)		
	50-100	101-500	>500
EC_2	0.026	0.063*	0.048*
EC^2	-0.0002	-0.0006**	-0.0004**
EP_2	0.010	0.039**	0.020**
EP^2	-0.0003	-0.0006	-0.0004
F_2	104.473	151.784	136.916
R^2	0.939	0.862	0.784

Note: Other independent variables were schooling, occupation, race and gender.

In all three firm-size categories, the returns to current employment experience are greater than those to prior experience. The coefficients, for the firm size 50-100 workers, however, are not statistically significant. For the firms with 101-500 workers, prior employment experience (EP) increases earnings by 3.9 per cent and current employment experience (EC) increases earnings by a further 2.4 per cent. For firms with more than 500 workers EP raises earnings by 2.0 per cent and EC by a further 2.8 per cent. These findings are in line with human capital theory which predicts that employers reward firm-specific skill acquisition, namely, current experience (Chapter Seven). The earnings premium to workers in the 101-500 firm size category after 10 years current experience is 57 per cent and prior experience 33 per cent. For workers in the firms with more than 500 workers the premium after 10 years of current experience is 44 per cent and after 10 years of prior experience is 16 per

cent. It is also likely that the larger firms wll be characterised by internal labour markets which may "lock" workers into the enterprise through seniority wage scales and well-defined promotion ladders.

A further analysis was conducted for employees in the largest firms (more than 500 workers). This sub-sample was stratified by race and the influence of personal characteristics was examined (Table 10.7). The earnings function specified for each race contained as independent variables, schooling, employment experience, occupation and gender.

For Africans, the explanatory power of the regression is relatively weak (R^2 = 0.36) and for Indians it is extremely high (R^2 = 0.95) with the proportion for Whites and Coloureds being respectively 77 per cent and 73 per cent. In the earnings function for Africans, only four of the variables are significant.

In these firms schooling was significant only for Whites and Coloureds with respective private returns of 6.1 and 4.1 per cent. The experience coefficients are all significant with the appropriate signs. Employment experience reaps higher rewards for Coloureds and Indians in these large firms.

Table 10.7: Earnings Functions - Employees in Largest Firms (>500 workers) by Race

Variable	African	White	Coloured	Indian
Schooling	0.0007	0.061*	0.041*	0.039
Experience	0.040**	0.047**	0.052*	0.066*
Experience Squared	-0.0001**	-0.0003**	-0.0010*	-0.0023**
Unskilled Manual	-0.338*		-0.509*	
Semi-skilled Manual	-0.063	-0.578*	-0.255*	-0.909**
Lower Non-manual	0.087	-0.612**	0.060	-0.675*
Higher Non-manual		0.123	0.808*	-
Male	0.085*	0.043	0.080**	-0.178**
C	6.454	6.963	5.920	7.941
F	21.271	37.060	38.555	18.330
R^2	0.362	0.771	0.725	0.948
N	286	100	131	15

Substantial occupational differences exist for all three races (Coloureds, Indians and Whites), particularly Coloureds and Indians. The coefficient on White higher non-manual is not statistically significant so a full comparison is not possible. To cite two examples of occupational differences from Table 10.7: in the case of Coloureds, unskilled manual workers earned 40 per cent less than skilled manual workers (the omitted category) and higher non-manual workers earned 124 per cent more. For the Indian group, semi-skilled manual workers earned 60 per cent less than skilled manual workers and lower non-manual workers 49 per cent less. Discrimination against females was prevalent in the African and Coloured groups but in the Indian case, males were discriminated against! A closer examination of the data showed that Indian males were almost wholly concentrated in the lower paying semi-skilled manual occupations and females in the higher

paying lower non-manual occupations.

The coefficients on current and prior employment experience were also measured (Table 10.8). None of the coefficients in the African and Indian samples were significant. For both Coloureds and Whites the coefficients on current employment expereience are as expected, higher than those on prior employment experience.

Table 10.8: Coefficients on Current (EC) and Prior (EP) Employment Experience - Employees in Largest Firms by Race

Variable	African	White	Coloured	Indian
EC_2	0.026	0.046**	0.068*	0.014
EC^2	-0.0003	-0.0006**	-0.0013*	-0.0009
EP	0.030	0.019	0.042*	0.006
EP	-0.0001	-0.0001	-0.0012**	-0.0004
F	16.037	30.983	34.673	11.209
R^2	0.359	0.783	0.753	0.953

Note: Other independent variables - schooling, occupation and gender.

(b) Firm Location

The survey data was stratified by city of employment and an earnings function was specified for each region so that the influence of a series of individual characteristics could be measured. Table 10.9 shows the results.

Table 10.9: Earnings Function by City of Employment

Variable	Cape Town	P.E.	Durban	P-J-E
Schooling	0.022**	0.028**	0.002	0.004
Experience	0.038*	0.041*	0.048	0.061*
Experience Squared	-0.0004**	-0.0009*	-0.0002	-0.0001**
Unskilled Manual	-0.556*	-0.630*	-0.290*	-0.528*
Semiskilled Manual	-0.262*	-0.591*	-0.205*	-0.270*
Lower Non-manual	0.027	0.179**	0.023	-0.053
Higher Non-manual	0.649*	0.889*	0.364*	0.611
African	-0.182**	-0.045	-0.414*	-0.291*
Coloured	-0.227*	-0.151**	0.041	-0.076**
Indian	0.158	0.082	0.016	0.063
Male	0.096*	0.138*	0.205*	0.044**
C	6.438	6.177	6.934	6.825
F	117.393	96.185	90.232	252.919
R^2	0.831	0.892	0.878	0.826
N	283	145	162	615

There is little difference in the explanatory power of the regression for the four regions, with all of them in excess of 80 per cent. The schooling coefficient is small and significant in Cape Town and Port Elizabeth but insignificant in Durban and the PJE area. However, employment experience received relatively larger rewards in PJE than in the other centres. As with the firm size category, significant occupational earnings differentials exist particularly in Cape Town, Port Elizabeth and PJE. Discrimination against Africans exists in all four regions but more so in Durban and PJE. In these two regions Africans earn, on average, 34 and 25 per cent less than Whites. In contrast. in Cape Town the differential is 17 per cent and in Port Elizabeth it is only 4 per cent (but not significant). Discrimination against Coloureds exists in Cape Town, Port Elizabeth and to a lesser extent in PJE. In Cape Town, Coloureds

earn, on average, 20 per cent less than Whites; in Port Elizabeth 14 per cent less and in the PJE area 7 per cent less. In the case of both Africans and Coloureds discrimination is greatest in the area in which these groups are most highly concentrated. This points to a "racial crowding" explanation, that is, in areas where a particular Black group is numerically dominant, substantial wage discrimination occurs probably because of the crowding of workers from such groups in the lower-paying occupations. Gender discrimination (against females) exists in all four regions with earnings differentials being significantly larger in Durban and Port Elizabeth than in Cape Town and PJE.

10.4 Conclusion

In this chapter the earnings function analysis was carried a step further with the introduction of firm characteristics. By combining personal and firm characteristics, the role of each set of characteristics was highlighted. The analysis indicates that personal variables are the predominant influence on earnings. When the firm variables, firm size, sub-sector and location are introduced into the earnings function, the explanatory power of the regression is improved but only to a minor extent.

The earnings function comprising only the firm variables showed substantial earnings differentials by city of employment and sub-sector and to a lesser extent by firm size. These results

indicate a degree of segmentation in the labour market. An attempt was also made to further probe the impact of firm size and location through specifying earnings functions for these sub-samples. The results indicate that the largest firms, contrary to general expectations, are not the highest paying. However, this finding may be due to a sample bias in that these firms tended to provide a larger proportion of the unskilled and semi-skilled manual workers in the sample. An analysis of the largest firms (>500 workers) showed significant racial differences, particulary in terms of substantial occupational wage differences within each race. Gender discrimination was also a feature although in the case of Indians it was the male group that was discriminated against. Finally, the analysis of the firm location showed significant earnings differentials between the cities particularly with respect to occupation, race and gender.

In summary, while the findings for the largest firm category are not convincing, there is evidence of segmentation in the labour market. The higher paying firms are likely to be those that employ more than 100 workers, are located in PJE and are in the motor, machinery, metal and chemical sub-sectors.

No firm conclusions can be drawn about the rewards to education, occupation and experience by firm size, location and sub-sector although the data does reveal that the largest firms reward Whites and Coloureds for schooling, employment experience and tenure.

SUMMARY AND CONCLUSIONS

This thesis set out to examine the relationship between the educational process and the labour market by focusing on the relative importance of formal education and on-the job experience including occupational attainment and training as determinants of earnings. The roles of race and gender were also examined.

The project on which this thesis is based made use of a set of qualitatively-rich data collected from a 1987 establishment survey in the manufacturing sector in the four major cities of South Africa.

At the time of the survey many changes were manifesting themselves in the South African political economy. Following the 1976 uprising in Soweto and elsewhere in South Africa, the government embarked on a policy of educational expansion for Blacks. This expansionary policy was characterised by dramatic rises in educational expenditure and rising enrolment ratios. However, the quantitative expansion of education was not accompanied by a corresponding change in the quality of African and to a lesser extent Coloured education.

Also during the 1980s the governement repealed virtually all the discriminatory legislation applicable to the labour market.

African trade unions were legalised, job reservation and influx control legislation were scrapped and institutional mechanisms for the industrial training of Blacks were set up.

As government policies on education and the labour market were liberalising, the economy, however, was stagnating. After the high growth periods of the 1960s and the 1970s, the South African economy in the 1980s was characterised by low growth rates, high inflation, increasing levels of unemployment and an almost total lack of productive employment opportunities especially in manufacturing. The fact that the economy was performing poorly and the education system was expanding had serious implications for the capacity of the economy to absorb increasing numbers of educated Africans into gainful employment.

11.1 FINDINGS

The main findings of this thesis are listed below.

(1) The rate of return to investment in formal schooling is exceptionally low for Africans. While a private rate of return of approximately 10 per cent was obtained for the entire sample, the rate of return for Africans was 4 per cent and for African females it was negative.

The rate of return varies by educational level and race. Africans

and Coloureds received poor returns for primary education. In the sample there were no Indian or Whites with primary education. At the lower secondary education level, the rates of return increase substantially for Coloureds but not for Africans. At the higher secondary education level African returns are relatively high at around 10 per cent. For all races higher secondary education reaps the highest returns. Although the returns to education at this level for Africans is relatively high, the returns are significantly lower than for other groups. It would appear therefore that employers detect qualitative differences in education. For instance, employers are probably detecting differences between the quality of African and Coloured lower secondary graduates on the one hand and between African and the other races at the higher secondary level on the other. Education, however, provides only a partial explanation for the low returns to Africans.

Further analysis showed that occupational segregation is an important determinant of earnings. For Africans to reap high returns to education, they have to have higher secondary education and be in the higher paying occupations. The low average returns recorded for Africans are attributed to their "crowding" into the lower paying unskilled and semi-skilled non-manual occupations and their virtual exclusion from the higher paying skilled manual and higher non-manual occupations. Indian females also recorded low returns to education in spite of most of them having post-secondary education qualifications. Again,

this was attributed to the crowding effect, in this case of women with high educational status, into the lower paying non-manual occupations.

(2) Employment experience was an important determinant of earnings. Except for White and Indian females, all groups received positive and internationally comparable returns to labour market experience. This suggests that skill acquisition on-the-job is an important determinant of earnings.

(3) The analysis of matriculant earnings to detect whether employers were screening employees on the basis of their matric qualifications revealed substantial earnings differentials between matriculants and non-matriculants. In the case of Africans, especially, the quality of the matric pass, as reflected in the aggregate symbol was an important determinant of earnings. However, in the final analysis, substantial earnings differentials exist between Africans and non-African matriculants. This again suggests that employers are distinguishing between the quality of the education received by Africans and the other race groups. Some screening on the basis of matric does occur, but education also seems to have a productivity enhancing role.

(4) There was substantial evidence of wage discrimination by gender and race. In most occupations, women earned less than men irrespective of educational qualifications. While the personal

characteristics of women reveal more frequent job changes, and lower job tenure than males, so decreasing their opportunities for skill acquisition through on-the-job experience and training, the evidence is consistent with the view that substantial wage discrimination against females exists. Female wage discrimination has to be explained in terms of job discrimination. The structure of jobs typically open to women are likely to reflect employer perceptions of the average characteristics of women (that is, intermittent labour force participation, low tenure) so that women are crowded into the lower paying occupations.

This thesis also addressed the continuing degree of racial wage discrimination. Substantial wage discrimination against Blacks especially Africans and Coloureds, exists in spite of expanding educational qualifications and the removal of statutory discrimination, which had previously hampered Black advancement. Racial wage discrimination can also be attributed to job discrimination. This raises the issue of why job discrimination exists. Blacks, especially Africans and Coloureds, remain crowded in the unskilled and semi-skilled manual occupations because of the inability of the failing economy to absorb increasing numbers of more educated labour. Furthermore, because of the recessionary conditions, the non-manual occupations have become effective internal labour markets in which very few "ports of entry" are being created for Blacks.

(5) The analysis of the relationship between seniority and earnings showed that, in general, employers reward tenure and

hence the acquisition of firm-specific skills. In other words, the key predictions of the human capital theory are borne out, namely that, firms reward experience in the currrent firm against skills acquired in prior employment. There is a positive relationship between seniority and earnings for all races and all occupations, except skilled manual labour.

(6) The analysis of labour turn-over showed that turnover rates are low and are probaly related to the restrictive economic climate, especially the high levels of unemployment. Age, occupation, gender and education are all important determinants of mobility. Most likely to move are those that are young, educated, male and in the higher non-manual occupations.

(7) Occupation is a powerful influence on earnings. Inclusion of occupation in the earnings function analysis increases the explanatory power of the regression and affects a number of variables including education, employment experience, race and gender. It matters what occupation an individual is in since the opportunities for skill acquisition and hence earnings vary by occupation. In general, the less educated do not enter occupations that are more skill intensive but the more educated are increasingly entering occupations requiring less skills as the supply of educated labour increases. Because of educational expansion, lower occupations are being filled increasingly by individuals with higher educational qualifications than in the 1950s and the 1960s. The effect of this filtering down process

has been to lower average earnings and reduce the wage dispersion in manual occupations. There is also evidence of limited occupational mobility of Africans and Coloureds from unskilled to semi-skilled manual occupations and of Whites from lower non-manual occupations to higher non-manual occupations. Black occupational mobility to the skilled manual and higher non-manual occupations was negligible. What then are the determinants of mobility? For the mobility of all groups for which analysis was possible, education and employment experience was crucial. Educated Africans lacking substantial experience, for instance are unlikely to achieve any degree of occupational mobility.

(8) The returns to formal training were of the order of 8 per cent which is a reasonable rate given the amount of training provided by the state and employers. All the manual occupations received positive and significant returns to training. However, as stated in Chapter Nine, the small training coefficients may not be illustrative of the real impact of training because the nature of the questions in the survey may not be picking up the full extent of training especially in smaller firms where the nature of on-the-job training is likely to be less formal. However, the evidence is that a small proportion of the labour force receives training and that the provision of training by the state and employers is inadequate.

(9) The influence of firm characteristics on earnings is shown to be minor compared to the influence of personal characteristics. However, there is some evidence of segmentation

in the labour market with the higher paying jobs likely to be located in firms employing more than 100 workers, in the motor, chemical, metal and machinery sectors, in the Pretoria-Johannesburg-East Rand region.

The question that needs to be addressed is whether the findings of this thesis are relevant to the entire economy. While there are significant differences between the manufacturing and other sectors, especially public service employment, there is no reason why the findings relating to the rates of return to education, the quality of education, the returns to skill-acquisition on-the-job and to the role of occupation should not apply to the entire economy. Most of the other economic sectors have faced similar conditions as the manufacturing sector: namely, expanding education, liberalising reforms in the labour market and a stagnating economy in which the ability to create employment has been constrained.

11.2 POLICY RECOMMENDATIONS

The relevance of labour market theories to the analysis of the survey data has to addressed. It is obvious that the neoclassical theory of human capital accumulation cannot explain completely the structure of the labour market. Individuals with increasing levels of education are unable to enter the higher paying occupations. The job competition and segmentation models are

relevant. It is apparent that as high productivity jobs are becoming scarce, competition to get to the head of the queue is intensifying. A leapfrogging process is occurring whereby as demand for education by individuals is increasing, it is becoming more difficult for each group to secure jobs. At the top of the queue are individuals with certain characteristics: in the South African context they are invariably White, educated and male. The internal labour market concept is also relevant especially in non-manual occupations. The end result is that large numbers of Blacks and females are crowded into lower paying occupations.

What policy implications arise from this study? Three issues need to be highlighted. The first is that employers are sending a clear signal that while the level (quantity) of education of Africans is rising, the quality of education is not improving significantly. Secondly, workers of all races attain significant rewards to skill acquisition on-the-job particularly through labour market experience, high-skill occupations and formal training. Thirdly, this in turn has policy implications for the creation of high-productivity jobs and the provision of formal training on a greater scale than attempted before. What flows from this study is the need to emphasise the development of effective supply-side (education and training) and demand-side (job creation) policies.

On the one hand this calls for what Behrman (1990) has described as a Human Resource-Led Development Strategy. In the South

African context this means prioritising improvements in the quality of education. The high returns to higher secondary education for Africans suggest that the economy may benefit from concentrating resources on a smaller proportion of students and improving the quality of education. This does not necessarily mean sacrificing productivity for equity. While it may not be politically feasible or desirable to move from a policy of free universal primary education, consideration needs to be given to the use of limited state resources increasingly for the education of the poor at all levels.

The need to improve the quality of Black education is paramount. This need is especially illustrated by the low rates of return to Africans particularly when repetition is taken into account.

At the same time there is an urgent need for the restructuring of training policy. On the whole the evidence is consistent with the view that training is inadequate. Given the poor quality of education of a large proportion of the labour force, and the benefits to be gained from on-the-job training, consideration needs to be given to making such investments by employers more financially attractive. Alternatively, the state may wish to be come involve in training on a more extensive and intensive scale than before.

In South Africa, the distribution of educational resources has been distorted by apartheid. Any attempt to reduce racial inequalities in education must, of necessity, involve fundamental

restructuring of the education system along non-racial lines. However, this may not be sufficient to ensure that all children have access to high quality school education. The early years of the post-apartheid society are especially crucial. Because of the high expectations of the previously disenfranchised for free and universal education the government will find it extremely difficult, if not impossible, to accede to such demands especially with the economic instability and stagnation that will accompany the transitional period.

Under such a scenario the state will be forced to shift the burden of financing education to other sources at least in the first decade of the "new" South Africa. As the process of educational restructuring takes place and economic growth rates of sufficiently high magnitude occur it may be possible to shift the burden back to the state to some extent.

In the short term the government will be forced to seek new partners in financing education. One scheme by which a more equitable allocation of resources can be achieved is shown in Table 11.1. It should be noted that the extent to which the state can fund free education will be determined by the resources it has its disposal at any particular time. Therefore, it is extremely difficult to predict how much of education should be free. The state should provide as much free education as it is able to.

Table 11.1: Education Financing Options

Level of Education	Suggested source of financing
Pre-primary, primary and secondary level	block grants categorical grants community financing donor support user fees
Tertiary	
(a) Universities, technikons	categorical grants user fees loans donor support graduate tax graduate payroll tax
(b) Teacher training	block grants
Non-formal	categorical grants donor support

Note: Block grants are public subsidies granted to educational institutions without placing restrictions on how these funds should be used. Categorical grants stipulate that funds should be used for a specified purpose.

Table 11.1 suggests that a multi-pronged strategy would be needed at each and every level to ensure equality of access to and survival within the education system. Block grants could be paid to all schools to cover recurrent costs such as teachers' salaries. In addition, categorical grants could be made available for the provision of facilities in impoverished communities where these are not available, and for the upgrading of existing but inadequate facilities. Schools may also be established through community financing, as well as through private and foreign donor support. User fees may have to be implemented but the state may wish to keep these at relatively low levels at the primary level.

In tertiary education public subsidies could be provided to the needy and for some categories of the educated workforce for which the state may wish to stimulate demand, for example technical occupations. However, the main source of tertiary education financing should be through the use of fees and loans.

Teacher training should be subsidised fully. Given the chronic problems relating to numbers and quality of teachers, the level of teacher output will be an important determinant of the progress in achieving improved quality of education for all.

Non-formal education programmes will need to be established to improve, inter alia, literacy, adult education and vocational training. The state may contribute but funds should be forthcoming from private sector donor support for whom benefits are evident.

The increased social and economic demand for education, coupled with the lingering economic crisis in this country, may mean that free and universal education at all levels is an unrealistic objective in the short term for a post-apartheid government. To ensure greater equality of access for the poor and the disadvantaged, innovative policies need to be formulated in order to shift the costs of education to those who have the ability to pay.

Supply-side policies relating to education and training can only

be effective when jobs are being created. Education does not provide jobs, it creates skills. In the final analysis, the success of educational policies depends on the extent to which the educated are absorbed into gainful employment. A successful employment creation strategy is crucial in order to reverse the filtering-down process whereby individuals with increasingly higher education qualifications have no alternative but to enter lower occupations than previous generations.

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APPENDIX A

EDUCATION AND EMPLOYMENT SURVEY

EMPLOYEE QUESTIONNAIRE

Research Surveys
79 Kloof Street
Gardens
CAPE TOWN 8001

(021) 23-4166

Research Surveys
Richmond House
21 Napier Street
Richmond
JOHANNESBURG 2001
(011) 482-1445

Research Surveys
AA Mutual House
RM 604 6th Floor
447 Smith Street
DURBAN 4001
(031) 301-7965

	Query	Omissions	Checkback	Date	Initial	Face to Face	Phone
FIELD	-1	-1	YES -1			-1	-2
CODING	-2	-2	NO -2			-1	-2

RESPONDENT NO: .....

DEBRIEFED BY: ..... CODING CHECKED BY: .....
EDITED BY: ..... CONSISTENCY CHECKED BY:.....
CODED BY: ..... EDITING CHECKED BY: .....

---

1. We are a market research company called Research Surveys. At present we are conducting a study amongst people who are currently employed.

2. From time to time we research people's working conditions. Please feel free to tell us what you think, as we finally look at people's opinions in general and not at the opinion of an individual.

3. Do you have a manual or a non-manual job?
   MANUAL.....-1
   NON-MANUAL.....-2

COMPANY: .....

DATE: .....

TIME: .....

---

1. CITY OF INTERVIEW

CAPE TOWN.....-1
PORT ELIZABETH.....-2
DURBAN.....-3
JOHANNESBURG.....-4

---

2. SUB-SECTOR

TEXTILES.....-1
FOOD & BEVERAGES.....-2
PRINTING & PAPER.....-3
MOTOR.....-4
LEATHER & FOOTWEAR.....-5
CLOTHING.....-6
PLASTICS & RUBBER.....-7
MACHINERY.....-8
CHEMICAL.....-9
METAL.....-10

DEMOGRAPHICS

3. **SEX**

MALE.....-1
FEMALE.....-2

---

4. **RACE**

AFRICAN.....-1
WHITE.....-2
COLOURED.....-3
INDIAN.....-4
OTHER.....-5

---

6. **MARITAL STATUS**

Are you:

MARRIED.....-1
DIVORCED.....-2
WIDOWED.....-3
SEPARATED.....-4
SINGLE (NEVER MARRIED).....-5
LIVING TOGETHER.....-6
OTHER.....-7

(FOR AFRICAN EMPLOYEES ONLY)

7. **RESPONDENT:**

Are You:

A CONTRACT WORKER WITH A CONTRACT.....-1
A PERMANENT RESIDENT BY BIRTH.....-2
A PERMANENT RESIDENT THROUGH CONTINUOUS EMPLOYMENT FOR 10 TO 15 YEARS LEGAL RESIDENCE...-3
A DEPENDANT OF A RESIDENT WHO QUALIFIED UNDER (2) OR(3) ABOVE.....-4
IN THE AREA ILLEGALLY.....-5

FAMILY BACKGROUND

We would like you to read the following questions and insert your answers in the grid :

8. What was the highest grade of education that your FATHER reached? (PLEASE CIRCLE THE APPROPRIATE NUMBER)

9. How many years did it take for your FATHER to obtain this grade of education? (FILL IN YOUR ANSWER IN THE ALLOCATED SPACE)

GRADE OF EDUCATION		NO OF YRS
SUB A - STD 1	-01	...
STD 1 - STD 2	-02	...
STD 3 - STD 5	-03	...
STD 6 -	04	...
STD 7 -	-05	...
STD 8 -	-06	...
STD 9 -	-07	...
STD 10 -	-08	...
SOME UNIVERSITY	-09	...
UNIVERSITY COMPLETED	-10	...
OTHER POST MATRIC STUDIES (SPECIFY)	-11	...
DON'T KNOW/CAN'T REMEMBER	-99	...
NONE	-13	...

---

10. What was the highest grade of education that your MOTHER reached? (PLEASE CIRCLE THE APPROPRIATE NUMBER)

11. How many years did it take for your MOTHER to obtain this grade of education? (FILL IN YOUR ANSWER IN THE ALLOCATED SPACE)

GRADE OF EDUCATION		NO OF YRS
SUB A - STD 1	-01	...
STD 1 - STD 2	-02	...
STD 3 - STD 5	-03	...
STD 6 -	04	...
STD 7 -	-05	...
STD 8 -	-06	...
STD 9 -	-07	...
STD 10 -	-08	...
SOME UNIVERSITY	-09	...
UNIVERSITY COMPLETED	-10	...
OTHER POST MATRIC STUDIES (SPECIFY)	-11	...
DON'T KNOW/CAN'T REMEMBER	-99	...
NONE	-13	...

12. What was the highest grade of education that your SPOUSE reached? (PLEASE CIRCLE THE APPROPRIATE NUMBER)

13. How many years did it take for your SPOUSE to obtain this grade of education? (FILL IN YOUR ANSWER IN THE ALLOCATED SPACE)

GRADE OF EDUCATION		NO OF YRS
SUB A - STD 1	-01	...
STD 1 - STD 2	-02	...
STD 3 - STD 5	-03	...
STD 6 -	04	...
STD 7 -	-05	...
STD 8 -	-06	...
STD 9 -	-07	...
STD 10 -	-08	...
SOME UNIVERSITY	-09	...
UNIVERSITY COMPLETED	-10	...
OTHER POST MATRIC STUDIES (SPECIFY)	-11	...
DON'T KNOW/CAN'T REMEMBER	-99	...
NONE	-13	...

EDUCATION

14. What was the highest grade of education that YOU reached? (PLEASE CIRCLE THE APPROPRIATE NUMBER)

15. How many years did it take for YOU to obtain this grade of education? (FILL IN YOUR ANSWER IN THE ALLOCATED SPACE)

GRADE OF EDUCATION		NO OF YRS
SUB A - STD 1	-01	...
STD 1 - STD 2	-02	...
STD 3 - STD 5	-03	...
STD 6 -	04	...
STD 7 -	-05	...
STD 8 -	-06	...
STD 9 -	-07	...
STD 10 -	-08	...
SOME UNIVERSITY	-09	...
UNIVERSITY COMPLETED	-10	...
OTHER POST MATRIC STUDIES (SPECIFY)	-11	...
DON'T KNOW/CAN'T REMEMBER	-99	...
NONE	-13	...

16. In what year did you complete your full time education?

.....

17. When leaving full-time formal education (either school or post-school), would you have liked to continue full-time but were unable to do so?

YES .....-1 GO TO 18
NO .....-2 GO TO 19

18. What prevented you from continuing full-time education?

COULD NOT COPE WITH SCHOOL WORK.....-1
UNSUCCESSFUL IN EXAMS.....-2
FINANCIAL REASONS.....-3
NO SCHOOL LOCALLY .....-4
BECAME ARTICLED/APRENTICED .....-5
BECAME PREGNANT.....-6
OTHER (SPECIFY).....-7

If you obtained Matric/a School Leaving certificate answer Q 19 and Q 20 otherwise go to Q 30.

19 Did you obtain a:

VOCATIONAL SCHOOL LEAVING CERTIFICATE.....-1
ACADEMIC SCHOOL LEAVING CERTIFICATE.....-2
MATRICULATION EXEMPTION (UNIVERSITY PASS).....-3

20 What aggregate pass did you get? (Your school leaving symbol)

A.....-1
B.....-2
C.....-3
D.....-4
E.....-5
DON'T KNOW/CAN'T REMEMBER.....-6

If you have obtained some post-matric training, answer Q 21 and Q 22 & 23 otherwise go to Q 17

21 Was the post-school education you received:

FULL-TIME.....-1 GO TO Q 22
PART-TIME.....-2 GO TO Q 23
BOTH.....-3 GO TO Q 22 & 23

Consider 2 years of part-time education as the equivalent of 1 year full-time education

22 How many years of full-time post school education did you have?

23 How many years part-time post school education did you have?

24 Total No of years of Post-school education.

NO OF YEARS	Q 22 FULL - TIME	Q 23 PART-TIME	Q 24 TOTAL
1 YEAR	-1	-1	-1
2 YEARS	-2	-2	-2
3 YEARS	-3	-3	-3
4 YEARS	-4	-4	-4
5 YEARS	-5	-5	-5
6 YEARS	-6	-6	-6
OTHER (Specify)	-7	-7	-7
.....			

---

25 Was this formal post-school education at a:

UNIVERSITY.....-1 GO TO Q 26
TECHNIKON.....-2 GO TO Q 29
TEACHERS TRAINING COLLEGE.....-3 GO TO Q 28
TECHNICAL COLLEGE.....-4 GO TO Q 29
CORRESPONDENCE COLLEGE.....-5 GO TO Q 29
COMMERCIAL COLLEGE.....-6 GO TO Q 29
OTHER (SPECIFY).....-7 GO TO Q 29
.....

If you have attended university, answer Q 26 and 27 otherwise go to 28

26 What was your highest degree?

NO DEGREE.....-1
BACHELORS.....-2
HONOURS.....-3
MASTERS.....-4
DOCTORATE.....-5

---

27 What was your field of study?

ARTS.....-1
COMMERCE.....-2
SOCIAL SCIENCE.....-3
NATURAL SCIENCES.....-4
ENGINEERING.....-5
ARCHITECTURE.....-6
AGRICULTURE.....-7
OTHER (SPECIFY).....-8
.....

If you attended teachers' training college, answer Q 28 otherwise go to Q 30

28 What certificate did you receive?

NO CERTIFICATE.....-1
PTC.....-2
JSTC.....-3
STC.....-4
OTHER (SPECIFY).....-5

If you attended a technikon, technical college, commercial college or correspondence college, answer Q 29

29 What certificate or diploma did you receive?

NO DIPLOMA.....-1
ENGINEERING.....-2
SCIENCE.....-3
COMMERCIAL AND SECRETARIAL.....-4
DOMESTIC SCIENCE.....-5
ART.....-6
EDUCATION.....-7
OTHER (SPECIFY).....-8

EARNINGS

30 What is your gross monthly wage/salary? (Included housing allowance but exclude annual bonus and overtime.)

.....

31 What is your net monthly wage/salary? (i.e. gross monthly wage less all deductions)

.....

32 Do you receive an annual bonus?

YES.....-1 GO TO Q 33
NO.....-2 GO TO Q 34
DON'T KNOW.....-9999 GO TO Q 34

33 How much do you receive?

.....
DON'T KNOW.....-9999

Please circle the appropriate number in grid

34 Do you belong to a medical aid scheme?

35 Do you belong to a pension scheme?

36 Does your employer contribute to a pension fund?

37 Are rations/meals provided by the firm free or at reduced prices?

38 Do you receive a housing allowance?

	YES	NO	DON'T KNOW
MEDICAL AID	-1	-2	-3
PENSION FUND	-1	-2	-3
RATION/MEALS PROVIDED	-1	-2	-3
HOUSING ALLOWANCE	-1	-2	-3

39 If you receive a housing allowance, how much do you receive?

.....

EMPLOYMENT EXPERIENCE IN THE FIRM

40 How many people work for this firm?

LESS THAN 50.....-1
50 - 100.....-2
101 - 500.....-3
MORE THAN 500.....-4
DON'T KNOW.....-5

---

41 When did you take up your current employment? .....

---

42 How did you apply for a job with this employer?

APPROACHED THE COMPANY DIRECT.....-1
BY LETTER IN RESPONSE TO AN ADVERTISEMENT.....-2
BY LETTER UNSOLICITED THROUGH A FRIEND OR RELATIVE.....-3
THROUGH A PRIVATE EMPLOYMENT AGENCY.....-4
THROUGH A LABOUR BUREAU.....-5
OTHER (SPECIFY).....-6

---

43 Is your job?

MANUAL.....-1
NON-MANUAL.....-2

---

44 If manual, was it...?

SKILLED.....-1
SEMI-SKILLED.....-2
UNSKILLED.....-3

---

45 What is the job called? .....

---

46 If non manual is your occupation:

CLERICAL.....-1
SUPERVISORY.....-2
TECHNICAL AND SEMI-PROFESSIONAL.....-3
MANAGERIAL AND ADMINISTRATIVE.....-4
PROFESSIONAL.....-5
SALES.....-6
LAW AND ORDER.....-7
OTHER (SPECIFY).....-8

---

47 What is the job called?

.....

---

48 What occupation were you in when you first joined this firm?

MANUAL -1 GO TO Q 49
NON-MANUAL -2 GO TO Q 51

---

49 If the job was manual: Was it ...?

SKILLED.....-1
SEMI-SKILLED.....-2
UNSKILLED.....-3

---

50 What was the job called

.....GO TO 53

---

51 If the job was non-manual: Was it...?

CLERICAL & RELATED.....-1
SUPERVISORY.....-2
TECHNICAL AND SEMI-PROFESSIONAL.....-3
MANAGERIAL & ADMINISTRATIVE.....-4
PROFESSIONAL.....-5
SALES.....-6
LAW AND ORDER.....-7
OTHER (SPECIFY).....-8

---

52 What was the job called

.....

PREVIOUS EMPLOYMENT EXPERIENCE

53 How long was it after you left full-time formal education that you entered paid employment?

1 - 3 MONTHS.....-1
4 - 6 MONTHS.....-2
6 - 9 MONTHS.....-3
9 -12 MONTHS.....-4
1 - 2 YEARS.....-5
MORE THAN 2 YEARS.....-6

54 Were you in paid employment at any time before coming to this employer?

YES.....-1 GO TO Q 55
NO.....-2 GO TO Q 90

55 In what year did you get your first paid job?

.....

56 Have you been continuously in wage employment since then?

YES.....-1 GO TO Q 59
NO.....-2 GO TO Q 57

57 How many times have you been out of wage employment?

1.....-1
2.....-2
3.....-3
4.....-4
5 OR MORE.....-5

58 How many previous employers have you had?

1.....-1
2.....-2
3.....-3
4.....-4
5 OR MORE.....-5

Please answer q 59 to 68 with respect to your first job

59 In which city or town was your first job?

.....

60 In your first job, how many people worked for the firm?

LESS THAN 50.....-1
50 - 100.....-2
101 - 500.....-3
MORE THAN 500.....-4
DON'T KNOW.....-5

---

61 Which of the following fits the enterprise that you worked for?

AGRICULTURE AND FORESTRY.....-01
MINING AND QUARRYING.....-02
MANUFACTURING.....-03
ELECTRICITY AND WATER.....-04
CONSTRUCTION.....-05
WHOLESALE AND RETAIL TRADE.....-06
RESTAURANTS AND HOTELS.....-07
TRANSPORT AND COMMUNICATION.....-08
FINANCE, INSURANCE, REAL ESTATE.....-09
COMMUNITY, SOCIAL AND PERSONAL SERVICES.....-10
DOMESTIC SERVICE.....-11
DON'T KNOW.....-12
OTHER.....-13

---

62 Was the employer ...?

GOVERNMENT.....-1
PRIVATE SECTOR.....-2
PUBLIC CORPORATION.....-3
LOCAL AUTHORITY.....-4
HOUSEHOLDER.....-5

---

63 Was your occupation ...?

MANUAL.....-1 GO TO Q 64
NON-MANUAL.....GO TO 66

---

64 If Manual, was it ...?

SKILLED.....-1
SEMI-SKILLED.....-2
UNSKILLED.....-3

---

65 What was the job called?

.....GO TO Q 69

---

66 If Non-Manual, was it...?

CLERICAL AND RELATED.....-1
SUPERVISORY.....-2
TECHNICAL AND SEMI-PROFESSIONAL.....-3
MANAGERIAL AND ADMINISTRATIVE.....-4
PROFESSIONAL.....-5
SALES.....-6
LAW AND ORDER.....-7
OTHER (SPECIFY).....-8

---

67 What was the job called?

.....

---

68 How long were you in this job?

.....

Please answer Q 69 to Q 79 with respect to the job you held in 1977

69 Were you in full time employment in 1977?

YES.....-1 GO TO 71
NO.....-2 GO TO 70

---

70 Were you...?

UNEMPLOYED.....-1
STILL IN FORMAL EDUCATION.....-2
DID NOT WANT TO WORK.....-3

---

71 In which town or city was this?

.....

---

72 How many people worked for the firm?

LESS THAN 50.....-1
50 - 100.....-2
101 - 500.....-3
MORE THAN 500.....-4
DON'T KNOW.....-5

---

73 Which of the following fits the enterprise that you worked for?

AGRICULTURE AND FORESTRY.....-01
MINING AND QUARRYING.....-02
MANUFACTURING.....-03
ELECTRICITY AND WATER.....-04
CONSTRUCTION.....-05
WHOLESALE AND RETAIL TRADE.....-06
RESTAURANTS AND HOTELS.....-07
TRANSPORT AND COMMUNICATION.....-08
FINANCE, INSURANCE, REAL ESTATE.....-09
COMMUNITY, SOCIAL & PERSONAL SERVICE.....-10
DOMESTIC SERVICE.....-11
DON'T KNOW.....-12
OTHER (SPECIFY).....-13

---

74 Was the employer ...?

GOVERNMENT.....-1
PRIVATE SECTOR.....-2
PUBLIC CORPORATION.....-3
LOCAL AUTHORITY.....-4
HOUSEHOLDER.....-5

---

75 Was your occupation:

MANUAL.....-1 GO TO Q 76
NON-MANUAL.....-2 GO TO Q 78

---

76 If Manual, was it ...?

SKILLED.....-1
SEMI-SKILLED.....-2
UNSKILLED.....-3

---

77 What was the job called?

.....GO TO Q 80

---

78 If Non-manual, was it ...?

CLERICAL AND RELATED.....-1
SUPERVISORY.....-2
TECHNICAL AND SEMI-PROFESSIONAL.....-3
MANAGERIAL AND ADMINISTRATIVE.....-4
PROFESSIONAL.....-5
SALES.....-6
LAW AND ORDER.....-7
OTHER (SPECIFY).....-8

---

79 What was the job called?

.....

Please answer Q 80 to 89 with respect to the last job you held. If your present job is your first job, go to Q 90

80 In which town or city was this?

.....

---

81 How many people worked for the firm?

LESS THAN 50.....-1
50 - 100.....-2
101 - 500.....-3
MORE THAN 500.....-4
DON'T KNOW.....-5

---

82 Which of the following fits the enterprise that you worked for?

AGRICULTURE AND FORESTRY.....-01
MINING AND QUARRYING.....-02
MANUFACTURING.....-03
ELECTRICITY AND WATER.....-04
CONSTRUCTION.....-05
WHOLESALE AND RETAIL TRADE.....-06
RESTAURANTS AND HOTELS.....-07
TRANSPORT AND COMMUNICATION.....-08
FINANCE, INSURANCE, REAL ESTATE.....-09
COMMUNITY, SOCIAL & PERSONAL SERVICE.....-10
DOMESTIC SERVICE.....-11
DON'T KNOW.....-12
OTHER (SPECIFY).....-13

83 Was the employer ...?

GOVERNMENT.....-1
PRIVATE SECTOR.....-2
PUBLIC CORPORATION.....-3
LOCAL AUTHORITY.....-4
HOUSEHOLDER.....-5

---

84 Was your occupation:

MANUAL.....-1 GO TO Q 85
NON-MANUAL.....-2 GO TO Q 87

---

85 If Manual, was it ...?

SKILLED.....-1
SEMI-SKILLED.....-2
UNSKILLED.....-3

---

86 What was the job called?

.....GO TO Q 89

---

87 In Non-manual, was it ...?

CLERICAL AND RELATED.....-1
SUPERVISORY.....-2
TECHNICAL AND SEMI-PROFESSIONAL.....-3
MANAGERIAL AND ADMINISTRATIVE.....-4
PROFESSIONAL.....-5
SALES.....-6
LAW AND ORDER.....-7
OTHER (SPECIFY).....-8
.....

---

88 What was the job called?

.....

---

89 How long were you in this job?

1 - 6 MONTHS.....-1
6 - 12 MONTHS.....-2
1 - 2 YEARS.....-3
2 - 4 YEARS.....-4
5 - 7 YEARS.....-5
7 - 10 YEARS.....-6
OTHER (SPECIFY).....-7
.....

TRAINING

For each course, please answer the following questions and fill in the answer in the allocated space

90 Has this firm given you a training course?

YES.....-1 GO TO Q 91
NO.....-2 GO TO Q 98

---

91 What was the nature of the course?

92 Was the course done in the firm or in some outside institution?

93 Was the course done part-time or full-time?

94 Did you receive full pay while attending the course?

95 Did you receive a higher pay after completing the course?

91 NATURE OF COURSE	92 IN FIRM	92 OUT-SIDE	93 PART TIME	93 FULL TIME	94 YES	94 NO	95 YES	95 NO
1.....	-1	-2	-1	-2	-1	-2	-1	-2
2.....	-1	-2	-1	-2	-1	-2	-1	-2
3.....	-1	-2	-1	-2	-1	-2	-1	-2
4.....	-1	-2	-1	-2	-1	-2	-1	-2
5.....	-1	-2	-1	-2	-1	-2	-1	-2
6.....	-1	-2	-1	-2	-1	-2	-1	-2
7.....	-1	-2	-1	-2	-1	-2	-1	-2
8.....	-1	-2	-1	-2	-1	-2	-1	-2

---

96 Consider all the on-the-job training you have done - what is the total amount of training you have done?

1 - 3 MONTHS.....-1
3 - 6 MONTHS.....-2
6 - 9 MONTHS.....-3
9 - 12 MONTHS.....-4
1 - 2 YEARS.....-5
2 - 4 YEARS.....-6
OTHER (SPECIFY).....-7
.....

97 Since 1977, have you had any additional training?

YES.....-1
NO.....-2

EDUCATION OF CHILDREN

98 How many children do you have *not* old enough to go to school?

1.....-1
2.....-2
3.....-3
4.....-4
5.....-5
NONE.....-6

---

99 How many children do you have old enough to go to school but who never attend?

1.....-1
2.....-2
3.....-3
4.....-4
5 .....-5
NONE.....-6

---

100 How many children do you have in formal education now?

1.....-1
2.....-2
3.....-3
4.....-4
5 OR MORE.....-5
NONE.....-6

---

101 How many children do you have who have completed their formal education?

1.....-1
2.....-2
3.....-3
4.....-4
5 OR MORE .....-5
NONE.....-6

Please answer the following questions for your three eldest children 6 years or older (if any)

102-104 What are the sexes of your children?

105-107 What are the ages of your children

108-110 How many years of formal education have your children had?

111-113 Is the formal education still continuing?

114-116 If yes, how much did education cost you last year?

	ELDEST CHILD	SECOND ELDEST	THIRD ELDEST
AGES OF CHILDREN	....	....	....
SEX OF CHILDREN			
MALE	-1	-1	-1
FEMALE	-2	-2	-2
YEARS OF EDUCATION	....	....	....
IS THE EDUCATION STILL CONTINUING ?			
YES	-1	-1	-1
NO	-2	-2	-2
COST OF EDUCATION LAST YEAR	.....	.....	.....

117 How much did the education of all your children cost you last year?

.....

APPENDIX B

EDUCATION & EMPLOYMENT SURVEY

EMPLOYER QUESTIONNAIRE

FIRM NAME	.....
SECTOR	.....
OCCUPATION	.....

A. RECRUITMENT
B. EDUCATION & PRODUCTIVITY
C. THE DETERMINANTS OF WAGES
D. TRAINING
E. TURNOVER & VACANCIES

A. RECRUITMENT

1. **HOW DO YOU RECRUIT YOUR WORKERS IN THIS OCCUPATION OR FOR TRAINING IN THIS OCCUPATION?**

	usually	sometimes	never
a) by advertising			
b) through a labour bureau			
c) unsolicited application by job-seeker (e.g. at the gate or by post)			
d) recommendation by employees or others			
e) from among workers in other jobs in the firm			

f) other (specify)

2. **ARE THERE DIFFERENT PROCEDURES FOR DIFFERENT OCCUPATIONS?**

yes	no

.....

.....

.....

3. **WHAT CRITERIA DO YOU USE TO CHOOSE BETWEEN APPLICANTS?**

	main	secondary	irrelevant
a) formal education			
b) attendance on training course			
c) experience in firm			
d) other experience			
e) age			
f) prior acquaintance			
g) performance in aptitude/literacy tests			

	main	secondary	irrelevant
h) ability to speak English/Afrikaans			
i) offering at lowest wages			
j) strength or quality of references			
k) race			
l) gender			

m) other (specify)

IF FORMAL EDUCATION IS IRRELEVANT, PROCEED TO SECTION B

3. IF FORMAL EDUCATION IS A MAIN OR SECONDARY CRITERION, WHICH ARE IMPORTANT?

a) years of schooling	
b) possession of certificate	
c) exam results in last year at school	
d) subjects studied	
e) no reply	
f) other (specify)	

5. DO YOU NORMALLY REQUIRE A PARTICULAR MINIMUM OF FORMAL EDUCATION?

yes	no	no reply

IF NO, PROCEED TO SECTION B. IF YES, SPECIFY

6. IF YES, WHY?

	important	irrelevant
a) education provides necessary skills		
b) those who are naturally more able are found among the educated i.e. the education system picks out for you those people with the intrinsic qualities you want		
c) education makes people more trainable		
d) the educated fit in better		

important	irrelevant

e) education is a fair way of choosing among too many applicants

f) other (specify)

7. **IF YES, HAVE YOUR NORMAL MINIMUM FORMAL EDUCATION REQUIREMENTS INCREASED SINCE 1977?**

yes	no	don't know

8. **IF REQUIREMENTS HAVE INCREASED, IS THIS BECAUSE;**

yes	no

a) there are more better educated applicants than before

b) the job has become more complex

c) the quality of recruits of a particular education has declined

d) other (specify)

B EDUCATION AND PRODUCTIVITY

1. **ON AVERAGE, ARE WORKERS WITH MORE EDUCATION BETTER AT THEIR JOBS?**

much better	a bit better	no better	can't determine

IF BETTER, IS THIS BECAUSE OF

yes	no

a) literacy

b) numeracy

c) adaptability

d) discipline

e) other (specify)

UNLESS THE ANSWER TO QUESTION 1 WAS "CAN'T DETERMINE" WHAT MEANS DO YOU USE TO DETERMINE THIS?

		yes	no
a)	direct assessment by superiors		
b)	specific investigations		
c)	more educated workers earn productivity bonuses more often than others		
d)	other (specify)		

2. AMONG WORKERS WITH THE SAME LENGTH OF EDUCATION, ARE THOSE WITH HIGHER EXAM RESULTS BETTER AT THEIR JOB ON AVERAGE?

much better	a bit better	no better	can't determine

3. DOES IT MATTER WHICH SUBJECTS THEY STUDY?

yes	no	can't determine

If yes, specify

4. CAN TRAINING AND/OR EXPERIENCE MAKE UP FOR A LACK OF FORMAL EDUCATION?

yes	no	don't know	no reply

5. HOW DO NEW WORKERS WITH A GIVEN LEVEL OF EDUCATION RECRUITED TODAY COMPARE WITH NEW WORKERS 5-10 YEARS AGO?

better at their job	
the same	
worse	
can't determine	

no reply

C DETERMINANTS OF WAGES

1. HOW IMPORTANT ARE THE FOLLOWING IN DETERMINING THE WAGES YOU PAY?

		very	somewhat	not import.
a)	your firm's negotiation with union			
b)	the industry's negotiation with union			
c)	government directives			
d)	shortages or surpluses of labour			
e)	profitability of your enterprise			
f)	other (specify)			

2. DO ALL WORKERS IN THIS OCCUPATION START AT THE SAME WAGE?

yes	no	no reply

IF NO, DOES THE STARTING WAGE DEPEND ON?

		yes	no
a)	level of formal education		
b)	quality of formal education		
c)	experience in other jobs		
d)	experience elsewhere		
e)	race		
f)	age		
g	gender		
h)	wage in other job		
i)	other (specify)		

3. **DOES PAY NORMALLY RISE WITH LENGTH OF TIME IN THIS JOB (APART FROM COST OF LIVING INCREASES)?**

yes	no	no reply

4. **IF YES, DOES THE JOB HAVE A FORMAL INCREMENTAL SCALE?**

yes	no	no reply

IF NO TO EITHER QUESTION 3 OR QUESTION 4 WHAT CRITERIA ARE USED FOR INDIVIDUAL PAY RISES?

		yes	no
a)	increased job content		
b)	increased responsibility		
c)	increased efficiency		
d)	other (specify)		

5. **DO MORE EDUCATED WORKERS HAVE A BETTER CHANCE OF PROMOTION?**

yes	no	no reply

D TRAINING

1 **DO YOU PROVIDE FORMAL TRAINING FOR THIS OCCUPATION?**

yes	no	no reply

IF NO PROCEED TO SECTION E

2. **IF YES, WHAT FORM DOES THIS TAKE?**

a training course	
training while on the job (i.e. learning by doing)	

no reply

3. **IF COURSES ARE PROVIDED, WHERE ARE THEY HELD?**

at an outside institution

within the enterprise

no reply

4. **HAVE ALL WORKERS IN THIS OCCUPATION UNDERGONE TRAINING?**

yes	no	no reply

5. **DO ALL NEW RECRUITS UNDERGO THIS TRAINING?**

yes	no	no reply

6. **WHO PARTICIPATES IN THESE COURSES?**

workers already employed by you in this occupation for some time

workers already employed by you in other occupations

new recruits to the firm

no reply

7. **HOW LONG ARE THE COURSES PROVIDED?**

8. **ARE THESE COURSES FULL TIME/PART TIME?**

9. **DO WORKERS RECEIVE HIGHER PAY AFTER SUCCESSFULLY COMPLETING THE COURSES?**

yes	no	no reply

10. **IF NOT ALL THE MEMBERS IN THE OCCUPATION UNDERGO TRAINING, WHY IS THIS?**

		yes	no
a)	some do not have the ability to benefit from the training		
b)	there is a shortage of training opportunities		
c)	there is no need to train more workers		
d)	formal education makes training unnecessary		
e)	previous experience makes training unnecessary		
f)	other (specify)		

E TURNOVER AND VACANCIES

1. **ROUGHLY WHAT PROPORTION OF WORKERS IN THIS OCCUPATION LEAVE THE FIRM IN ANY YEAR OF WORK?**

0%	
0-5%	
10-20%	
20-50%	
50-100%	
100% & over	
don't know	

2. **IS THIS PROPORTION**

too high	
about right	
too low	
don't know	

3. **IF NOT TOO LOW, DO YOU ADOPT POLICIES DESIGNED TO DISCOURAGE PEOPLE FROM LEAVING THE FIRM?**

yes	no	no reply

IF YES, ARE THEY

		yes	no
a)	a wage above average		
b)	incremental pay scales		
c)	fringe benefits		
d)	other (specify)		

IF YOU ADOPT SUCH POLICIES, IS IT

a)	to avoid wasted expenditure on training	
b)	because of difficulties in recruiting	
c)	other (specify)	

4. **DO YOU NORMALLY HAVE UNFILLED VACANCIES IN THIS OCCUPATION?**

yes	no	no reply

IF YES, IS THIS BECAUSE

		yes	no
a)	your labour requirements are expanding		
b)	workers have been leaving the firm		
c)	there is a chronic shortage of suitable candidates.		
d)	the work is irregular or seasonal		
e)	other (specify)		

APPENDIX C

EMPLOYER RESPONSES

		No. of Interviews
C2-6	Semi-skilled Manual Occupations	5
C7-11	Skilled Manual Occupations	2
C12-16	Unskilled Manual Occupation	1
C17-21	Clerical Occupations	2

NOTE: Columns show number of responses to a particular answer.

EMPLOYER RESPONSES

SEMI-SKILLED MANUAL OCCUPATIONS

C2

A. RECRUITMENT

1. HOW DO YOU RECRUIT YOUR WORKERS IN THIS OCCUPATION OR FOR TRAINING IN THIS OCCUPATION?

		usually	sometimes	never
a)	by advertising			5
b)	through a labour bureau		1	4
c)	unsolicited application by job-seeker (e.g. at the gate or by post)		2	3
d)	recommendation by employees or others		5	
e)	from among workers in other jobs in the firm		5	
f)	other (specify)			

2. ARE THERE DIFFERENT PROCEDURES FOR DIFFERENT OCCUPATIONS?

yes	no
5	

ADVERTISING FOR MORE SKILLED OCCUPATIONS

3. WHAT CRITERIA DO YOU USE TO CHOOSE BETWEEN APPLICANTS?

		main	secondary	irrelevant
a)	formal education	2	3	
b)	attendance on training course		5	
c)	experience in firm	1	4	
d)	other experience		5	
e)	age		5	
f)	prior acquaintance			5
g)	performance in aptitude/literacy tests		5	

	main	secondary	irrelevant
h) ability to speak English/Afrikaans		5	
i) offering at lowest wages			5
j) strength or quality of references		2	3
k) race			5
l) gender		5	
m) other (specify)			

IF FORMAL EDUCATION IS IRRELEVANT, PROCEED TO SECTION B

3. IF FORMAL EDUCATION IS A MAIN OR SECONDARY CRITERION, WHICH ARE IMPORTANT?

a) years of schooling	5
b) possession of certificate	
c) exam results in last year at school	
d) subjects studied	
e) no reply	
f) other (specify)	

5. DO YOU NORMALLY REQUIRE A PARTICULAR MINIMUM OF FORMAL EDUCATION?

yes	no	no reply
5		

IF NO, PROCEED TO SECTION B. IF YES, SPECIFY

6. IF YES, WHY?

	important	irrelevant
a) education provides necessary skills	5	
b) those who are naturally more able are found among the educated I.e. the education system picks out for you those people with the intrinsic qualities you want	3	
c) education makes people more trainable	5	
d) the educated fit in better		3
e) education is a fair way of choosing among too many applicants	3	
f) other (specify)		

7. IF YES, HAVE YOUR NORMAL MINIMUM FORMAL EDUCATION REQUIREMENTS INCREASED SINCE 1977?

yes	no	don't know
3		2

8. IF REQUIREMENTS HAVE INCREASED, IS THIS BECAUSE;

	yes	no
a) there are more better educated applicants than before	3	
b) the job has become more complex		
c) the quality of recruits of a particular education has declined		
d) other (specify)		

B EDUCATION AND PRODUCTIVITY

1. ON AVERAGE, ARE WORKERS WITH MORE EDUCATION BETTER AT THEIR JOBS?

much better	a bit better	no better	can't determine
5			

IF BETTER, IS THIS BECAUSE OF

	yes	no
a) literacy	5	
b) numeracy	5	
c) adaptability	5	
d) discipline		
e) other (specify)		

UNLESS THE ANSWER TO QUESTION 1 WAS "CAN'T DETERMINE" WHAT MEANS DO YOU USE TO DETERMINE THIS?

		yes	no
a)	direct assessment by superiors	5	
b)	specific investigations		
c)	more educated workers earn productivity bonuses more often than others		
d)	other (specify)		

2. AMONG WORKERS WITH THE SAME LENGTH OF EDUCATION, ARE THOSE WITH HIGHER EXAM RESULTS BETTER AT THEIR JOB ON AVERAGE?

much better	a bit better	no better	can't determine
			5

3. DOES IT MATTER WHICH SUBJECTS THEY STUDY?

yes	no	can't determine
		5

If yes, specify

4. CAN TRAINING AND/OR EXPERIENCE MAKE UP FOR A LACK OF FORMAL EDUCATION?

yes	no	don't know	no reply
1		4	

5. HOW DO NEW WORKERS WITH A GIVEN LEVEL OF EDUCATION RECRUITED TODAY COMPARE WITH NEW WORKERS 5-10 YEARS AGO?

better at their job	2
the same	2
worse	
can't determine	1
no reply	

C DETERMINANTS OF WAGES

1. HOW IMPORTANT ARE THE FOLLOWING IN DETERMINING THE WAGES YOU PAY?

		very	somewhat	not import.
a)	your firm's negotiation with union		2	
b)	the industry's negotiation with union		3	
c)	government directives			5
d)	shortages or surpluses of labour		5	
e)	profitability of your enterprise		5	
f)	other (specify)			

2. DO ALL WORKERS IN THIS OCCUPATION START AT THE SAME WAGE?

yes	no	no reply
	5	

IF NO, DOES THE STARTING WAGE DEPEND ON?

		yes	no
a)	level of formal education	5	
b)	quality of formal education		5
c)	experience in other jobs	5	
d)	experience elsewhere	5	
e)	race		5
f)	age		5
g	gender	3	2
h)	wage in other job		
i)	other (specify)		

3. DOES PAY NORMALLY RISE WITH LENGTH OF TIME IN THIS JOB (APART FROM COST OF LIVING INCREASES)?

yes	no	no reply
	5	

4. IF YES, DOES THE JOB HAVE A FORMAL INCREMENTAL SCALE?

yes	no	no reply

IF NO TO EITHER QUESTION 3 OR QUESTION 4 WHAT CRITERIA ARE USED FOR INDIVIDUAL PAY RISES?

	yes	no
a) increased job content		
b) increased responsibility		
c) increased efficiency	1	
d) other (specify)	NEGOTIATIONS WITH UNIONS (3)	

5. DO MORE EDUCATED WORKERS HAVE A BETTER CHANCE OF PROMOTION?

yes	no	no reply
3	2	

D TRAINING

1 DO YOU PROVIDE FORMAL TRAINING FOR THIS OCCUPATION?

yes	no	no reply
4	1	

IF NO PROCEED TO SECTION E

2. IF YES, WHAT FORM DOES THIS TAKE?

a training course	4
training while on the job (i.e. learning by doing)	4
no reply	

3. IF COURSES ARE PROVIDED, WHERE ARE THEY HELD?

at an outside institution	
within the enterprise	4
no reply	

4. HAVE ALL WORKERS IN THIS OCCUPATION UNDERGONE TRAINING?

yes	no	no reply
1	3	

5. DO ALL NEW RECRUITS UNDERGO THIS TRAINING?

yes	no	no reply
3	1	

6. WHO PARTICIPATES IN THESE COURSES?

workers already employed by you in this occupation for some time	3
workers already employed by you in other occupations	4
new recruits to the firm	2
no reply	

7. HOW LONG ARE THE COURSES PROVIDED?

AV. 4 MTHS

8. ARE THESE COURSES FULL TIME/PART TIME?

4 (PT)

9. DO WORKERS RECEIVE HIGHER PAY AFTER SUCCESSFULLY COMPLETING THE COURSES?

yes	no	no reply
	1	3

10. IF NOT ALL THE MEMBERS IN THE OCCUPATION UNDERGO TRAINING, WHY IS THIS?

		yes	no
a)	some do not have the ability to benefit from the training		
b)	there is a shortage of training opportunities		
c)	there is no need to train more workers		
d)	formal education makes training unnecessary	2	
e)	previous experience makes training unnecessary		2
f)	other (specify)		

E TURNOVER AND VACANCIES

1. ROUGHLY WHAT PROPORTION OF WORKERS IN THIS OCCUPATION LEAVE THE FIRM IN ANY YEAR OF WORK?

0%	
0-5%	
10-20%	3
20-50%	
50-100%	
100% & over	
don't know	2

2. IS THIS PROPORTION

too high	
about right	3
too low	
don't know	

3. IF NOT TOO LOW, DO YOU ADOPT POLICIES DESIGNED TO DISCOURAGE PEOPLE FROM LEAVING THE FIRM?

yes	no	no reply
3		

IF YES, ARE THEY

		yes	no
a)	a wage above average	3	
b)	incremental pay scales		
c)	fringe benefits	3	
d)	other (specify)		

IF YOU ADOPT SUCH POLICIES, IS IT

a)	to avoid wasted expenditure on training	3
b)	because of difficulties in recruiting	
c)	other (specify)	

4. DO YOU NORMALLY HAVE UNFILLED VACANCIES IN THIS OCCUPATION?

yes	no	no reply
	5	

IF YES, IS THIS BECAUSE

		yes	no
a)	your labour requirements are expanding		
b)	workers have been leaving the firm		
c)	there is a chronic shortage of suitable candidates.		
d)	the work is irregular or seasonal		
e)	other (specify)		

EMPLOYER RESPONSES

SKILLED MANUAL OCCUPATIONS

C7

A. RECRUITMENT

1. HOW DO YOU RECRUIT YOUR WORKERS IN THIS OCCUPATION OR FOR TRAINING IN THIS OCCUPATION?

		usually	sometimes	never
a)	by advertising	1	1	
b)	through a labour bureau			2
c)	unsolicited application by job-seeker (e.g. at the gate or by post)		1	
d)	recommendation by employees or others		1	
e)	from among workers in other jobs in the firm	1	-	
f)	other (specify)			

2. ARE THERE DIFFERENT PROCEDURES FOR DIFFERENT OCCUPATIONS?

yes	no
2	

SEE C-1

3. WHAT CRITERIA DO YOU USE TO CHOOSE BETWEEN APPLICANTS?

		main	secondary	irrelevant
a)	formal education	2		
b)	attendance on training course			
c)	experience in firm			
d)	other experience		2	
e)	age			
f)	prior acquaintance			
g)	performance in aptitude/literacy tests			

	main	secondary	irrelevant
h) ability to speak English/Afrikaans			
i) offering at lowest wages			
j) strength or quality of references		2	
k) race			2
l) gender		2	
m) other (specify)			

IF FORMAL EDUCATION IS IRRELEVANT, PROCEED TO SECTION B

3. IF FORMAL EDUCATION IS A MAIN OR SECONDARY CRITERION, WHICH ARE IMPORTANT?

a) years of schooling	
b) possession of certificate	2
c) exam results in last year at school	
d) subjects studied	
e) no reply	
f) other (specify)	

5. DO YOU NORMALLY REQUIRE A PARTICULAR MINIMUM OF FORMAL EDUCATION?

yes	no	no reply
2		

IF NO, PROCEED TO SECTION B. IF YES, SPECIFY

6. IF YES, WHY?

	important	irrelevant
a) education provides necessary skills	2	
b) those who are naturally more able are found among the educated i.e. the education system picks out for you those people with the intrinsic qualities you want		
c) education makes people more trainable		
d) the educated fit in better		
e) education is a fair way of choosing among too many applicants		
f) other (specify)		

7. IF YES, HAVE YOUR NORMAL MINIMUM FORMAL EDUCATION REQUIREMENTS INCREASED SINCE 1977?

yes	no 1	don't know 1

8. IF REQUIREMENTS HAVE INCREASED, IS THIS BECAUSE;

	yes	no
a) there are more better educated applicants than before		
b) the job has become more complex		
c) the quality of recruits of a particular education has declined		
d) other (specify)		

B EDUCATION AND PRODUCTIVITY

1. ON AVERAGE, ARE WORKERS WITH MORE EDUCATION BETTER AT THEIR JOBS?

much better	a bit better	no better	can't determine
2			

IF BETTER, IS THIS BECAUSE OF

	yes	no
a) literacy	2	
b) numeracy	2	
c) adaptability	2	
d) discipline		
e) other (specify)		

UNLESS THE ANSWER TO QUESTION 1 WAS "CAN'T DETERMINE" WHAT MEANS DO YOU USE TO DETERMINE THIS?

		yes	no
a)	direct assessment by superiors	2	
b)	specific investigations		
c)	more educated workers earn productivity bonuses more often than others		
d)	other (specify)		

2. AMONG WORKERS WITH THE SAME LENGTH OF EDUCATION, ARE THOSE WITH HIGHER EXAM RESULTS BETTER AT THEIR JOB ON AVERAGE?

much better	a bit better	no better	can't determine
			2

3. DOES IT MATTER WHICH SUBJECTS THEY STUDY?

yes	no	can't determine
2		

If yes, specify: BOTH EMPHASISED TECHNICAL EDUCATION REQUIPEMENT

4. CAN TRAINING AND/OR EXPERIENCE MAKE UP FOR A LACK OF FORMAL EDUCATION?

yes	no	don't know	no reply
	2		

5. HOW DO NEW WORKERS WITH A GIVEN LEVEL OF EDUCATION RECRUITED TODAY COMPARE WITH NEW WORKERS 5-10 YEARS AGO?

better at their job	
the same	2
worse	
can't determine	

C9

no reply

C DETERMINANTS OF WAGES

1. HOW IMPORTANT ARE THE FOLLOWING IN DETERMINING THE WAGES YOU PAY?

		very	somewhat	not import.
a)	your firm's negotiation with union		2	
b)	the industry's negotiation with union			
c)	government directives			2
d)	shortages or surpluses of labour	2		
e)	profitability of your enterprise			2
f)	other (specify)			

2. DO ALL WORKERS IN THIS OCCUPATION START AT THE SAME WAGE?

yes	no	no reply
	2	

IF NO, DOES THE STARTING WAGE DEPEND ON?

		yes	no
a)	level of formal education	2	
b)	quality of formal education	2	
c)	experience in other jobs		
d)	experience elsewhere	2	
e)	race		2
f)	age	2	
g	gender		
h)	wage in other job		
i)	other (specify)		

3. DOES PAY NORMALLY RISE WITH LENGTH OF TIME IN THIS JOB (APART FROM COST OF LIVING INCREASES)?

yes	no	no reply
	2	

4. IF YES, DOES THE JOB HAVE A FORMAL INCREMENTAL SCALE?

yes	no	no reply

IF NO TO EITHER QUESTION 3 OR QUESTION 4 WHAT CRITERIA ARE USED FOR INDIVIDUAL PAY RISES?

	yes	no
a) increased job content	2	
b) increased responsibility	2	
c) increased efficiency	2	
d) other (specify)		

5. DO MORE EDUCATED WORKERS HAVE A BETTER CHANCE OF PROMOTION?

yes	no	no reply
2		

D TRAINING

1. DO YOU PROVIDE FORMAL TRAINING FOR THIS OCCUPATION?

yes	no	no reply
	2	

IF NO PROCEED TO SECTION E

2. IF YES, WHAT FORM DOES THIS TAKE?

a training course	
training while on the job (i.e. learning by doing)	
no reply	

3. IF COURSES ARE PROVIDED, WHERE ARE THEY HELD?

at an outside institution	
within the enterprise	
no reply	

4. HAVE ALL WORKERS IN THIS OCCUPATION UNDERGONE TRAINING?

yes	no	no reply

5. DO ALL NEW RECRUITS UNDERGO THIS TRAINING?

yes	no	no reply

6. WHO PARTICIPATES IN THESE COURSES?

workers already employed by you in this occupation for some time	
workers already employed by you in other occupations	
new recruits to the firm	
no reply	

7. HOW LONG ARE THE COURSES PROVIDED?

8. ARE THESE COURSES FULL TIME/PART TIME?

9. DO WORKERS RECEIVE HIGHER PAY AFTER SUCCESSFULLY COMPLETING THE COURSES?

yes	no	no reply

10. **IF NOT ALL THE MEMBERS IN THE OCCUPATION UNDERGO TRAINING, WHY IS THIS?**

		yes	no
a)	some do not have the ability to benefit from the training		
b)	there is a shortage of training opportunities		
c)	there is no need to train more workers		
d)	formal education makes training unnecessary		
e)	previous experience makes training unnecessary		
f)	other (specify)		

E TURNOVER AND VACANCIES

1. **ROUGHLY WHAT PROPORTION OF WORKERS IN THIS OCCUPATION LEAVE THE FIRM IN ANY YEAR OF WORK?**

0%	
0-5%	
10-20%	2
20-50%	
50-100%	
100% & over	
don't know	

2. **IS THIS PROPORTION**

too high	
about right	2
too low	
don't know	

3. **IF NOT TOO LOW, DO YOU ADOPT POLICIES DESIGNED TO DISCOURAGE PEOPLE FROM LEAVING THE FIRM?**

yes	no	no reply

IF YES, ARE THEY

		yes	no
a)	a wage above average	2	
b)	incremental pay scales		
c)	fringe benefits	2	
d)	other (specify)		

IF YOU ADOPT SUCH POLICIES, IS IT

a)	to avoid wasted expenditure on training	
b)	because of difficulties in recruiting	2
c)	other (specify)	

4. **DO YOU NORMALLY HAVE UNFILLED VACANCIES IN THIS OCCUPATION?**

yes	no	no reply
2		

IF YES, IS THIS BECAUSE

		yes	no
a)	your labour requirements are expanding		
b)	workers have been leaving the firm		
c)	there is a chronic shortage of suitable candidates.	2	
d)	the work is irregular or seasonal		
e)	other (specify)		

EMPLOYER RESPONSES

UNSKILLED MANUAL OCCUPATION

C12

A. RECRUITMENT

1. HOW DO YOU RECRUIT YOUR WORKERS IN THIS OCCUPATION OR FOR TRAINING IN THIS OCCUPATION?

		usually	sometimes	never
a)	by advertising			1
b)	through a labour bureau			1
c)	unsolicited application by job-seeker (e.g. at the gate or by post)		1	
d)	recommendation by employees or others		1	
e)	from among workers in other jobs in the firm			
f)	other (specify)			

2. ARE THERE DIFFERENT PROCEDURES FOR DIFFERENT OCCUPATIONS?

yes	no
1	

SEE C-1

3. WHAT CRITERIA DO YOU USE TO CHOOSE BETWEEN APPLICANTS?

		main	secondary	irrelevant
a)	formal education	1		
b)	attendance on training course			
c)	experience in firm			
d)	other experience		1	
e)	age		1	
f)	prior acquaintance			
g)	performance in aptitude/literacy tests		1	

		main	secondary	irrelevant
h)	ability to speak English/Afrikaans		1	
i)	offering at lowest wages			1
j)	strength or quality of references			1
k)	race			1
l)	gender		1	
m)	other (specify)			

IF FORMAL EDUCATION IS IRRELEVANT, PROCEED TO SECTION B

3. IF FORMAL EDUCATION IS A MAIN OR SECONDARY CRITERION, WHICH ARE IMPORTANT?

		1
a)	years of schooling	
b)	possession of certificate	
c)	exam results in last year at school	
d)	subjects studied	
e)	no reply	
f)	other (specify)	

5. DO YOU NORMALLY REQUIRE A PARTICULAR MINIMUM OF FORMAL EDUCATION?

yes	no 1	no reply

IF NO, PROCEED TO SECTION B. IF YES, SPECIFY

6. IF YES, WHY?

		important	irrelevant
a)	education provides necessary skills		
b)	those who are naturally more able are found among the educated i.e. the education system picks out for you those people with the intrinsic qualities you want		
c)	education makes people more trainable		
d)	the educated fit in better		
e)	education is a fair way of choosing among too many applicants		
f)	other (specify)		

7. IF YES, HAVE YOUR NORMAL MINIMUM FORMAL EDUCATION REQUIREMENTS INCREASED SINCE 1977?

yes	no	don't know

8. IF REQUIREMENTS HAVE INCREASED, IS THIS BECAUSE;

		yes	no
a)	there are more better educated applicants than before		
b)	the job has become more complex		
c)	the quality of recruits of a particular education has declined		
d)	other (specify)		

B EDUCATION AND PRODUCTIVITY

1. ON AVERAGE, ARE WORKERS WITH MORE EDUCATION BETTER AT THEIR JOBS?

much better	a bit better	no better	can't determine
1			

IF BETTER, IS THIS BECAUSE OF

		yes	no
a)	literacy	1	
b)	numeracy	1	
c)	adaptability	1	
d)	discipline		
e)	other (specify)		

UNLESS THE ANSWER TO QUESTION 1 WAS "CAN'T DETERMINE" WHAT MEANS DO YOU USE TO DETERMINE THIS?

	yes	no
a) direct assessment by superiors	1	
b) specific investigations		
c) more educated workers earn productivity bonuses more often than others		
d) other (specify)		

2. AMONG WORKERS WITH THE SAME LENGTH OF EDUCATION, ARE THOSE WITH HIGHER EXAM RESULTS BETTER AT THEIR JOB ON AVERAGE?

much better	a bit better	no better	can't determine
			1

3. DOES IT MATTER WHICH SUBJECTS THEY STUDY?

yes	no	can't determine
		1

If yes, specify

4. CAN TRAINING AND/OR EXPERIENCE MAKE UP FOR A LACK OF FORMAL EDUCATION?

yes	no	don't know	no reply
			1

5. HOW DO NEW WORKERS WITH A GIVEN LEVEL OF EDUCATION RECRUITED TODAY COMPARE WITH NEW WORKERS 5-10 YEARS AGO?

better at their job	
the same	
worse	
can't determine	1

no reply

C DETERMINANTS OF WAGES

1. HOW IMPORTANT ARE THE FOLLOWING IN DETERMINING THE WAGES YOU PAY?

	very	somewhat	not import.
a) your firm's negotiation with union			1
b) the industry's negotiation with union	1		
c) government directives		1	
d) shortages or surpluses of labour			1
e) profitability of your enterprise			1
f) other (specify)			

2. DO ALL WORKERS IN THIS OCCUPATION START AT THE SAME WAGE?

yes	no	no reply
	1	

IF NO, DOES THE STARTING WAGE DEPEND ON?

	yes	no
a) level of formal education	1	
b) quality of formal education		1
c) experience in other jobs		
d) experience elsewhere	1	
e) race		1
f) age	1	
g gender		1
h) wage in other job		1
i) other (specify)		

3. DOES PAY NORMALLY RISE WITH LENGTH OF TIME IN THIS JOB (APART FROM COST OF LIVING INCREASES)?

yes	no	no reply
	1	

4. IF YES, DOES THE JOB HAVE A FORMAL INCREMENTAL SCALE?

yes	no	no reply

IF NO TO EITHER QUESTION 3 OR QUESTION 4 WHAT CRITERIA ARE USED FOR INDIVIDUAL PAY RISES?

	yes	no
a) increased job content		
b) increased responsibility		
c) increased efficiency		
d) other (specify)	UNION NEGOTIATIONS	

5. DO MORE EDUCATED WORKERS HAVE A BETTER CHANCE OF PROMOTION?

yes	no	no reply
1		

D TRAINING

1 DO YOU PROVIDE FORMAL TRAINING FOR THIS OCCUPATION?

yes	no	no reply
1		

IF NO PROCEED TO SECTION E

2. IF YES, WHAT FORM DOES THIS TAKE?

a training course	1
training while on the job (i.e. learning by doing)	1
no reply	

3. IF COURSES ARE PROVIDED, WHERE ARE THEY HELD?

at an outside institution	
within the enterprise	1
no reply	

4. HAVE ALL WORKERS IN THIS OCCUPATION UNDERGONE TRAINING?

yes	no	no reply
1		

5. DO ALL NEW RECRUITS UNDERGO THIS TRAINING?

yes	no	no reply
1		

6. WHO PARTICIPATES IN THESE COURSES?

workers already employed by you in this occupation for some time	1
workers already employed by you in other occupations	
new recruits to the firm	1
no reply	

7. HOW LONG ARE THE COURSES PROVIDED?

2 MTHS

8. ARE THESE COURSES FULL TIME/PART TIME?

P.T.

9. DO WORKERS RECEIVE HIGHER PAY AFTER SUCCESSFULLY COMPLETING THE COURSES?

yes	no	no reply
	1	

10. IF NOT ALL THE MEMBERS IN THE OCCUPATION UNDERGO TRAINING, WHY IS THIS?

		yes	no
a)	some do not have the ability to benefit from the training		
b)	there is a shortage of training opportunities		
c)	there is no need to train more workers		
d)	formal education makes training unnecessary		
e)	previous experience makes training unnecessary		
f)	other (specify)		

E TURNOVER AND VACANCIES

1. ROUGHLY WHAT PROPORTION OF WORKERS IN THIS OCCUPATION LEAVE THE FIRM IN ANY YEAR OF WORK?

0%	
0-5%	1
10-20%	
20-50%	
50-100%	
100% & over	
don't know	

2. IS THIS PROPORTION

too high	
about right	1
too low	
don't know	

3. IF NOT TOO LOW, DO YOU ADOPT POLICIES DESIGNED TO DISCOURAGE PEOPLE FROM LEAVING THE FIRM?

yes	no	no reply
	1	

IF YES, ARE THEY

		yes	no
a)	a wage above average		
b)	incremental pay scales		
c)	fringe benefits		
d)	other (specify)		

IF YOU ADOPT SUCH POLICIES, IS IT

a)	to avoid wasted expenditure on training	
b)	because of difficulties in recruiting	
c)	other (specify)	

4. DO YOU NORMALLY HAVE UNFILLED VACANCIES IN THIS OCCUPATION?

yes	no	no reply
	1	

IF YES, IS THIS BECAUSE

		yes	no
a)	your labour requirements are expanding		
b)	workers have been leaving the firm		
c)	there is a chronic shortage of suitable candidates.		
d)	the work is irregular or seasonal		
e)	other (specify)		

EMPLOYER RESPONSES

CLERICAL OCCUPATIONS

C17

A. RECRUITMENT

1. **HOW DO YOU RECRUIT YOUR WORKERS IN THIS OCCUPATION OR FOR TRAINING IN THIS OCCUPATION?**

		usually	sometimes	never
a)	by advertising	2		
b)	through a labour bureau			2
c)	unsolicited application by job-seeker (e.g. at the gate or by post)		1	1
d)	recommendation by employees or others		1	
e)	from among workers in other jobs in the firm		2	
f)	other (specify)			

2. **ARE THERE DIFFERENT PROCEDURES FOR DIFFERENT OCCUPATIONS?**

yes 2	no

SEE C-1

3. **WHAT CRITERIA DO YOU USE TO CHOOSE BETWEEN APPLICANTS?**

		main	secondary	irrelevant
a)	formal education	2		
b)	attendance on training course			2
c)	experience in firm			
d)	other experience		2	
e)	age		2	
f)	prior acquaintance			2
g)	performance in aptitude/literacy tests			2

	main	secondary	irrelevant
h) ability to speak English/Afrikaans		2	
i) offering at lowest wages			2
j) strength or quality of references		2	
k) race			2
l) gender			2
m) other (specify)			

IF FORMAL EDUCATION IS IRRELEVANT, PROCEED TO SECTION B

3. IF FORMAL EDUCATION IS A MAIN OR SECONDARY CRITERION, WHICH ARE IMPORTANT?

a) years of schooling	2
b) possession of certificate	2
c) exam results in last year at school	
d) subjects studied	
e) no reply	
f) other (specify)	

5. DO YOU NORMALLY REQUIRE A PARTICULAR MINIMUM OF FORMAL EDUCATION?

yes	no	no reply
2		

IF NO, PROCEED TO SECTION B. IF YES, SPECIFY

6. IF YES, WHY?

	important	irrelevant
a) education provides necessary skills	2	
b) those who are naturally more able are found among the educated i.e. the education system picks out for you those people with the intrinsic qualities you want	2	
c) education makes people more trainable		
d) the educated fit in better	1	
e) education is a fair way of choosing among too many applicants		
f) other (specify)		

important	irrelevant

7. IF YES, HAVE YOUR NORMAL MINIMUM FORMAL EDUCATION REQUIREMENTS INCREASED SINCE 1977?

yes	no	don't know
2		

8. IF REQUIREMENTS HAVE INCREASED, IS THIS BECAUSE;

	yes	no
a) there are more better educated applicants than before	2	
b) the job has become more complex		
c) the quality of recruits of a particular education has declined		
d) other (specify)		

B EDUCATION AND PRODUCTIVITY

1. ON AVERAGE, ARE WORKERS WITH MORE EDUCATION BETTER AT THEIR JOBS?

much better	a bit better	no better	can't determine
2			

IF BETTER, IS THIS BECAUSE OF

	yes	no
a) literacy	2	
b) numeracy	2	
c) adaptability	2	
d) discipline		
e) other (specify)		

UNLESS THE ANSWER TO QUESTION 1 WAS "CAN'T DETERMINE" WHAT MEANS DO YOU USE TO DETERMINE THIS?

		yes	no
a)	direct assessment by superiors	2	
b)	specific investigations		
c)	more educated workers earn productivity bonuses more often than others		
d)	other (specify)		

2. AMONG WORKERS WITH THE SAME LENGTH OF EDUCATION, ARE THOSE WITH HIGHER EXAM RESULTS BETTER AT THEIR JOB ON AVERAGE?

much better	a bit better	no better	can't determine
			2

3. DOES IT MATTER WHICH SUBJECTS THEY STUDY?

yes	no	can't determine
		2

If yes, specify

4. CAN TRAINING AND/OR EXPERIENCE MAKE UP FOR A LACK OF FORMAL EDUCATION?

yes	no	don't know	no reply
	2		

5. HOW DO NEW WORKERS WITH A GIVEN LEVEL OF EDUCATION RECRUITED TODAY COMPARE WITH NEW WORKERS 5-10 YEARS AGO?

better at their job	1
the same	
worse	1
can't determine	

no reply

C DETERMINANTS OF WAGES

1. HOW IMPORTANT ARE THE FOLLOWING IN DETERMINING THE WAGES YOU PAY?

		very	somewhat	not import.
a)	your firm's negotiation with union			2
b)	the industry's negotiation with union			2
c)	government directives			2
d)	shortages or surpluses of labour	1	1	
e)	profitability of your enterprise		2	
f)	other (specify)			

2. DO ALL WORKERS IN THIS OCCUPATION START AT THE SAME WAGE?

yes	no 2	no reply

IF NO, DOES THE STARTING WAGE DEPEND ON?

		yes	no
a)	level of formal education	2	
b)	quality of formal education	2	
c)	experience in other jobs	1	
d)	experience elsewhere	2	
e)	race		2
f)	age		2
g	gender		2
h)	wage in other job		2
i)	other (specify)		

3. DOES PAY NORMALLY RISE WITH LENGTH OF TIME IN THIS JOB (APART FROM COST OF LIVING INCREASES)?

yes	no	no reply
2		

4. IF YES, DOES THE JOB HAVE A FORMAL INCREMENTAL SCALE?

yes	no	no reply
	2	

IF NO TO EITHER QUESTION 3 OR QUESTION 4 WHAT CRITERIA ARE USED FOR INDIVIDUAL PAY RISES?

	yes	no
a) increased job content	2	
b) increased responsibility	2	
c) increased efficiency	2	
d) other (specify)		

5. DO MORE EDUCATED WORKERS HAVE A BETTER CHANCE OF PROMOTION?

yes	no	no reply
	2	

D TRAINING

1 DO YOU PROVIDE FORMAL TRAINING FOR THIS OCCUPATION?

yes	no	no reply
1	1	

IF NO PROCEED TO SECTION E

2. IF YES, WHAT FORM DOES THIS TAKE?

a training course	
training while on the job (i.e. learning by doing)	1
no reply	

3. IF COURSES ARE PROVIDED, WHERE ARE THEY HELD?

at an outside institution	
within the enterprise	1
no reply	

4. HAVE ALL WORKERS IN THIS OCCUPATION UNDERGONE TRAINING?

yes	no	no reply
	1	

5. DO ALL NEW RECRUITS UNDERGO THIS TRAINING?

yes	no	no reply
	1	

6. WHO PARTICIPATES IN THESE COURSES?

workers already employed by you in this occupation for some time	
workers already employed by you in other occupations	1
new recruits to the firm	1
no reply	

7. HOW LONG ARE THE COURSES PROVIDED?

?

8. ARE THESE COURSES FULL TIME/PART TIME?

P.T.

9. DO WORKERS RECEIVE HIGHER PAY AFTER SUCCESSFULLY COMPLETING THE COURSES?

yes	no	no reply
	1	

10. IF NOT ALL THE MEMBERS IN THE OCCUPATION UNDERGO TRAINING, WHY IS THIS?

		yes	no
a)	some do not have the ability to benefit from the training		
b)	there is a shortage of training opportunities		
c)	there is no need to train more workers		
d)	formal education makes training unnecessary	1	
e)	previous experience makes training unnecessary	1	
f)	other (specify)		

E TURNOVER AND VACANCIES

1. ROUGHLY WHAT PROPORTION OF WORKERS IN THIS OCCUPATION LEAVE THE FIRM IN ANY YEAR OF WORK?

0%	
0-5%	
10-20%	2
20-50%	
50-100%	
100% & over	
don't know	

2. IS THIS PROPORTION

too high	
about right	2
too low	
don't know	

3. IF NOT TOO LOW, DO YOU ADOPT POLICIES DESIGNED TO DISCOURAGE PEOPLE FROM LEAVING THE FIRM?

yes	no	no reply
1	1	

IF YES, ARE THEY

		yes	no
a)	a wage above average	1	
b)	incremental pay scales		
c)	fringe benefits	1	
d)	other (specify)		

IF YOU ADOPT SUCH POLICIES, IS IT

a)	to avoid wasted expenditure on training	1
b)	because of difficulties in recruiting	
c)	other (specify)	

4. DO YOU NORMALLY HAVE UNFILLED VACANCIES IN THIS OCCUPATION?

yes	no	no reply
	1	

IF YES, IS THIS BECAUSE

		yes	no
a)	your labour requirements are expanding		
b)	workers have been leaving the firm		
c)	there is a chronic shortage of suitable candidates.		
d)	the work is irregular or seasonal		
e)	other (specify)		

APPENDIX D

OCCUPATIONAL CODES

(Occupational Titles)

1. MANUAL

Unskilled (100)

101 Labourer, general
102 Labourer, factory
103 Labourer, farm
104 Labourer, other
105 Cleaner
106 Dishwasher
107 Driver's mate
108 Gardener
109 Machine operator's assistant
110 Messenger
111 Porter
112 Sweeper
113 Watchman

Semi-skilled (200)

201 Machine operator. general, semi-skilled
202 Machine operator, factory, semi-skilled
203 Machine operator, farm, semi-skilled
204 Machine operator, other semi-skilled
205 Artisan's mate
206 Assistant cook
207 Barber, hairdresser
208 Barman
209 Bus conductor
210 Driver, light vehicle
211 Driver , simple machines (e.g. forklift)
212 Domestic servant
213 Factory assembler, semi-skilled
214 Housekeeper
215 Petrol pump attendant
216 Waiter
217 Factory Worker, semi-skilled
218 Head messenger
219 Caretaker
220 Butcher, semi-skilled

Skilled (300)

301 Machine operator, general, skilled
302 Machine operator, factory, skilled
303 Machine operator, farm, skilled
304 Machine operator, other, skilled
305 Blacksmith

306 Boilermaker
307 Bricklayer, mason
308 Carpenter
309 Chef
310 Compositer
311 Dressmaker
312 Driver, heavy vehicles
313 Driver, complicated machinery (e.g. bulldozer)
314 Electrician
315 Fitter
316 Flamecutter
317 Headman
318 Head barman
319 Headcleaner
320 Head steward
321 Head waiter
322 Instrument maker
323 Joiner
324 Machine setter
325 Mechanic, motor
326 Mechanic, other
327 Painter
328 Polisher
329 Pipefitter
330 Plumber
331 Printer
332 Stonemason
333 Tailor
224 Toolmaker
335 Toolsetter
336 Welder
337 Panel beater
338 Coach builder
339 Foundry worker, skilled
340 Other skilled artisan
341 Butcher, skilled
342 Apprentice Artisan

2. NON-MANUAL

Clerical and Related (400)

Clerical

401 Clerical supervisor
402 Clerk, general function
403 Cler, single function
404 Clerical assistant
405 Data machine operator

Accounts

411 Non-certified accountant
412 Head bookkeeper
413 Bookkeeper, general
414 Bookkeeper, single function (e.g. wage clerk)
415 Assistant bookkeeper
416 Chief cashier
417 Cashier
418 Assistant cashier
419 Business machine operator
420 Head storekeeper
421 Storekeeper
422 Assistant storekeeper

Secretarial

431 Personal secretary
432 Stenographer
433 Shorthand typist
434 Copy typist
435 Other, e.g. Receptionist

Sales

441 Sales supervisor
442 Buyer, salesman
443 Sales assistant

Supervisory (500)

501 Foreman

Technical and Semi-professional (600)

601 Agricultural extension worker
602 Agricultural instructor
603 Agronomist, semi-professional
604 Dental technician
605 Draughtsman
606 Engineering technician
607 Library assistant
608 Medical assistant
609 Nurse and midwife, professional
610 Nurse and midwife, enrolled

611 Pharmaceutical technician
612 Photographer
613 Physiotherapist
614 Science technician
615 Statistical and computing technician
616 Surveyor
617 Watch and clock repairer
618 Clerk of Works
619 Other semi-professional
620 Training Officer
621 Laboratory Assistant

Managerial and Administrative (700)

701 Government administrative officer
702 Government executive officer
703 General manager
704 Production manager
705 Specialised manager
706 Farm manager
707 Assistant manager
708 Trainee Manager

Professional (800)

801 Accountant, professional
802 Actuary
803 Agronomist, professional
804 Aircraft pilot, navigator
805 Architect
806 Auditor
807 Author
808 Dentist
809 Doctor
810 Economist
811 Engineer, civil
812 Engineer, chemical
813 Engineer, electrical
814 Engineer, mechanical
815 Engineer, other
816 Journalist
817 Jurist
818 Lawyer
819 Librarian
820 Pharmacist
821 Priest
822 Quantity surveyor
823 Scientist
824 Statistician
825 Teacher, university level
826 Teacher, other post-secondary
827 Teacher, secondary level
828 Teacher, primary level
829 Teacher, pre-primary level
830 Teacher, special education
831 Townplanner
832 Veterinarian

833 Teacher, untrained temporary
834 Computer scientist
835 Industrial Chemist
836 Designer

Law and Order (900)

901 Soldier
902 Sailor
903 Policeman
804 Warder

No reply (999)

Criteria for Occupational Coding

The main problem comes in deciding whether a 'machine operator', or 'factory worker' or 'driver' is unskilled, semi-skilled or skilled.

We have to take a number of pieces of evidence into account, and ultimately use our judgement.

1. Skilled

Pointers are;

(i) Possession of relevant trade certificate; this would normally be decisive if positive.

(ii) a long period of learning on-the-job e.g. 4- years.

(iii) operating and setting complicated machinery

(iv) supervision of other machine operators.

(v) a lengthy period of full-time formal training, e.g. more than 3 months.

2. Semi-skilled

Pointers are;

(i) no relevant trade test.

(ii) a short period of formal training, e.g. less than 3 months.

(iii) some period being necessary for the worker to become fully proficient in the occupation, e.g. 2 months to 4 years

(iv) operating a machine, or operating and setting a simple machine.

(v) assistant to a skilled person

3. Unskilled

Pointers are:

(i) no formal training.

(ii) short time to become fully proficient at the job e.g. less than 2 months.

(iii) close supervision, little autonomy.

(iv) assistant to a semi-skilled person.

(v) simple, repetitive tasks.

APPENDIX E

Table D1: LIST OF PARTICIPATING FIRMS

Firm	Sub-sector	City	Size
Atlantic Knitting Mills	Textile	CT	3
Rex Trueform	Clothing	CT	4
Tej Clothing	Clothing	CT	3
C.C. Cantley	Clothing	CT	1
Dermar Fashions	Clothing	CT	2
Rudco Outerwear	Clothing	CT	2
All Gold	Food	CT	3
Donald Cook's	Food	CT	2
Tuna Marine	Food	CT	2
Sven Mill Fabrics	Textile	CT	2
SA Fine Worsted	Textile	CT	2
Metal Box	Metal	PJE	4
Heynes Mathews	Chemical	CT	2
Peninsula Beverage	Food	CT	4
SA Breweries	Food	CT	4
Nampak	Paper	CT	4
Caltex Oil	Chemical	CT	3
Bromor Foods	Food	Dbn	2
Da Gama Textiles	Textile	Dbn	2
Tongaat Foods	Food	Dbn	3
Robertsons Spices	Food	Dbn	3
Carnation Foods	Food	Dbn	3
Beacon Sweets	Food	Dbn	4
Bull Brand	Food	PJE	4
Pro-tol Foods	Food	PJE	2
ASEA	Machinery	PJE	4
Sterling Clothing	Clothing	PE	3
Dow	Chemical	PJE	3
Nampak	Paper	PJE	3
Metal Closures	Metal	CT	3
Atlas Engineering	Machinery	PJE	3
Scaw Metals	Metal	PJE	2
Nestles	Food	PJE	3
Liptons	Food	PJE	3
Cerebros	Food	PJE	3
Kelloggs	Food	PJE	3
Snow Flake	Food	PJE	3
Lascon Lighting	Machinery	PJE	2
Burroughs-Welcome	Chemical	PJE	3
Adcock-Ingram	Chemical	PJE	4
Darex	Paper	PJE	4
Flameglow	Plastics	PJE	2
Silverton Engineering	Machinery	PJE	3
Baywear	Clothing	PE	3

Table D1 contd.

Frametex	Textile	Dbn	4
Mullana	Leather	PE	3
Sigma	Motor	PJE	4
Steel Reinforcing	Machinery	PJE	2
Cobra Brassware	Metal	PJE	3
Airtek	Machinery	PJE	1
HMD Engineering	Machinery	PJE	1
Volkswagen	Motor	PE	4
Jack n Jill	Leather	PE	3
Carter Harris	Paper	PE	1
Delta Motor Corporation	Motor	PE	4
Nissan	Motor	PWV	4
Speedplast	Plastics	PJE	2
Valley Textiles	Textile	PJE	2
Megapipe Plastics	Plastics	PJE	2
Creda Press	Paper	PJE	3
Acoustical Fibreglass	Machinery	PJE	2

PJE: Pretoria-Johannesburg-East Rand. "Paper" sub-sector includes paper, printing and packaging; "machinery" includes engineering and machinery.

Table D2: Number of participating firms by sub-sector

Sub-sector	Number of firms
Textile	5
Food and Beverages	17
Paper and Printing	5
Motor	4
Leather and Footwear	2
Clothing	7
Plastics and Rubber	3
Machinery	8
Chemical	6
Metal	4

APPENDIX F

ISSUES RELATING TO THE SURVEY

1. "Research Surveys"

Discussions early in 1986 with acquaintances in the private sector suggested that, given the traditional suspicion of South African employers towards academic researchers, coupled with the fact that this period was an especially difficult time in employer-employee relationships with the incipient development of the independent trade union movement, employers would be reluctant to agree to establishment interviews of employees. A "testing of the water" by the author in early 1987 confirmed this. A written request to 212 employers for participation in the survey elicited only 6 positive responses.

As a result it was decided to commission a market research firm to conduct the employee interviews. Three national market research firms were initially approached: "Market Research Africa", "Markinor" and "Research Surveys". All three companies were confident of access to a wide range of firms in the manufacturing sector. For several reasons Research Surveys was the most suitable: the proximity of its head office in central Cape Town, the fact that they had completed some recent socio-economic surveys relating to disinvestment and sanctions suggested that they were familiar with the requirements of social research, and last but not least, in financial terms their tender was the most attractive. An important aspect of the contract with Research Surveys was that the author would have access to a small number of employers to conduct employer interviews.

2. Time Frame

A time frame listing the commencement and completion of the various tasks is shown in Table F-1. It should be noted that the unduly long time taken for some of the tasks and the lags between tasks was due to the fact that the author was able to work on the project only on a part-time basis while on the teaching staff of the School of Economics and then in the Academic Support Programme at the University of Cape Town. Moreover, funds were not available for the employment of assistants to help with the coding and checking of questionnaires and the transfer of data to

the computer.

Table F-1: Time Frame - Task Commencement and Completion

Task	Date of Commencement	Date of Completion
(a) Drafting of Questionnaires	June 1986	July 1987
(b) Pilot Surveys	October 1987	October 1987
(c) Employee Surveys	Week 1, November, 1987	Week 4, November 1987
(d) Employer Surveys	April 1988	July 1988
(e) Checking and Coding - Questionnaires	January 1988	May 1988
(f) Transfer of data to Lotus Spreadsheet	June 1988	April 1989
(g) Transfer of data to BMDP	June 1989	June 1989
(h) Cross Tabulations	August 1989	September 1989
(i) Data transferred to SAS	November 1989	