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**Taxation of the South African Tobacco Industry :
With Special Reference to its Employment Effects**

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requirements for the degree of

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by

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Abstract

This study examines the economic impact of cigarette excise taxes in South Africa. In particular, it looks at the economic impact of increasing excise taxes, or in effect, reducing consumption, and the resultant impact on output and employment in the economy.

Real cigarette excise taxes in South Africa have steadily declined over the period 1970 to 1995. As a result there has been a concomitant decrease in the real retail cigarette price, caused primarily by the tax component. The South African government has however, since 1995, despite vociferous opposition from the industry, effected tax increases greater than expected inflation to adjust the cigarette duty back to its former levels.

The tobacco industry has argued that such actions will result in job losses. The industry has argued that, regardless of its effects on physical health, tobacco plays an important role in the communities' economic health, generating employment and contributing vital revenues to government coffers, which in a country like South Africa with high unemployment, has strong political appeal. This study examines these arguments.

The first part of the paper looks at the effect of taxation on consumption and government revenue. Using a price elasticity estimate of -0.6 for South African cigarette consumption, a simulation model of the government's tax policy is run. This shows that the government's policy on tobacco taxes has been non-optimal and revenue could have increased by 2 percent, had the government maintained the real value of excise duties. The results suggest that an optimal tax for the government could be set at a level higher than the current 52 percent of retail price which, contrary to industry arguments would maximise government revenue.

The second part of the paper, then addresses the question of employment losses in the economy in the wake of increases in excise taxes by government. An input-output

model is used and the methodology is based on the assumption that expenditure switching will occur from cigarettes to other goods and services in the economy. The model is tested using 1995 data. The study looks at the impact on output and employment from this alternative spending and examines the argument that increased excise taxes will result in job losses.

The results suggest that the economic effects of increased excise taxes on cigarettes, which would result in a change in personal consumption behaviour away from cigarettes, will not have the harmful effects on employment that the industry claims. South Africa as a whole would have gained net increases in output and employment if smokers quit their habit completely or even partially during 1995. The government's current taxation policy therefore bodes well for public health, public finance, and the economy.

CHAPTER 1

Introduction

"Five hundred years ago, at the end of 1492, Columbus became acquainted with tobacco in the new world. His men took the golden leaves back with them as highly sought-after gifts amongst the kings and rulers of Europe. In this way tobacco became part of the culture of the whole world. In South Africa, Jan van Riebeeck planted the first tobacco shortly after his arrival in 1652. Today, in South Africa, the Tobacco Industry stands proud - ambitious and fundamentally sound - our product."

Chairman's Report, Tobacco Board *Annual Report*, 1992

Since the early 1990s, the South African tobacco industry has come under increasing pressure from health lobbyists, the anti-tobacco movement, the medical world, and more recently, government. Whether the industry stands proud, ambitious and fundamentally sound today is coming under increasing scrutiny.

A consumption tax on cigarettes is almost always an important element of government policy toward tobacco products, toward the industry, and toward smoking. It serves as a window into social attitudes about smoking because cigarette taxation policies not infrequently reflect shifts in views about cigarettes and smokers. Therefore, aside from tobacco taxes being a popular source of government revenue, recent increases in excise taxes that have taken place, also reflect the government's and the public's changing attitudes toward tobacco products.

Today, South African policy towards the tobacco industry is at a cross-roads. On the one hand, the government professes to be committed to reducing consumption of tobacco products since it can lead to avoidable illness and death (Yach, McIntyre & Saloojee, 1992)¹. On the other hand, the government is very sensitive to concerns for the loss of jobs in the tobacco industry, through increased taxation. Particularly in a country like South Africa with high unemployment, this argument carries much

¹ This study discusses the health consequences of smoking in South Africa and morbidity and mortality rates.

political weight. This has often been a block for public policy to address tobacco morbidity and mortality through stronger tobacco control measures such as higher excise taxes.

In 1994 the Tobacco Board *Annual Report* states :

"It is especially important during this sensitive period to protect productive job opportunities and unrealistic government policies which place these opportunities under pressure should at all costs be avoided."

It is true to say that reducing tobacco usage will lead to reductions in employment in tobacco growing and manufacturing. But does that mean the government cannot have it both ways? Is the taxation policy towards the tobacco industry misconceived or unrealistic? The government essentially wants to, on the one hand, raise revenue and promote health policies. On the other hand, it wants to do this in a way that will minimise negative repercussions in terms of job loss. Does a policy that aims to raise revenue or reduce tobacco-caused illness necessarily imply that jobs in the economy will be lost? Simply to say that jobs will be lost in the tobacco industry as health objectives are pursued is not the end of the analysis - it is only the beginning.

The question is firstly, how taxation affects the tobacco industry and how important it is to government. How much revenue does it collect and how does it impact on the individual's consumption behaviour? One would then need to know how many jobs will disappear in tobacco production and other related areas, and how large those declines would be should stronger taxation policies and other tobacco control measures be implemented. One would also need to know whether the economy will "self-correct" and create new jobs to replace those lost in tobacco production. For example, the movement to a tobacco free society could lead to a redirection of purchasing power from tobacco to other products. Will that redirection create jobs in other industries to make up for the declines in the tobacco industry?

This study investigates these questions over the period 1970 to 1997 and assesses the economic role of taxation on the tobacco industry, its effect on consumption, pricing

and revenue, and its ultimate effect on employment. In a developing country like South Africa, taxation is a more potent mechanism to reduce consumption than in developed countries, because consumers of cigarettes tend to be more price sensitive in developing countries (Chapman & Richardson, 1990). High excise taxes are therefore strongly synonymous with a reduced consumption. The government therefore needs to find an optimal policy that will maximise its revenue generation from this source, but at the same time contain consumption and promote public health. However, this policy also needs to be achieved without reducing output and creating unemployment.

1.1 Broad principles of this study

This study will investigate whether an optimal tax on the tobacco industry is achievable in terms of the objectives mentioned, and if so, in particular what the effects will be on employment in South Africa. Before dealing with the details of the analysis, three broad principles that support the conclusions of the study need to be highlighted: first, a fundamental reason that tobacco job losses do not present formidable economic problems is because the tobacco industry is very small in terms of its employment contributions. Hence, even large declines in its activity are almost imperceptible from the perspective of the South African economy as a whole. In 1995, 2924 people² were used in the production of tobacco. Total employment in the formal economy was just over 8.5 million, so the tobacco manufacturing industry employs less than 4 out of each 10 000 South African workers. If one included employment in the primary producing sector and the distribution chain, the total industry employs 0.1 percent of South African workers. In other words, the elimination of all these jobs would raise the South African unemployment rate by less than one tenth of one percent.

Second, the level of employment in the South African economy does not depend on the size of the tobacco industry. According to one view, the level of employment depends on the level of aggregate demand in the economy. The government can determine that level through its fiscal and monetary policies. Consequently, any change in employment in tobacco production can be offset by expansionary policies that will create as many jobs as might be lost in tobacco. Another view has it that the economy

² Central Statistical Service (CSS), *South African Labour Statistics*, 1995

automatically tends towards a “natural rate” of employment that is not determined by government policy. In this view, the economy is so resilient that it will generate new jobs to make up for any lost by the decline of the tobacco industry.

It is not the purpose of this study to decide between these hypotheses. However, it is essential to emphasise that there is much international evidence which suggests that very few, if any, permanent job losses will occur, even within the context of an economy such as South Africa (Allen, 1993).

Third, while this study is primarily concerned with the question of job losses due to a stronger taxation policy, it should be noted that the decline in tobacco usage has other implications for the economy. In particular, less cigarette smoking will lead to a healthier workforce. The decline in sickness will raise the productivity of labour. The avoidance of premature death will preserve the skills and talents of experienced workers. Reducing tobacco consumption will conserve human resources and cannot but improve economic performance (Buck, Godfrey, Raw & Sutton, 1995).

1.2 The structure of this study

This study will focus on the employment effects of increased excise taxes, or indeed falling tobacco consumption. In order to do this, the paper uses an estimate of the price elasticity of demand for cigarettes in South Africa to estimate what an optimal level of taxation would be. The paper then looks at the employment effects of an optimal tax policy, how many people would be potentially affected and whether jobs would necessarily be lost.

Chapter 2 of this study looks at the theoretical notion of excise taxes, government’s competing objectives in setting an optimal tax, and the theory of public choice. Chapter 3 gives the socio-economic arena in which tobacco control policies have taken place in South Africa and the conceptual arguments that could be levelled for and against the use of excise taxes as a tobacco control measure. Chapter 4 gives some of the statistical trends of the tobacco industry and the price elasticity of demand estimate for South Africa. This estimate is then used in a model which simulates the optimal use of

excise taxes as a source of revenue. Chapter 5 uses a Social Accounting Matrix of the economy to establish the employment effects of increased excise taxes for South Africa through input-output methodology. Chapter 6 concludes with implications for government within the context of these competing objectives. The arguments for and against the increase in excise taxes are revisited, with focus on the findings of this study.

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CHAPTER 2

A review of research on tobacco excise taxes and public choice theory

The taxation of tobacco products is a universal practice. Wherever tobacco products are consumed, they are taxed. Taxes serve different objectives and have different effects depending on the prevalence of smoking, the behavioural impact of the tax and the pricing effects. This chapter will discuss the theoretical notion of what would be an optimally appropriate tax on cigarettes and what objectives the tax may serve to meet. One objective may, for example, be the maximisation of government revenue, another may be a deterrent objective where the tax acts as a tobacco control measure. This chapter will review theories on the setting of an optimal tax and government's competing objectives in finding this appropriate tax level.

This chapter will also review the notion of public choice theory, which lies at the heart of the debate surrounding the taxation of smoking. In determining a socially optimal tax, public choice theory will need to play an important role in determining what society deems an appropriate tax in terms of efficiency and justice.

2.1 The theoretical notion of excise taxes from government's perspective

An excise tax is simply a tax levied on the consumption of a good. Every time an individual purchases a packet of cigarettes from any retailer, a percentage of the selling price is handed over to the particular government's Excise Revenue Department. The excise tax is applied by the manufacturer prior to any sale to a retailer for resale, therefore manufacturers would have included the cost of the excise payment into their cost structure already. The retail price of cigarettes, net of sales tax or value added tax, thus consists of the producer price plus the excise tax. An increase in the excise tax therefore causes an increase in the equilibrium price and a resultant decrease in the equilibrium quantity demanded.

The question for any government then, is what would be an optimal level of excise duty to apply and this largely depends on what objectives the excise tax is intended to serve. Government excise tax policy on cigarettes can be intended to serve at least three objectives : revenue, efficiency, and deterrence (Zimring & Nelson, 1995).

The generation of revenue is the first purpose of taxation. Tobacco taxes have traditionally been classified as “luxury” or “sin” taxes which are susceptible to high tax rates. Because such recreational chemicals are generally not seen as necessities of life, but at the same time are non-criminal substances, they have borne a high tax burden. They are from this point of view a popular source of government revenue.

If efficiency in taxation were a second distinct goal of government, this could be achieved by setting the tax at a level which reflects the social cost of cigarette consumption (Grossman, 1989). This would mean that total revenue extracted from an optimal efficient tax would be equal to the total social cost generated. Any higher tax is sub-optimal because it discourages smoking among persons for whom benefits of cigarettes outweigh the costs, as revealed by their willingness to pay a price that reflects the true social cost. Any lower tax would encourage smoking when the benefits to the smoker do not outweigh the total community cost. This Pigouvian tax is levied where externalities exist and will produce the efficient consumption of cigarettes, in that only the cigarettes worth their full marginal social cost to the smoker are consumed (Warner, Chaloupka, Cook, Manning, Newhouse, Novotny, Schelling & Townsend, 1995).

The central feature of a cigarette tax is the fact that higher cigarette prices reduce both the number of smokers (prevalence) and the number of cigarettes consumed (incidence) (Lewit & Coate, 1982). No controversy surrounds the general effect of price on the demand for cigarettes. The behavioural uncertainty enters when considering the extent to which increases in price reduce demand, or the elasticity. Again if efficiency is the premise of taxation policy, the Ramsey Rule states that tax rates should vary inversely with the elasticity of demand for products (Zimring & Nelson, 1995). Therefore on goods for which consumer's demand is least affected by

price changes, such as cigarettes which have an addictive capacity, the highest taxes should be borne. This will minimise consumer's loss of utility associated with a tax by minimising the need to forego consumption they would prefer in order to avoid paying the tax. From this perspective, the primary effect of low elasticity of demand, as is generally the case of cigarettes, is to increase greatly the revenue flow to government.

If the third objective of government is deterrence, a tax on cigarettes reflects a tobacco control policy that will discourage smoking. When government decides to actively discourage a behaviour, taxation is a tool that exists to help reduce consumption (and also production). If promotion of basic health is therefore considered a desirable government social objective, the containment of tobacco smoke is a well documented and effective policy measure (Warner, 1987).

These three different purposes of taxation imply different definitions of what would be an optimal level of cigarette tax. If revenue is the objective, the ideal level of taxation is that which maximises the total revenue generated. If this were to discourage smoking, it would be of secondary importance to a government whose primary objective was to maximise revenue. If on the other hand deterrence were the principal objective, at the extreme, there would be no level of smoking that will be optimal. The social policy would be to discourage the habit and the industry entirely.

These objectives to some extent overlap as well as diverge. Within a certain range, as the tax rises, government raises its revenue and achieves its goal of containing consumption (deterrence), hence the two objectives converge. It is possible, however, that the tax rate that is optimal as a deterrent factor does not necessarily generate maximum revenue for the state. At the extreme, the tax level that may be justified as a deterrent factor, may lead to a total collapse of the industry, something which is not optimal from a revenue maximisation perspective (Zimring *et al*, 1995).

The broader social objectives of government are also affected by tobacco taxation. Job creation or the maintenance of employment is one objective which may have

particularly strong political appeal in a country where unemployment is high. Any tax policy leading to more job losses is then hard to justify in socio-political terms.

These apparent contradictions highlight the inherent difficulty of a single policy tool such as taxation to reach numerous policy objectives simultaneously. If more than one motive is relevant, no single tax can be optimum, but instead a range of tax rates that are optimal to the multiple objectives of the policy tool (Warner *et al*, 1995).

A final consideration is that governmental interest should be to set a cigarette tax that is fair, appropriate and just. One view would be that the taxed sale of cigarettes is unobjectionable at any level because it is a voluntary transfer of money under conditions of full information. If it were not fair to customers, they would not complete the transaction. There is no government coercion in the activity, so there should be no concerns about the fairness or justice of the tax on the activity. This is however a questionable argument, as smokers who are addicted to nicotine, could be unjustly exploited to raise government revenue, whereas the burden of supporting the government should be spread more evenly across citizens and activities. In addition, non-smokers, such as spouses and children, may suffer economic deprivations because of the high tax burden. Therefore, the voluntary character of the purchase does not make cigarette taxes immune to charges of unfairness. Jurisprudence remains an important aspect of the use of taxes which cannot be ignored in making judgements about the optimal level of taxes (Warner *et al*, 1995).

2.2 Public choice and the assignment of property rights

At the heart of the ongoing debate surrounding the tobacco industry is a key political economy issue, namely, the assignment of 'property rights' on uncontaminated air.

In terms of economic theory, the Coasian hypothesis has long argued that a clear assignment, or re-assignment, of property rights would not necessarily affect the optimality of resource allocation, but it would entail material consequences for income distribution (benefits). For the issue under consideration, it means that the optimal resource use within the economy would not be affected by whether or not the

constitution assigns the right for clean air to the non-smokers or permits the addicts to pollute the air. What will be affected, however, is the distribution of losses or gains amongst the competing groups within the society. If the right to polluting the air is given to the smokers, income distribution in the society would favour those who smoke. In such a society, not only do smokers derive satisfaction from smoking, but they are under no obligation to pay the non-smokers for the pecuniary or non-pecuniary costs imposed on them. In fact, the non-smokers would technically have to bribe the smokers if they want them to abstain from smoking. If however entitlement to clean air is a constitutional right, then the distribution system would favour the non-smokers. Now, the smokers might well face a situation where they are expected to compensate the affected non-smokers for the associated peripheral costs (Abedian, Van der Merwe & Annett, 1997).

Ultimately, therefore, it is the value system of the society that needs to determine which way the property rights should be assigned. The assignment of these rights needs to be clearly articulated in the new South Africa. This will help to minimise wasteful resource use by contending claimants to capture the potential gains from property rights. In this way, the society also reveals its preference for the attendant income distribution consequences of the constitutional ruling. The articulation of property rights on uncontaminated air will thus reflect society's values and preferences with regard to smoking or not smoking, and ultimately, what society deems an optimal tax that satisfies societal objectives of efficiency and justice.

2.3 Conclusion

A number of theories suggest ways in which a government can set the level of excise duty on tobacco. However no clear-cut answers exist and setting the tax policy is complicated further when more than one purpose motivates government in setting its cigarette taxes. Ramsey's Rule suggests that the highest tax rates should be borne by goods with an inelastic demand such as cigarettes that are of an addictive nature. In addition, tobacco has traditionally been very susceptible to high tax rates by virtue of it not being an essential good and the tax applied to it being classified as a "luxury" or

“sin” tax. At some point setting the appropriate tax to achieve different government objectives may require different tax levels.

It is one thing to speak of the theoretical notion of an optimal taxation on cigarettes, but quite another even to determine in practice what that level should be. For example, being able to estimate a theoretically appropriate tax to cover the health care costs precipitated by smoking, as part of the social costs of smoking, will depend on the level of medical technology available. The sheer difficulty of measuring these costs, the environmental costs, and the full social costs, makes a genuinely corrective tax extremely difficult.

This does not however detract from the fact that it is in theory possible for the taxation level as a policy tool, to achieve these seemingly conflicting objectives of revenue maximisation, public health and employment maintenance. Some area of overlap may exist where these objectives may not be as polarised as one is given to believe and the fine balance which government has to strike between health and employment may indeed be achievable. This paper will investigate whether there may be such an area of overlap, where a tax policy will be able to maximise revenue, be good for public health, and not harm the economy in terms of output and employment.

In determining such a socially optimal tax, public choice will need to play an important role in that the value system of the society will need to determine which way the property rights of clean air should be assigned. The notions of fairness and justice will need to be considered too, as this will reflect society’s acceptance of a tax that is deemed equitable and appropriate.

The tobacco industry and anti-tobacco lobby groups in South Africa have engaged in strong debates concerning the level of excise tax on cigarettes which each side respectively considers to be optimal. Government will need to take account of these views in achieving its own objectives. The following chapter will discuss in broad terms the case given by these two sides for and against tobacco taxation.

CHAPTER 3

A conceptual review of the case for and against tobacco taxation

This chapter examines in general terms, a conceptual case for taxing the tobacco industry. Some of the broader economic consequences of a tobacco tax are examined. The arguments that have been used by the tobacco industry to oppose an increase in excise taxes are examined. Similarly, the arguments and research that have been used by the anti-tobacco lobby to increase excise taxes, are reviewed. The arguments from both sides of the spectrum lead to a broad conceptual framework for the taxation of tobacco that can guide policy decisions. Chapter 4 will then empirically analyse the specific case for an optimal tax to achieve government's objectives of revenue maximisation and public health (deterrence) and Chapter 5 will empirically examine the employment consequences of such a tax.

3.1 The current socio-economic environment of South African tobacco policy

Smoking has become an increasingly debated issue in South Africa in the lay press, media, and academic circles. Pressure from the anti-tobacco lobby has grown and since 1990 has resulted in new legislation restricting smoking in public places and on public transport. It has also resulted in anti-tobacco advertising being carried out in cinemas for the first time since 1990. From May 1995 regulations were imposed based on the Tobacco Products Control Act of 1993 which was aimed to discourage the use of tobacco industry products. Policy measures have included explicit health warnings on all cigarette packets and on print and visual advertising. Excise taxes on tobacco have increased substantially, advertising has been restricted and a prohibition on selling to minors has been introduced.

In recent years the medical community has also emphasised the harmful impact. This has led to a strong anti-tobacco lobby and resistance to smoking, particularly from the

non-smoking community. In May 1991 the three principal voluntary organisations with an interest in controlling smoking - the Council Against Smoking, the National Cancer Association, and the Heart Foundation of South Africa - formed a coalition, the Tobacco Action Group, to co-ordinate their anti-smoking activities. People have become more aware of the potential detrimental consequences of smoking and public attitudes appear to have changed. In a national survey completed in March 1992, the majority of people in both rural and urban areas were aware that smoking is a health hazard (Martin, Steyn & Yach, 1992).

These measures have in recent years reversed the trend of smoking in South Africa. In 1990, South Africans smoked 3.53 cigarettes per day, in 1995 it had fallen to 2.45 cigarettes per day. In 1990, the average Canadian smoked 3.95 cigarettes per day, while the average American consumed 5.6, the average Hungarian 7.0, the average Greek 7.8, and the average Pole 9.5 per day (Allen, 1993, pg. 3). Even though the trend has been reversing in South Africa, the average per capita consumption is still much higher than other developing countries. Comparative consumption figures for most other African countries for 1990, are between 0.8 and 1.3 cigarettes per day (World Health Organisation, 1996, pg. 5).

In 1994, South Africa produced approximately 0.6 percent of the world total production and consumed approximately 0.7 percent of the world total, which puts South Africa in the top 25 leading producers and consumers in the world (World Health Organisation, 1996, pg. 6). The top producers and consumers, by comparison, in 1990 were China at 40 and 32 percent respectively, the United States at 10 and 10 percent, Brazil at 6 and 3 percent, the former USSR at 3 and 7 percent, and Italy at 3 and 2 percent respectively (Stanley, 1993, pg. 707).

It is widely believed in both industry and health circles that the recent increases in excise taxes in South Africa, have been the main explanation for the recent decline in per capita cigarette consumption. Since 1990, primarily because of increased excise taxes, the real retail price of cigarettes has risen by a factor of 1.38¹ and this increase

¹ Central Statistical Service (CSS), *South African Statistics*, 1995

has made tobacco use much more expensive. In a developing country like South Africa, the taxation policy has therefore been a strong contributory factor to falling consumption.

Between 1990 and 1995, the average price charged by manufacturers for a cigarette increased from 5.5 cents to 8.8 cents - a gain of 60 percent. Over the same period the general producer price index for manufactures increased by 48 percent². Thus, cigarette firms were raising their prices much faster than manufacturers in general. This of course affected retail prices, as the overall consumer price index over that period increased by 70 percent, and for cigarettes and tobacco products it increased by 116 percent. Barzel (1976) suggests that this result is consistent with other studies of the cigarette industry, and implies that the industry is able to increase the retail price by more than the size of the tax increase (Appelbaum, 1982), (Barnett, Keeler & Hu, 1995). There is therefore no doubt that, in response to increased excise taxes, South African tobacco manufacturers raised their prices much more rapidly than inflation during the early 1990s.

While a steep rise in prices may seem at first glance a peculiar response for an industry whose demand is falling, this pricing policy has a ready explanation. The tobacco industry in South Africa is a tight oligopoly in which four firms produce virtually all of the cigarettes and most of the other tobacco products made in the country. Rembrandt dominates with 85 percent market share through two manufacturing arms, Intercontinental and Trans Atlantic. United Tobacco have approximately 12 percent market share and recently returned R J Reynolds claim to have about 2 percent of the market (Cape Business News, July 1996a). Philip Morris entered the market in 1996. Imports play very little role in the South African market. Therefore due to the oligopoly structure of the market, some form of price co-ordination probably occurs between these four players³.

² Central Statistical Services (CSS), *Statistical Indicators*, 1995

³ Barnett, Keeler & Hu (1995) describe the U.S. cigarette industry as a six-firm oligopoly which is very concentrated and has a high degree of price co-ordination. Price changes are therefore initiated by one of the two largest firms, R.J. Reynolds or Phillip Morris, and these price changes are usually quickly followed by the remaining manufacturers within 48 hours.

From the point of view of manufacturers, the increases in excise tax have two important effects. First, they reduce the demand for cigarettes at the factory gate. By itself, this change would probably have led producers to reduce prices or keep them constant. Second, the increased excise tax burden reduces the share of the retail price of cigarettes that is received by the producers. Therefore with the recent increases in excise taxes, a 10 percent increase in price charged by manufacturers would translate into a smaller percentage increase in the price paid by the consumer and consequently would have a smaller and smaller percentage impact on sales volume. High taxation allows cigarette manufacturers to increase prices unnoticed. Producers therefore have more latitude to raise their prices without reducing their sales (Allen, 1993). The four tobacco manufacturers therefore act in concert to raise prices as their sales become less sensitive to price changes. That is the reason prices have risen rapidly even as demand has fallen. The high prices have therefore guaranteed that tobacco firms earn a high rate of return even though the industry is contracting. Testament to this is that the operating profits for the Rembrandt Group (Tobacco Division) over the last few years have increased by between 10 and 17 percent per annum (Rembrandt Group Limited, 1996).

The increased excise taxes and the industry's resultant increase in prices, have therefore contributed to the decline in tobacco usage in South Africa more recently. Given the public's changing attitudes toward smoking, its associated negative externalities, as well as the increasing strength of lobby groups, a tax on the consumption of tobacco has been seen as fair and acceptable by large sections of the population (Van Walbeek, 1996). This form of government revenue implies only a small political opportunity cost. It is easy to raise excise duties from the consumer's (demand) side, yet such government action has been met by fierce opposition from the producer's (supply) side.

Already in the 1995 Tobacco Board Annual Report, it states that :

"The tobacco industry must realise that it cannot count on any government assistance whatsoever in these times of unfair discrimination against the tobacco industry. Events during the past year such as, ...the drastic increase in excise duty, speak for themselves. To my mind unrealistic decisions are being taken. Persistent exorbitant increases in excise duty may prejudice the contribution which the tobacco industry makes to the South African economy. Presently, the South African economy can certainly not afford this. The tobacco industry is indeed one to be handled with greater circumspection and responsibility."

Following the Minister of Finance's 1997 Budget Speech (Budget Review, 1997) announcing an increase in tobacco duty, the Tobacco Institute wrote an open letter to the government. In this letter they stated that an increase in duty on cigarettes, would not materially affect overall consumption, but would lead to "increased contraband activity, reduced government income, and job losses" (Sunday Times, 15 March 1997).

Despite these claims the government has been resolute in increasing excise taxes.

3.2 A conceptual examination of the tobacco industry's arguments

Increased excise taxes which result in falling tobacco consumption could have a number of economic consequences - industry has argued in the open letter that these include increased contraband activity, reduced government income, and job losses. This section will examine each of these arguments at a conceptual level before turning to the anti-tobacco lobby arguments for increasing excise taxes.

3.2.1 Contraband activity and illegal trade threats

Zimbabwe, another major tobacco producing country in Southern Africa, would be a major consideration in terms of contraband activity. If either South Africa or Zimbabwe were to increase excise tax rates on tobacco, resulting in substantially different cigarette prices, it could have implications for trade between the two countries, and more importantly, for smuggling activities. Price differences between neighbouring countries would lead to a diversion of tobacco trade, legally and illegally,

to countries with cheaper cigarettes. Smuggling would generally take place from low tax countries to high tax countries where cigarettes are more expensive⁴.

This argument has been used by the tobacco industry in South Africa to urge the government not to increase the tax on tobacco products. Particularly with a country like Zimbabwe bordering South Africa, the industry has vociferously argued about the dire effects of cross border shopping and smuggling and have claimed that tobacco taxes should be lowered.

A study by Van der Merwe (1997) has however shown that, because price elasticities and demand specifications are very similar in both countries, and excise rates as a proportion of final selling price are highly comparable, the adverse economic effects of smuggling and cross border shopping are reduced.

There were large differences in terms of real excise tax rates between the two countries in the 1980s, but the gap has narrowed more recently. In Zimbabwe the tax rate increased from 26 to 40 percent from 1992 to 1996. Over the same period South Africa increased from 22 to 32 percent. There is now greater compatibility in terms of the two countries' tobacco taxation policies, which bodes well for the economic consequences of such policies. In terms of a Southern African regional trade impact of an increased excise tax on cigarettes, it would appear that any harmful consequences of such a taxation policy would be negligible. From the elasticity estimates and the excise duties levied, it would appear that the taxation policies of the two countries are highly comparable.

This suggests that the increased tax rate in South Africa has not harmed trade relations between the two countries or encouraged illegal smuggling activities through large disparities in taxation policies.

⁴ For a further discussion of smuggling and cross-border shopping, and why lowering tobacco taxes is not considered a solution, see Joossens & Raw (1995).

3.2.2 Reduced government income

The industry has argued that, regardless of its effects on physical health, tobacco plays an important role in the communities' economic health, generating employment and contributing vital revenues to government coffers. Regulatory measures such as increased excise taxes and regulated advertising that reduce smoking, and hence cigarette sales, will increase unemployment and government deficits. Ironically however, in the case of excise taxes, the industry's argument only relates to employment, since higher taxes clearly will increase government revenue.

From any government's point of view, tobacco taxation is a significant and useful source of revenue, which is raised with relative ease. Tobacco taxes yielded R1,232 million in the 1994/95 financial year⁵, which is equivalent to 1.1 percent of total government revenue. Currently there are enormous fiscal demands on the South African government. The already high direct tax burden makes it very difficult for the government to raise additional revenues from this source, which gives indirect taxes, such as an excise duty great merit.

That government income will be reduced, as the tobacco industry states, is therefore arguable. Higher tobacco taxes will clearly lead to increased government income. The degree of latitude that the government does have to increase excise taxes, in order to raise revenue, will be empirically examined in Chapter 4.

3.2.3 Employment losses

Tobacco industries universally have suggested that falling tobacco consumption, particularly through increased excise duties, cause job losses in tobacco manufacturing and in other related industries such as retailing (Buck, Godfrey, Raw & Sutton, 1995).

However, when the industry estimates tobacco's importance in terms of jobs, they treat the resources devoted to tobacco production and sales as disappearing, if sales decline altogether. The industry focuses on the jobs directly associated with producing and selling its products and argues that any stronger tobacco control measures, will

⁵ South African Reserve Bank *Quarterly Bulletin*, 1995

affect jobs directly associated with the industry⁶. This is of course true, but it is not a complete picture of what could happen if stronger tobacco control initiatives were implemented.

It is conceptually possible that resources could be redistributed as consumers used the same money to purchase alternative goods and services. This alternative spending could in theory generate employment and tax revenues associated with the production, distribution and sale of the purchased goods and services⁷.

The effect of reduced consumption on retail jobs would also depend on their dependence on tobacco sales. If spending on tobacco was reduced, people would spend more on other goods and services, even if some expenditure was delayed through saving (Warner & Fulton, 1994). As consumers would have no less income, there is no reason to assume that the economy should shrink when tobacco money is freed. This means that it is conceivable that there could be increases in employment in other sectors.

This argument will be empirically examined in Chapter 5 which focuses on the employment effects of increased excise taxes on tobacco. There are however other factors that may impinge on employment losses in the economy and the view of the severity of these losses. These include changes in the health care industry, productivity improvements initiated by the tobacco industry, the industry's actions to mitigate any employment losses, and the potential employment losses from the perspective of the South African economy.

⁶It is of interest to note that the Rembrandt Controlling Investments *Annual Report* for 1995 states that any negative effects on employment from the increased excise duties, particularly in farming and manufacturing, have indeed not been felt in South Africa. This could suggest that, while the tobacco industry has argued that increased excise duties will result in employment losses, the industry has not yet experienced any such negative consequences.

⁷At the extreme, where the industry is totally wiped out, there may be a net loss, only if the resources currently under use by tobacco generate more turnover than their alternative use can. This will most probably be the case if the country is a net exporter of cigarettes. If the country is a net importer, there will be no net loss. If the country has a closed industry like South Africa with very little imports and exports, the net effect is more indeterminate and is essentially an empirical question.

3.2.3.1 Health care employment

Reductions in smoking will result in behavioural changes that will have economic consequences. Reductions in smoking across the whole population will reduce illnesses and will save health care resources. Employment losses may also result in the health care industry in the long run, because of fewer smokers, and because of the delay between the onset of smoking and illness (Buck *et al*, 1995). There will also however be larger numbers of people surviving into old age. Geriatric care and frail care services may again generate more employment. In addition higher pension payments may result. Hodgson (1992) suggests that smokers have higher lifetime medical care expenditure than people who have never smoked, although there is still some debate on this matter.

A complete examination of the economic impact of the tobacco industry and its effective taxation, should include a consideration of the economic implications of the eventual elimination of tobacco-related disease. Health care costs are however, not addressed in most studies investigating the employment issue. Tobacco-related health care represents economic activity - jobs, incomes, and tax revenues - attributable to the consumption of tobacco products. Its omission from any analysis therefore results in a short-term underestimation of the economic impact of the tobacco industry and a long-term overestimation, because in the long-run, other health care needs will arise. Tobacco-related health care expenditures will decline only gradually, since current tobacco-related diseases reflect the cumulative effects of past decades of smoking (Buck *et al*, 1995).

The nation's kicking its tobacco habit would increase the trend toward an ageing population profile. Thus the changing demographics will force changes on the health care system. The most obvious would be the increasing demand for specialists in geriatric medicine and for long-term care services. While the demise of tobacco consumption would contribute to the dominant impact of changing demographics, it would also have some unique effects. For example, it could substantially reduce the demand for physicians specialising in pulmonary medicine or oncology. Similarly, the need for neonatologists would fall, as would the need for neonatal intensive care units.

Over the next decade or two, while the need for treatment of serious chronic disease in the young and middle-aged would decrease, the number of elderly patients with chronic diseases might increase (Warner, 1987).

Therefore, just as in the case of tobacco product expenditures, reduced spending on tobacco-related health care could be redistributed to other spending within the economy that would generate “replacement” employment.

3.2.3.2 Job loss as a result of industry changes

The obvious explanation for a decline in tobacco manufacturing employment would be that it is due to a fall in consumption. It is also possible however, that the decline in employment is due to productivity improvements which are implemented by the industry. It is probable that an increase in excise tax may result in some productivity or quality improvements. The hypothesis is that a tax on a commodity results in production substituting towards characteristics of the commodity not subject to the tax. For example, a tax levied on cigarettes may induce manufacturers to produce a ‘slow burning cigarette’, which increases the quality of the cigarette and improves the production process. The ‘slow-burning’ characteristic of the cigarette is not subject to the tax (Barzel, 1976). This productivity or production improvement, may also result in employment losses⁸.

Capacity utilisation in South Africa in the early 1990s has been higher in tobacco production than in manufacturing in general, suggesting that technological changes have improved tobacco production to the extent that it is more efficient than other areas of manufacturing. Production capacity utilisation in manufacturing was on average 78.7 percent from 1990 to 1995, and in tobacco production it was 87.1 percent⁹. This would suggest that increased efficiency and higher profitability in the industry could have led to expansion through the use of capital-intensive technology.

⁸ A study in the UK (Pieda, 1991) showed that much of the employment loss in the industry between 1980 and 1990 was due to productivity improvements.

⁹ Central Statistical Services (CSS), *Labour Statistics*, 1995

Testament to the industries' production efficiency is their rationalisation programme, as described in the Rembrandt Controlling Investments *Annual Report* for 1995 :

"As part of the tobacco division's continued control of operating expenses to ensure international competitiveness, a start was made to rationalise facilities and overall support services. The rationalisation in Gauteng comprises the transfer of the division's manufacturing unit in Johannesburg to the plant in Heidelberg. The reduction in support services and personnel, resulting from the merging of production facilities, as well as a voluntary early retirement package in other divisions, will ensure that productivity and costs will remain competitive. Full provision for these rationalisation expenses has been made and amounts to R37 million before taxation."

In October 1995, Remgro Company (Rembrandt's tobacco interest) merged with Richemont, whose tobacco interests are Rothmans International (RI). One of the major strategic benefits given for this merger would be that South Africa is a potential source of low cost manufacture (Rembrandt Group Limited, 1996). This underlines the production efficiency that has been achieved through shedding costs.

In the primary sector, the average number of tobacco farms has fallen from 1022 in 1990 to 663 in 1996, which gives an average per annum decline of 7.6 percent¹⁰. However the average hectareage has fallen by a smaller amount and over most of this period the average hectare per farm unit actually increased, suggesting that some of the adjacent farms may have amalgamated to achieve greater efficiency. Whether or not demand for tobacco fell, the number of farms would have in all likelihood declined as growers sought to realise the advantages of large scale operation. Up to 1995 capital investment per hectare, in real terms, grew by 9.6 percent¹¹ suggesting that growers were introducing technological advancements into their production processes. These technological improvements could also have led to job losses in the primary sector.

3.2.3.3 Minimising employment losses through industry exports

As a result of a fall in local tobacco consumption, any tobacco industry could increasingly focus on export markets. Finding these foreign markets means the decline in local employment in the industry, will be dampened. As an example, cigarette and

¹⁰ Tobacco Board *Annual Reports*, 1990 - 1996

¹¹ Tobacco Board *Annual Reports*, 1990 - 1996

leaf tobacco imports are relatively low in South Africa (0.2 percent of consumption in 1995). Exports have also been relatively low historically (0.04 percent of production in 1995). Table 3.1 shows South Africa's total exports and imports of tobacco products, cigarettes and leaf tobacco to and from various countries and regions. These are not very high and have been declining for some years. This would perhaps suggest the potential for a country like South Africa to increasingly seek export markets to offset the decline in local consumption and employment.

Table 3.1 : Imports and exports of tobacco products for selected countries and regions with South Africa, Rands million 1995

	Exports	Imports
Angola	3.37	0.01
Malawi	3.99	0.61
Mozambique	21.58	0.64
Tanzania	11.65	0.10
Zambia	11.81	0.14
Zimbabwe	9.54	3.70
Zaire	8.01	0.08
Rest of East and Southern Africa	8.92	1.03
East Asia and Pacific	2.56	22.21
European Union	4.48	57.94
Rest of Europe	0.04	5.01
Western Hemisphere	0.09	20.68
Unallocated	9.42	7.05
Totals	96.42	125.06

Source : Social Accounting Matrix (SAM), Development Bank Southern Africa, 1995

The total tobacco exports and imports in 1995, given in Table 3.1, are very low. Both export and import totals were less than 0.1 percent in value of total imports and exports in the South African economy at large. This underscores the potential for these markets to still develop to negate the fall in domestic consumption. Export growth will thus soften the blow of any potential employment losses.

The export policy has been evident in 1996 and 1997 with primary producers making greater efforts to become less dependent on local markets. Because local demand has been shrinking, and with rising international tobacco prices, there has been every

incentive to increase exports to expanding overseas markets. Exports have recently started increasing to countries like the US, Sweden and Taiwan.

In addition, another one of the major strategic benefits of the 1995 merger between Remgro Company (Rembrandt's tobacco interest) and Richemont (Rothmans International) would be "to gain exposure to, and participate in pursuing new opportunities in developing markets such as Asia and Eastern Europe" (Rembrandt Group Limited, 1996, pg. 1). South Africa's tobacco industry is therefore strategically poised to attempt to increase its export activities. This action will soften any negative repercussions in terms of employment losses for the industry, as long as other countries do not embark upon similar strategies with equal intent. This strategy does however lead to the exportation of illness and disease. In particular it affects some of the poorest in Sub-Saharan Africa, as seen from Table 3.1, that can least afford the additional burden of poor health. While the tobacco exportation strategy may solve the local industry's economic and employment problems, it does not solve the global health epidemic of tobacco.

3.2.3.4 Employment loss from the perspective of the South African economy

Over the period 1990 to 1995, 1200 jobs were lost in tobacco production. While 1200 jobs may seem a large loss, it is less than 0.01 percent of total employment in the formal economy over this period and approximately 0.02 percent of unemployment. The average decline in tobacco production jobs over this period was 7.1 percent¹². In manufacturing in South Africa over the same period, employment declined on average by 7.4 percent. The decline in tobacco production was therefore lower than the rest of the manufacturing industry. Total employment in non-agricultural sectors fell on average by 1.5 percent over the same period, and in agriculture by 6.1 percent. The overall employment trend in most sectors of the economy was therefore declining¹³. Tobacco was no exception, and its losses relative to other areas of manufacturing were lower.

¹² Central Statistical Service (CSS), *South African Labour Statistics*, 1995

¹³ The economy in general was moving towards more capital-intensive production methods and the period saw a lower than historic growth trend.

3.3 A conceptual review of anti-tobacco arguments

Anti-tobacco analysts have focused their arguments and their research on the social cost of smoking and the monetary value attached to its health care (Yach & Townshend, 1988), (Barnum, 1994). These studies have emphasised the economic and social burden that the tobacco industry bestows on society. As such, these researchers have argued that any appropriate tobacco control policy, through for example the tax medium, should focus on the total elimination of both tobacco production and consumption (Yach, McIntyre & Saloojee, 1992). Anti-tobacco activists have used their estimates of the economic and social costs of tobacco to pressure governments into stronger tobacco control policies and, in particular, higher excise taxes.

Anti-tobacco research on health care costs concentrate on the direct costs of medical care to treat smoking-related illnesses and the indirect costs of productivity losses associated with the premature mortality and excess morbidity of smokers (Yach *et al*, 1992), (Yach, 1982). Such anti-tobacco analysts have developed these estimates of the costs of smoking to emphasise that an optimal tobacco control policy would be the elimination of the production and consumption of tobacco. In other words, an optimal excise tax from their point of view, would result in the elimination of the tobacco industry. These studies have however been the focus of strong criticism.

In 1988, the South African Medical Research Council did such a health care cost analysis and put out a report recommending the abolition of the tobacco industry on the grounds that the costs of the tobacco industry to society outweigh the economic benefits (Yach *et al*, 1988). They argued that smoking-related diseases had already reached pandemic proportions in South Africa, and that the costs of diseases in terms of premature death, high morbidity, treatment costs in and out of hospital, absenteeism from work, and lost productivity were very high. In 1992 an updated version of this MRC report was produced (Yach *et al*, 1992) quantifying a more detailed cost-benefit analysis of the tobacco industry. Their estimations were that the costs to society outweigh the benefits by a ratio of nearly 4:1 (Yach *et al*, 1992, pg. 11). The costs they included in their study were expenditure on tobacco, lost productivity due to

premature death and hospital admission, and direct health care costs. The benefits were earnings of employees, the general sales tax on tobacco and excise revenue generated.

Following these reports, two articles were written by Reekie and Wang (1992) and Reekie (1994) contesting the Medical Research Council findings. They argued, using state-dependent decision theory, that smokers have already discounted the hazards associated with smoking. This means that the decision to smoke or not, is influenced on the one hand, by the expected utility or satisfaction obtained from smoking, and on the other hand, by the probability of knowing that one could contract a smoking-induced illness or even die. Smokers have already discounted the latter in their decision to smoke. In addition, using public choice theory and utilitarian economic analysis, Reekie *et al* (1992) argued that smoking does not impose net costs on society. Reekie estimated that even with the most conservative assumptions, consumers would still receive substantial benefits from smoking. The results of these studies provided the South African Tobacco Institute with useful support for its cause, as they could then argue that the industry does not impose net costs on society¹⁴.

Abedian and Dorrington (1994) strongly refuted the findings from Reekie's studies on the basis that state-dependent utility theory fails as a model, particularly in the presence of an addictive product. Consumers are not as rational and capable of processing information as the standard theory leads one to believe.

The MRC health care cost-benefit studies have therefore provoked much debate as they have inherent shortcomings.

The World Bank have done a similar cost-benefit analysis on a global scale, looking at the world-wide effects of tobacco production, by comparing the benefits of consumption - in terms of the amount spent on tobacco and profits generated by the industry - with the costs, the direct health care costs and the indirect costs of premature death and productivity loss (Barnum, 1994). In their study the costs also outweighed the benefits by a ratio of 11:1 (Barnum, 1994, pg. 3).

¹⁴ In 1992, The Tobacco Institute of Southern Africa issued a brochure, "The costs of smoking", in which they extensively quote Reekie and Wang (1992).

These studies have had several types of criticism levelled at them, not only in the measurement of the costs, and the omission of other costs, but also in the use to which these cost estimates have been put. For the main part, the costs that are estimated, are real. However by focusing on the readily measurable “tangible” costs of smoking, the analyses exclude hard-to-measure psychological costs such as pain and suffering, that may greatly exceed the measurable costs in terms of true social value. Nevertheless, the essential question is not the precise magnitude of the social costs, but rather their qualitative meaning. As they are used by some anti-tobacco activists lobbying to restrict tobacco use, their intended implication is clear : tobacco use is imposing a socio-economic burden on society that is avoidable; smokers are imposing costs on non-smokers. The logic then follows that smokers should pay more, through excise taxes, to fund these unnecessary “extra” costs.

There are however serious flaws in this argument. At any given age, smokers do incur greater health care costs than non-smokers. But precisely because smokers have a shorter lifespan, non-smokers have more years during which to incur health care costs. In particular, non-smokers have more years of old age in which they could be plagued by chronic illness and cost the tax payer millions in health care expenditure. There is no definitive resolution yet to the question of whether smokers’ higher annual health care costs outweigh non-smokers’ additional years of costs (Hodgson, 1992).

Several caveats are necessary to put the overall conclusion into perspective. First, and by far the most important, the possibility of an approximate equality of the two expenditure streams of smokers and non-smokers does not mean that the two situations are equally desirable. Non-smokers spend their health care money over a longer, healthier life. Health care costs associated with the attainment of a tobacco-free society would then seem a more cost-effective social investment in health. Also, non-smokers may work longer due to a longer working life and have greater productivity-related contributions, thereby also contributing more to funding the health care system and offsetting later costs.

A further flaw in the analysis of the social cost of smoking is that differential insurance premiums are not considered. In most cases, smokers already pay more than non-smokers (Warner, 1987). Also, an expansion of the number of people into retirement years would have a financial impact on pension plans. Such plans would see a substantial increase in their financial obligations because their benefit provisions currently reflect actuarially the reduced life expectancy of smokers. They are currently based on the actuarial realities of a smoking society. In other words, by dying prematurely smokers “save” the pension plans millions of rands, a “saving” that would be lost if everyone ceased to smoke today. Most anti-tobacco arguments do not consider these implications when calculating the economic costs of tobacco (Warner, 1987).

Studies focusing on the social and economic costs of smoking have generally been subject to many of the above criticisms, yet have been used by lobbyists to pressure government into enacting higher excise taxes and stronger tobacco control measures. This study has not entered the debate on the social costs or social ills of smoking at all. The ubiquity of the tobacco habit is accepted as a fact of life, something pervasive in South African society. Related to that, the taxation of the product has also been accepted as a universal practice, a fact of life.

This study focuses on finding the level of taxation that will best meet government’s competing objectives, and will at the same time not jeopardise the economy in any way. In particular, this study focuses on the employment effects of an optimal excise tax, and like most studies on tobacco and jobs, it does not include a full cost-benefit analysis of the industry even though some of the potential economic effects of falling tobacco consumption may best be addressed through such an overall analysis.

3.4 Conclusion

Often it may appear that government’s tobacco policy objectives of revenue creation, public health and employment maintenance, are mutually exclusive. This has acted as a block to public policy to increase excise taxes on cigarettes. The industry has vociferously opposed any tax increases by suggesting several dire economic

consequences that will result from such a policy. In particular, in their open letter to the government, they focused on increased contraband activity, reduced government income, and job losses (Sunday Times, 15 March 1997). However, if one examines the economic consequences of excise taxes in more detail, the analysis suggests that the government's dilemma is in essence false. Through fleshing out the arguments that the industry has given to prevent increases in excise taxes, it would appear that the consequences of increased tax rates would not be as severe as the industry would lead one to believe.

Firstly, the threats of illegal trade seem to be misconceived. Secondly, tobacco taxes serve as an important source of government income, and thirdly, the job loss in the industry could potentially be mitigated by increases in employment in other sectors through consumption expenditure switches. These industry arguments have been addressed at a conceptual level and at that level, seem to be refutable.

Similarly, anti-tobacco arguments are used to lobby government to increase excise taxes. Anti-tobacco analysts typically focus their efforts on estimating the social and health care costs of smoking. These estimates are notoriously difficult to make and often flawed.

Government's dilemma is therefore to strike a comfortable balance between these two opposing views that will in essence also achieve its own objectives of revenue generation, public health, and employment maintenance. Government will therefore potentially endeavour to set an optimal tobacco tax to achieve these objectives.

The following chapter will empirically examine whether an optimal level of tax could be set on cigarettes and what such a tax policy would be.

CHAPTER 4

The effects of an optimal tobacco tax on fiscal revenue in South Africa

In order to ascertain an optimal tax on cigarettes in South Africa and its economic impact, the concept of price elasticity is important. The chapter starts by showing the relevant trends in the South African tobacco industry in terms of taxation, prices, consumption, employment and wages. The price elasticity of demand for cigarettes in South Africa is compared to estimates in industrialised countries. A model is then developed using a price elasticity of demand estimate, to show what the government has historically lost by not operating an optimal taxation policy and what such an optimal tax policy would be, in order to achieve government's objectives of revenue generation and deterrence.

4.1 Basic trends in the South African tobacco industry which impinge on taxation policy

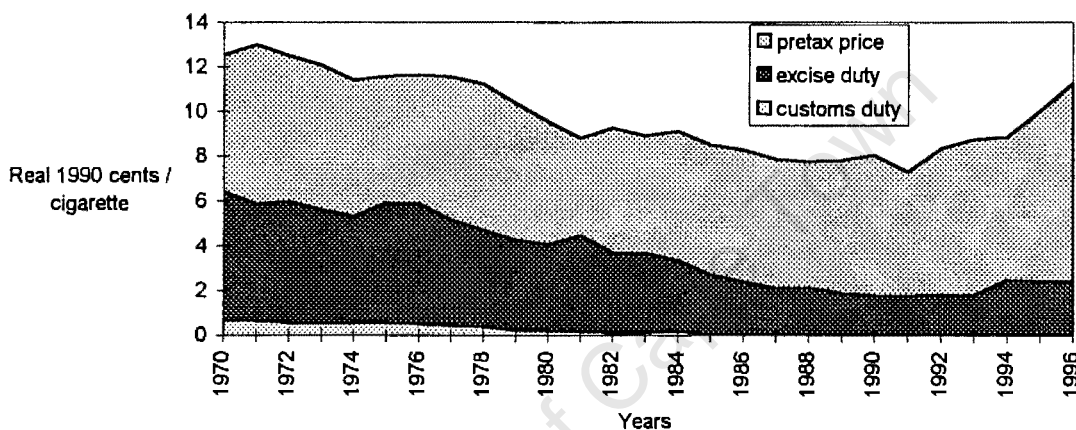
Virtually all of the cigarettes consumed in South Africa are manufactured by the four local cigarette producers. The quantity of cigarettes imported is very small, therefore customs duty is almost negligible and the study therefore focuses on excise taxes. Likewise value added tax is omitted because it is common to all non-essential goods and services. Thus the term taxation essentially refers to the excise paid on all locally manufactured cigarettes that are consumed in South Africa. In addition, the consumption of snuff, roll tobacco and pipe tobacco is so small, that the analysis is restricted to cigarettes only.

The following section gives a short overview of relevant trends in the South African tobacco industry, in particular, pricing, taxation, consumption, employment and wages.

4.1.1 Pricing, taxation and consumption

Figure 4.1 shows the real price of cigarettes over the period 1970 to 1996 together with the real excise duty and (negligible) customs duty paid in 1990 cents per cigarette. The figure reveals the steady decline in the selling price up to 1991, which was caused primarily by a decrease in the tax component and clearly shows that the real tax paid per cigarette has declined from 1970 to 1991.

Figure 4.1 : The real price of cigarettes and real excise tax rates for South Africa, 1970 - 1996



Source : South African Tobacco Board *Annual Reports*

Indices of price, consumption and the percentage of price that is excise tax for the period 1970 - 1997, are given in Table 4.1. Again as in Figure 4.1, the real price of cigarettes is shown to have declined noticeably up to 1990. As compared with 1970, the real price index declined from 100 to a low of 63 in 1988. Concurrently, a distinct trend in Table 4.1 is the decline in real cigarette excise taxes from 1970 to 1993. From constituting about 45 percent of the total price in the 1970s, taxation in the early 1990s made up only 20 percent of the price of a cigarette. This suggests that cigarette tax rates have not kept pace with inflation. Not only has government not optimised revenue from this source, but also by allowing a continuous decline in tobacco taxes, it has in effect encouraged consumption. As shown in Table 4.1, the consumption index increased from 100 in 1970 to a high of 165 in 1991.

In other words, government has not pursued the revenue objective or the deterrence objective to an optimum. This underlines the important link between pricing and consumption, highlighting the strong role that taxation policy plays.

The South African government has, however, since 1995 committed itself to a stronger taxation policy and has introduced duty increases that have brought the effective tax rate to 52 percent of the retail price in 1997.

Table 4.1 : Indices of the real retail cigarette price, per capita cigarette consumption, and the percentage of excise tax per cigarette in South Africa : 1970 - 1997

Year	Price	Consumption	% Excise
1970	100	100	46
1971	103	100	40
1972	100	102	43
1973	97	109	42
1974	92	115	41
1975	92	120	46
1976	93	125	47
1977	92	114	41
1978	89	116	39
1979	84	125	39
1980	77	135	40
1981	71	142	48
1982	75	147	38
1983	73	143	39
1984	73	144	35
1985	69	140	31
1986	68	140	28
1987	64	147	26
1988	63	151	27
1989	64	148	24
1990	66	151	22
1991	70	165	24
1992	71	135	22
1993	73	119	20
1994	72	119	28
1995	81	105	24
1996	85	95	32
1997*	90	90	52

* Projected figures for 1997

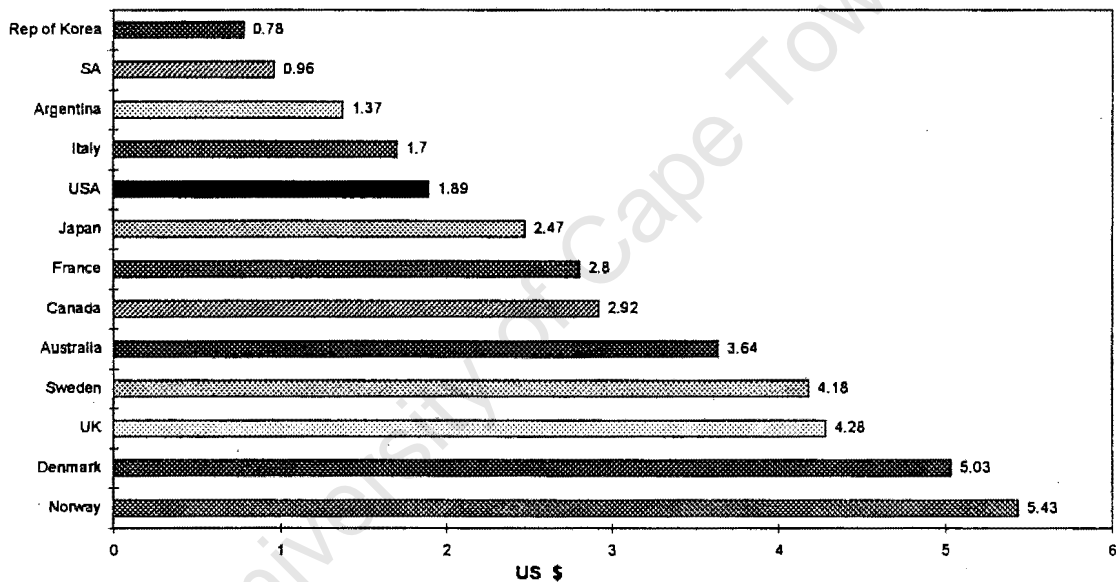
Source : South African Central Statistical Service (CSS) *South African Statistics*, Tobacco Board *Annual Reports*, and see Data sources for optimal tax simulation

If one converts Table 4.1 to real 1990 prices, the real price per packet of 20 cigarettes in 1970 was around R2.60. In 1995 this had declined to R2.03, after a low of R1.48 in

1991. Despite this, the proportion of the retail price made up by excise taxes declined by a greater amount from 46 to 20 percent. This suggests that the profit margin to the industry per cigarette also increased.

The low duties on cigarettes have been a strong contributor to the low real price of cigarettes. This price can be contrasted with international price levels, as in Figure 4.2. It would appear that countries that have maintained higher excise taxes, have also been able to reduce consumption, through higher cigarette prices.

Figure 4.2 : Average price of 20 cigarettes in US\$ for selected countries, 1995



Source : World Health Organisation. *Tobacco Alert : The Tobacco Epidemic : A Global Public Health Emergency* May 1996, WHO: Geneva.

The cigarette excise tax levied in 1995 was 24 percent of retail price, which as seen from Figure 4.2, gave rise to a relative international price of less than 1 US\$ for a pack of 20 cigarettes. Although the excise duty has increased substantially from 24 percent in 1995 to 52 percent of retail price in 1997, the real price of cigarettes in South Africa relative to other countries is still extremely low. This suggests that there could still be scope to increase excise taxes.

As seen in Table 4.1, consumption of cigarettes has steadily decreased since 1991 in South Africa. Table 4.2 shows a demographic breakdown of the 7.6 million people who consumed cigarettes in 1995. This consumption level has declined further from 1995 to 1997. The demographic consumption data in Table 4.2 for 1995 reveals the people who would have been affected by an incremental taxation policy on cigarettes.

Table 4.2 : Prevalence of smoking in South Africa, 1995

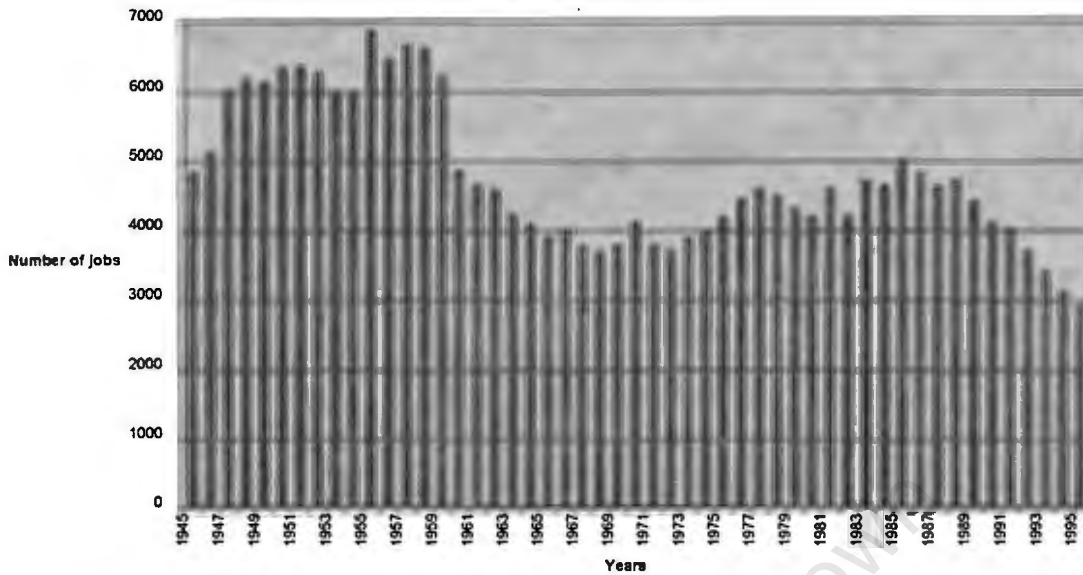
Population	Percent
Whites	38%
Indians	34%
Coloureds	49%
Blacks	26%
Men	49%
Women	13%
Total Population	30%

Source : South African All Media Product Survey (AMPS) 1995 of over 16 year olds (Cape Business News, July 1996b).

Table 4.2 highlights that the predominance of smoking is among the Coloured population and among males. Trends suggests that consumption may be on the increase amongst blacks, women and youth, and on the decrease in the other groups (Cape Business News, July 1996b).

4.1.2 Employment

Figure 4.3 shows employment in the tobacco manufacturing industry in South Africa from 1945 to 1995. There was a considerable decrease in employment over the 1960s which was followed by a steady increase in the 1970s and early 1980s. This was followed again by a decline in the late 1980s and early 1990s. From 1985 to 1995 the average decline in employment in the industry was 5.6 percent per annum.

Figure 4.3 : Employment in tobacco manufacturing in South Africa, 1945 - 1995

Source : Central Statistical Service (CSS) *South African Labour Statistics*

The drop in employment in the 1960s, the late 1980s and early 1990s may be, as suggested in Chapter 3, as much due to the fall in consumption, as to production improvements by the industry. Consumption only really started falling from 1991, which would suggest that employment losses before that, had to be the result of other causes, such as productivity improvements.

4.1.3 Wages

How have tobacco industry employees fared as the demand for their labour has declined? On the face of it, one might imagine that employees in a declining industry like tobacco production would earn low or falling wages. That has not however been the case for South African tobacco workers. Since the early 1990s, employees in tobacco manufacturing have been some of the highest paid employees in the manufacturing industry in South Africa. On average, from 1990 to 1995, their monthly wages and salaries in real terms were between 25 and 35 percent higher than average manufacturing wages¹. Over this period their average wages in real terms increased by 10.6 percent, whereas in manufacturing, it increased by only 4.4 percent. Of the 29

¹ Central Statistical Service (CSS), *South African Labour Statistics*, 1995

Standard Industrial Classifications given by the CSS, they were the eighth highest earning group. They also earned more than workers in mining and quarrying.

Why are South African tobacco workers paid so well? The answer is twofold, first, historically, the falling tax component and increased demand would have made the industry more profitable which would have enabled them to pay higher wages. Even more recently with the rise in tobacco taxation, this would have reduced the sensitivity of demand to price changes and given manufacturers greater scope for raising prices, which they have done. The enhanced source of cash flow is the source of the high profits of tobacco companies, and it also gives them the resources to pay high wages (Allen, 1993). Most tobacco industry employees would also be union members, and these unions would have been able to secure high wages for their members. The non-competitive structure of the tobacco industry is therefore at the root of its high profits and resultant high wages and salaries.

Secondly, employers have little incentive to resist demands for higher wages since they maintain morale even as the workforce is cut and the industry falls under increasingly critical public scrutiny. The cigarette industry can therefore accomplish productivity gains without alienating the labour force because they earn higher than average wages.

4.2 Simulating an optimal tobacco tax for fiscal revenue

This section uses the trend data from the tobacco industry to develop a model to simulate the tax revenue that government has lost from not operating an optimal tax policy. In order to run this model an estimate of the price elasticity of demand for cigarette consumption was used.

4.2.1 An estimate of the price elasticity of demand for cigarettes

Several statistical studies in South Africa have estimated the impact of higher prices on cigarette consumption. The price elasticity of demand shows how sensitive consumption would be to a price increase, all other factors remaining constant. Reekie (1994) found an elasticity of -0.87 for South Africa, and Van Walbeek (1996) found an estimate of -0.66 on the same data. Reekie's estimate would therefore appear to be too

high. The statistical and empirical fit of Reekie's model was also criticised by Abedian and Dorrington (1994).

The Economics of Tobacco Control Project Update 2 (1996) found a price elasticity of -0.57. This estimate was developed from an integrated supply and demand model of the South African tobacco industry. Abedian, Van der Merwe and Annett (1997), using cointegration analysis found a price elasticity estimate of -0.59 in the short-run and -0.69 in the long-run. For the purposes of the simulation exercise, the model by Abedian, Van der Merwe & Annett was used with an elasticity of -0.59, as the estimate of Reekie (1994) was considered too high.

For most developed countries the price elasticity of demand is around -0.4, that is, a 10 percent increase in price leads to a 4 percent decline in consumption.

To provide an international comparative perspective for the South African price elasticity estimates, Table 4.3 shows a survey of these estimates similar to Zimring and Nelson (1995).

Table 4.3 : Comparison of price elasticity estimates for cigarette consumption for selected countries

Date	Reference	Country studied	Elasticity estimate	Comments
1980	Fujii	USA	-0.45	Time-series 1929-73
1982	Lewit and Coate	USA	-0.42	1976 Health Interview Survey gives elasticity by age and sex
1984	Leu	Switzerland	-0.50	1954-81 sales data
1985	Bishop and Yoo	USA	-0.45	Time-series aggregate data 1954-80
1985	Radfar	UK	-0.23 (SR) -0.39 (LR)	Quarterly aggregate sales data 1965-80
1988	Godfrey and Maynard	UK	-0.56	1956-84 aggregated sales data
1990	Chapman and Richardson	Papua New Guinea	-0.71 -0.50	Excise elasticity for cigarettes and for non-cigarette tobacco 1973-86
1993	Keeler, Hu, Barnett and Manning	California	-0.3 to -0.5 (SR) -0.5 to -0.6 (LR)	Monthly time-series consumption data, 1980-90
1994	Sung, Hu and Keeler	11 US states	-0.40 (SR) -0.48 (LR)	1967-90 panel data
1994	Reekie	SA	-0.877	1970-89 Time-series consumption data
1995	Tremblay and Tremblay	US	-0.4	Time-series 1955-1990
1996	Van Walbeek	SA	-0.32 (SR) -0.53 (LR) -0.66 (SR) -1.52 (LR)	1972-90 Tobacco Board data 1971-89 Reekie's data
1996	Economics of Tobacco Control Project	SA	-0.57	1970-95 Time-series consumption data
1997	Abedian, Van der Merwe & Annett	SA	-0.59 (SR) -0.69 (LR)	1970-95 Time-series consumption data

Table 4.3 shows that for most developing countries, and for South Africa, the estimates appear to be slightly higher, suggesting a greater sensitivity to prices than consumers in developed countries. Like the results from Papua New Guinea (Chapman & Richardson, 1990), it appears that the estimates in South Africa are more price elastic than in developed countries. This underscores the fact that in developing countries, excise taxes are a more potent weapon for governments to reduce consumption than other non-tax measures. The level of excise is an important and practical instrument for the control of consumption, particularly as consumption is most prevalent in the lower income population groups in South Africa.

4.2.2 The methodology

To examine the government's loss of revenue from not operating an optimal tax policy, the following simulation was performed :

$$\text{Max } R_t = Q_t \times \text{TAX}_t$$

$$\text{s.t. } Q_{Dt} = \alpha_1 Y_t + \alpha_2 P_t$$

where R is real tax revenue (in 1990 Rands), Q is the total quantity of cigarettes consumed, TAX is the total tax paid on cigarettes (including GST / VAT²) expressed in 1990 prices, Q_D is per capita cigarette consumption, Y is per capita disposable income, and P is the real retail price per cigarette (in 1990 Rands)³.

The maximisation problem implies the following assumptions :

1. Tax rates were maximised over the period. This assumption requires government to be able to perfectly forecast future consumption and income in period $t+1$ at time t .
2. The cigarette industry is able to pass the entire excise tax on to the consumer. Theory would suggest that the tax burden is shared between consumers of cigarettes, who have to pay more for each packet of cigarettes, and suppliers, who receive less for each packet of cigarettes. Traditional microeconomic analysis also tells us that firms cannot increase the retail price by more than the excise tax increase. However, many studies have found that because of the oligopoly structure of the industry, they are able to increase the retail price by more than the size of the tax increase (Barzel, 1976), (Sung, Hu & Keeler, 1994), (Barnett, Keeler & Hu, 1995). The simplifying assumption was however necessary, as it is not known by how much cigarette manufacturers in South Africa can increase the retail price and how much of the tax burden can be passed on to consumers.

4.3 The results

Using these assumptions, the optimisation was solved using -0.59 as a price estimate (Abedian, Van der Merwe & Annett, 1997). The results of the maximisation simulation are given in Table 4.4. Note that the results do not consider the effects that reduced consumption from an optimal taxation policy could have on production, and therefore on corporate tax receipts. Nor does it calculate the future savings in the health sector from lower costs incurred treating patients for health related illnesses.

² GST (goods and services tax) was introduced in 1978. It was replaced by VAT (value added tax) on 30 September 1991.

³ See Data sources for optimal tax simulation.

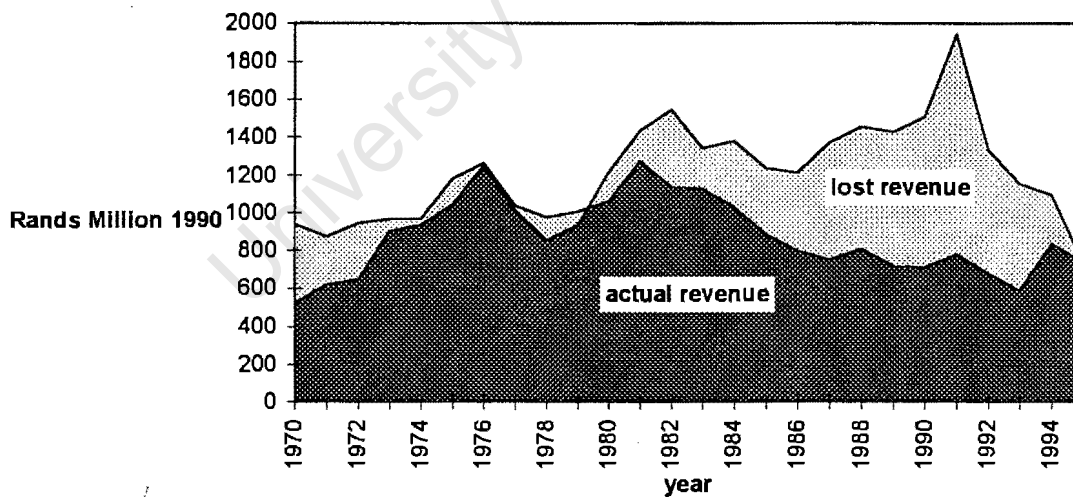
Table 4.4 : The impact of excise tax increases on consumption and revenue in South Africa : 1970 - 1995

Period	ΔQ	% change	ΔR	% change
1970 - 74	-5.304	-29.3	200	21.3
1975 - 79	-7.685	-33.4	372	34.0
1980 - 84	-12.044	-39.2	809	71.7
1985 - 89	-15.455	-43.6	1.176	148.2
1990 - 95	-15.819	-42.2	1.131	157.0

Note : ΔR is the change in real revenue measured in 1990 prices.

The simulation indicates that excise tax revenue could have been 157 percent higher in the first half of the 1990s. This translates into approximately 1.2 billion (1990 Rand) of additional receipts or 2 percent of total government revenue. If the tax revenue was used specifically for health expenditure, approximately 10 percent more funds on average could have been allocated to the health budget. The actual and simulated maximum real excise revenue in 1990 Rands, is shown in Figure 4.4.

Figure 4.4 : Actual and foregone real government excise revenue from cigarettes in South Africa : 1970 - 1995



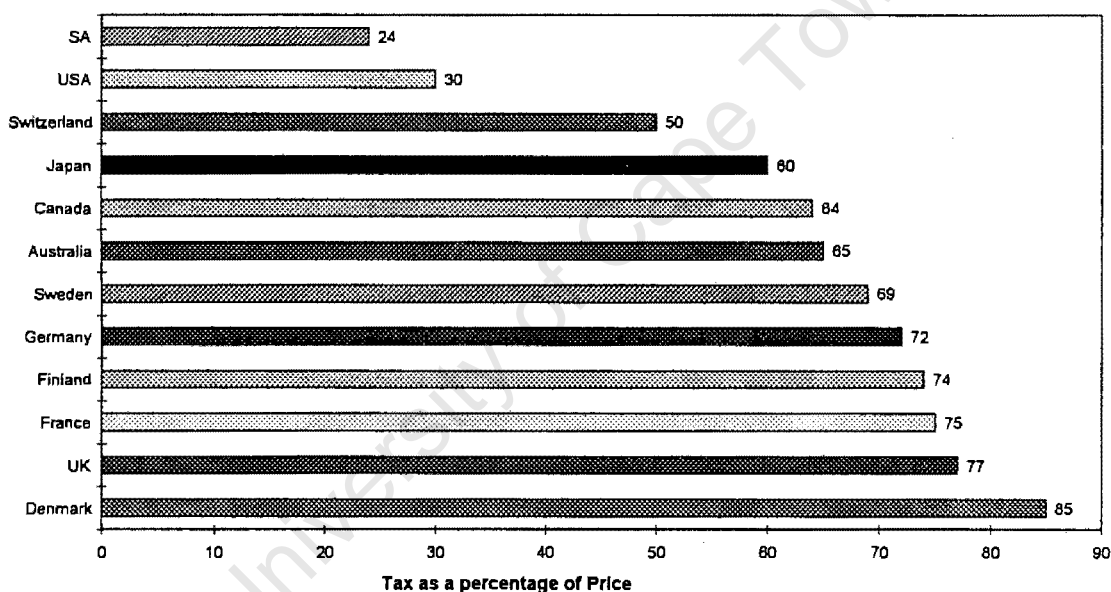
The trend highlights the increasing loss of government revenue over the 1980s reaching its maximum in 1990 and 1991. This suggests that the taxation objectives of revenue and deterrence have not been accomplished in South Africa over this period,

because excise tax rates have not kept pace with inflation, thus allowing real cigarette prices to decline⁴.

4.4 Conclusion

With regard to increases in excise taxes as a percentage of the price of cigarettes, South Africa still seems to have the potential to increase its duties. Figure 4.5 shows an international comparison of excise tax rates as a percentage of selling price on cigarettes for 1995.

Figure 4.5 : Tax as a percentage of the price of 20 cigarettes for selected countries, 1995



Source : World Health Organisation. *Tobacco Alert : The Tobacco Epidemic : A Global Public Health Emergency* May 1996, WHO: Geneva.

As shown in Figure 4.5, in 1995 excise tax as a percentage of price in South Africa was only 24 percent, which was much lower than many other countries. The government has increased the percentage of price that is tax, to 52 percent in the 1997 Budget Speech. This means that within the two year period 1995 to 1997, South Africa has made a significant increase with regard to excise taxes. Considering the historical decline in the real value of taxes, however, this new taxation policy seems

⁴ Again it could be argued that a portion of the fall in retail price is the result of efficiency gains.

long overdue. Government has been practising a non-optimal tax policy for very long, and the objective of revenue generation has not been achieved historically.

It could be argued that there still exists scope to increase excise taxes above the current 52 percent of selling price. Historically, any increase in excise tax has led to an increase in revenue, which may seem obvious, but it suggests that a maximum tax rate has not yet been achieved. Because of the inelasticity of demand, the tax rate can still be increased, particularly in terms of the government's revenue objective. At no point in the last 25 years has a high tax led to a fall in consumption which has resulted in revenues falling, not even in the 1970s when tax rates were around 45 percent. In other words, the optimal tax may very well be above the current 52 percent. The UK has a price elasticity of approximately -0.5 and their tax rate is at 77 percent. This would suggest that there is scope in South Africa to increase taxes to the extent that the industry still remains viable or profitable, and maximum revenues can be collected.

Van Walbeek (1996) reached a similar conclusion suggesting that increasing the excise rate to at least 110 percent of the producer price of tobacco, would increase cigarette excise revenues to at least double those currently being generated.

This would suggest that in terms of the government's objectives to maximise revenue and contain consumption, there is still scope to increase tax rates. This conclusion suggests that the government can achieve the objectives of good public health and revenue generation, through an optimal taxation policy on the tobacco industry which would suggest setting the tax level at one higher than the current 52 percent.

Whether the third objective of employment maintenance (not weakening the economy) is achievable, will be examined in the following chapter.

CHAPTER 5

The implications of rising tobacco taxes for employment in South Africa

This chapter assesses the economic significance, in terms of jobs, of the tobacco industry to the South African economy. If government were to pursue its objectives of revenue maximisation and public health through an optimal tobacco taxation policy that would lead to increased excise duties, as discussed in Chapter 4, what would the result be on the third objective of employment maintenance? The chapter addresses the question of employment and output outcomes that are associated with a decline in tobacco consumption through the use of stronger tobacco taxation policies. The question which was posed at a conceptual level in Chapter 3, is now examined empirically : "What would happen if the 7.6 million smokers in South Africa in 1995 decided not to spend their money on cigarettes, but instead spent their money on other goods and services in the economy?" This would happen primarily through the taxation component of the pricing effect of cigarettes, making it more expensive for smokers to pursue their habit. Other regulatory effects may play a role too in people's decision to cut down or quit (bans on smoking in public places, regulations on tobacco advertising and sponsorship, and so on), however excise taxes are considered more important.

The methodology used in this study makes use of input-output tables and a Social Accounting Matrix, and examines four different potential scenarios of employment effects, following four different expenditure scenarios. Results of the scenarios are discussed and policy implications drawn.

5.1 The methodology of this study

The analysis uses input-output tables that have been used for many years in applications that study inter-industry interactions and multiplier effects. These input-output tables have subsequently been extended to include other aspects of the social economy in a much larger matrix structure which has been labelled the Social

Accounting Matrix (SAM) (Roukens de Lange & Van Seventer, 1990). The SAM is therefore an extension of the input-output analysis which allows one to examine the interactive effects and sensitivities within the economy, looking at the impact of social and economic policies and trends.

This study uses the Development Bank of Southern Africa's 1995 SAM¹ which allows the full input-output spectrum of 104 sectors² to be identified. Appendix A details the derivation of this SAM and the general shortcomings of the use of this methodology.

The study uses a static model which looks at the effect of a change in one industry on the rest of the economy at a particular point in time. SAMs, like input-output tables have certain limitations in terms of linearity. They provide a quantitative, comparative static 'snapshot' of the economy and do not provide a dynamic look at the socio-economic changes over time. The study is therefore a short-run 'impact period' evaluation of the implications of a change in smoking behaviour on an economy-wide basis.

Even though the input-output methodology has certain limitations, these can be overcome to a certain extent by extending the input-output methodology to that of the social accounting matrix. SAM models are intuitively appealing and understandable. In the spirit that the assumptions made in the model are realistic simplifications, one can arrive at suggestive conclusions that will facilitate policy debate. The SAM model is therefore best suited to examine economic changes when data is introduced to allow for "what if" experiments to be carried out (Roukens de Lange *et al*, 1990). In the context of this paper, the SAM model was thus seen as a pragmatic and appropriate approach to the research question.

¹ The data sources for this SAM are the South African Reserve Bank (SARB) *Quarterly Bulletin* and unpublished data, the Central Statistical Services (CSS), unpublished data, and the CSS October Household Survey. The household expenditure patterns were drawn from income and expenditure surveys undertaken by CSS and the Bureau for Market Research (BMR) in 1994.

² The structure of the production function of each production activity, in which intermediate and primary inputs are combined to produce a unit of output, is derived from the censuses of production activities, such as those for the mining and the manufacturing sectors.

Five international studies that have attempted to answer the question of falling tobacco consumption and employment by comparing the actual level of employment in their different economies with the predicted level of employment when tobacco expenditure is reduced, are reviewed in Appendix B. All these studies have assumed that consumers who stop smoking, reallocate their tobacco expenditure to other goods and services in the economy. Falling employment in the tobacco industry will thus be offset by increases in employment in other industries, depending on how labour-intensive these other industries are relative to the tobacco industry. This is the first logical underpinning of all the research on this topic. Money that is released in the economy through reduced tobacco consumption, will be spent in some other way that may induce job creation. This assumption also underlies this study.

In 1995, 30.5 billion cigarettes were consumed in South Africa³. That is approximately equal to 1520 million packets of 20 cigarettes during the year. At R3.50 per pack of cigarettes (average retail price for 1995), this would suggest that South Africans spent R5009 million on cigarette consumption in 1995.

However many consumers in South Africa do not buy their cigarettes from retail outlets and often buy single cigarettes from vendors. As a result there may be a large informal sector purchasing and distributing cigarettes, of which there is not very accurate data. The SAM does not measure informal activity in South Africa and as a result underestimates much of the activity in terms of the distribution and sale of tobacco products. This study has however used the SAM data as it results in a much more conservative estimate of the employment effects and introduces a conservative bias to the results. A larger sum of money that is injected into labour-intensive industries will amplify employment creation prospects.

The SAM data estimates private consumption expenditure on tobacco products at R1606 million, and together with government consumption expenditure (which is negligible), capital investment expenditure, and exports, final demand is R1800 million.

³ See Data sources for optimal tax simulation.

Table 5.1 shows private consumption expenditure by households on tobacco products in South Africa, per income category which are drawn from the SAM.

Table 5.1 : Average household expenditure on tobacco products in South Africa per income category, Rands million, 1995

	White	Coloured	Asian	Black	Total Household Expenditure
Q1	63.59	16.36	6.64	28.82	115.41
Q2	75.92	25.81	9.00	130.92	241.65
Q3	88.34	30.22	11.32	150.13	280.01
Q4	110.63	40.35	13.80	186.28	351.06
Q5	141.13	56.41	17.71	402.72	617.97
	479.61	169.15	58.47	898.87	1606.10

Source : Social Accounting Matrix (SAM), Development Bank Southern Africa, 1995

Q1 is lowest average household income

Q5 is highest average household income

If this money was not spent on cigarettes, it would then be reallocated in the economy towards other expenditures which would result in alternative employment outcomes. For example, in South Africa, a smoker who smoked 20 cigarettes a day at a price of R3.50 in 1995, would have an extra R1280 per year to spend. It is extremely unlikely that this will not be spent in a way that generates some jobs.

In addition, because most of the smokers in South Africa are in the lower income population groups, it is quite probable that a switch in expenditure will be towards locally produced indigenous goods and services. Because the import-content of lower income groups' expenditure is generally lower, there is a much higher propensity to consume local goods and services. The additional expenditure will therefore not leak from the system, but will remain in South Africa and generate additional employment opportunities. The money will not be "exported", but will be recycled within the economy generating greater local economic activity. As shown in Table 5.1, more than half the total expenditure on tobacco products is by black households.

The methodology of this study is based on the conventional input-output assumption that economic activity is demand-determined, with supply reacting entirely passively. Alternative model specifications could, of course, produce different results. For the

purposes of the present study, the basic counterfactual assumption is that, in 1995, South Africans did not undertake any expenditure at all on cigarettes. This is obviously an extreme case; however, since the models used are essentially linear, the implications of specified reductions in South African smoking can be approximately interpolated from the results. The matrix multiplications used in the analysis are explained in Appendix A.

This means that the R1800 million is freed up by the cessation of smoking for expenditure on other goods and services. There is no way of knowing precisely on which goods and services this expenditure is made. Two different spending patterns were thus tested.

Firstly, it was assumed that the spending patterns that are adopted are of the average consumer, in other words the allocation of the consumer's expenditure across industries is in a pattern similar to that of the South African input-output tables. The one difference is that no expenditure is allocated to the sector containing tobacco manufacture.

Secondly, it was assumed that released tobacco expenditure may be spent in a way that resembles the "recent stoppers" from the UK study by Buck, Godfrey, Raw and Sutton (1995). Their study assumed that with a marginal increase in income, in the short term, expenditure on essential items such as housing would change very little, while expenditure on luxury items, recreational goods, transport, communication and educational services would change more⁴.

Table 5.2 shows the average household expenditures in the economy for South Africa as well as for the UK study (Buck *et al*, 1995) and shows that barring two functional categories, alcohol and household goods and services, the average expenditure patterns of the two groups are very similar. It was thus assumed reasonable to test, as an alternative to the average consumption expenditure pattern, one that resembled more closely those of the "recent stoppers", where relatively more expenditure went

⁴ For a review of this study, see Appendix B.

towards clothing and footwear, transport and communication, recreation, entertainment and education, and other goods and services.

Table 5.2 : A comparison of UK spending patterns of smoking, non-smoking, former-smoking, and recent stopper households, with average SA spending patterns

Functional category	Percentage of net household expenditure (excluding tobacco)				
	South Africa	United Kingdom study			
	Average spending	Smokers	Non-smokers	Former smokers	Recent stoppers
Food	22.8	21.1	20.3	21.0	18.6
Alcoholic drink	3.8*	6.2	3.5	3.7	4.3
Clothing and footwear	5.9	6.7	6.3	6.1	7.8
Housing ¹	21.0	22.0	25.6	25.1	19.1
Fuel and power ²	7.1	7.4	7.2	6.9	5.3
Household goods and services ³	8.4*	5.7	5.7	5.8	6.5
Transport and communication ⁴	12.2	12.4	11.9	11.8	14.8
Recreation, entertainment and education ⁵	8.6	9.4	10.0	10.3	12.5
Other goods and services ⁶	10.4	9.3	9.5	9.2	11.1

Source : 1990 Family Expenditure Survey for UK in Buck *et al* (1995)

Development Bank of Southern Africa (SAM) for South Africa, based on 1994 Bureau for Market Research (BMR) Expenditure Survey

* Indicates that percentage of total expenditure in the SA functional category is significantly different from the percentage spent by smoking households at the 95% level in the UK study.

1 Includes housing, water supply and real estate 2 Includes electricity, gas, steam, and other fuels 3 Includes household furniture, hardware, household appliances and fixtures, and household insurance 4 Includes cars, air travel, transport, postal and telecommunications 5 Includes durable goods, pets, books, tuition costs 6 Includes medicines, toiletries, jewellery, meals and accommodation, life insurance and bank charges

This study is therefore a short-run impact study and does not take account of the long-run dynamic changes that take place over time such as a decline in government expenditure on the treatment of smoking-related diseases. All health care implications of a reduction in smoking are not addressed in this study.

If one were to assume that a portion of the reallocated resources would go to saving rather than spending, there could still be net employment gains. If the consumption expenditure on tobacco were saved, this would presumably also generate jobs in the savings industry, assuming people do not keep their additional savings under their

mattresses. Most of the international studies as reviewed in Appendix B, have tested for this assumption through sensitivity analyses which test different levels of savings.

This study assumes that very little of the additional money would be saved as this appears to be most consistent with South African savings behaviour. South Africa typically has a low savings rate out of personal disposable income at 2% in 1995⁵. It is thus assumed that the additional money which is freed up in the economy by not smoking, will not all be saved. However in the sensitivity analysis this assumption was challenged and a proportion of the released tobacco money was saved (or hoarded) instead. The economy thus shrunk by the amount of the saving which was 15 percent as shown in Appendix A. This is essentially an unrealistic assumption, as the saved money will not disappear from the economy. This therefore introduces a conservative bias to the results to test for the qualitative consistency of the findings.

Finally, if we assume that the cessation of smoking was achieved not by raising excise taxes, but by other regulatory actions, then consumers would have the additional money to spend on goods and services besides cigarettes. So long as the money is not all saved, which is a reasonable assumption, then demand for other products will rise accordingly. The loss of jobs in tobacco products will then to a degree be counterbalanced by new jobs created in the industries supplying new consumer demands.

Alternatively, if we assume that the cessation of smoking is brought about by excise tax increases, then new jobs will also be created so long as the government spends the additional tax revenues. For the number of new jobs, to offset the lost jobs, consumers and governments must spend their extra income instead of saving it or using it for deficit reduction. There is then every reason to believe that the economy can respond to the decline in cigarette consumption by generating at least as many jobs in other industries as were lost in tobacco production.

⁵ South African Reserve Bank *Quarterly Bulletin*, 1995

All international studies examining tobacco and jobs, as reviewed in Appendix B, have made certain assumptions to test different ways in which governments may react to the loss in revenue from tobacco control policies that reduce consumption. Usually the studies assume that government will either react by decreasing government expenditure, which would result in government job losses, or by increasing taxes from other goods and services. This would naturally occur as consumer expenditure is switched to other goods and more taxes are collected on these items. This is probably the more realistic response for most governments.

This analysis assumes that a combination of increased excise tax and other regulations causes the decline in consumption, however, as mentioned, the taxation policy is believed to play the most important part. The analysis is therefore more complex, in that reduced consumption will mean fewer tax receipts, but at a higher rate. However, because of the inelasticity of demand, it is likely that in the short run revenue will increase. The government expenditure would be able to generate employment by spending on public services. In this analysis, however, the conservative approach was taken and government was assumed to respond to reduced tobacco taxes, by both being able to reduce expenditure and thus employment, and also seeking alternative tax bases to compensate for its revenue losses. An increase or decrease in tax revenue would be matched by an increase or decrease in government spending. Government would act to keep its deficit at more or less the same limit. In addition, through consumer expenditure switches alternative goods and services would generate tax receipts.

5.2 Results of the input-output analysis on employment

5.2.1 Multipliers

The first part of the analysis was to compute output, income, value added and employment multipliers for the South African economy, to see how the tobacco industry compares to other sectors in terms of its ability to generate employment and income. The computational formulae of the multipliers are shown in Appendix A and the results in Table 5.3. The rank of the top six multipliers in each category are in parenthesis.

Table 5.3 : Output, income, value added and employment multipliers for the South African economy, 21 sectors aggregated, 1995

Industry / Sector	Output	Income	Income	Val Add	Val Add	Employ	Employ
	Mult	Mult 1	Mult 2	Mult 1	Mult 2	Mult 1	Mult 2
Fish, Forest, Hunt, Farming ¹	1.86	0.25	0.47	0.80	1.30	0.50 (2)	1.05 (2)
Field Crops ²	2.27 (3)	0.19	0.21	0.33	0.39	0.08	0.35
Mining ³	1.63	0.48 (5)	0.56	0.96 (4)	1.15	0.21 (3)	0.39
Food, Drink ⁴	2.32 (2)	0.31	0.77 (3)	0.63	1.69 (3)	0.07	0.14
Tobacco	2.59 (1)	0.09	0.10	0.16	0.19	0.02	0.15
Clothing ⁵	1.86	0.41	0.52	0.62	0.89	0.19 (6)	0.53 (5)
Furniture ⁶	1.89	0.38	0.41	0.52	0.61	0.19	0.76 (3)
Paper ⁷	1.95	0.39	0.52	0.80	1.10	0.08	0.11
Chemicals ⁸	1.95	0.39	0.54	0.81	1.15	0.07	0.12
Petrol, Rubber, Plastic ⁹	1.77	0.35	0.54	0.73	1.16	0.05	0.09
Building Materials ¹⁰	1.87	0.39	0.44	0.72	0.84	0.08	0.18
Machinery, Equipment ¹¹	1.86	0.52 (3)	0.69 (6)	0.90	1.28	0.12	0.22
Light Manufacture ¹²	1.88	0.17	0.17	0.30	0.31	0.04	0.22
Water, Electricity ¹³	1.86	0.44	0.62	1.17 (3)	1.58 (4)	0.08	0.12
Construction ¹⁴	2.07 (5)	0.36	0.39	0.52	0.61	0.13	0.40 (6)
Wholesale, Retail ¹⁵	1.69	0.74 (2)	1.51 (1)	1.31 (2)	3.07 (1)	0.19 (5)	0.26
Accommodation ¹⁶	2.22 (4)	0.26	0.33	0.40	0.55	0.05	0.23
Transport ¹⁷	1.73	0.50 (4)	0.74 (4)	0.94 (5)	1.48 (5)	0.05	0.10
Communication	1.41	0.47	0.54	0.93 (6)	1.10	0.19 (4)	0.55 (4)
Business Services ¹⁸	1.55	0.78 (1)	1.34 (2)	1.57 (1)	2.92 (2)	0.07	0.07
Government, Other Services ¹⁹	2.07 (6)	0.47 (6)	0.73 (5)	0.82	1.42 (6)	0.98 (1)	1.90 (1)

1 Includes dairy, fibres, fruit, vegetables, maize, wheat, poultry, sugar, forestry, fishing 2 Includes beans, peas, sorghum, lentils, peanuts, tea, and tobacco 3 Includes coal, diamond, gold and other mining 4 Includes meat, dairy, bakery, and confectionery products, canning, as well as wine, malt, liquors and soft drinks 5 Includes textile goods, knitting, carpets and cordage, tanneries and leather goods and footwear 6 Includes wood products and furniture 7 Includes paper, pulp, printing and publishing 8 Includes chemicals, paints, resins, fertilisers, cosmetic and pharmaceutical preparations 9 Includes petroleum refineries, tyres, rubber, plastic products 10 Includes bricks, tiles, glass, cement, iron, steel and metal products 11 Includes engines, turbines, industrial, electrical, office, computing, communication and transport machinery and equipment 12 Includes jewellery and other light manufacturing 13 Includes water, electricity, gas and steam supply 14 Includes building construction and civil engineering 15 Includes wholesale, retail and motor trade 16 Includes catering and accommodation services 17 Includes transport and storage 18 Includes financial, insurance, real estate and business services 19 Includes education and health services and all other profit and non-profit services

The Type 1 multiplier in each case, is referred to as a “simple multiplier” since it takes into account only the direct and indirect changes in, for example income, resulting from a 1 Rand increase in the output of all industries in the processing sectors. The Type 2 multiplier is a more realistic measure which takes into account the direct and indirect effects indicated by the input-output model as well as the induced changes in income resulting from increased consumer spending. They show the chain reaction of inter-industry reactions in income, output, and then again the households’ consumer expenditures. The Type 2 multiplier is therefore always larger than the Type 1 multiplier because it includes the effects of the household (Miernyk, 1957).

The multipliers show that different amounts of income, value added⁶ and employment are generated by different sectors of the economy even if we assume that each sector expands its output by the same amount. It is generally true to say that the income effects of the capital-intensive industry are larger than those of the labour-intensive industry. An industry that uses a great deal of labour but not many other inputs will probably have fewer interactions with other industries than one that utilises a considerable amount of capital equipment.

The results suggest that the tobacco manufacturing industry does not have very high multiplier effects in the economy in terms of income, value added and employment, following a 1 Rand injection into the output of all sectors in the economy. This suggests that income and employment generation are not as strong when compared to other industries in the economy. The output multiplier is however high suggesting that there are a few large inputs into the manufacture of cigarettes. These are tobacco farming and paper and printing.

The tobacco industry buys little besides packaging, advertising and incidental goods and services from other industries. Besides leaf tobacco purchased from agriculture, the biggest expense is for packaging, and for advertising and promotion. Most of job creation from tobacco production is in these sectors, and for sectors in the distribution chain such as wholesale and retail. Packing materials were the only important

⁶ Value added includes wages (income), gross operating surplus (profits), government indirect taxes and imports.

manufacturing goods purchased, and they amounted to 1.4 percent of the utilisation of packaging by South African businesses. Other purchases, mainly services, amounted to less than 0.1 percent of the utilisation of these items by South African business. The decline of the tobacco industry, therefore, besides tobacco farming, does not have severe ripple effects on the rest of the economy.

5.2.2 Employment outcomes

Table 5.4 shows the results of the employment outcomes when the tobacco industry is completely removed. These estimates are derived with the logically impossible assumption that when tobacco expenditures cease, the same money is neither spent elsewhere nor saved, the money simply disappears. This does not therefore indicate potential job losses from the economy. It simply shows the magnitude of tobacco-related employment in South Africa. Table 5.4 should therefore be interpreted realistically as a measure of the number of domestic jobs that are associated with the manufacture, distribution and sale of tobacco products.

Table 5.4 : Gross employment outcomes of reduced tobacco consumption across 21 sectors, 1995

Functional Category	Eliminate tobacco industry - money not reallocated in the economy
Fish, Forest, Hunt, Farming	3118
Field Crops	-2531
Mining	-439
Food, Drinks	-360
Tobacco	-2924
Clothing	-1245
Furniture	-732
Paper	-1847
Chemicals	-408
Petrol, Rubber, Plastic	-211
Build Materials	-200
Machinery, Equipment	-300
Light Manufacture	-217
Water, Electricity	-138
Construction	-455
Wholesale, Retail	-231
Accommodation	-234
Transport	-186
Communication	-602
Business Services	-71
Government, Other Services	-2671
Totals	-12884

The industry's estimate of jobs associated with the production and distribution of tobacco products for 1995 was 34584⁷. The estimate in this study is clearly much lower. From the Central Statistical Service information, it would appear that the lower estimate is more accurate.

There were 663 tobacco farmers in 1995. The average farming unit, employs approximately 11 full-time workers⁸ on it. If one includes casual or seasonal workers,

⁷ Tobacco Board *Annual Report*, 1995

⁸ Central Statistical Service (CSS) *Summary Agricultural Statistics*, 1995

the average rises to approximately 17 workers. Usually tobacco farmers rotate crops, which means these workers are not committed to farming tobacco only. However, if we were to assume that these workers were wholly dedicated to farming only tobacco, that would suggest that 7293 regular workers were employed and at peak times 11271 workers were employed in the primary sector. If we convert the seasonal workers to full-time equivalents, then approximately 10873 people were employed in the primary sector in total.

In addition there were 6 producer co-operatives and 2924 people employed in manufacturing. Therefore with the production of leaf tobacco and cigarettes there were on average approximately 13000 people employed. The uncertainty in the overall estimate comes in when estimating the employment in the distribution of tobacco products.

Estimates of jobs associated with the wholesale and retail distribution of tobacco are inherently difficult to make, because most tobacco products are sold in supermarkets or cafés rather than in dedicated tobacco shops. There are few employees whose jobs are exclusively concerned with selling tobacco. Hence, estimates of the number of retail jobs “attributable to” tobacco are usually made by allocating the total employment in retailing to various products in proportion to their share of the total retail mark-up.

It is not clear what, if anything, a number computed in this way might mean. The number does not mean that the disappearance of tobacco sales would reduce retail employment by this amount. It is likely that retail and wholesale employment is largely independent of tobacco sales since selling cigarettes absorbs only a small fraction of the time of most retail employees. It is therefore most unlikely that 231 jobs in wholesale and retail (as given in Table 5.4) will be lost, if any, if the tobacco industry was to disappear.

Similarly, with jobs in advertising, 8 of the top advertising agencies in South Africa have tobacco companies as a source of income and employment (Yach & Saloojee,

1994). Firstly, less than 5 percent of the total advertising expenditure in South Africa was from tobacco companies in 1993 (cinema, radio, print, and outdoor) and with further regulations on advertising this will likely be much lower today. Secondly, most of these agencies also represent major pharmaceutical companies and the Department of Health that are promoting products and services that are health-related. International experiences have shown that this conflict of interest can lead to the curtailment of campaigns, often on the side of the tobacco industry (Chester, 1985). Tobacco advertising budgets over the last few years have therefore slowly been reduced. In addition, with overseas magazines entering the market using no tobacco advertising at all there has been more pressure on local magazines to follow suit⁹. Thirdly, the effect of this reduced expenditure is spread across several agencies. Therefore, the impact on job loss over a slow period of transition to an advertising expenditure that is less dependent on tobacco, will not be much, particularly as expenditure is “replaced”.

In addition, if increased excise taxes were the cause of the decline of the tobacco industry, it is not clear that as many jobs as indicated will be lost in government, if any at all. This suggests that the lower overall employment estimate of jobs associated with the industry as given in Table 5.4, is more accurate. In 1990, the industry estimated that 60000 jobs were attributable to the production and distribution of its products. In 1994, the estimate fell to 52000 and now stands at 34584¹⁰. It would appear then that the industry has over the past few years consistently overestimated its contribution in terms of employment.

Table 5.5 shows the net employment effects when the expenditure in the economy is switched from tobacco to other goods and does not simply disappear. Four different scenarios are given where the economy is kept at the same size and the money reallocated to other industries. In Scenario 1 and 2 consumers spend their money like the average consumer in the economy. Scenario 1 is where only final demand is removed and Scenario 2 is where intermediate demand is also removed. This means

⁹ For example, a South African magazine “Men’s Health” has recently been launched using no tobacco advertising.

¹⁰ Tobacco Board *Annual Reports*, 1990 - 1995

that inter-industry reallocations also occur. Scenario 3 and 4 show the employment outcomes when expenditure patterns are like those of “recent stoppers” in Buck *et al* (1995). A relatively larger share of the money is thus spent on clothing, education, recreation, entertainment, communication, transport, and other services, and relatively less on housing, and durable goods. In Scenario 3 final demand is removed and reallocated according to this new expenditure pattern, and in Scenario 4 the current rate of decline in tobacco consumption, 11 percent, was doubled¹¹. In other words, there was an acceleration in the process of smoking cessation and that money was spent according to the “recent stoppers” spending patterns.

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¹¹ South African cigarette consumption has fallen on average 11 percent per annum between 1991 and 1995.

Table 5.5 : Net employment outcomes for 4 scenarios of reduced tobacco consumption, 1995 (All economic activities grouped to 21 sectors*)

Functional Category	Money spent as average consumer		Money spent like recent stoppers	
	Scenario 1 -	Scenario 2 -	Scenario 3 -	Scenario 4 -
	Remove Final Demand	Remove Final & Intermediate Demand	Remove Final Demand	Double current decline of tobacco consumption
Fish, Forest, Hunt, Farming	6438	5261	2245	-147
Field Crops	-2992	123	-2802	-931
Mining	2252	2707	-767	-922
Food, Drinks	627	866	-406	-522
Tobacco	-2876	-2924	-2875	-650
Clothing	817	1896	9610	150
Furniture	384	958	407	-1208
Paper	-1827	737	-1630	-1038
Chemicals	122	682	-327	-366
Petrol, Rubber, Plastic	243	538	-26	-209
Build Materials	731	889	-326	-401
Machinery, Equipment	1159	1830	-318	-464
Light Manufacture	90	96	-330	-334
Water, Electricity	635	964	-35	-247
Construction	1232	1387	-620	-806
Wholesale, Retail	1028	3200	-437	-604
Accommodation	142	170	-284	-342
Transport	316	616	2322	230
Communication	994	1397	690	1174
Business Services	731	1168	671	121
Government, Other Services	-1030	11814	45474	11054
Totals	9218	34377	50236	3536

* SAM has a total of 104 economic activities. These have been grouped into 21 categories.

It can be seen that, in the scenarios as specified, South Africa as a whole would have gained net increases in output and employment if smokers quit their habit completely or even partially during 1995. In Scenario 1 employment would be lost in those sectors

immediately associated with cigarette production; tobacco manufacturing, farming and paper and printing. Jobs would also be lost in government as a result of the loss in government revenue. However there would be a net gain in employment in all other sectors. Scenario 2 shows an employment loss only in tobacco manufacturing, as inter-industry reallocation takes place. In Scenario 3 marginal employment losses occur across all sectors as a large expenditure shift takes place towards more labour intensive service sectors. The major employment losses are again those most closely linked to the tobacco manufacturing industry; tobacco farming, and paper and printing. However these losses are again offset by very large increases in other industries, in particular service industries which are labour intensive. In Scenario 4, which would most closely resemble a decline in tobacco consumption in the short-run in South Africa, losses occur across all sectors again, except for those where "recent stopper" expenditure is switched to. These include clothing, transport, and communication, as well as business, recreation, education and other services. The gains here again offset losses in all other sectors. The results for Scenarios 1 to 4 coincide with the results from other international studies on tobacco and jobs¹².

If expenditure occurs as per the average consumer, net gains in activity would be realised in every broad economic sector, which suggests that, in general terms, the required degree of structural re-adjustment would be limited. For example, it seems probable that most shops losing retail margin on cigarettes would enjoy net increases in income through greater sales of other goods and services. It is likely that specialist tobacconists would lose income. One can therefore not assume that structural re-adjustment effects would be zero. There will be costs involved in making a transition to an economy less dependent on tobacco. Jobs will be lost, at least temporarily and the disruption for the newly unemployed would constitute a genuine cost. Because the transitional costs will in reality take place over a longer time and not instantaneously as represented in this study, they will be less. If however expenditure occurs as per "recent stoppers" where people who quit smoking exhibit different expenditure

¹² All five studies reviewed in Appendix B unequivocally came to the same conclusion that a reduction in tobacco consumption and sales, through increased tobacco control measures such as increased excise taxes, lead to increased employment. In each case through expenditure switching from tobacco to other goods and services, there was a net gain in employment in the respective economies.

patterns, there would be larger structural adjustments in the economy, but there would also be larger net gains.

Realisation of the net job gains requires that South Africa has sufficient spare capacity to satisfy the additional demands. Given that even 50 000 jobs is less than 2% of 1995 South African (official) unemployment, this does not seem an unreasonable assumption.

5.3 Conclusion

This chapter was concerned with the multiplier effects arising from a change in personal consumption behaviour away from cigarettes and in favour of alternative goods and services. This particular chapter attempted to estimate the effects on the South African economy as a whole in 1995 on the hypothetical premise that the 7.6 million smoking citizens stopped (or more generally, reduced) spending on cigarettes during that year.

The results presented, supported by the scenarios, indicate unequivocally that a cessation of cigarette purchasing would lead to significant increases in South African output and employment.

The inescapable conclusion is that stronger tobacco control policies such as increased excise taxes, do not jeopardise employment as the industry argues. In addition to the obvious health benefits from using stronger tobacco control policies that impact on tobacco cessation, there are also economic and employment benefits.

The political effects however, of the employment redistribution from tobacco to non-tobacco-related jobs differ considerably from the economic effects. Many of the tobacco-sector job losses are identifiable, while the larger number of new non-tobacco jobs, spread throughout the economy, are not so readily associated with specific individuals. This explains the strong constituency for the preservation of tobacco industry jobs and the absence of a constituency for the lobbying of the new employment that results when tobacco spending declines.

CHAPTER 6

Conclusions : The economic implications of raising tobacco taxes

This study has examined the economic effects of taxing the tobacco industry. Each side of the debate, in the battle for the hearts and minds of the public, has its economic argument concerning tobacco. The tobacco industry's argument emphasises its contribution to income, employment, and tax revenues. The anti-tobacco community's argument emphasises the social costs of tobacco use. The arguments are used to persuade relevant parties (in particular government) that the demise of tobacco use would be an economic catastrophe (pro-tobacco) or a major economic benefit (anti-tobacco). This is suggested by the anti-tobacco community's emphasis on tobacco-related health care as a "cost", while the industry would label this a "benefit", after all, it is an economic activity that produces jobs, incomes, and tax revenues.

While each argument contains some truth, the intended implication is questionable in both cases. Ultimately, the economic implications of tobacco control measures that lead to a reduced consumption of tobacco, are neither as dire as the tobacco industry implies nor as "profitable" as some of the anti-tobacco community believe. The anti-tobacco analysts estimates of the social costs of smoking, are generally flawed with omissions and inaccuracies and do not consider several of the cost "savings" that smokers engender to society through their premature mortality and excess morbidity. Insurance premiums, pension plans, and long-term health care expenditure flows are seldom considered in anti-tobacco arguments. Similarly, industry arguments concerning tobacco control measures, in particular, increased excise taxes, have been shown in this study to be equally flawed.

The message from the tobacco industry is that, regulatory measures restricting tobacco use, or increased taxes resulting in reduced consumption, would have dramatic adverse economic consequences. The demise of tobacco consumption would wreak havoc with

the economy by putting approximately 34584 people¹ out of work in South Africa, diminishing gross national product, and depriving government of valuable tax revenues.

The industry's argument however has fundamental flaws, in that it overstates the economic importance of the tobacco industry and simultaneously understates tobacco's contribution to increased illness, health costs and mortality.

As argued in this study, the size of the tobacco's employment has been greatly overstated. If all people related to the production and distribution of cigarettes were to lose their jobs instantaneously, this study estimates it would be closer to 15000 people, if that. In relation to the economy as a whole, the employment in the tobacco industry is very small. In addition, the industry's argument relating to the loss of government revenue with a fall in tobacco consumption, is ironically misguided when the source of the fall in consumption, has come from increased tobacco taxes. As this study has shown, tobacco taxes play the greater role in falling demand when compared to advertising, and other regulations. If tobacco taxes increased to an optimal level, as suggested in this study, government would be able to extract a maximum revenue to its coffers and falling consumption would not contribute to a loss in revenue as argued by the industry.

Furthermore, the main argument given in this study has been that, the industry dramatically overstates the negative economic effects of tobacco taxes and other regulations. Jobs and incomes produced by tobacco-related incomes are not irreplaceable. Without the tobacco industry, the expenditures on, and resources devoted to, the production of tobacco products would simply be shifted elsewhere in the economy. That is, if consumers were faced with no available tobacco products, they would reallocate their spending to other goods and services. This reallocated spending would generate additional business opportunities in other sectors of the economy along with the associated employment and incomes.

¹ Estimate of jobs associated with the production and distribution of tobacco in South Africa in 1995 by the Tobacco Board.

This study has shown that, except for transitional problems and differential industry levels of productivity, the net economic results from this expenditure switch are positive.

Through the use of input-output methodology, the results of this study (see Table 5.5) suggest that a reduction in residents' cigarette purchasing would lead to a net increase in economic activity in the following ways :

1. Between 9000 and 34000 jobs would be created if cigarette purchasing completely ceased in 1995 and consumers spent their money as average consumers do.
2. 50000 jobs would be created if cigarette purchasing completely ceased in 1995 and the money was spent in a way that resembles ex-smoker's expenditure patterns.
3. 3500 jobs would be created if the current rate of decline in cigarette consumption doubled in 1995.

The end of tobacco use would not throw thousands of South Africans out of work and undermine the economy, contrary to the image the industry wishes to create. Tobacco control policies, in particular the operation of optimal taxes on tobacco, can therefore increase employment at the same time that they improve the public's health.

Reductions in tobacco use will however produce real economic costs which reflect transitional problems, the costs of economic dislocation during the transition from tobacco-related to other economic activities. While these costs would be significant, particularly to tobacco farmers and manufacturing employees, they would not be nearly as significant as the industry would have one believe. In addition, as argued in this paper, the transitional costs toward a lower-consuming society are already occurring. Much of the transition has been pre-empted by the industry, through introductions of cost rationalisation programmes. For farmers, the gradualness of the transition would probably mean that "fewer of the children of today's tobacco farming families would grow up to be tobacco farmers," (Warner, 1987, pg. 2083) and not that thousands of current tobacco farmers would become instantly unemployed.

In describing the economic benefits of tobacco, the industry often stresses the R1.3 billion (1995) tax revenues from tobacco products². Taxes on tobacco-related employment are irrelevant for the reason given previously, such employment would be replaced following the demise of tobacco use, and hence so would employment-based tax revenues. As argued in this paper, loss of tobacco excise taxes associated with the fall in tobacco use would require government to find alternative revenues. While this paper has argued that an optimal taxation on tobacco would be able to extract maximum revenue for government, it is not sure at what point an increased tax may result in a deterrent effect, which will result in a decline in consumption and hence revenues. This paper has argued that because of the South African price inelasticity of approximately -0.6, the optimal taxation point is most probably above the current 52 percent of retail price. It is a moot point as to how high the excise tax should go exactly, but it is conceivable that up to a tax level still well above 52 percent, revenue generation will increase and beyond this (higher) tax level, revenue may diminish.

If government were to seek alternative sources of revenue, this might shift the tax burden to previous non-smokers. However if the new revenues compensate for the loss of the former excise tax yield, then consumers as a whole would bear no additional tax burden. Thus the demise of the tobacco industry would create a governmental revenue shortfall only if the excise tax revenue was not replaced with an equal-yield revenue source. The industry's argument of revenue loss is therefore misconceived.

Finally, regardless of the political or economic implications of tobacco-related employment, the primary focus should be on health, not employment. The principal contribution of the tobacco industry, which is continually understated by the industry, is not as a source of employment or revenue, but its role as a source of illness and premature death (Yach & Townshend, 1988), (Yach, McIntyre & Saloojee, 1992). The fact that stronger tobacco taxation policies contribute to the country's economic health, is just an additional worthwhile side-effect to the fact that it improves the country's public health.

² South African Reserve Bank *Quarterly Bulletin*, 1995

6.1 Policy implications

Public health motivates the call for a tobacco control measure that will reduce consumption. As shown in this study, the most powerful measure at the government's disposal is excise taxes. Government will need to play a fine balancing act between the interests of the tobacco industry and anti-tobacco groups in setting these excise taxes, if at the same time government wants to achieve its own objectives of revenue and deterrence.

By examining the government's objectives of maximising its revenue from this source, it was concluded that the excise tax currently levelled on tobacco could still be increased. From this perspective, it would not be optimal for government to destroy the industry, as a valuable revenue source would be lost. With regard to the government's deterrence objective, the taxation level to be used is not as clear cut. It would appear that while taxation plays a prominent role, government would need to use a package of tobacco control measures that would cover a wide spectrum, from laws restricting smoking in public places, to regulations on tobacco advertising. Together these instruments would help obtain government's goal of safeguarding public health.

In addition, policy makers will need to take into account the long-term economic effects that reduced smoking will have on longevity. Policies implemented today will have a ricochet effect into tomorrow's health care planning. Future research is necessary on the long-term effects of cessation on the economy. Other areas of concern are the individual's right to clean air, and the constitutional determination of these property rights that reflect what society deems fair and equitable.

Yet despite government's concern for public health and deterrence, diverse and powerful economic interests in the form of the tobacco industry, constitute a significant barrier to increasing tobacco control measures and in particular, excise taxes. This study has reviewed in particular, the arguments on the side of the tobacco industry, relating to the economic effects of taxing the industry. In each case, the

arguments of the industry were shown to be flawed. Revenue need not be lost, smuggling need not take place, output need not fall and jobs certainly need not be lost.

Finally, to reiterate the underlying principles of the study again, a fundamental reason why tobacco job losses do not represent a formidable economic problem, is that even if this job loss were to occur, it would not lead to a permanent decline in employment in the economy, as other jobs would replace those lost via expenditure switching. Even if all the jobs in the industry were erased, this would raise the South African unemployment rate by less than one tenth of one percent, and finally, less smoking would lead to a healthier workforce, the avoidance of premature death, the preservation of skills and increased productivity, which cannot but improve economic performance.

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Appendix A

The Social Accounting Matrix and input-output methodology

A1. Input-output tables and the South African Social Accounting Matrix

The first Social Accounting Matrix (SAM) published for South Africa was compiled by the Central Economic Advisory Service for the year 1978. This SAM was used in a number of applications, but by the end of the 1980s it had become outdated. In 1988 the Development Bank of Southern Africa (DBSA) used the same format as the 1978 SAM to update the contents of the various components with data then available in published form. The 1988 SAM was used to undertake analyses on aspects of income distribution in South Africa and was used as a database for a dynamic macroeconomic model of the South African economy (Van der Merwe & Van Seventer, 1995).

There were however serious deficiencies in the 1988 SAM. A new version was presented by the DBSA in 1992. In 1993 the Central Statistical Service (CSS) also published a SAM for South Africa using the same format as the 1978 SAM. Where the DBSA SAM had more detailed production activities, 34 as opposed to a more aggregated 23, the CSS SAM had more detailed breakdowns of occupational groups, mainly at the unskilled end of the spectrum. DBSA then made available a newer version of their SAM in 1995. This 1995 SAM was also used as a database for a dynamic macroeconomic Computable General Equilibrium (CGE) model (Van der Merwe *et al*, 1995).

The static input-output tables which form the core of the SAM, are based on three assumptions: firstly, the homogeneity assumption, that each sector produces a single output with a single input structure (there is no substitution between outputs of different sectors); secondly, the proportionality assumption, that increasing output will require proportional increases in inputs to the sector; and thirdly, the additivity

assumption, that total production equates to the sum of the separate effects (Roukens de Lange & Van Seventer, 1990).

SAMs do also not address the more qualitative issues relating to human values. They do not take account of market and psychological forces in the economy, although it is possible to estimate such adaptations by using elasticities and production functions and to introduce their effects exogenously. SAMs can then simulate a response of the economy to the new data structure. The South African SAM does also not incorporate the informal activities in the economy, which in a country like South Africa is a severe sacrifice.

Because the models are demand-driven, they ignore issues of price adjustments and alternative resource allocations. With fixed coefficients, the models ignore substitution possibilities in consumption, production, imports and exports and do not capture supply-demand interactions of agents acting across markets in response to shifts in market signals.

The input-output analysis however still has widespread recognition as the only method capable of tracing interrelationships between industries.

A2. The Social Accounting Matrix structure

A simplified Social Accounting Matrix structure of the economy is presented below (Roukens de Lange, 1989).

$$\begin{array}{c}
 \begin{array}{c} j \\ \vdots \\ i \end{array} \\
 \left[\begin{array}{c} a_{ij} \\ \vdots \\ \vdots \end{array} \right] \\
 \text{Q1}
 \end{array}
 \quad
 \begin{array}{c}
 j = 1, 2, \dots, n \\
 \left[\begin{array}{c} f_i \\ \vdots \\ \vdots \end{array} \right] \\
 \text{Q2}
 \end{array}
 \quad
 \begin{array}{c}
 \left[\begin{array}{c} x_i \\ \vdots \\ \vdots \end{array} \right]
 \end{array}$$

$$\left[\begin{array}{c} v_j \\ \vdots \\ \vdots \end{array} \right] \quad \text{Q3} \quad \left[\begin{array}{c} \text{Q4} \end{array} \right]$$

$$\left[\begin{array}{c} x_j \\ \vdots \\ \vdots \end{array} \right]$$

- a_{ij} : input-output coefficients indicating the value of input by sector i to sector j (or output from sector i to sector j) required to produce unit value of total output x_j
- v_j : value added (wages + profits + indirect taxes)
- f_i : final demand (private and government expenditure + fixed investments + inventories + exports - imports)
- x_i, x_j : total output (= total input)
- Q1...Q4 : quadrants 1 to 4

Table A1 shows the 4 quadrants of the South African Social Accounting Matrix that have been aggregated from 104 to 11 sectors.

Table A1 : Four quadrant Social Accounting Matrix for South Africa, aggregated to 11 sectors, 1995 (Rands '000 millions)

	Agric	Mi	Food	To	Che	Manu	Water	Con	W/S	Trans	Govt	GOS	Tot-	Tot-	Govt-	Tot-	Exter	Tot
	ning	Drink	Drin	bacco	mi	fac	&	struc	&	&	&		Wage	HHS	Cons	CAP	nal	Output
	thing	clo	thing	clo	thing	thing	thing	thing	thing	thing	thing	thing	thing	thing	thing	thing	thing	thing
Agric	2.4	0.0	16.4	0.5	1.1	0.5	0.0	0.0	0.0	0.1	0.6	-	-	11.1	0.5	1.3	5.3	39.9
Mining	0.1	0.2	0.1	0.0	8.5	0.9	2.2	4.3	0.0	0.1	0.3	-	-	1.9	0.1	0.2	41.2	60.1
Food, Drink, Clothing	4.3	0.3	16.7	0.0	1.5	0.9	0.1	0.5	0.6	0.5	4.0	-	-	45.5	1.2	2.8	6.7	85.6
Tobacco	-	0.0	-	0.0	-	-	-	-	-	0.0	0.0	-	-	1.6	0.0	0.1	0.1	1.8
Chemicals	4.7	3.4	5.8	0.4	18.6	4.3	0.6	3.5	7.3	4.6	7.1	-	-	20.2	3.8	1.8	13.3	99.0
Manufacture	1.0	4.4	1.6	0.1	1.5	12.7	0.8	5.2	1.4	1.8	3.8	-	-	11.5	5.5	21.1	15.0	87.2
Water & Elec	0.5	3.8	1.1	0.0	2.6	1.0	9.1	3.2	1.5	2.0	3.5	-	-	6.6	1.2	-	0.2	36.2
Construction	0.5	0.6	0.6	0.0	1.0	8.3	1.4	13.5	1.8	1.0	2.3	-	-	0.4	2.7	28.3	16.2	78.3
W/S & Retail	2.9	1.8	3.1	0.1	3.6	4.6	0.7	2.9	10.4	3.6	5.6	-	-	65.5	3.0	5.6	5.0	118.1
Trans & Comm	1.1	1.3	2.0	0.1	3.1	1.6	1.1	2.5	7.5	3.8	6.8	-	-	17.0	2.7	0.5	8.6	59.5
Govt & Other	1.0	4.6	5.1	0.2	6.5	6.3	1.2	6.2	17.0	4.8	29.5	-	-	57.4	2.2	2.7	5.9	150.4
GOS	14.2	15.2	11.2	0.1	17.8	11.3	13.0	10.2	25.1	14.3	36.9	-	-	-	30.9	-	3.6	204.0
Tot-Wages	4.5	17.7	12.6	0.2	14.7	20.8	4.7	18.3	40.7	18.3	36.2	-	-	4.5	62.9	-	-	256.3
Tot-HHS	-	-	-	-	-	-	-	-	-	-	-	73.4	256.3	5.8	21.9	-	0.6	357.9
Govt-Tot	0.8	1.9	0.7	(0.0)	1.1	0.7	0.3	1.0	0.7	1.7	8.1	25.1	-	79.5	8.7	8.1	(1.1)	137.1
Tot-CAP	-	-	-	-	-	-	-	-	-	-	-	94.2	-	6.0	(19.2)	-	-	81.0
External	1.9	5.0	8.5	0.1	17.4	13.1	1.1	7.1	4.1	2.9	5.7	12.7	-	23.4	9.0	8.6	(10.7)	109.8
Tot Input	39.9	60.1	85.6	1.8	99.0	87.2	36.2	78.3	118.1	59.5	150.4	204.0	256.3	357.9	137.1	81.0	109.8	1,960.8

GOS is Gross Operating Surplus or Profits, HHS is Household Expenditure, CAP is Capital Expenditure, External in the column is Exports and External in the row is Imports

Total output, value added and final demand are related to each other through the input-output coefficients by the following relationships :

$$v_j = x_j (1 - \sum a_{ij}) \quad (1)$$

$$f_i = x_i - \sum a_{ij} x_j \quad (2)$$

and in matrix notation where capitals indicate matrices or vectors, and I is the unit matrix

$$X = F(I - A)^{-1} = FR \quad (3)$$

where R is the Leontief inverse matrix, with coefficients r_{ij} . Table A2 shows the Leontief inverse for the 11 sectors as aggregated in Quadrant 1 from Table A1.

Table A2 : Quadrant 1 Leontief inverse matrix for South Africa, aggregated to 11 sectors, 1995

	Agric	Mining	Food, Drink, Clothing	To bacco	Che micals	Manu facture	Water & Elec	Construc tion	W/S & Retail	Trans & Comm	Govt & Other
Agric	1.101	0.006	0.267	0.325	0.023	0.016	0.005	0.008	0.007	0.009	0.017
Mining	0.026	1.021	0.023	0.040	0.116	0.034	0.094	0.085	0.015	0.020	0.017
Food, Drink, Clothing	0.158	0.015	1.290	0.067	0.035	0.028	0.012	0.022	0.020	0.023	0.050
To bacco	0.000	0.000	0.000	1.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Che micals	0.201	0.100	0.176	0.373	1.272	0.110	0.057	0.107	0.116	0.130	0.101
Manu facture	0.052	0.101	0.053	0.079	0.045	1.197	0.054	0.116	0.034	0.053	0.051
Water & Elec	0.040	0.102	0.046	0.055	0.067	0.043	1.359	0.091	0.038	0.065	0.053
Construc tion	0.034	0.033	0.032	0.031	0.032	0.147	0.073	1.233	0.034	0.037	0.037
W/S & Retail	0.115	0.057	0.096	0.126	0.074	0.094	0.048	0.078	1.123	0.092	0.071
Trans & Comm	0.059	0.045	0.065	0.080	0.063	0.050	0.060	0.067	0.095	1.092	0.077
Govt & Other	0.100	0.137	0.154	0.249	0.147	0.161	0.096	0.175	0.232	0.153	1.289

A3. The calculation of multipliers

From equation (3) we can find the effect X resulting from a change F in final demand. For a unit change in final demand for the product of sector j , in other words for $F = f_j = 1$, the change in output by a sector I will be given by r_{ij} and the change in output for the whole economy will be

$${}_x m_j = \sum r_{ij} \quad (4)$$

where ${}_x m_j$ is known as the output multiplier for sector j (Roukens de Lange, 1989)

If one is interested in the change in value added or employment resulting from a unit change in final demand, one can by a simple extension of the output multiplier concept contained in equation (4) obtain the following multipliers for income, value added, and employment

$${}_y m_j = \sum r_{ij} y_i / x_i \quad (5)$$

$${}_v m_j = \sum r_{ij} v_i / x_i \quad (6)$$

$${}_e m_j = \sum r_{ij} e_i / x_i \quad (7)$$

A4. The input-output matrix with the elimination of expenditure on cigarettes

An input-output coefficient matrix, A^s (21×21), was defined as follows, a^s_{ij} is the sales of South African industry i per unit of South African industry j ; $i, j = 1 \dots 20$. a^s_{hj} is the net South African household income received per unit of output of South African industry j ; $h = 21, j = 1 \dots 20$. a^s_{jh} is the expenditure on output of South African industry j per unit of South African household income; $j = 1 \dots 20, h = 21$.

Given the matrix A^s , the Leontief inverse was derived as

$$B^s = [I - A^s]^{-1} \quad (8)$$

Let y_C be the vector of actual 1995 purchases of South African goods and services associated with expenditure on cigarettes, then the estimated South African output generated by this expenditure is given by

$$X^s_C = B^s \cdot y_C \quad (9)$$

Let y^*_{NC} be a hypothetical vector of South African expenditure in 1995 on the assumption that the residents' purchases of cigarettes had not taken place. The estimated South African output generated by each such scenario consumption vector is given by

$$X^s_{NC} = B^s \cdot y^*_{NC} \quad (10)$$

Thus, the net impact of South African output of each complete scenario based on a switching of South African cigarette expenditure is given by

$$\Delta X^s = X^s_{NC} - X^s_C = B^s (y^*_{NC} - y_C) \quad (11)$$

Let $I = (l_i)$, a column vector of employment/output coefficients, where l_i is the estimated employment/output coefficient for sector i in 1995, then the estimated net scenario impact on South African employment is given by

$$\Delta L = I' \Delta X^s \quad (12)$$

where I is a diagonalised matrix of l_i coefficients (McNicoll & Boyle, 1992).

A5. A sensitivity analysis on savings behaviour

Results of the sensitivity analysis indicate that the qualitative findings from the analysis are unaffected when more conservative assumptions are introduced. Table A3 shows the results when 15 percent of the released money is saved (or hoarded) and the economy is essentially smaller. Qualitatively, the same results hold as for Scenario 1, except for the numbers being smaller.

Table A3 : Net employment outcome of reduced tobacco consumption with the presence of money hoarding, 21 sectors, 1995

Functional Category	Sensitivity analysis - economy shrinks, 15 % of extra money is hoarded
Fish, Forest, Hunt, Farming	5481
Field Crops	-2838
Mining	1843
Food, Drinks	487
Tobacco	-2876
Clothing	1058
Furniture	38
Paper	-1955
Chemicals	-1
Petrol, Rubber, Plastic	225
Build Materials	562
Machinery, Equipment	930
Light Manufacture	23
Water, Electricity	479
Construction	941
Wholesale, Retail	882
Accommodation	28
Transport	220
Communication	608
Business Services	628
Government, Other Services	-102
Total	6661

Appendix B

A review of international studies on tobacco and employment

The following five studies assess the question of falling tobacco consumption and employment. As yet, no research has been done in a developing country like South Africa, and it is therefore important to understand the global debate on tobacco and jobs in order to assess the merits of the debate in this country.

B1. Scotland

McNicoll and Boyle (1992) estimated the impact on the Scottish economy of a reduction in spending on cigarettes in Glasgow in 1989. Specifically, they looked at the multiplier effects on economic activity in Scotland if the citizens of Glasgow (Glaswegians) were to reduce or eliminate their expenditure on tobacco. The money not spent on tobacco was assumed to be spent on other goods and services according to consumers' existing (average) expenditure patterns. Therefore lost jobs would be replaced by new jobs created in other industries. They based their study on the use of input-output tables which show the interdependencies between industries in the economy, and how the changes in one industry affect the level of output in other industries. They compared two alternative situations in a given base year, using a static approach. They also assumed that there would be no change in government expenditure. Tax revenue changes were therefore assumed not to affect the Scottish economy. Their results suggest that if everyone in Glasgow stopped smoking in 1989 there would be a net gain of nearly 8000 jobs in Scotland.

B2. Michigan

In contrast to a static model, Warner and Fulton (1994) used a dynamic model, allowing for the adjustment of the economy to falling tobacco expenditure to occur over a number of years. A dynamic model can simulate the full impact of all important

influences on the economy. A regional economic model of the United States was used (REMI dynamic regional forecasting model) for the state of Michigan which is a non-producing tobacco state. They then used the model to examine two scenarios : a complete and instantaneous cessation of tobacco expenditure, and a more realistic gradual acceleration in the rate of decline in tobacco consumption over a number of years, from 1992 to 2005. The new expenditure would take place according to the average consumer's existing spending patterns. The reduced government revenue was dealt with by assuming offsetting increases in other government taxes, and reduced government spending (and hence employment).

Their results suggest that Michigan state would have a net gain of 5600 more jobs in 1992, and by the year 2005 still 1500 more jobs. Job losses would be in retail, wholesale and government. However, the losses were outweighed by increases in jobs in all other industries (services, manufacturing, transport, communication, public utilities, finance, construction, and mining). Labour income was also estimated to be greater without tobacco, \$226 million in 1992 and \$112 million by 2005. The reason for the higher earnings was the net change in the mix of industries from lower-paying to higher-paying industries, and competitive pressures driving up earnings because of increases in demand in the stronger economy.

B3. The US

In 1996, the Michigan study (Warner and Fulton, 1994) was extended to include the whole of the United States to assess whether declining tobacco product sales significantly reduced employment across all the tobacco producing and non-tobacco producing states from 1993 to the year 2000 (Warner, Fulton, Nicolas & Grimes, 1996). The study used the same macroeconomic computer simulation model (Regional Economic Models Inc., REMI) to assess employment effects with domestic tobacco expenditures eliminated or reduced and the equivalent spending redistributed according to consumers' normal spending patterns. Being a dynamic model, the inter-regional trade flows and feedback effects could be simulated.

The results showed that the tobacco-producing region, Southeast Tobacco, would have lost jobs, but collectively all other regions would have gained enough employment to completely offset the losses, with every other non-tobacco region gaining jobs. By the year 2000 the absence of tobacco spending would mean a net gain of 133 000 jobs in the US economy. In the more realistic scenario of doubling the downward trend in tobacco consumption, the net gain in US employment would be 19719 jobs. They concluded that contrary to the tobacco industry's claims, reductions in spending on tobacco products would boost employment in all of the non-tobacco regions and would not diminish employment in the tobacco region by as much as the industry estimates.

B4. Canada

Allen (1993) argues that even though the Canadian government believe that they must chose between health or jobs, this is not true. Canadians can have good health without losing out on employment. Firstly, with Canadian consumption dropping slowly, those jobs that are lost can, through careful planning, mostly be met by attrition. Secondly, technological changes have caused many of the job losses and will continue to do so, regardless of the health policy that the government may pursue. Thirdly, the most potent cause of falling consumption was increased excise taxes, and the government revenues that were raised through these taxes, were spent to maintain public services which created many new jobs.

The study develops these arguments by analysing employment changes in the industry and rates of return earned in the industry. Allen argues that the tobacco manufacturing companies have been able to maintain among the highest profits in the country. In addition, real hourly wages earned by tobacco manufacturing workers are much higher than average earnings of Canadian workers. Tobacco growers also earned on average much more than non-tobacco farmers.

Allen therefore argues that tobacco control policies aimed at reducing consumption, primarily government taxes, will have a negligible adverse effect on employment. Firstly, much of the employment decline in tobacco manufacturing has already

occurred. Even if Canadian production was shifted abroad, there would be significant cost savings in supplying the Canadian market from abroad. Canadian plants are much smaller and less efficient than American plants. This rationalisation through the free trade agreement would be an inevitability. Secondly, the jobs in distribution would remain even if production was shifted elsewhere. And thirdly, Allen argues, the economy will tend to self-correct, generating new jobs to replace those lost in tobacco production.

B5. The UK

A study by Buck, Godfrey, Raw and Sutton (1995) used a static model of the UK, as a sufficiently detailed dynamic model of the various industries was not available. The model compared what the economy would look like at a particular point in time, if 40 percent of tobacco expenditure was switched to other forms of spending. It did not predict how the economy would react over the long run.

The assumption that consumers would spend their money according to average consumption expenditure patterns, was also challenged. It was assumed that with a marginal increase in income, in the short term, expenditure on essential items such as housing would change very little, while expenditure on luxury items such as recreational goods and services would change more. Four patterns of changed consumer spending were thus tested, spending according to : average consumers (the standard assumption); all non-smokers; all former smokers; and recent stoppers (the more realistic assumption). The spending patterns from these groups are found in Table B1 (Buck *et al*, 1995).

Table B1 : Spending patterns of smoking, non-smoking, former-smoking, and recent stopper households in the UK

Functional category	Percentage of net household expenditure (excluding tobacco and miscellaneous)			
	Smokers	Non-smokers	Former smokers	Recent stoppers
Food	21.1	20.3*	21.0	18.6*
Alcoholic drink	6.2	3.5*	3.7*	4.3*
Clothing and footwear	6.7	6.3	6.1*	7.8*
Housing	22.0	25.6*	25.1*	19.1*
Fuel and power	7.4	7.2	6.9*	5.3*
Household goods and services	5.7	5.7	5.8	6.5
Transport and communication	12.4	11.9	11.8	14.8*
Recreation, entertainment and education	9.4	10.0*	10.3*	12.5*
Other goods and services	9.3	9.5	9.2	11.1*
Number of households	3003	4043	1580	359

Source : 1990 Family Expenditure Survey in Buck *et al* (1995)

* Indicates that percentage of total expenditure on this functional category is significantly different from the percentage spent by smoking households at the 95% level.

It was also assumed that the government would react to lost revenue by either, reducing expenditure, or, more likely, increasing consumer taxes to replace lost revenue. Different goods and services are taxed at different levels, and re-allocated expenditure to the different industries in Table B1 will bring in different tax revenues.

Results showed a smaller net increase in jobs when it was assumed that governments increased other consumer taxes, as opposed to reducing expenditure. All categories showed net increases in jobs, except if released expenditure were spent according to non-smokers spending patterns, which was not assumed to be the realistic assumption. If ex-smokers spent freed money as recent stoppers and government increased other consumer taxes in response (the more realistic assumptions), there would be a net increase of 115 000 full-time equivalent jobs. The results of the study are shown in Table B2.

Table B2 : Predicted changes in full-time equivalent jobs if there was a 40 percent reduction in consumption in the UK

GOVERNMENT REACTION TO LOST REVENUE		
Assumptions about how released tobacco expenditure spent	Reduction in expenditure	Increase in other consumer taxes
According to existing patterns ¹	6382	889
As non-smokers	-14834	-22133
As all former smokers	3742	-3771
As recent stoppers ²	124705	115688

1 Assumption of other studies for example Warner *et al* (1994) and McNicoll *et al* (1992).

2 More realistic assumption that recent stoppers spend much higher proportion of income on other goods and services, transport and communication, recreation, entertainment and education, which is more labour-intensive.

Data sources for optimal tax simulation

Principal data sources were the CSS publication *South African Statistics* (annual), the South African Reserve Bank *Quarterly Bulletin*, and the Tobacco Board *Annual Reports* (1970 - 1996).

Consumption data from 1970 until 1989 was taken from Reekie (1994). From 1989 the 1989 value for consumption volume was rated forward using movements in real retail sales of cigarettes and tobacco.

Manufacturing wages and employment figures were from the CSS *South African Labour Statistics*. The current price values were deflated by the manufacturing unit labour cost IPD from the South African Reserve Bank *Quarterly Bulletin*.

TAX was estimated as the tax on cigarettes consumed (domestic production plus imports) plus customs duty on imports of cigarettes. Customs duty rates are expressed as a tax on the amount of tobacco imported. These were converted to a per cigarette basis by assuming one kilogram of tobacco is equal to 1000 cigarettes. The source for this conversion was the Tobacco Board *Annual Report* (every edition). The Tobacco Board *Annual Report* was also the source for excise and customs duty rates. The formula used to estimate the net tax on cigarettes was equal to the proportion of cigarettes imported in relation to total consumption, multiplied by the customs duty rate; plus the excise duty rate. Nominal tax rates were deflated by the cigarette and tobacco CPI to derive real values.

Taxes on imports of raw tobacco were calculated in a similar way. The net tax was equal to the proportion of total imports of unprocessed tobacco (less the amount free of duty) to total purchases of tobacco by manufacturers, multiplied by the customs duty rate.

References

- Abedian, I. & Dorrington, R.E., (1994), An evaluation of a recent attempt to assess the social benefits of cigarette smoking, *Journal for Studies in Economics and Econometrics*, 18(1), 59 - 72.
- Abedian, I., Van der Merwe, R. & Annett, N., (1997), Tobacco control in South Africa : An analysis of contemporary trends and policy issues. Submitted to *Tobacco Control*, 1998.
- Allen, R.C., (1993), *The false dilemma : The impact of tobacco control policies on employment in Canada*. National Campaign for Action on Tobacco : Ottawa, Ontario.
- Appelbaum, E., (1982), The estimation of the degree of monopoly power, *Journal of Econometrics*, 19, 287 - 299.
- Barnett, P.G., Keeler, E., Hu, T., (1995), Oligopoly structure and the incidence of cigarette excise taxes, *Journal of Public Economics*, 57, 457 - 470.
- Barnum, H., (1994), The economic burden of tobacco - a World Bank Analysis (summary of presentation in BASP newsletter). *Smoking Prevention*, Newsletter 26, December 1994. Brussels, European Bureau for Action on Smoking Prevention.
- Barzel, Y., (1976), An alternative approach to the analysis of taxation, *Journal of Political Economy*, 84(6), 1177-1197.
- Becker, G.S., Grossman, M. & Murphy, K.M., (1994), An empirical analysis of cigarette addiction, *The American Economic Review*, 84(3), 396 - 418.
- Bishop, J.A. & Yoo, J.H., (1985), "Health scare," excise taxes and advertising ban in the cigarette demand and supply, *Southern Economic Journal*, 2, 402 - 411.
- Buck, D., Godfrey, C., Raw, M. & Sutton, M., (1995), *Tobacco and jobs : the impact of reducing consumption on employment in the UK*. Society for the Study of Addiction, Centre for Health Economics : University of York.
- Budget Review (1997), *Republic of South Africa Budget Review*. Pretoria : Department of Finance, Government Printer.

- Cape Business News, (July 1996a), *The main pushers*.
- Cape Business News, (July 1996b), *Your typical addict*.
- Central Statistical Service (annual), *South African Statistics*. Pretoria : Government Printer.
- Chakraborty, D., Sinha, A. & Ghosh, A.P., (1989), *Impact of rural income distribution on the demand for manufactures*. Paper presented at Ninth International Conference on Input-Output Techniques, Keszthely, Hungary, 4-9 September 1989.
- Chapman, S. & Richardson, J., (1990), Tobacco excise and declining tobacco consumption : The case of Papua New Guinea, *American Journal of Public Health*, 80(5), 537 - 540.
- Chester, D.L., (1985), Ad agency conflict : selling cigarettes and dentistry, *New York State Journal of Medicine*, 85, 469-470.
- Christensen, L.R. & Green, W.H., (1976), Economies of scale in U.S. electric power generation, *Journal of Political Economy*, 84(4), 655 - 676.
- Cohen, S.I., (1986), *Input-output versus social accounting in the macro-analysis of development policy*. Paper presented at Eighth International Conference on Input-Output Techniques, Sapporo, Japan, 28 July -2 August, 1986.
- Cohen, S.I. & Tuyl, J.M.C., (1989), *Growth and equity effects of changing demographic structures in the Netherlands: simulations within a social accounting matrix*. Erasmus University : Rotterdam.
- Cummings, K.M., Sciandra, R., Gingrass, A. & Davis, R., (1991), What scientists funded by the tobacco industry believe about the hazards of cigarette smoking, *American Journal of Public Health*, 81(7), 894 - 896.
- Economics of Tobacco Control Project, (1996), *Cigarette prices and taxes in South Africa, 1970 - 1995 : The facts*. Update 1 : University of Cape Town.
- Economics of Tobacco Control Project, (1996), *An econometric estimation of actual and potential government revenue from cigarette taxation in South Africa : 1970 - 1995*. Update 2 : University of Cape Town.
- Economics of Tobacco Control Project, (1996), *An econometric analysis of the effect of advertising on cigarette consumption in South Africa : 1970 - 1995*. Update 3 : University of Cape Town.

- Fujii, E.T., (1980), The demand for cigarettes : further empirical evidence and its implications for public policy, *Applied Economics*, 12, 479 - 489.
- Godfrey, C. & Maynard, A., (1988), Economic aspects of tobacco use and taxation policy, *British Medical Journal*, 297, 339 - 343.
- Grossman, M., (1989), Health benefits of increases in alcohol and cigarette taxes, *British Journal of Addiction*, 84, 1193 - 1204.
- Hodgson, T.A., (1992), Cigarette smoking and lifetime medical expenditures, *The Milbank Quarterly*, 70(1), 81-125.
- Hu, T., Keeler, T.E., Sung, H. & Barnett, P.G., (1995), The impact of California anti-smoking legislation on cigarette sales, consumption, and prices, *Tobacco Control*, 4(suppl 1), s34 - s38.
- Hu, T., Sung, H. & Keeler, T.E., (1995), The state anti-smoking campaign and the industry response : the effects of advertising on cigarette consumption in California, *The American Economic Review Papers and Proceedings*, 85(2), 85 - 90.
- Joossens, L. & Raw, M., (1995), Smuggling and cross border shopping of tobacco in Europe, *British Medical Journal*, 310, 1393 - 1397.
- Keeler, T.E., Hu, T., Barnett, P.G. & Manning, W.G., (1993), Taxation, regulation, and addiction : a demand function for cigarettes based on time-series evidence, *Journal of Health Economics*, 12, 1 - 18.
- King, B.B., (1981), *What is a SAM? A layman's guide to social accounting matrices*. World Bank : Staff Working Paper No. 463.
- Leu, R., (1984), Anti-smoking publicity, taxation and the demand for cigarettes, *Journal of Health Economics*, 3, 101 - 116.
- Lewit, E.M. & Coate, D., (1982), The potential for using excise taxes to reduce smoking, *Journal of Health Economics*, 1, 121 - 145.
- Martin, G., Steyn, K. & Yach, D., (1992), Beliefs about smoking and health and attitudes toward tobacco control measures, *South African Medical Journal*, 82, 241 - 245.
- McNicoll, I.H. & Boyle, S., (1992), Regional economic impact of a reduction of resident expenditure on cigarettes: a case study of Glasgow, *Applied Economics*, 24, 291 - 296.

- Miernyk, W.H., (1957), *The elements of input-output analysis*. Random House : New York.
- Paukert, F., Skolka, J.V. & Maton, J., (1974), *Redistribution of income, patterns of consumption, and employment : A case study for the Philippines*, Ch. 8 in *Advances in input-output analysis* (Eds. Polenske, K.R. & Skolka, J.V.). Ballinger Publishing Company : Cambridge.
- Pieda, P.L.C., (1991), *The economic significance of the UK tobacco industry*. London: Pieda.
- Radfar, M., (1985), The effect of advertising on total consumption of cigarettes in the UK, *European Economic Review*, 85, 225 - 231.
- Reddy, P., Meyer-Weitz, A. & Yach, D., (1996), Smoking status, knowledge of health effects and attitudes towards tobacco control in South Africa, *South African Medical Journal*, 86(11), 1389 - 1393.
- Reekie, W.D., (1994), Consumers' surplus and the demand for cigarettes, *Managerial and Decision Economics*, 15, 223 - 234.
- Reekie, W.D. & Wang, L.F.S., (1992), The benefits and costs of cigarette smoking - a state dependent approach, *Journal for Studies in Economics and Econometrics*, 16(1), 1 - 12.
- Rembrandt Controlling Investments, (1995), *Annual Report*.
- Rembrandt Group Limited, (1996), *Annual Report*.
- Roukens de Lange, A., (1989), The impact of macro-economic policies on the South African economy : Analysis based on a social accounting matrix, *Journal of Studies in Economics and Econometrics*, 13(3), 21-44.
- Roukens de Lange, A., (1990), *The impact of provision of low-cost housing on the South African economy*. Institute for Futures Research : University of Stellenbosch.
- Roukens de Lange, A. & Van Seventer, D.E.N., (1990), The contribution of social accounting matrices to economic enquiry in South Africa : A review, *Development Southern Africa*, 7(2), 151 - 166.
- Social Accounting Matrix (1995), Development Bank of Southern Africa.
- South African Reserve Bank (quarterly), *Quarterly Bulletin*, Pretoria : Government Printer.

- Stanley, K., (1993), *Control of tobacco production and use*. In Disease Control Priorities in Developing Countries (Eds. Jamison, D.T., Mosley, W.H. & Measham, A.R.). World Bank : Oxford University Press, Washington.
- Sunday Times, (15 March 1997), *An open letter to the government*.
- Sung, H., Hu, T. & Keeler, T.E., (1994), Cigarette taxation and demand : and empirical model, *Contemporary Economic Policy*, 22, 91 - 100.
- Tobacco Board (annual), *Annual Report*, 1970 - 1996.
- Tobacco Institute of Southern Africa, (1992), *The costs of smoking*. PO Box 990, Pretoria, 0001.
- Tremblay, C.H. & Tremblay, V.J., (1995), The impact of cigarette advertising on consumer surplus, profit, and social welfare, *Contemporary Economic Policy*, 13, 113 - 124.
- Van der Merwe, C. & Van Seventer, D.E.N., (1995), *Towards a system of economic and social accounting matrices for South Africa*. Development Bank of Southern Africa : Development Paper 63.
- Van der Merwe, R., (1997), *An empirical analysis of the output effects of cigarette taxes in South Africa and the regional impact*. Paper presented at the 10th World Health Conference on Tobacco or Health, Beijing, China, 24 - 28 August, 1997.
- Van der Merwe, R., (1997), *An international comparison of tobacco control policies : Taxation, pricing, and the control of advertising*. Economics of Tobacco Control Project, Update No. 4 : University of Cape Town.
- Van der Merwe, R., (1997), *Tobacco and jobs : A review of international research*. Economics of Tobacco Control Project, Update No. 5 : University of Cape Town.
- Van der Merwe, R., (1997), *The output and employment effects of reducing tobacco consumption in South Africa*. Economics of Tobacco Control Project, Update No. 6: University of Cape Town.
- Van Seventer, D.E.N., De Lint, F.J. & Roukens de Lange, A., (1985), *A regional input-output model for the Western Cape*. Institute for Futures Research : University of Stellenbosch.

- Van Seventer, D.E.N., (1987), Income distribution, economic structure and employment in South Africa, *Development Southern Africa*, 4(1), 133 - 145.
- Van Walbeek, C.P., (1996), Excise taxes on tobacco : how much scope does the government have?, *The South African Journal of Economics*, 64(1), 20 - 42.
- Vernon, J.M., Rives, N.W. & Naylor, T.H., (1967), An econometric model of the tobacco industry, *The Review of Economics and Statistics*, 1, 149 - 158.
- Warner, K.E., (1987), Health and economic implications of a tobacco-free society, *Journal of the American Medical Association*, 258(15), 2080 - 2086.
- Warner, K.E., Chaloupka, F.J., Cook, P.J., Manning, W.G., Newhouse, J.P., Novotny, T.E., Schelling, T.G. & Townsend, J., (1995), Criteria for determining an optimal cigarette tax : the economist's perspective, *Tobacco Control*, 4, 380 - 386.
- Warner, K.E. & Fulton, G.A., (1994), The economic implications of tobacco product sales in a nontobacco state, *Journal of the American Medical Association*, 271(10), 771 - 776.
- Warner, K.E., Fulton, G.A., Nicolas, P. & Grimes, D.R., (1996), Employment implications of declining tobacco product sales for the regional economies of the United States, *Journal of the American Medical Association*, 275(16), 1241 - 1246.
- World Health Organisation (May 1996) *Tobacco alert : The tobacco epidemic : A global public health emergency*. WHO : Geneva.
- Yach, D., (1982), Economic aspects of smoking in South Africa, *South African Medical Journal*, 62(1), 167 - 170.
- Yach, D., McIntyre, D. & Saloojee, Y., (1992), Smoking in South Africa : the health and economic impact, *Tobacco Control*, 1, 272 - 280.
- Yach, D. & Saloojee, Y., (1994), South African advertising agencies' involvement with tobacco products, *South African Medical Journal*, 84(12), 871.
- Yach, D., Townshend, G., (1988), *Smoking and health in South Africa : the need for action*. South African Medical Research Council, Centre for Epidemiological Research in Southern Africa, Technical Report No. 1, Parow.
- Zimring, F.E. & Nelson, W., (1995), Cigarette taxes as cigarette policy, *Tobacco Control*, 4(suppl 1), s25 - s33.