The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

University of Cape Town

University of Cape Town

Faculty of Commerce

Measuring the Gender-Wage Differential and Discrimination in the Eritrean Labour Market

By

HAGOS MEBRAHTU (MHRHAG001)

University of Cape Town

A dissertation submitted to the School of Economics, University of Cape Town, in partial fulfillment of the requirements for the award of a Master of Commerce Degree in Labour Economics.

September 2003

Dedication

To

My mother

University of Cape Town

DECLARATION

I would like to declare that this dissertation is my own original work, produced by my own efforts apart from the assistance received from my supervisor. All sources of information have been fully credited and acknowledged.

I also declare that this thesis has not been, and will not be presented any other university for any other degree.

Signed by candidate

Hagos Mebrahtu

...../...../.....

Date

This research paper has been submitted for examination with my approval as the university supervisor.

..

Dr Haroon Bhorat

27/05/2004

Date

ABSTRACT

The objective of the study is to measure and investigate the sources of gender-wage differentials in the Eritrean labour market. The study uses primary data drawn from the Income and Expenditure Household Survey collected by National Statistics Eritrea in 1997.

Three separate standard wage functions for males, females and a pooled one for both sexes are estimated, in which, the dependent variable (semi-log monthly wage) is a linear function of years of schooling, experience, experience squared, hours worked, and dummy variables capturing, occupations, ethnicity, industry, employer, marital status, fighters (represents whether the individual employee belong to the group who participated in the army struggle for independence or not). The decomposition exercise involved subtracting the female wage equation from the male wage equation, and then the wage differential that is found is in turn decomposed using the standard Oaxaca –Blinder (1973) procedure. The econometric result showed that women earned about 66 % of what men earned. The wage differentials are decomposed into two components, the differential due to the measurable variables and that due to discrimination. The results from the decompositions of the gender-wage differentials show that 18 % of the wage differentials result from discrimination, while 82 % is accounted for by the measurable variables. These results signal that gender-wage differentials emanate both from human capital differences and unequal treatment in the labour market.

The results from the wage equation of female workers showed that human capital followed by the variable fighters, hours worked per a week, marital status, industrial sectors, and type of employer were important determinant of female wages. Place of work and occupations were the least important, and ethnicity was insignificant in the wage determination process of the female employees. Likewise, the human capital followed by the variable fighter, place of work and occupations were important

University of Cape Town

variables in determining the male wages. Ethnicity, industrial sectors, employer and marital status were least important in the wage determination process of the male employees in Eritrea in 1997.

University of Cape Town

ACKNOWLEDGEMNTS

It gives me a great pleasure to thank God who gave me strength and peace and all the people who assisted me in completing my study.

I am greatly indebted to my supervisor, Dr Haroon Bhorat for the constant interest, guidance, critical assessments, support and motivation that he has given me over the semester. His professional and personal support was invaluable to my writing process.

Special thanks go to all my lecturers especially Jeremy Wakeford in assisting me in getting the required knowledge to do my studies.

I would like to extend my gratitude to the Government of Eritrea for giving me this opportunity by sponsoring my postgraduate study.

In particular, I would like to thank Ms Askalu Menkerios, Minister of Labour and Human Welfare, Dr. Giorgish Teclemiceal, Minister of Trade and Industry, and Statistics Eritrea, for granting me access to useful data that I used for my dissertation. I would also like to thank Mr. Tesfamicael Geratu an Eritrean Ambassador to South Africa and Ms Luula Gebreyesus, Director of Africa Institute for Policy Analysis (AIPA) for their help in my studies.

Finally, I would like to thank my colleagues at Ministry of Labour and Human Welfare, classmates and the staff members of Development Policy Research Unit (DPRU) for their unconditional support and love they have given me throughout my academic years.

University of Cape Town

TABLE OF CONTENTS

DECLARATION.....iii
ABSTRACT.....iv
ACKNOWLEDGEMNTS.....vi
TABLE OF CONTENTS.....vii
LIST OF TABLES.....viii

CHAPTER ONE: INTRODUCTION.....1
1.1 Background.....1
1.2 The Rationale for the Study.....2
1.3 Objectives.....4
1.4 Structure of the Study.....4

CHAPTER TWO: THEORETICAL BACKGROUND.....5
2.1 Introduction.....5
2.2 Productivity Difference (Human capital theory).....6
2.3 Differences in Ability (Comparative advantage theory).....8
2.4 Differences in Preferences (Difference in group preference theory.....10
2.5 Pre-labour Market Discrimination Theories.....11
2.6 Employers' Behaviour and Labour Market Condition.....12
2.6.1 Employers' Preference (Preference theory).....14
2.6.2 Employers' Ignorance (Statistical discrimination theory).....15
2.6.3 Market Imperfection (Monopoly power).....16
2.6.4 Segmented Labour Market (The institutionalists' theories).....17
2.7 Conclusions.....18

CHAPTER THREE: DATA, METHODOLOGY AND VARIABLE SPECIFICATION.....20
3.1 Introduction.....20
3.2 The Data.....20
3.3 Methodology.....21
3.2.1 Simple OLS Estimates.....21
3.2.1 Chow Test.....22
3.2.3 Oaxaca – Blinder (1973) Decomposition.....23
3. 4 Variable Specification.....27
3.5 Specification Test.....33
3.6 Conclusion.....34

CHAPTER FOUR: DESCRIPTIVE AND ECONOMETRIC ANALYSES.....35
4.1 Introduction.....35
4. 2 Wage Differential: Descriptive Statistics.....35
4.3 Estimation and interpretation of Earnings Functions and Measuring Wage Differentials.....50

University of Cape Town

4.3.1 Results from Pooled Earnings Function..... 51
4.3.2 Wald and Heteroscedasticity Test..... 54
4.3.3 Male and Female Earnings Function..... .55
4.3.4 Structural Test.....64
4.3.5 Measuring Gender Pay Gap.....64
4.6 Empirical Findings.....69
4.4 Critique of the Oaxaca-Blinder (1973) model.....71
4.5 Conclusion.....74

CHAPTER FIVE: SUMMARY AND CONCLUSION.....76
5.1 Summary and Implications.....76
5.2 Conclusion.....81

REFERENCES.....84

APPENDIX 1
Appendix 1: Estimating earning function using Heckman two stage.....88

APPENDIX 2.....90
Appendix2A: Mean wages by ethnic groups and gender.....90
Appendix 2B: Mean Monthly wages of employees by place of work and gender..90

University of Cape Town

LIST OF TABLES

Table 1: Percentiles of gross monthly wages by gender 36
Table 2: Gross mean monthly wages by educational level & gender 37
Table 3: Mean gross monthly wages by gender and years of experience 39
Table 4: Percentage distribution of employment by industrial groups & gender..... 40
Table 5: Gross mean monthly wages by sector 41
Table 6: Distribution of employment by occupation and gender 42
Table 7: Gross mean monthly wages by occupation 43
Table 8: Percentage distribution of employment by employer..... 44
Table 9: Gross mean monthly wages by employer..... 45
Table 10: Mean wages by maritual status and gender..... 45
Table 11: percentage distribution of employment by gender 46
Table 12: Gross mean monthly wages by fighters and non-fighters and gender 47
Table 13:The mean value of male, female and male & female 48
Table 14: Pooled earnings function 52
Table 15: Male earnings functions 55
Table 16: Female earnings function 58
Table 17 : Measuring gender-wage gap eq (4) 64
Table 18: Measuring gender-wage gap eq (5) 66
Table 19: Decomposition results using log wage differential 67
Table 20:Survey of empirical findings of F/M earnings ratio of different countries .. 70
Table 21: Decomposition results using mean log wage differential 73

University of Cape Town

CHAPTER ONE

INTRODUCTION

1.1 Background

Eritrea is a young and small country at the Horn of Africa, with a land area of about 124,320 square kilometres, and an estimated population size, according to Brixiova and Cmenetz (2001), of about 3.9 million .The exact population of Eritrean is not yet known because not even one census has been conducted. Eritrea gained its independence after a protracting war against Ethiopia in May 1991, and two years later, following a referendum, the country was formally declared an independent state. The Eritrean economy, like that of many developing countries, relies on agriculture.

Italians and the British colonized Eritrea consecutively for nearly 60 years before it was colonized by Ethiopia. During this period, Eritrea was relatively industrialized. In the 1940s the country had more than 2000 industrial firms and almost 3000 commercial firms, despite the country's small population of less than 700,000 (Arneberg and Pederson, 1997). The three decades-long war had a serious impact on the resources of the economy. It destroyed physical and human resources as well as training and administrative institutions.

The suffering, of course, was extended to affect the lives of all Eritreans in general and the labour force in particular. Yet, the extent of damage is not known. After independence, the first Income and Expenditure household survey 1997 was conducted, which provides us with the basis for understanding gender-based wage differential in the labour market. The analysis that is to follow indicates that there is gender-wage differential in Eritrean labour market. To be more specific, female employees on average earned about 66 % of what male workers earned in 1997.

University of Cape Town

The wage gap could be attributed to factors that can be measured, such as differences in education, experience, on the job training, hours of work per a week, occupations and sectors, and belonging to one ethnic group, etc. In addition, those variables that cannot be measured like unequal treatment in the labour market proved also to be significant.

1.2 The Rationale for the Study

In Eritrea, because of the long civil war and other social reasons such as beliefs and culture, a significant number of households are headed by women. As shown by the Income and Expenditure Household Survey 1997, 24 % of the households are headed by women. Many empirical studies (Appleton & Pedersen1997, Glick & Sahn 1997, Paglin & Rufolo 1990, Isemonger& Robserst 1997, Winter 1998) show that female employees earn less than their male counterparts. Eritrea is no exception. Such a situation causes an inequality in income between the two groups and in society as a whole. This is because the economic consequence of a gender-wage differential will not be restricted to the individual female employee who is earning lower wages than her male counterpart. The consequences will go further to influence their dependents, and will create or aggravate income inequality between the two groups and in the country as a whole.

Moreover as it has been proven in empirical findings that the negative consequence of unequal treatment of male and female employees (before or post entry) in the labour market is not only restricted to inequality between groups, but it is also extended to affect the productivity, economic growth and quality of life in the country.

Becker (1975) argues that if a male and female employee who are perfectly substitute face unequally treatment in the labour market so that male favoured over the female, then this will have a negative effect on firm's profit. This will in turn negatively affect investment in the firm, and growth of the economy as a whole. A report from the State

University of Cape Town

of World Population (2000) also warns that the unequal treatment of males and females in any form does not only harm millions of individuals worldwide, but it also cripples national economic growth. According to the report a 1 % increase in female secondary schooling may results in a 0.3 % increase in economic growth.

Endogenous growth theories stress the important roles that human capital in general and female education in particular plays in growth and productivity. This is because women's education increases labour market participation, provides better employment opportunities for women, and hence raises their productivity and incomes. (Klasen, 1999, and Blackden & Bhanu, 1998). Moreover, it is also believed that education raises the quality of life by improving health and labour productivity in both paid employment and household production, increasing the individual's access to paid employment, and facilitating social and political participation (Summers, 1994).

Furthermore, if non-economic factors, like gender are taken into consideration when hiring or rewarding employees with the same qualifications, it will result in misallocation of resources in the domestic labour market and enhances migration (as migration increases the price (wage) of human capital) to search for higher wages outside the domestic market. Besides, gender discrimination in the labour market has a forward and backward effect on the decisions of individual workers, parents, teachers and other actors.

The implication of the above explanation is that societies that discriminate on the basis of gender pay a significant price in terms of inequality, misallocation of resources and brain drain, slower economic growth and a lower quality of life.

Given the harmful effects of the gender-wage gap to individuals, society and the national economy, the rationale of the study is to provide robust estimates of this gap for Eritrea, and hopefully create awareness and help parents, society and national policy-makers in the country, by suggesting ways of avoiding it.

University of Cape Town

1.3 Objectives

Even though the degree of the gender-wage gap may differ from country to country, empirical evidence in many countries show that working women do not enjoy equal access, opportunity and reward in the labour market. Eritrea is no exception. The sources of the gender-wage gap could be due to those variables that can easily be measured such as human capital, or due to variables that cannot be easily measured such as discrimination. Hence the objective of this paper is to answer the following questions:

- Is there a gender-wage gap in the Eritrean labour market?
- If there is a gender-wage gap, to what extent can be explained by measured and unmeasured factors (such as discrimination)?
- What kind of public policies should be warranted to correct the distortion?

1.4 Structure of the Study

The rest of the study is structured as follows. In chapter two, we discuss alternative theories, which attempt to explain the potential sources of gender-wage discrepancy. After discussing the competing theories underlying the model that are used to measure the gap, we proceed to describe the data used in the model and to specify the potential causes of the gender-wage gap. Moreover, we discuss the methodology broadly in chapter three. The estimation procedure, descriptive and econometric analyses, is provided in chapter four. Finally, we present summary and conclusions in chapter five.

University of Cape Town

CHAPTER TWO

THEORETICAL BACKGROUND

2.1 Introduction

Many empirical studies have revealed that female employees earn less than their male counterparts. No one seriously disputes the existence of a gender-wage differential. There is, however, disagreement on the causes of the wage differential. Is it a result of gender discrimination? Or is it a result of differences in other characteristics that are correlated with gender?

Although easy to state, the questions are hard to answer mainly because it is difficult to pinpoint exactly the cause of each and every problem stated above. However, the persistent existence of a wage differential between groups in general, and between men and women in particular, has been the subject of great interest and concern to labour economists. This concern has led to the emergence of the various theories.

The existing theories on gender-wage differentials can be classified into two broad groups: the supply side and the demand side theories. The supply side theories suggest that the gender-wage gap can be explained by differences in innate abilities, acquired knowledge (i.e. the skills one possesses), and one's individual preferences. The theories that fall outside of the neoclassical paradigm suggest that the behaviour of employers and prevailing market conditions (such as prejudice, ignorance, monopoly power) are sources of a gender-wage differential.

This section highlights the general theories that suggest the potential sources of a gender-wage differential. Unfortunately, this study being the first in its kind in Eritrea, there are no similar empirical studies for comparisons or crosschecking.

University of Cape Town

2.2 Productivity Difference (Human capital theory)

According to Human Capital Theory, workers' knowledge levels are measured by their levels of formal schooling. Their attainment of higher education levels implies higher productivity, which in turn implies higher wages (developed by Mincer, 1958, 1962, and Becker, 1962, 1964).

The key argument of human capital theory is that wage differences arise from differences in group productivity levels. Productivity is, in turn, positively related to the possession of human capital, i.e. investment in education, training and work experience. According to human capital theory, therefore, the observed wage discrepancy is a result of the positive impact of human capital on productivity. Put differently, possessing a greater stock of human capital puts an individual into a better position to get a better job and in a better place to negotiate for higher wages than one who has lower levels of human capital. Hence, the gender-wage differential can basically be explained in terms of differences in productivity.

The implication of human capital theory to the gender-wage differential is that female workers are less productive because they possess less stock of human capital, hence they can legitimately be paid lower wages than their counterpart male workers who are supposed to be more productive. The conclusion is that the gender-wage differential is justified. That is to say, there are no unjustified differences. However, human capital fails to take into account the following points:

i) The feedback effect of social unfairness exercised in the labour market in the form of discrimination. According to Coate and Loury (1993b) the persistent existence of gender discrimination in the labour market can influence human capital investment choice both before and after an individual enters the labour market. It can also influence the behaviour of parents and teachers. By

University of Cape Town

definition, investment assumes that expenditure will result in benefits later. If the reward in the labour market is not attractive enough women might not be motivated to invest in themselves, not because they do not want to invest in human capital, but because they are discouraged by the outcome in the labour market. The question that the human capital theory fails to answer is: Do women invest less in themselves because they are paid less or are they paid less because they invest less? Human capital theory, therefore, implicitly ignores both the impact of discriminatory treatment in the labour market and the feedback effect.

ii) Human capital theory fails to consider the wage differential that may arise as a result of differences in family background, cohort and peer effects and differences in innate ability.

iii) The criticism of human capital theory is also extended as to whether education increases productivity or not. Some economists say it is ability and not education that boosts productivity. This argument forfeits the whole argument of human capital theory.

In spite of the limitations discussed above, human capital theory has played a great role in shedding light on the gender-wage gap arising from less investment in education of women. According to Mincer (1974) women invest less in themselves because they leave the market to bear children, which in turn lessens their productivity. It is true that, in addition to the formal education, employees learn by doing and thus accumulate experience, which helps them to increase their productivity. If women leave the market to bear a child, they may end up acquiring less experience, hence become less productive and earn lower wages than their male counterparts. This can bring about a gender-wage difference as well as differences in the acquisition of work experience, which impacts negatively on a woman's earnings in the long run.

University of Cape Town

Premature exit from the labour market amongst women is expected to be less prevalent in Eritrea mainly because the majority of female employees remain in the labour force once they enter it for the reasons listed below:

i) Low probability of getting a job after leaving the labour force for childbearing – it is not easy for a woman to get a job if she leaves the market for family responsibilities or for any other reason. This puts pressure on women employees to stay in the labour force.

ii) High level of poverty – this is to say that female workers' incomes make significant contributions to families' incomes. Hence, leaving the market for child-rearing would affect the life of the family.

iii) Strong family relationship- even though there are no baby-sitters in Eritrea, the strong family relationships help or encourage female employees to resume working. That is to say, close relatives take care of the children in the absence of the female workers and hence, minimise the cost of having a child.

2.3 Differences in Ability (Comparative advantage theory)

In contrast to human capital theory, the comparative advantage theory suggests that gender-wage differences may arise from innate endowments or biological differences. For instance, men are physically stronger than female workers. Similarly, motherhood is uniquely a female's job. Palling and Rufolo (1999) suggest that individuals have different initial attributes that determine comparative advantages in producing different kinds of human capital. It is stated that there is an ability difference between men and women. Therefore, according to this theory, individuals, just like in the production of goods market, may end up producing human capital in the fields they can most easily succeed in, or would choose to work in occupations that are less demanding. Since fields of study, occupation and wages are highly correlated, the gender-wage differential may arise as a result of the differences in men and women's

University of Cape Town

abilities. To put the above explanation in the words of Wonacott and Wonacott (1986:728), "An individual's income may be higher because of some specific talents or ability: Tome Aston was born with a great natural ability to hit golf; others are born with a special talent for solving mathematical problems". Therefore, those individuals who are born with special talents might enjoy easy access to higher paying occupations such as engineering.

Other empirical studies also prove that both quantity and quality of schooling account for a sizeable part of the race-based wage gap (Card & Kruger, 1992). However, quality of schooling is far more vital in explaining the male-female wage gap (Ploachek, 1978), which could possibly be the result of differences in comparative advantage. Differences in educational qualifications might be indications of pre-existing differences in ability (Marshall *et al*, 1980). The income differential in this case is not attributed to the differences in the stock of human capital but to the difference in the ability that produces the type of the human capital.

Ability is not a concept restricted to talent alone, but also incorporates tolerance and patience (in short, it includes all innate abilities). As stated by Altonji and Blank (1999), if unskilled employees who are tolerant of dirty or risky jobs are mainly male, then men will largely fill these jobs. This kind of job segregation could result in compensating differentials between men and women. In addition to this, if a male worker is a better match physically for some occupations, he may enjoy wage premia over a female worker in these occupations.

The implication of comparative advantage theory to gender-wage gap analysis is that men and women choose different fields of study, and differ in tolerance and physical fitness, and this may help to explain the gender-wage gap. This is because field of study, tolerance and physical fitness are positively correlated with occupation and wages.

University of Cape Town

Although the theory cannot adequately explain the gender-wage differential, it suggests the potential source of wage differential.

2.4 Differences in Preferences (Difference in group preferences theory)

The discussion of group differences in preferences is emphasized mainly in the gender difference in wages rather than race or ethnic differences. Altonji and Blank (1999) argue that individuals' preferences for market versus non-market and for types of jobs such as manual work versus office work differ.

Differences in individual preferences may result in group difference in preferences. Women and men as a group may prefer certain types of jobs with specific characteristics. The common believe, for instance, is that men may adopt a more ambitious approach towards wage work and married women a less ambitious attitude toward market work as a result of marital status (Graddy & Pistagerri, 2000). Hence, the allocation of preferences for specific job characteristics between groups, on the one hand, and the value to employers offering jobs with particular characteristics, on the other, will determine the occupational allocation and wage distribution for a particular group[1]. This may lead to male-dominated (relatively high paid) and female-dominated (low paid) occupations.

It is true that differences in group preferences can explain at least some portion of gender-wage differences in the labour market as long as individual employees have different choices in market and non-wage work or in particular occupations. However, the whole discussion of differences in group preferences is all about the behaviours as regards choices of individual employees. The question remains: Why do individuals prefer non-market to market work or vice versa? In this case the causation effect is not dealt with.

University of Cape Town

The sources of the gender-wage gap might be attributed to other factors, and not to differences in group preferences. The cause could be traced back to pre-market discrimination in child-rearing practices and in the educational system (Altonji & Blank, 1999) or it might be attributed to biological differences (since women and men are not the same physically).

Although the above theory cannot explain the gender-wage differential adequately, it nonetheless suggests a potential explanation for the wage gap.

2.5 Pre-labour Market Discrimination Theories

According to McConnell and Brue (1989) pre-labour market discrimination is the same as human capital discrimination. They define it as the lack of equal opportunity to education and training or anything related to human capital investment.

As identified by Ehrenberg and Smith (1985), there are three stages of investment in the knowledge and skills of a particular worker. The first stage is in early childhood when the individual does not decide for him or herself. The second is in adulthood when the individual decides for him or herself, and the third is in the place of work. The acquisition of human capital in early childhood is largely determined by the decisions of others (most of the time by parents). Therefore, according to pre-labour market theory, if pre-market discrimination is practised before the individual employee enters the labour market; it may affect the productivity and the wage of the worker.

In the case of gender discrimination (unlike race) it is less likely that women would be discriminated against in enjoying equal access to government education. However, empirical studies prove that because of economic and socio-cultural factors, parents

[1] Classic references are Thaler and Rosen (1975), and Rosen (1986)

University of Cape Town

exercise pre-labour market discrimination. As indicated by Thomas (1990) recent studies outside the US have emphasised parental discrimination in favour of boys as the cause of the gender gap in human capital attainment. Moreover, Cain (1986) and Altonji and Blank (1999) suggest that if an educational difference between male and female is large, it may reflect societal discrimination (pre-labour market discrimination).

This seems plausible in developing counties where a boy-child is often considered to be more valuable than a girl-child because of strong cultural factors. Eritrea is no exception. The implication of the pre-labour market discrimination theory for the male-female wage differential is that the human capital possessed by the group (say, women) may in itself encourage discrimination. Therefore, the source of the wage differential could be viewed as arising not from the acquisition of education at the second stage (adulthood when individuals decide for themselves) or third stage (after individuals have entered the labour market) but from discrimination practiced by parents before individual workers enter the labour market or the higher education system.

The pre-labour market discrimination theory suggests one of the potential sources of the gender-wage gap but cannot adequately explain it.

2.6 Employers' Behaviour and Labour Market Conditions

Earlier sections discussed how differences in endowments (innate or acquired) and the behaviour of employees could be potential sources of the gender-wage gap. This section provides a discussion of how market conditions (market imperfection and segmented labour market) and the discriminatory behaviour of employers can be sources of potential gender-wage differences.

University of Cape Town

One could say that a certain group of employees is discriminated against when one group (female, in our case) has the same abilities, education, training and work experience as another group (male) but is treated unequally with respect to hiring, occupational access, promotion or wage rate (McConnell & Brue, 1989). The discriminatory behaviour of employers might take on different forms. According to Winter (1998) there are four types of discrimination in the labour market, that is employment, wage, on-the-job training and occupational access discriminations. Employment and wage discrimination are the most common type of discrimination exercised in the labour market. Employment or wage discrimination occurs when female employees who have equal or similar human capital and required skills do not enjoy equal access to employment or obtain lower wages than male employees because of their gender.

On-the-job training discrimination occurs when females do not enjoy equal access to the training offered by employers in the workplace mainly because employers believe women are less attached to the market. The negative impact of this decision by employers might result in a low wages-experience profile for female employees. This is because women are protected from an investment (from learning by doing) that is expected to boost their productivity.

Moreover, occupational discrimination exists when female employees are prohibited from entering certain occupations for economic reasons (i.e. employers may discriminate more informally when they consider interactions between women and men in the workplace adversely affect productivity), legal reasons (i.e. when labour laws prohibit shifts or night work) and cultural reasons (i.e. because society classifies male and female occupations). The negative impact of such decisions is over or under-representation of one group (female) in a less desired and low-paying occupation.

University of Cape Town

2.6.1 Employers' Preference (Preference theory)

Becker (1971) tries to explain how labour market discrimination arises from personal prejudice whereby employers dislike associating with workers of a given race or sex. Employers may feel comfortable or uncomfortable employing some specific groups in their work places. The implication of employer's preference on the gender-wage differential is that the prejudice may take the form of hatred associated of being with the group that they do not want to hire (in our case it may be with women). It may also manifest as a desire to help the group they like to work with (fellow men) whenever possible, or it may be motivated by considerations of rank and take the form of occupational segregation, thus shunting female workers to low-paying occupations while promoting male workers to the high-paying occupations.

Therefore, preference or prejudice means that employers have to pay for their prejudice in terms of higher wages for such favoured workers. If the wages earned by women are less than those of men, the employer can maximize his profits by employing women only. If, however, the employer ignores the wage relativities and employs male workers, his profits will be lower. According to this model, non-discriminatory employers will be at a competitive advantage because they can recruit equally productive workers from other groups (female) at a lower wage and gain in terms of profits. As a result of the competitive labour market, the wages of those lower-paid workers (female) ultimately will be driven up, implying that discrimination will be eliminated in the long term.

This further implies gender discrimination only persists where there is some degree of imperfect competition. The major criticism of this theory lies in the statement that discrimination will, in the long run, disappear by itself in a competitive market. As indicated by McConnell and Brue (1989) and Faundz (1994), evidence in the USA does not show declining gender-wage discrimination. Despite the long-term prediction, gender-wage gaps persist over very long periods. This proves that it is

University of Cape Town

highly unlikely that gender discrimination will be abolished by market forces without government intervention.

2.6.2 Employers' Ignorance (Statistical discrimination theory)

Employers' ignorance of important information about potential employees may cause the gender-wage differential. In their screening process, employers may use personal and group data when hiring employees. They consider all the personal qualifications and work experience of the individual, but they still hardly know about the productivity of the individual based on the personal data supplied by the prospective employees. For example, personal information like education is a weak predictor of productivity. Hence, employers use group characteristics such as gender when they are screening workers. This is referred to as the so-called screening problem.

Hamermesh and Rees (1988) summarised employers' ignorance as follows: employers base their employment decision on the perception of reality. That is to say that an individual (female) employee is discriminated against because employers consider the group that individual (female) belongs to as less productive than another group (male). This does not mean that they have a taste for gender discrimination but, rather employers utilize group traits like race and sex because of the information asymmetry and because, unlike with proper screening of personnel, it is an inexpensive selection characteristic.

The following example makes this argument clearer. If an employer is faced with two identically qualified and competent candidates, one male and the other female, he may take into account the likely costs of employment associated with each of them. On average, it is more likely that if he hires the woman, he will face maternity costs. Women are more likely to leave the labour force for child-rearing which will decrease their productivity. This selection criterion is used regardless of whether the individual might have better characteristics (for example, a female might not leave the market

University of Cape Town

for child-rearing) than the group as a whole. One member of the group is therefore discriminated against on the basis of belonging to that group, thereby reducing the demand for that particular group. Consequently, the wages will also be below the levels that would have been offered, had they been given equal treatment with the favoured group.

The implication of the above theory to the gender-wage gap is that the greater the similarity between the relevant demographic groups, the less effective it becomes to apply group characteristics. Therefore, the gender-wage gap disappears gradually.

2.6.3 Market Imperfection (Monopoly power)

In the case of market imperfections, employers may use their power and offer different compensation levels to different groups of employees if they realise that it can be more profitable or minimises costs. Up until now firms were assumed to be prices-takers, but in the case of market imperfection firms have some degree of influence over the wages they pay.

As pointed out by Barker (1999), where there are no competitive conditions the employer may apply a wage differential to equally productive groups of workers (for example, men and women) when they find it profitable. The employers will find it advantageous to pay lower wages to groups of workers whose labour supply is inelastic (i.e. less responsive to a wage reduction). This suggests that in a situation where there is high unemployment of some groups (women in this case), employers can be encouraged to pursue discriminatory policies against women.

The implication of the model on gender-wage differentials is that differentials can be avoided or minimized by solving the unemployment problem through economic growth and job creation. However, this is not what happens in reality. Even countries

University of Cape Town

with relatively competitive labour markets, such as the US, still face compensating differences between male and female employees.

2.6.4 Segmented Labour Market (The institutionalists' theories)

Economists have for years attempted to determine which factors are more responsible for the large wage gap that exists between men's and women's wages in the labour market. The institutionalists present the notion of a Segmented Labour Market as a potential source of the gender-wage differential. Various types of Segmented Labour Market models exist (differing in the number of segments that characterise the market and the cause of the segmentation).

The most recent and notable view suggested by some economists is the existence of a dual labour market. According to dualists, the labour market is divided into two non-competing sectors: the primary sector (which pays relatively high wages, offers stable employment, has good working conditions, and has good opportunities for advancement) and the secondary sector (which offers relatively low wages, is unstable, offers few promotional opportunities and has poor working conditions). The returns to education and experience in the latter sector are considered to be insignificant (Ehrenberg & Smith, 2000). Furthermore, Dex (1985) also suggests that the primary sector itself is further classified into two sectors, the first of which covers the professional and managerial positions with favourable conditions and attractive wages, and the second of which is the less favourable sector. Dualists argue that motilities between sectors are limited. Workers demoted to the secondary sector are marked as unstable, unwanted workers, and are thought to have little hope of obtaining primary sector jobs.

According to the dualist labour market theory, women have been historically employed in the secondary sector. They have, therefore, been exposed to discrimination due to the perception that women leave the market at some time in

University of Cape Town

order to fulfil their child-rearing responsibilities. The dualists argue that it is due to this unstable work history that women have not been able to break into the primary labour market.

As a result, earnings become a function of segment, rather than of all the previously mentioned factors such as human capital investment choice, preferences and information asymmetry. The arguments of the intitutionalist have some validity, because, in the case of women, recent empirical evidence suggests that there are two distinct sectors of the labour market. The first is one in which education and experience is associated with higher wages. The second is one in which they are not, and women are more likely to be in the latter sector (Dickens & Lang, 1985). However, the intuitionalists do not really explain the initial cause of the concentration of women and minorities in specific segments, i.e. secondary sector jobs. Is this because of their preferences or because of some other constraints?

University of Cape Town

2.7 Conclusions

The supply-side theories suggest that the gender-wage gap can be explained by the differences in innate or acquired knowledge, skills of workers, and differences in group preferences. Individuals may join the labour market with different abilities that could give them easy access to high-paying jobs. Different preferences result in individuals taking low-paying jobs, and different human capital investment resulting from pre-labour market discrimination may prevent them from enjoying all the opportunities that the other group enjoys. Hence, the observed gender-wage differential is solely because the human resources rented out to the employer are different in quality. Conversely, the demand side theories suggest that the gender-wage differential exists because of employers' preferences, lack of perfect information, the existence of market imperfections and segments in the labour market.

However, no one theory is dominant in explaining the gender-wage gap. There is a bit of truth in all of them. In some countries, the labour market may be understood in terms of one theory over another, given the economy's particular configuration and that society's own history.

In the case of Eritrea, because of the strong cultural factor which demands that women do the non-market job of child-rearing and take on other family responsibilities, and because of the incapability of employers to know the productivity of potential employees (information asymmetry) the pre-labour market discrimination theory and ignorance of employers (statistical discrimination theory) respectively could explain the gender-wage gap in the Eritrean labour market more than the remaining theories can.

University of Cape Town

CHAPTER THREE

DATA, METHODOLOGY AND VARIABLE SPECIFICATION

3.1 Introduction

In this section we will discuss methodological issues, variable specification and the nature of the data used for the analysis. Oaxaca-Blinder (1973) is the standard model used to measure the gender-wage differential. The same model will be applied in measuring the Eritrean gender-wage differential. Moreover, for a general overview of the data, a descriptive statistic analysis will be provided. The data used in the analysis is the Income and Expenditure Household Survey 1997.The data being the first in its kind there are no similar data sets for comparisons or cross-checking. Finally, all the variables included in the model and reasons for their inclusion will be presented.

3.2 The Data

The data used in this paper is drawn from the urban Eritrean Household Income and Expenditure Survey (EHIES) conducted by the National Statistics Office (now Statistics and Evaluation Office) of Eritrea and Fafo institute for Applied Social Science between August 1996 and October 1997. All members over the age of ten of each participating household were asked a series of detailed questions about their labour market activities as well as personal characteristics such as the level of education. The survey covered 5200 households (and over 76,000 individuals) of all ethnic groups in twelve urban centres in all the regions of the country.

However, in analyzing the gender-wage differential in the labour market we confined our investigation to men and women between 16 and 65 years who had positive

University of Cape Town

earnings and full time workers[2] who work in Asmara (the capital city), other highland towns (Adikeih, Nakfa, Mendefera, Decemhare, Keren, Ghinda), Western Lowland towns (Barentu, Agurdat, Tesseney), Massawa and Assab (Ports). After deleting the observations with missing values, the sample consists of 6033 observations out of which 4180 are men and the remaining 1853 women. The mean values of the explanatory variables of the wage model are given in table 13.

3.3 Methodology

Both descriptive statistics and econometric modelling will be part of the methodology in analysing wage differential and discrimination. Two models: the very simply Mincerian (1974) human capital earnings function and the Oaxaca-Blinder (1973) decomposition technique will be employed in measuring the gender-wage differentials and discrimination.

University of Cape Town

3.2.1 Simple OLS Estimates

The human capital earning function derived by Mincer (1974) can be summarized in the following wage equation:

$$\ln W_i = \alpha + \beta_i \mathbf{X}_i + \mu_i \quad \text{..... (1)}$$

Where lnW is the natural logarithm of the gross monthly wage for individual i; $\mathbf{X_i}$ is a vector representing the set of characteristics thought to be significant in the determination of individual earnings; μ_i is the error term.

[2] The full-time workers are those who worked more than 35 hours per week. Workers with non-positive or unspecified wages and observations with missing data on any variable included in the earnings functions were deleted.

The wage equation is estimated using Ordinary Least Squares (OLS) regression. The technique involves estimating the extent to which the disparity in the wage variable is associated with difference in the explanatory variables, which in this case are all the measurable variables. Keeping the effect of the others, the above technique enables the definition of the independent impact of each of the explanatory variables on the log of wages.

This equation can be used to decompose the gender-wage differential. The above OLS model assumes the slope coefficients of explanatory variables are to be equal for both men and women. In other words, the model is a restricted model since only the intercept varies with gender, but the returns to all other variables are restricted to be equal for men and women. Of course one can test these assumptions by running a Chow-test.

3.2.1 Chow Test[3]

In the post-entry labour market discrimination analyses running the Chow test as "the general approach is to take structural difference between male and female wage equations as a *priori* evidence of discrimination" (Chiplin & Sloane, 1976:733).

Two separate regression functions (with the same variables) ought to be estimated, that is one for men and one for women. After estimating two separate functions it is necessary to test for structural change between the two functions. "The structural test may mean that the two intercepts are different, or the two slopes are different, or both the intercept and the slopes are different or any other suitable combination of the

[3] The assumptions underlying the Chow test are twofold: a) $\mu_{1t} \approx (0, \delta^2)$ and $\mu_{2t} \approx (0, \delta^2)$ that is, the two error terms are normally distributed with the same variance δ^2, and b) μ_{1t} and μ_{2t} are independently distributed.

University of Cape Town

parameters. Assuming that the two earnings functions are equivalent, the Chow test is then applied," (Gujarati, 1995:263).

If the null hypothesis is rejected then this implies that the two functions are structurally different. This in turn implies that the earnings profiles of men and women are not homogenous. If it is otherwise, it implies that the two functions are the same, and further implies that we should not go further and decompose the two equations to investigate the sources of the gender-wage gap. Assuming the male and female wage equations are significantly different it is then possible to operationalize the standard Oaxaca-Blinder (1973) decomposition technique to measure the gender-wage differentials and discrimination.

3.2.3 Oaxaca – Blinder (1973) Decomposition

The most widely used, and now standard, approach for the measurement of gender-wage differences is the direct regression approach of Oaxaca (1973) and Blinder (1973). The Oaxaca–Blinder (1973) decomposition technique measures the gender-wage differential and discrimination by separating the effects into two parts: the wage differential as a result of the measurable variables (such as human capital endowments) difference and another part that cannot be measured which is commonly taken to represent labour market discrimination.

Basically, this frequently used model for measuring wage differentials and discrimination, assumes that where discrimination does not exist the estimated effect of male and female workers' endowments on wages are identical. Furthermore, differences are not only restricted to intercept terms through simple dummy variable specifications, but also include variations in estimated slope coefficients.

The following steps are pursued in the model to measure wage difference and gender discrimination:

University of Cape Town

1) Estimate wage regressions for the sample of men and a sample of women separately.

$$\ln(wage)_i^M = \alpha^M + \beta X_i^M + \mu_i^M \quad \text{..... (2)}$$

$$\ln(wage)_i^F = \alpha^F + \beta X_i^F + \mu_i^F \quad \text{..... (3)}$$

Where F equals female and M equals male; the notation *lnwage* is the natural logarithm of gross monthly wages, X_i denotes an nxk – dimensional matrix of observed characteristics known to affect wages (education, experience, industry and occupation, type of employer, marital status, hours worked, etc), β is the k-dimensional column vector of regression coefficients associated with the characteristics, and μ_i is a white-noise error term assumed to be normally distributed with variance σ^2.

2) Taking the mean values of the independent variables and subtracting the second from the first equation gives:

$$\ln(wage)^M - \ln(wage)^F = \sum \beta^M (X^M - X^F) + \sum X^F (\beta^M - \beta^F) \text{.....(4)}$$

Or

$$\ln(wage)^M - \ln(wage)^F = \sum \beta^F (X^M - X^F) + \sum X^M (\beta^M - \beta^F) \text{.....(5)}$$

The dependent variable

The left-hand side of equations 4 and 5 represent the difference in log mean wages between male and female. The value on the left hand side is equated with the explained (the first term on the right-hand side of equations 4 and 5) and unexplained components (the second term in equations 4 and 5), which is commonly referred to as discrimination. Any differential in log means gross monthly wage between men and

University of Cape Town

women therefore arise from either the difference in rewards to male and female characteristics ($\beta_m - \beta_f$) or from the difference in the quantity of these endowments held by men and women employees ($X_m - X_f$). The wage differential caused by differences in endowment is normally called non-discriminatory[4] or justified discrimination. Whereas the difference in male and female coefficients is commonly known as unjustified discrimination and provides the upper (lower) bound estimate of discrimination.[5]

These two equations explain the difference in the average wage of men and women that can arise because $\beta_m > \beta_f$ and $X_m > X_f$. Using either of the two equations stated above one can measure the gender-wage gap and the two sources of the gender-wage differential. The decomposition technique may be sensitive to the choice of index (standardizing according to male means or female means), ideally both decompositions should be carried out. Equation (4) is referred to as standardizing by female means while equation (5) is referred to as standardizing by male means[6].

The formulations in equations 4 and 5 correspond to Oaxaca's first and second assumptions, respectively. "In his empirical work he treated the issue as essentially an index number problem and obtained estimates from both formulations, using them to establish the range within which the true values of the components presumably would fall. Some subsequent research followed Oaxaca's example of estimating both forms of decomposition, while others opted for one form or the other, or some variant of

[4] In this respect the Oaxaca-Blinder (1973) is trying to categorize the sources of the wage differential into two parts: the measurable variables (non-discriminatory) and unmeasurable variables (discrimination). But this doesn't mean that parents do not exercise pre-labour market discrimination, for religious cultural or other reasons. The standard model of Oaxaca–Blinder (1973), accommodate such kind of problems with some caution of interpreting the error term.

[5] It will be an upper bound if there are omitted variables. Conversely, if the variables reflect discrimination, for instance, if education reflects pre-labour market discrimination, it will be lower bound. Therefore, caution has to be taken when interpreting the error term.

6 Oaxaca explained these alternative forms of the decomposition in the following manner: On the basis of either of two assumptions, we can estimate the Male-female wage ratio that would exist in the absence of discrimination: if there were no discrimination, 1) the wage structure currently faced by female would also apply to males, 2) the wage structure currently faced by males would also apply to women. Assumption one (two) says that women (Males) would on average receive in the absence of discrimination of same wages as they presently receive, but that discrimination takes the form of males (female) receiving more (less) than a non-discrimination labour market would award them (1973:695).

University of Cape Town

both" (Cotton, 1998:237). In this study, we employ both equations to estimate the range within which the true values of the components presumably would fall[7].

The dependent variable can be estimated in two ways. The mean log monthly wage of men and mean log monthly wage of women can be separately estimated, and the mean log monthly wage of women can be deducted from the mean log monthly wage of women to get the gender-wage gap (this is the same like subtracting the geometric means of men and women). Or, using the decomposition technique, the values for the two components (i.e. the difference in endowment and discrimination) can be estimated and summed up to get the dependent variable.

The explained component

This simply states that the coefficient of male multiplied by mean characters of male minus coefficients of male multiplied by mean characters of female. In other words, one has to multiply each mean explanatory variable of female by the respected male coefficient and deduct from the mean explanatory variables of male weighted by each respected male coefficient. The summation of it will measure the explained component of equation 4. This is the same as plugging in the average values of the female characteristics into the male equation to estimate the female earnings in equation 4. Likewise, the explained component can be measured using (5).

University of Cape Town

[7] In this case, it doesn't mean that the index number problem can generally be resolved by looking simply at the range of estimates when changing the benchmark from male to female. It is difficult to say so. That is because there is no guarantee that the appropriate counterfactual for the return structures for men and women would lie anywhere in the range. The non-discriminatory return structures for both groups are of course dependent on the preferences of men and women for market versus non-market labour, and without knowing more about this, it is hard to say that a common return structure would lie somewhere in the range of the rates of return to say education for men and women.

The unexplained component

The unexplained component can be estimated in two ways. One is to directly estimate discrimination by differencing the female coefficients from the male coefficients and weight by the female characteristic values of the female if equation 4 is used. If equation 5 is employed, the male characteristics are multiplied by the difference of the male and female coefficients. Or discrimination can be indirectly estimated by first estimating the dependent variable (by differencing the mean log wage of male and the mean log wage of female) and the explained component and deducting the explained component from the dependent variable. Estimating discrimination using the two different approaches might be different.

3. 4 Variable Specification

Before one commences measuring the gender-wage differential and discrimination using Oaxaca–Blinder (1973), for unbiased estimation the following questions need to be answered: what variables could cause the variation in the dependent variable? And what variables are available in the data? Therefore, here below, we present the specification of the dependent and independent variables included in the model.

Dependent variable

The dependent variable is the worker's gross monthly wage or salary. This includes the regular hourly wage and overtime payments.

University of Cape Town

Explanatory Variables

Education

The reward for education in the labour market varies across the educational ladder. Therefore, to capture the influence of education, as a continuous variable but with different slopes, on the gender-wage differential three educational splines are incorporated in the model. The three educational splines included are for those who have no education and completed primary education (edulev1), completed secondary education (edulev2) and completed tertiary education (edulev3). Signs of the coefficients of the three educational splines are expected to be positive implying higher education higher wages.

Experience

Wages differ with differences in work experience (Mincer, 1994). Since actual labour market experience is not available, potential experience is used as a proxy[8]. Hence to capture the male-female wage differential that may arise because of differences in experience of work potential experience is included in the model. Wage is positively related with work experience. Thus a positive sign is expected.

Experience squared

A squared term for experience is included to allow for the possibility that experience's influence on wages is non-linear. This is to demonstrate that returns to experience are positive and decline with increase in experience peaking somewhere on the average working life. If the earnings function is concave in experience, as is

[8] Potential experience is calculated using the convention Mincerian approximation (Age – educational level – 6)

University of Cape Town

suggested by human capital theory, then the expected sign of the coefficient is negative.

Erichen and Wakeford (2001) warned that if one uses potential experience as a proxy for actual experience might inflate the quantity of experience. This is because it implicitly assumes that all workers begin elementary school at age six and that no time is spent outside the labour force or school. Note in particular that for females the temporary withdrawal of women from the labour market is not captured.

Hours worked per week

The dependent variable in our analyses is gross monthly wage. So long as the dependent variable is monthly wage, hours of work need to be included to capture the gender-wage differential as a result of variation in hours worked. Wage and hours worked are positively related and the expected sign of the coefficient is positive.

Marital Status

Marital status of individuals has an impact on their wages. For instance, married men have a responsibility to feed for the family and this push them to either work hard in their current occupation or search for a better paying job. Alternatively, a common belief is that married men may take on a more ambitious attitude toward work and married women a less ambitious attitude toward work as a result of marital status (Grady & Pistagerri, 2000). On the other hand, however, married women may be more likely to work because they are able to save money for investment through their husbands to open small enterprises or use their husband's connections to find wage employment (Glick & Sahn, 1997).

Hence marital status can either negatively affect an individual's wage especially in the case of women in less developed countries whose wages are perceived as just being

University of Cape Town

there to compliment their husbands' income, or positively if marriage offers an opportunity of getting a job or power to invest. Therefore four marital status dummies: married (mari1), widowed (mari2), divorced (mari3) and never married (mari4) are included in the analyses to capture the impact of marital status in the gender-wage differential. Married is the referent variable. We expect an ambiguous relationship between marital status and wages.

Industry

The industry in which an individual is employed also has an effect on their wage. This is because the demand for skilled and unskilled labour differs between the industries depending upon the nature of production. The skilled- unskilled ratio might be higher for the tertiary sector compared to secondary and primary sectors, i.e. the demand for skilled might be higher in the tertiary (such as financial and business service sectors) compared to secondary (such as manufacturing) and primary sectors (such as agriculture and mining). Hence the unequal distribution of skill between the sectors might result in a wage differential between male and female employees. Moreover, wages for individuals with the same skills and occupations can vary depending upon the risk linked a sector. For instance, a manager from the mining industry can earn more than a manager in the public sector because the one from the mining sector has a high-risk premium, so he or she is rewarded by a higher wage. Hence, to capture the sectoral gender-wage gap sixteen industrial dummies were considered in the analyses and these are Agriculture (ind1), Fishing (ind2), Mining (ind3), Manufacturing (ind4), Energy and Water (ind5), Construction (ind6), Trade (ind7), Hotels and restaurant (ind8), Transport and communication (ind9), Finance and Real estate (ind10) Public administration (ind11) Education (ind12) Health and Social work (ind13), Other service activities (ind14), Private households (ind15), and Extra-territorial organization (ind16). The signs of the coefficients are expected to be ambiguous. Moreover, the agricultural sector is considered to be the categorical variable.

University of Cape Town

Occupation

The occupational distribution of men and women across the occupations are different. As indicated by empirical evidences women are over-represented in the so-called female dominated occupations and men are over-represented in the male–dominated occupations. One of the main reasons for the male-female wage differential is that those occupations that are disproportionately filled by women tend to be relatively low-paying occupations while male-dominated occupations tend to offer high wages.

Hence, to capture the differential as a result of being working in different occupations we incorporated eleven occupational dummies and theses are Professional & technical (occp1), Administrative & managerial (occp2), Government & executive official (occp3), Clerical works (occp4), Sales workers (occp5), Service workers (occp6), Military (occp7), Agriculture & Fishing (occp8), Production related (occp9), and Transport equipment operators (occp10). The referent variable is daily labourers. The signs of the coefficients are ambiguous.

Employer

Wage differs with the type of employer. The self-employed, for instance, earn less than those employees in the governmental and public sector. Thus, in the wage estimation process four employer dummies were included to capture the difference that may be elicited from being employed in different employers. These are Government (empl1), Private (empl2), Public (empl3) and self-employment (empl4). The variable 'government' is the base variable. Moreover, the expected sign is ambiguous.

University of Cape Town

Ethnic group

Wage levels may also vary with ethnicity. This could be when belonging to one group opens more access to different variables important in the wage determination process or when belonging to one ethnic releases opportunity to employment or promotion. To capture the wage differential that may arise as a result of belonging to one ethnic group, we incorporated in our model nine ethnic dummies. These are Afar (ethn1), Billen (ethn2), Hedarb (ethn3), Kunama (ethn4), Nara (ethn4), Rashaida (ethn5), Saho (ethn7), Tigre (ethn8) and Tigrigna (ethn9). The base variable is specified to be Tigrinya ethnic group and the expected sign is ambiguous.

Place of work

Wage differs with the place of work. This is because in one place there might be more employment and overtime work, while in other places of work the demand for labour may be low. Or, because of harsh working conditions, wages might be high in some places and low in others. Hence, to capture the wage differential that could be demonstrated as working in different places we integrated twelve town dummies; namely, Adekeyih (town1), Akurdet (town2), Assab (town4), Barentu (town5), Decemhare (town6), Ghinda (town7), Keren (town8), Massawa (town9), Menderfera (town10), Nakfa (town11), and Tseney (town12). The base variable is specified to be Asmara. The sign of the coefficients of the dummy variables are ambiguous.

Fighter

The variable 'fighter' is included in the analyses to represent whether an individual employees has participated in the liberation struggle or not. This is because the wage determination process for those employees who participated in the liberation struggle and those who did not are quite different. In the wage determination process of those

University of Cape Town

employees who participated in the struggle for liberation non-economic factors (a sort of affirmative action) are considered.

Generally the employees who participated in the liberation struggle earn more than those employees who didn't participate in it. This is consistent for both male and female workers. However, the proportion of male employees who participated in the army struggle for liberation is significantly higher than for female employees (in the sample 18% and 13% of the sample labour force are male and female fighters respectively). Hence, in the analyses of gender-wage gap, some portion of the differential is expected to be explained by whether one belongs to the fighter group or not. Therefore, the impact of wage differential that arise as a result of belonging the fighter group or not is capture by a dummy variable defined as; 1 if one belongs to that group and zero otherwise. The sign of the coefficient of male is expected to be positive.

Finally, job tenure, union membership, quality of education, educational level of parents, children less than six and ability might influence wage earnings. However, information was not available in the income and expenditure household survey 1997.

University of Cape Town

3.5 Specification Test

After specifying the variables that cause the gender-wage differential and dealing with the expected sings on the various explanatory variables, it is necessary to run the specification test. The problem with most models is an over-reliance on assumptions that rarely hold true. The solution to the problem is undergoing the required test. Heterogeneity is, for instance, a problem associated with cross-sectional data.

3.6 Conclusion

Basically, the estimation technique commences by including all the measurable and available potential sources of the gender-wage gap in the model. However, it is possible for three reasons that some differences would remain 'unexplained' even if all the measurable factors were incorporated. Firstly, some variables cannot be observed or measured by the researcher. Secondly, the existing variables are inaccurately or poorly measured in the estimation. Alternatively the unexplained differential could be interpreted as resulting from discriminatory treatment in the labour market.

Moreover, to investigate the causes of gender-wage differences is simply to employ a human capital approach and estimate the wage equation using the Ordinary Least Square (OLS) regression. In coming up with the measure of discrimination first, estimate three wage equations, which included a pooled one for both men and women and two others for men and women, respectively. Then apply the conventional Oaxaca-Blinder (1973) decomposition technique to decompose the differences as explained and unexplained components. Specifications tests are however necessitated.

University of Cape Town

CHAPTER FOUR

DESCRIPTIVE AND ECONOMETRIC ANALYSES

4.1 Introduction

This chapter provides descriptive statistics, giving a general overview of the data on the wage differential between men and women. However, since we could not measure each variable's contribution to the wage differential using descriptive statistics, we go further to model the earnings function of both male and female employees and measure the wage gap which could be attributed to an 'explained' (also commonly known as human capital investment) component and to an 'unexplained' (discrimination) part.

4. 2 Wage Differential: Descriptive Statistics

In 1997, the mean monthly gross wages of women was Nacfa 376, or 61 % of men's average monthly gross wage, Nacfa 615.[9] The wage gap, as one can imagine, can be attributed both to differences in human capital investment and unequal treatment in the labour market. In order to better understand the causes of the wage gap it is necessary to analyse the distribution of the endowments between the groups and how the two groups are distributed in the major occupational classifications, sectors etc. In addition, it is necessary to analyse the wage distribution across all variables included in the model. For a general overview of the male-female wage gap at different level of income, a presentation of wage distribution by percentile will be helpful.

University of Cape Town

[9] This is equivalent to 52.22 and 85.42 US dollar respectively. In 1997 one American dollar was exchanged for 7.20 Nacfa.

Wage distribution by percentile

A percentile wage distribution shows what percentages of workers in an occupation earn less than a given wage and what percentages earn more. Table 1 presents the wage distribution by percentile level and gender.

Table 1: Percentiles of gross monthly wages by gender

Percentile	Male	Female	National	Log(Mp-Fp)	%Of male
10%	202.78	121.67	152.08	1.91	60.00
50%	506.94	283.89	446.11	2.35	56.00
75%	811.11	456.25	709.72	2.55	56.25
90%	1115.28	811.11	1049.38	2.48	72.73

As revealed from table 1 above, 10 % of all the employees earn less than Nacfa 152 and the remaining 90 % earn more than Nacfa 152 per month. However this figure differs when disintegrated by gender. Male and female employees in the 10th percentile earned Nacfa 203 and Nacfa 122 per month respectively. Women earned 60 % (or Nacfa 81 less than men) of what men earned in 1997.

Moreover, 50 % of all the employees earned Nacfa 446 per month. Both male and female employees in the 50th percentile earned Nacfa 507,284 per month respectively. Women in the 50th percentile earned 56 % of what men earned (Nacfa 233 lower than men) in 1997.

Furthermore, 75 % of the total employees earned less than Nacfa 710 and the remaining 25 % earned more than Nacfa 710 per month. Men and women in the 75th earned Nacfa 811 and Nacfa 456 respectively per month. Women in the 75th percentile earned about 56.25 % or Nacfa 355 lower than what men earned in 1997.

University of Cape Town

In addition, 90 % of the employees earned less than Nacfa 1049 and 10 % earned more than Nacfa 1049 per month. Male and female employees in the 90th percentile earned Nacfa 1115 and Nacfa 811 respectively per month. Women in the 90th percentile earned about 73 % or Nacfa 304 lower than what men earned.

Clearly the largest gender-wage gap was indicated for those workers in the 75th percentile compared to the other percentiles. The median gender-wage gap (56 %) was larger compared to the mean gender-wage gap (61 %).

Education

The mean years of education in the sample is 7.46, the average male and female schooling are 7.95 and 6.41 respectively. Male employees had about a year and a half more years of schooling than female employees. As indicated in chapter three, workers' labour market outcomes are affected by the amount and kind of education they acquire, and so is the condition with both male and female Eritrean workers.

Table 2: Gross mean monthly wages by educational level & gender

	Sex			
Level of education	**Male**	**Female**	**Average**	**%Of male**
No formal education	384.01	206.71	310.69	53.83
Primary & Junior education	549.01	273.26	473.2	49.77
Secondary education	630.53	486.22	587.31	77.11
Tertiary education	928.06	755.62	898.54	81.42
Average	615.15	376.14	541.78	61.15

As indicated in table 2 above, both male and female workers' wages are positively related to education as expected. That is to say, across the educational hierarchy wages increase for both male and female workers simultaneously. However, even though wages of both male and female employees are positively related to educational level, women earn less than men across all the educational levels. The wage gap is highest in primary and junior education where women's wages are about 50 % of

University of Cape Town

what men earn. Conversely, the gap is minimum at tertiary education level at about 82 %.

Furthermore, the mean gross monthly wage of men with no formal education is higher than those women who possess primary and junior education. Again men with primary and junior education earn more than those female employees who possess secondary education.

The two samples of educational means of the two groups are significantly different[10]. As suggested by Altonji and Blank (1999), if educational differences between genders are large it may reflect different preferences and choices, and/or they may reflect pre-market discrimination.

Experience

The mean year of experience for the whole sample is 22.93 years while it is 23.84 and 20.87 for men and women respectively. Male workers, on average, have three years of experience (14 %) more than female workers. Mean wages, as is indicated in table 3 (except for the first five years) first increases at a decreasing rate then decreases with respect to experience. In other words, as individuals get older their earnings actually fall. This complies with the explanation of the wage-experience profile of human capital theory.

University of Cape Town

[10] A mean test is run to determine whether the sample educational means of the two groups are the same or not. The null hypothesis was rejectd (Z=5.28935 and 22.0310 at 1 % level for both education and experience respectively) implying that the two sample means are significantly different.

Table 3: Mean gross monthly wages by gender and years of experience

Yrs of exp	Male	Female	Average	% of Male
0- 5	624.94	427.09	526.01	68.34
5-10	572.69	421.39	497.04	73.58
10-15	615.15	500.02	557.59	81.28
15-20	2009.01	1528.92	1768.97	76.1
20-25	758.58	351.41	554.99	46.32
25-30	657.62	284.1	470.86	43.2
30-35	675.61	269.43	472.52	39.88
40+	445.29	194.6	319.94	43.7
Average	615.15	376.14	541.78	61.15

Hours worked[11]

The sample mean of weekly hours worked was 47 hours. The mean for men and women's average weekly hours worked were 49 and 45 respectively. The mean value of weekly hours worked by men is higher than the sample mean and women's mean value as well. This implies that male employees work longer hours per a week.

Industry

Overall, 10.63 % of employed women worked in the other service activities sector compared with 3.85 % of men. Likewise, 19.56 % and 14.61 % of employed men worked in the transport and communication and construction sectors respectively compared to 8.8 % and 2.81 % women.

University of Cape Town

Table 4: Percentage distribution of employment by industrial groups & gender

	Sex		
Sector	***Male***	***Female***	**Average**
Agriculture	3.85	4.32	3.99
Fishing	1.65	0.43	1.28
Mining	2.06	0.92	1.71
Manufacturing	15.35	14.68	15.14
Energy and water	4.26	1.67	3.46
Construction	14.61	2.81	10.98
Trade	5.4	3.4	4.79
Hotels and restaurant	1.82	9.61	4.21
Transport and communication	19.56	8.8	16.25
Finance and real estate	3.9	4.16	3.98
Public administration	14.99	17.38	15.72
Education	5.26	6.21	5.55
Health and social works	2.58	11.28	5.25
Other service activities	3.85	10.63	5.93
Private households	0.17	3.02	1.04
Extra-territorial organization	0.72	0.7	0.71
Total in percent	100	100	100

One can easily observe in table 4 above that the largest employer of men is the transport and communications sector. Manufacturing, public administration and construction were also major industries employing men. Almost 65 % of men were employed in these four industries. The major employer of women was public administration, which employs about 17.38 % of the entire female labour force. Manufacturing and health & social work were also important female-employing industries. That is, almost half of all women were employed in these three sectors.

At the time of the survey, the transport and communication, construction, manufacturing and public administration were highly dominated by men, whereas women were over-represented in public administration, manufacturing (most probably in the textile factories) health and social work.

[11] Individuals that do not work are treated like they have zero hours of earnings and zero wages. Two earning functions of the entire sample have been estimated using the Tobit and OLS estimators. The estimation were exactly the same implying the estimates are unbiased.

University of Cape Town

Table 5: Gross mean monthly wages by sector

Sector	Male	Female	Average	%Of Male
Agriculture	306.77	250.56	288.11	81.68
Fishing	662.44	298.46	624.63	45.05
Mining	824.32	358.86	747.49	43.53
Manufacturing	571.66	270.92	482.16	47.39
Energy & water	644.84	418.64	611.29	64.92
Construction	567.53	328.96	548.82	57.96
Trade	510.77	364.74	478.94	71.41
Hotels & restaurant	368.61	206.37	254.92	55.99
Transport & communication	686.03	583.94	669.07	85.12
Finance & real estate	866.99	484.87	744.39	55.93
Public administration	677.08	449.06	599.71	66.32
Education	559.96	487.55	535.1	87.07
Health & social work	796.18	505.7	604.67	63.52
Other service activities	478.26	257.23	356.63	53.78
Private households	169.46	149.3	151.54	88.1
Extra-territorial organizations	693.78	542.59	648.07	78.21
Average	615.15	376.14	541.78	61.15

Table 5 above reveals that mining, finance & real estate, and transport & communication sectors yield the highest mean wages consecutively. Hotels & restaurant, agriculture, private household and other service activities sectors, on the contrary, yield the lowest mean wages respectively. After analysing employment distribution across the industrial group and wages earned we discovered that 27.58 % of all women employed were working in the sectors with low payment compared to only 9.69 % men. On top of this, 26.24 % of the overall employed men were working in the sectors which offer high payment compared with only 14.58 % women.

Table 5 above also presents the gross mean monthly wage of men and women within each sector. In all sectors male employees earned more than female ones. The gender-wage gap is high in mining, fishing and manufacturing industries where women earned only 43 %, 45 % and 47 % of what men earned in 1997. On the other hand the wage gap is narrow in the private household, education and transport and communication sectors where women earn 88 %, 87 % and 85 % respectively.

University of Cape Town

Occupation

As shown in tables 6 and 7, comparisons of the different distributions of women and men employees and mean wages across 11 broad occupational categories are provided.

Table 6: Distribution of employment by occupation and gender

Occupations	Male	Female	Average
Professional & technical	11.26	13.71	12.01
Administrative & managerial	5.07	2.16	4.17
Government & executive	1.03	0.16	0.76
Clerical workers	11.64	22.67	15.03
Sales workers	1.94	2.05	1.97
Service workers	9.16	**37.18**	17.76
Military	0.86	0.22	0.66
Agriculture/ fishing	5.21	5.67	5.35
Production and relate	39.28	15.76	32.06
Transport equipment o	8.77	0.16	6.13
Daily labourers	5.79	0.27	4.09
Total in percent	100	100	100

From the 11 occupational groups shown above, those showing the greatest concentrations of men were production and related occupations with 39.28 % of the employed men in the labour force whereas 37.18 % of the employed w omen were contracted on service works occupation. Moreover, 38.43 % of the overall employed women in the labour force are confined to clerical and production & related works. Overall of the labour force, about 30 % of the employed men worked in the clerical, professional & technical occupations. In other words, 75.61 % of the employed women were concentrated only in service, clerical and production and related works. Similarly, 62.18 % of the employed men in the labour force were over-represented in production & related, professional and technical, and clerical works.

University of Cape Town

Table 7: Gross mean monthly wages by occupation

Occupation	Male	Female	Average	%Of male
Military	751	663	720.06	88.39
Administrative & managerial	1118	834	1073.35	74.58
Govern & executive official	910	661	893.53	72.67
Professional & technical	645	515	584.98	79.83
Transport equip operators	387	277	351.81	71.73
Daily labourers	354	200	255.11	56.61
Clerical works	1133	672	1086.71	59.29
Production & related	351	313	338.85	89.2
Sales works	590	300	545.87	50.85
Agriculture/fishing	625	383	623.4	61.16
Service works	607	789	610.47	130.03
Average	615.15	376.14	541.78	61.15

As displayed in table 7, the clerical, administrative & managerial and government & executive occupational groups yield the highest mean wages consecutively. Employment distribution across the occupational group and wages earned we discovered that 24.89 % of all women employed were working in the occupations with high payment compared to only 17.74% men. However, the employed women who belong to these occupational groups are paid 59.29%, 74.58% and 72.67 % of their men counterparts.

On the other hand, daily labourers, production & related, and transport equipment operators are the least-paying occupational groups consecutively. The employment distribution of men and women, on average, across the above mentioned occupational groups are 53.84 % and 16.19 % consecutively. The employed women who belong to these occupational groups earned 56.61%, 89.2% and 71.73% of what men earned.

Moreover, 75 % of all the employed women and about 60% of all the employed men were concentrated on the so-called female dominated occupational groups; namely, service, clerical and production and related works. Women workers in the above mentioned occupational groups, on averaged, earned 85 % of their men counterpart.

University of Cape Town

Generally, working in predominantly female occupations lowers the wages of both female and male workers, but women in such occupations on average earn even less than their male counterparts. Women (except in one occupational group) were paid substantially less than their men counterpart employees within each occupational category. The finding, however doesn't confirm that segregation contributes to women's lower wages.

Employer

Table 8 below shows that the largest employer of both women and men is the government (42.93 %) followed by the private sector (34.06 %).

Table 8: Percentage distribution of employment by employer

Employer	Male	Female	Average
Private	35.17	31.57	34.06
Government	39.56	50.51	42.93
Public	21.09	13.6	18.79
Self-employed	4.18	4.32	4.22
Total in percent	100	100	100

University of Cape Town

Despite the fact that a significant share of the employed women work for the government (50.51 %) which pays the highest wages compared to other sectors, women workers were paid substantially less than men by each type of employer. As it can be observed from table 9 below, the wage gap is higher in the self-employed sector followed by the private sector compared to the public and government sectors[12]. The economic reason could be that the public and government sectors are insulated from competition, and are more likely to adopt a less discriminatory hiring and wage system than the private sector.

[12] Government and public sector in the Eritrean context are different. Government sector is a sector, which includes all the government ministries that are usually administered by government budget. Whereas the public sector are different from the government in a sense that it includes all the firms that belong to the government but that are administered by their own budget.

Table 9: Gross mean monthly wages by employer

Employer	Male	Female	Average	%Of Male
Private	539	264.65	460.94	49.1
Government	681.53	458.8	601.07	67.32
Public	645.59	375.34	585.54	58.14
Self-employed	474.12	226.75	396.51	47.83
Average	615.15	376.14	541.78	61.15

Marital status

As depicted in table 10, married employees followed by employees who were never married earned more than widowed or divorced employees. However, if the mean wages are further classified according to marital status and gender, interesting findings may be observed. Divorced men earned higher than the married, never married and widowed. The economic reason might be the increased responsibility a divorced Eritrean man has for the cost of living of his child.

Table 10: Mean wages by maritual status and gender

Marital Status	Average	Male	Female	%Of Male
Married	622	649	508	78.27
Widowed	275	435	241	55.29
Divorced	358	658	284	43.18
Never married	488	542	352	64.93
Average	542	615	376	61.15

University of Cape Town

Conversely, the fact that married women, on average, earned more than the never married, widowed and divorced might be attributed to married women getting the highest employment opportunity (35.77 %), as compared to those never married (26.11 %), divorced (24.66 %), and widowed (13.44 %). The economic reason could be that married women may be more likely to work because they are able to secure capital through their husbands to start up small enterprises or use their husbands' connections to obtain wage employment. Women earned less than what men earned in

each category. However, the gap is higher for widowed (55.4 %) and divorced (43.16 %) employees.

The fact that about 66 % of the employed men are married compared to about 36 % women, as shown in table 11 below, supports the common presumption that married men may adopt a more ambitious attitude toward work and married women a less ambitious attitude toward work as a result of marital status.

Table 11: percentage distribution of employment by gender

Marital status	Male	Female	Average
Married	66.46	35.78	57.04
Widowed	1.27	13.44	5.00
Divorced	2.70	24.66	9.44
Never married	29.57	26.12	28.51
Total	100.00	100.00	100.00

University of Cape Town

Fighters

As revealed in table 12, non-fighter employees, on average, earned about 66 % of what fighter employees earned in 1997. Although the mean wage gap between men and women employees of the non-fighters was higher, women fighters still earned less than their men fighter counterparts. The proportion of male fighter employees (18.04 %) is higher compared to only 13 % women fighter employees. If the percentage distribution of men and women fighter workers is taken into account, the fighter variable contributes significantly to the gender-wage differential.

The mean gross monthly wage for the non-fighters (Nacfa 504.37) was 65.64 % of what the fighters (Nacfa 768.42) earned. About 62 % of the workers are employed by the government and the public sectors. These are the two sectors expected to employ fighters. In the wage determination of fighters a form of affirmative action is considered. The two vital variables in the wage determination process were education

and experience. In the case of fighters the experience referred to is the years spent in the struggle for independence. Therefore, it is possible to say that the mean gross monthly wage for fighters was higher because of non-economic factors (pay-back for fighting in the war) which were considered. As the proportion of male fighters is 38 % higher than that of female fighters, the fighter variable contributes to the wage gap as a group.

Table 12: Gross mean monthly wages by fighters and non-fighters and gender

	% Distribution		Mean wages			
Fighter	**Male**	**Female**	**Male**	**Female**	**Average**	**%Of male**
Non-fighters	81.96	86.89	585.52	332.15	504.37	56.73
Fighters	18.04	13.11	798.82	655.91	768.42	82.11
Total	100	100	615.15	376.14	541.78	61.15

Ethnicity and place of work

As shown in appendix 2A, male employees belonging to Afar, Rashaida and Tignigna ethnic groups earned 60.69 %, 11.69 %, and 9.59 % higher than the average group monthly wage. Conversely, workers who belong to the other ethnic groups earned less than the mean monthly wage. Female employees who belong to Afar, Tigre, Billen and Saho ethnic groups earned 57.98 %, 18.51 %, 5.65 %, and 4.2 % higher than the mean gross monthly wages respectively and the remaining female employees belonging to the other ethnic group earned less than group mean monthly wages.

Moreover women across all the ethnic groups earned less than what men earned in 1997. The mean wage gap in the Tigre ethnic group was very small, i.e. women earned 99.37 % of what men earned during the survey. Female employees who belong to the Tigrigna ethnic group earned 54.35 % of what male ones earned, signalling the largest mean monthly wage gap.

University of Cape Town

As shown in appendix 2B, Assab (port), Asmara (the capital city) and Massawa (another port), were, respectively, the first, second and the third towns in terms of high wage-earnings. Male employees who worked in the above-mentioned towns earned wages 32.15 %, 9.2 %, and 7.56 % higher than the mean group gross monthly wages. Whereas the remaining employees who work in the other towns, on average, earned less than the group mean gross monthly wage. Women who worked in Nakfa (17.02 %), Assab (13.59 %), Asmara (6.91%) and Decemhare (2.21%) earned higher than the group mean gross monthly wage. Employees who worked in the other towns, however, earned less than the group mean gross monthly wage in 1997. Except, in Nakfa where female earned 10.56 % higher than male, female employees earned less than their male counterparts in all the other towns.

Table 13:The mean value of male, female and male & female

Variables	Code	M-Female	Male	Female
Log Gross Monthly wage	*lnwage*	*6.038976*	*6.207503*	*5.6585386*
Elementary &Junior education	edulev1	5.280649	5.52546	4.7280086
Secondary education	edulev2	1.427601	1.481712	1.3054506
Tertiary education	edulev3	0.8020212	0.94645	0.47598489
P.work Experience	exper	22.93058	23.8415	20.874258
P.work Experience Squared	exper2	735.5456	792.6017	606.74582
Adekeyih	town1	0.0205434	0.018169	0.02590394
Akurdet	town2	0.0468854	0.051399	0.03669725
Assab	town4	0.1452949	0.157542	0.11764706
Barentu	town5	0.0349569	0.030361	0.04533189
Decemhare	town6	0.0289927	0.027253	0.03291959
Ghinda	town7	0.0289927	0.037055	0.01079331
Keren	town8	0.0667661	0.070045	0.05936319
Massawa	town9	0.2064281	0.216352	0.1840259
Mendefera	town10	0.0420808	0.034425	0.05936319
Nakfa***	town11	0.0112657	0.010041	0.0140313
Teseney***	town12	0.0755467	0.076022	0.07447383
Professional & technical	occp1	0.1201127	0.112599	0.13707501
Administrative & managerial	occp2	0.0417495	0.050681	0.02158662
Government &executive official***	occp3	0.0076209	0.01028	0.001619
Clerical works	occp4	0.1502651	0.116424	0.22665947
Sales workers***	occp5	0.019715	0.019364	0.02050729
Service workers	occp6	0.1776011	0.091561	0.37182947
Military***	occp7	0.0066269	0.008606	0.00215866
Agriculture/fishing***	occp8	0.0535123	0.052116	0.05666487
Production & related	occp9	0.3205765	0.39278	0.1575823

University of Cape Town

Transport equipment operators	occp10	0.0612989	0.087736	0.001619
Afar	ethn1	0.0208748	0.026536	0.00809498
Billen	ethn2	0.018224	0.021994	0.00971398
Hedarb***	ethn3	0.0008284	0.001195	0
Kunama	ethn4	0.0188867	0.014583	0.02860227
Nara	ethn5	0.0235255	0.021994	0.02698327
Rashiada***	ethn6	0.0003313	0.000478	0
Saho	ethn7	0.0243539	0.030122	0.01133297
Tigre	ethn8	0.1133201	0.143916	0.04425256
Fishing	ind2	0.0127568	0.016495	0.00431732
Mining	ind3	0.0170643	0.020559	0.00917431
Manufacturing	ind4	0.1514248	0.153478	0.14678899
Energy and water	ind5	0.0346256	0.042553	0.01672963
Construction	ind6	0.109841	0.146067	0.0280626
Trade	ind7	0.0478794	0.054028	0.03399892
Hotels and restaurant	ind8	0.0420808	0.018169	0.09606044
Transport &communication	ind9	0.1625249	0.195553	0.08796546
Finance & real estate***	ind10	0.0397614	0.038967	0.04155424
Public administration	ind11	0.1572233	0.149892	0.17377226
Education	ind12	0.0555003	0.052594	0.06206152
Health and social work	ind13	0.0525182	0.025819	0.11279007
Other service activities	ind14	0.0593108	0.038489	0.10631409
Private households	ind15	0.0104374	0.001673	0.03022126
Extra territorial organization	ind16	0.0071239	0.007172	0.00701565
Private employee	empl1	0.3406229	0.351661	0.31570426
Public employee	empl3	0.1878728	0.210853	0.13599568
Self-employed***	empl4	0.0422465	0.041836	0.04317323
Hours worked per week	f02bq13	47.52684	48.69448	44.890988
Widowed	mari2	0.0500331	0.01267	0.13437669
Divorced	mari3	0.0944334	0.027014	0.24662709
Never married	mari4	0.2851226	0.295721	0.26119806
Fighter	Fighter	0.1652577	0.180383	0.13113869
Sample Size		**6033**	**4180**	**1853**

A mean test is run to determine whether the sample means of the two groups are the same or not. The sample means of the variables with *** are found to be the same whereas the sample means without the *** are found to be statistically significantly different[13] at 5% level.

[13] The null hypothesis which says the sample means of the two group are the same is rejected in favour of the alternative hypothesis which says the sample means of the two group are not the same if

$$\frac{\bar{x}-\bar{y}}{\sqrt{(s_x^{\,2}/n_x)+(s_y^{\,2}/n_y)}} > Z_\alpha$$, where $\bar{x}$ = the sample mean of male and $\bar{y}$ = the sample mean of female; S_x = Standard error for males and S_y = Standard error for females; n_x = male sample size and n_y = female sample size. The above approximation is generally satisfactory when each sample contains at least thirty observations. Then to a good approximation, tests of significance level α for the difference between population means are obtained by replacing the population variances by the sample variances, $s_x^{\,2}$ and $s_y^{\,2}$.

University of Cape Coast

In concluding the descriptive statistical analysis, given the lower education level, experience, and hours of work per week for women and subsequent employment of women in low-skilled sectors, low paying occupations, it is not surprising that these women on average earned less than men in Eritrea. This does not mean that there is no unequal treatment of both sexes in the labour market. The fact that female employees are disproportionately represented in some specific occupations indicate some form of occupational discrimination (Barker, 1999) and the wide mean wages gap between men and women suggests gender-wage discrimination in the labour market.

Descriptive statistics cannot be used to effectively account for the simultaneous contribution of each of the variables to explain and measure the extent of the gender-wage differential. Therefore, it is necessary to employ earnings function to separately understand the input of each variable in the model to the gender-wage gap and to measure the extent of the wage gap and discrimination in the labour market.

University of Cape Town

4.3 Estimation and interpretation of Earnings Functions and Measuring Wage Differentials

Two separate regression models on the two groups (male and female) and one pooled regression were estimated using Stata Version 8. Furthermore, a Heckman two- stage model was run on the pooled sample of men and women, so that sample selection bias in the gender-wage analyses is controlled for. Selection bias is the introduction of error due to systematic differences in the characteristics between those individuals selected and those not selected into a given study. According to Kennedy (1998) the existence of selection bias can be investigated by testing the coefficient of the expected error term (measured by lambda) from the Heckman two-stage procedures. A significance of the coefficient on the selectivity term (inverse mills ratio) indicates the presence of selectivity bias. On the other hand, if the coefficient on the lambda term is insignificant, it indicates an absence of sample selectivity.

As shown in Appendix 1, we estimated the two-stage Heckman model for the entire sample. The results from the combined earnings function confirmed that lambda (-0.1854721) was insignificant. The standard error for lambda was 0.1633803 and t-value was -1.14. This implies that there is no serious sample selection bias.

Moreover, the F values of the models are significant at all conventional levels showing that the three models are statistically significant and the variables have the right signs.

According to Erichen and Wakford (2001) the semi-logarithmic functional form of the earnings function enables the interpretation of the coefficient of a given continuous variable measures as the constant proportional or relative change in the dependent variable for a given absolute change in the value of that independent variable[14].

The majority of the independent variables were statistically significant in each case. The effects and interpretation of each variable are incorporated in the model given below. The interpretation of all the dummy variables will follow Halvosen and Palmquist (1980)[15].

4.3.1 Results from Pooled Earnings Function

As indicated in table 14 below the human capital variables (education and experience) appear to be significant determinants of wage. All the coefficients of the educational spline were positive and significant at 1 % level .One additional year in primary, secondary and tertiary education resulted in about 5.20 %, 7.77 %, and 5.58 % increase in the gross mean monthly wage.

---

[14] $\ln(W) = \alpha + \beta X \Leftrightarrow e^{\alpha} e^{\beta x}$ the derivative of ln(W) with respect to X equals β .The derivative of W with respect to X is given by : $\partial W / \partial X = e e^{\beta X} \beta = W\beta$

Thus $\partial \ln(W) / \partial X = \beta = W^{-1} \partial W / \partial X$

[15] Take the antilog of the estimated dummy coefficient and subtract one from it.

University of Cape Town

This implies that the rate of return on secondary education was higher than the rate of return on primary as well as tertiary education.

Moreover, the coefficients for experience and experience-squared variables were with expected sign and significant at 1 % level. An additional year of experience (evaluated at the average years of experience) resulted in a 1.80 % increase in gross monthly wages. Furthermore, the negative sign on the experience-squared variables indicates that wage increases over time occur at a decreasing rate. This complies with the explanation from human capital theory. The hours of work per week variable was also positive and significant at 1 % level. This implies that for every additional hour of work higher wage was offered

From the regressions results, most of the dummy variables representing marital status, fighter status (whether one participated in the struggle for independence or not), occupation, industry, employer and towns (place of work), appear to be significant at conventional levels. Moreover, majority of the signs of the coefficients were in line with the *apriori* expectations specified in chapter three.

Table 14: Pooled earnings function

Variables	Coef.	Std. Err.	t	Dum Int
Elementary &Junior education	0.052001*	0.003822	13.61	
Secondary education	0.077675*	0.0060424	12.85	
Tertiary education	0.05579*	0.0032834	16.99	
P.work Experience	0.030538*	0.002256	13.54	
P.work Exper Squared	-0.00038*	0.000036	-10.52	
Adekeyih	-0.33189*	0.049131	-6.76	-0.282
Akurdet	-0.04333	0.0365731	-1.18	-0.042
Assab	0.1676*	0.0242266	6.92	0.182
Barentu	-0.01887	0.0470551	-0.4	-0.019
Decemhare	-0.04179	0.041785	-1	-0.041
Ghinda	0.137912*	0.0446301	3.09	0.148
Keren	-0.08422**	0.0317869	-2.65	-0.081
Massawa	0.188772*	0.0218603	8.64	0.208
Mendefera	-0.34932*	0.0356094	-9.81	0.418
Nakfa	-0.08829	0.066453	-1.33	-0.085
Teseney	0.198317*	0.0324881	6.1	0.219
Professional & technical	0.15219*	0.0493407	3.08	0.164
Administrative & managerial	0.270672*	0.0534303	5.07	0.311

University of Cape Town

Government &executive official	0.112945	0.0887714	1.27	-0.107
Clerical works	-0.00161	0.0441965	-0.04	-0.002
Sales workers	-0.16761	0.0726286	-2.31	-0.154
Service workers	-0.31788*	0.0451236	-7.04	-0.272
Military	0.466651*	0.0936378	4.98	0.595
Agriculture/fishing	-0.011052	0.0685764	0.16	-0.011
Production & related	0.135376*	0.0426974	3.17	0.145
Transport equipment operators	0.179238*	0.0453679	3.95	0.196
Afar	-0.01154	0.0494137	-0.23	-0.011
Billen	-0.000219	0.0544185	0	-0.0002
Hedarb	-0.20533	0.2332627	-0.88	-0.186
Kunama	-0.14135**	0.0601365	-2.35	-0.132
Nara	-0.05387	0.0534763	-1.01	-0.052
Rashiada	0.993076**	0.3703868	2.68	1.693
Saho	-0.00305	0.0461715	-0.07	-0.003
Tigre	-0.11895*	0.024389	-4.88	-0.112
Fishing	0.221743**	0.082414	2.69	0.248
Mining	0.324352*	0.0858828	3.78	0.383
Manufacturing	0.060342	0.0706006	0.85	0.062
Energy and water	0.11768	0.0771893	1.52	0.125
Construction	0.209237*	0.071888	2.91	0.233
Trade	-0.033765	0.0771228	0.44	-0.033
Hotels and restaurant	-0.04402	0.0762806	-0.58	-0.043
Transport &communication	0.249194*	0.0706358	3.53	0.283
Finance & real estate	0.305768*	0.075565	4.05	0.358
Public administration	0.15617**	0.0682742	2.29	0.169
Education	-0.06343	0.0771359	-0.82	-0.061
Health and social work	-0.091392	0.0752523	1.21	-0.087
Other service activities	-0.006528	0.0718062	0.09	-0.007
Private households	-0.25135**	0.0959298	-2.62	-0.222
Extra territorial organization	0.433526*	0.1003802	4.32	0.543
Private employee	-0.059*	0.0212235	-2.78	-0.057
Public employee	-0.06812*	0.0218526	-3.12	-0.066
Self-employed	-0.1418*	0.0386381	-3.67	-0.132
Hours worked per week	0.005165*	0.0004791	10.78	0.005
Widowed	-0.16151*	0.0341379	-4.73	-0.149
Divorced	-0.11351*	0.0262919	-4.32	-0.107
Never married	-0.0934*	0.0214215	-4.36	-0.089
Fighter	0.330969*	0.0200552	16.5	0.392
Gender	0.154151*	0.0195535	7.88	0.167
Cons	4.679326	0.0921408	50.78	0

F = 114.89; R-squared = 0.5273; N= 6033

*** = Significant at 1%;**=Significant at 5%; ***=Significant at 10%.**

Note: omitted variables are, working in Asmara (the capital city), agricultural sector, working as a daily labourer, married, belonging to Tigrinya ethnic group, Government, being a fighter.

Dum Int = the interpretation of the dummy variables

University of Cape Town

To analyse the effect of gender, the variable 'gender' was included as an explanatory variable in the model. The intercept dummy for men has a positive impact on the gender-wage differential as indicated by the coefficient of the variable 'gender'. This means that, male workers enjoyed 15.4 % higher mean gross monthly wage than their female counterparts in Eritrea, keeping all other variables constant.

The gender effect measured from the pooled earning function was equivalent to that of African skilled women in South Africa. According to Bhorat (2000), South African skilled and semi-skilled African and White women earned substantially lower than their male counterparts. Wages were reduced by merely being a female and not by differences in the observed average characteristics of men and women. The wage of African skilled and semi-skilled women was 15.1 % and 63 % lower than their men counterparts respectively. Moreover, the wage of White skilled and semi-skilled women was 49 % and 69 % lower than their men counterparts respectively.

University of Cape Town

4.3.2 Wald and Heteroscedasticity Test

After estimating the earning function using ordinary least squares, Wald Adjusted F-tests was run to check for the joint significance of education, experience, hours worked, education, residence, occupation, employer, marital status, ethnic and industry. All the variables were collectively significant at 5 % level. Unobserved heterogeneity is a statistical problem occurring mainly in all cross-sectional studies (e.g. because of different sizes of the units under consideration such as households, firms, countries, etc.). Therefore, there is a need to run a heteroscedasticity test. The null hypothesis was that the variance of the error term is constant. The result from Breusch-Pagan-Godfrey test confirmed the existence of heteroscedasticity in the data.

It was corrected using White's Heteroscedasticity-consistent-covariance-matrix-estimation[16].

4.3.3 Male and Female Earnings Function

Tables 15 and 16 present the estimation of the earning functions of male and female separately.

Table 15: Male earnings functions

lnwage	Coef.	Std. Err.	t	Dum Int
Elementary &Junior education	0.0476409*	0.0048102	9.9	
Secondary education	0.0584957*	0.0073098	8	
Tertiary education	0.060618*	0.0038028	15.94	
P.work Experience	0.0316184*	0.0027628	11.44	
P.work Exper Squared	-0.0004076*	0.0000438	-9.3	
Adekeyih	-0.4343311*	0.0644379	-6.74	-0.352
Akurdet	-0.0894927***	0.0445503	-2.01	-0.086
Assab	0.2474299*	0.0297309	8.32	0.281
Barentu	-0.0241051	0.0582682	-0.41	-0.024
Decemhare	-0.0578591	0.0526052	-1.1	-0.056
Ghinda	0.1148147**	0.050444	2.28	0.127
Keren	-0.0940263**	0.0394239	-2.39	-0.089
Massawa	0.210251*	0.0273893	7.68	0.234
Mendefera	-0.4479025*	0.0475997	-9.41	-0.361
Nakfa	-0.2635834*	0.0867641	-3.04	-0.232
Teseney	0.1655626*	0.0390396	4.24	0.180
Professional & technical	0.158606*	0.0555278	2.86	0.172
Administrative & managerial	0.2971566*	0.0585049	5.08	0.346
Government &executive official	0.2044963***	0.0948421	2.16	0.227
Clerical works	-0.03411	0.0494578	0.69	-0.034
Sales workers	-0.0974682	0.0840006	-1.16	-0.093
Service workers	-0.2637112*	0.0540525	-4.88	-0.232
Military	0.5921492*	0.1012482	5.85	0.808
Agriculture/fishing	-0.0902986	0.0805887	-1.12	-0.086
Production & related	0.1802436*	0.0455979	3.95	0.198
Transport equipment operators	0.2040235*	0.047543	4.29	0.226
Afar	-0.0580246	0.0545301	-1.06	-0.056
Billen	-0.0265293	0.0624397	-0.42	-0.022
Hedarb	-0.2164277	0.2377517	-0.91	-0.195
Kunama	-0.1652258***	0.0783186	-2.11	-0.152
Nara	-0.0937984	0.065606	-1.43	-0.090
Rashiada	0.9734138**	0.3784945	2.57	1.647

[16] Regression packages such as STATA have this form built in. Applying regression using White's standard errors is sometimes known as heterosckedasticity-robust regression. This means the conventional t and F tests can be applied. For more information see (Gujarati, 1995: 380)

University of Cape Town

Saho	-0.0428255	0.0519161	-0.82	-0.042
Tigre	-0.1730546*	0.0281586	-6.15	-0.159
Fishing	-0.1246527	0.0930967	1.34	-0.117
Mining	0.2136936***	0.1010069	2.12	0.132
Manufacturing	-0.0461793	0.0852165	-0.54	-0.045
Energy and water	-0.0167871	0.0916486	-0.18	-0.017
Construction	-0.0512415	0.0862254	0.59	-0.050
Trade	-0.1587527	0.0916547	-1.73	-0.147
Hotels and restaurant	-0.1022957	0.1036455	-0.99	-0.097
Transport &communication	-0.0758019	0.0854338	0.89	-0.730
Finance & real estate	0.2155247**	0.0918903	2.35	0.241
Public administration	-0.0122688	0.0833818	0.15	-0.012
Education	-0.1965071	0.0944078	-2.08	-0.178
Health and social work	-0.0781315	0.0985431	-0.79	-0.178
Other service activities	-0.1554196	0.089433	-1.74	-0.144
Private households	-0.6075071**	0.2212857	-2.75	-0.455
Extra territorial organization	0.341113*	0.1221661	2.79	0.407
Private employee	-0.0312699	0.0265131	-1.18	-0.031
Public employee	-0.0487931	0.0265991	-1.83	-0.048
Self-employed	-0.1624028*	0.0482675	-3.36	-0.150
Hours worked per week	0.0063634*	0.0006252	10.18	0.006
Widowed	-0.033865	0.0750348	-0.45	-0.033
Divorced	-0.0217382	0.0513672	0.42	-0.022
Never married	-0.0728048**	0.0271099	-2.69	-0.070
Fighter	0.2575217*	0.0234585	10.98	0.294
Cons	4.927489*	0.1108784	44.44	000

F = 55.72; R-squared = 0.4352; N = 4180

* = Significant at 1%;**=Significant at 5%; ***=Significant at 10%.

Note: omitted variables are, working in Asmara (the capital city), agricultural sector, working as a daily labourer, married, belonging to Tigrinya ethnic group, Government, being a fighter.

Dum Int = the interpretation of the dummy variables

Education

The performance of the education splines for men and women are generally as expected. The signs of all the educational spline coefficients are positive and significant at 1 % level. This implies that acquiring more education will yield a higher rate of return.

As revealed in tables 16 and 17, the rates of return on primary (4.76 %) and tertiary (6.06 %) educations are higher for male employees than for female workers at 4.36 %,

University of Cape Town

and 5.06 % respectively. The rate of return on secondary education for female workers is substantially higher than male workers. The rate of return (13.36 %) on secondary education for female employees is about 7.51 % higher than the rate of return (5.85 %) for male workers.

The service, sales and clerical works are occupations that can be satisfied by secondary school graduates. As shown in table 5, the distributions of male and female employees in the occupations mention above were 23 % and 62 % respectively. Therefore, the economic reason for the high rate of return on secondary education for female workers could be that female employees had the opportunity to work according to their level of education whereas male high school graduates were forced to be unemployed or to work below their educational achievement.

Experience

The coefficient of the variables experience and experience-squared variables were significant at the 1 % level in all the estimations performed and have the expected signs. The wage increment for one year of experience (evaluated at the average years of experience) in the case of female workers is 1.7 % and 1.2 % for male workers[17]. The rate of return to experience for female is therefore marginally higher than the rate of return for the male workers. That means female employees have greater returns from experience. Even though the economic reason is not established beyond a doubt, perhaps suggesting that the longer that women remain in the labour market the fewer the concerns relating to continued labour force attachment.

Moreover, the negative sign of the experience-squared variable is indicating that the wage increase over time occurs at a decreasing rate that complies with the human

[17] To calculate the rate of return, we need to take the partial derivative of ln wage with respect to experience and evaluate this partial at the mean level of experience.

University of Cape Town

capital explanation. That means the wage-experience profile have the conventional shape. The years of experience at which ln wage is maximised are 38.78 and 37.48 for male and female respectively[18].

Table 16: Female earnings function

Variables	Coef.	Std. Err.	t	Dum Int
Elementary &Junior education	0.043578*	0.0061508	7.09	
Secondary education	0.133564*	0.0105216	12.69	
Tertiary education	0.05066*	0.0065491	7.74	
P.work Experience	0.041423*	0.0041694	9.93	
P.work Exper Squared	-0.00059*	0.0000703	-8.34	
Adekeyih	-0.13448	0.0738173	-1.82	-0.126
Akurdet	-0.027251	0.0637683	0.43	-0.027
Assab	-0.04449	0.0413216	-1.08	-0.044
Barentu	-0.02147	0.0755564	-0.28	-0.021
Decemhare	-0.008583	0.0648549	0.13	-0.009
Ghinda	-0.074992	0.108751	0.69	-0.078
Keren	-0.09225	0.0512391	-1.8	-0.088
Massawa	0.124855*	0.0359997	3.47	0.133
Mendefera	-0.21498*	0.0507424	-4.24	-0.193
Nakfa	-0.118423	0.0984673	1.2	0.112
Teseney	0.249928*	0.0571645	4.37	0.284
Professional & technical	-0.03672	0.2177799	-0.17	-0.360
Administrative & managerial	-0.125034	0.2261093	0.55	0.118
Government &executive official	-0.087929	0.3467573	0.25	-0.084
Clerical works	-0.20977	0.2133136	-0.98	-0.189
Sales workers	-0.40073	0.2408909	-1.66	-0.330
Service workers	-0.5032*	0.2155116	-2.33	-0.395
Military	-0.16437	0.3166268	-0.52	-0.152
Agriculture/fishing	-0.01091	0.2335125	-0.05	-0.011
Production & related	-0.24602	0.2186871	-1.12	-0.218
Transport equipment operators	-0.26337	0.3427785	-0.77	-0.232
Afar	-0.00879	0.1252393	-0.07	-0.009
Billen	-0.01264	0.1150089	-0.11	-0.013
Hedarb	0			000
Kunama	-0.09943	0.091542	-1.09	-0.095
Nara	-0.0267	0.0901847	-0.3	-0.026
Rashiada	0			000
Saho	-0.01563	0.105931	-0.15	-0.016
Tigre	-0.00212	0.0575081	-0.04	-0.002
Fishing	0.448512***	0.2035735	2.2	0.566
Mining	0.384725*	0.1649125	2.33	0.469
Manufacturing	0.251342***	0.1238178	2.03	0.286

[18] To calculate the years of experience for which Ln wage is greatest, one can differentiate ln wage with respect to experience set the result equal to zero, and then solve for experience at the stationary point. This yields that level of experience for which ln wage is maximized.

University of Cape Town

Energy and water	0.336093**	0.1443475	2.33	0.399
Construction	0.482155*	0.137427	3.51	0.620
Trade	0.364081**	0.1426818	2.55	0.439
Hotels and restaurant	0.1393	0.1230986	1.13	-0.13
Transport &communication	0.460664*	0.1224265	3.76	0.585
Finance & real estate	0.37241*	0.1281089	2.91	0.451
Public administration	0.307796**	0.1157449	2.66	0.36
Education	0.072729	0.1296059	0.56	0.075
Health and social work	0.227894	0.1226931	1.86	0.256
Other service activities	0.171529	0.1211321	1.42	0.187
Private households	-0.01591	0.1336985	-0.12	-0.016
Extra territorial organization	0.489099*	0.1678111	2.91	0.631
Private employee	-0.13485*	0.0343833	-3.92	-0.126
Public employee	-0.12517*	0.0369191	-3.39	-0.118
Self-employed	-0.10239	0.0627822	-1.63	0.097
Hours worked per week	0.002784*	0.0007579	3.67	0.003
Widowed	-0.15602*	0.0387753	-4.02	-0.144
Divorced	-0.10865*	0.0312065	-3.48	-0.103
Never married	-0.07203***	0.0348528	-2.07	-0.069
Fighter	0.535934*	0.0389651	13.75	0.075
_Cons	4.703937	0.2584136	18.2	0

F = 50.97; R-squared = 0.6094; N = 1853

* = Significant at 1%;**=Significant at 5%; ***=Significant at 10%.

Note: omitted variables are, working in Asmara (the capital city), agricultural sector, working as a daily labourer, married, belonging to Tigrinya ethnic group, Government, being a fighter.

Dum Int = the interpretation of the dummy variables

Hours of work

The coefficients of hours worked for both men and women earnings functions are positive and significant at 1 % level. This implies that one additional hour worked brings about 0.64 % and 0.28 % increase in the wages of men and women respectively. The increment in wages as a result of the additional hour of work was higher for men than women.

Place of Work

With the exception of the regional dummies for Berentu and Decemhare, all other regional dummies were significant for men. In the case of men, using working Asmara (the capital city) as a base category, and keeping all others variables constant,

University of Cape Town

it is observed that employees working in Adekehih (35.2 %), Akurdat (8.6 %), Keren (8.9 %), Mendefera (36.1 %), and Nakfa (23.2 %) earned significantly less than those employees working in Asmara. Even though the economic reason is not established beyond a doubt, the reason could be that demand for labour is higher in Asmara relative to the other towns. The employment distribution of the Asmara, Adekehih, Akurdate, Keren, Mendefera and Nakfa was 27.13 %, 1.82 %, 5.14 %, 7 %, 3.44 %, 1 % respectively.

Conversely, employees working in Assab (28.1 %), Gindae (12.7 %), Massawa (23.4 %), and Tesenay (18 %) were observed to be earning significantly higher than those employees working in Asmara. The employment distribution of Asmara was higher compared to the other towns mentioned above. The reason could be the harsh weather conditions of the towns (these towns are ports in the western and the eastern low - lands of Eritrea). That is to say, because of the harsh weather condition the supply of labour might be less than the demand, and that hence the wage in these towns was higher compared to Asmara.

From the female regression equation, it can be seen that only three of the proxies for regional dummies were significant. The remaining regional dummies were insignificant. Keeping all other variables constant, employees working in Mendefera, were observed to be earning 19.3 % lower than those employees working in Asmara. The reason could be because employment opportunity is higher in Asmara (27.13 %) than in Mendefera (3.44 %). Wages were higher for those employees who worked in Massawa (13.3 %) and Teseney (28.4 %) rather than those employees who worked in Asmara. The employment distribution for the three towns is 27.13 %, 21.64 %, 7.6 % respectively. Wages in Massawa and Teseney were higher compared to Asmara for the same reason given in the male earnings function.

University of Cape Town

Occupations

All the coefficients for occupational dummies, except for social work, in the female regression model were insignificant. The coefficient for social works is significant but negative. Using daily labourers, and holding all other variables constant, social service workers earned 39.5 % lower than the daily labourers.

Furthermore, in the case of male employees, those who worked in professional and technical, administrative and managerial, government and executive official, military, production and related and transport equipment operators earned 17.2 %, 34.6 % 22.7 %, 80.8 %, 19.8 %, 22.6 % respectively higher than daily labourers, keeping all variables constant.

On the other hand, service workers earned 23.2 % less than those employees in daily labourers. During the time of the survey, many big construction projects like the Sembel Housing and Massawa Korean projects were paying decent wages for daily labourers (the wages of daily labourers were inflated because of the high demand). Most likely a large portion of the service workers were government employees who were paid low wages.

Ethnicity[19]

The coefficients of three dummy variables for ethnicity in the male regression equation are significant. Taking employees belonging to the Tigrigna ethnic group as a base category - *ceteris paribus* – employees belonging to the Kunama and Tigre ethnic group earned 15.2 %, 15.9 % respectively, lower than employees belonging to the Tigrigna ethnic group. In addition, employees belonging to the Rashaida ethnic group earned 165 % higher than those employees belonging to the Tigrigna ethnic

[19] Women in the two ethnic groups (Rashaida and Hedareab) were excluded in the sample.

University of Cape Town

group. This is because there were only two Rashaida employees in the sample representing the ethnic group (the mean gross wage was obtained by averaging their earnings).All the coefficients for the ethnic dummy variables in the female earnings function are insignificant.

Industry

The industrial dummy coefficients for fishing, mining, manufacturing, energy and water, construction, trade, transport and communication, finance and real estate, public administration and extra-territorial organizations are positive and significant in the female earning equation. Using agriculture industry as the base case, and holding all the other variables constant, employees working in the industries mentioned above earned 56.6 %, 46.9 %, 28.6 %, 40 %, 62 %, 43.9 %, 58.5 %, 45.1 %, 36 %, 63.1 % higher than those employees who worked in agricultural industry respectively. Likewise, male employees who were working in the mining, finance and real estate, and extra territorial organizations industries, earned 13.17 %, 24.05 % and 40.65 % higher than those employees in the agricultural industry respectively, keeping all other variables constant. Moreover, employees in private household earned 45.5 % lower wages than in the agricultural industry respectively.

Employer

Only one of the coefficients of the employer dummies (self employed) is significant but negative in the case of male's regression model. Taking government as the base variable, the self-employed were earning 17.66 % lower than those employees who were employed by the government, keeping all the other variables constant. In the female regression model, the coefficients of the employer dummy variables for private and public are significant at 1 % level but negative. Using government as base case, and keeping all other variable constant, employees in the private and public sectors earned 12.6 % and 11.8 % respectively lower than those employed by the

University of Cape Town

government. This implies that there is a public sector wage premium operating in the Eritrean labour market.

Marital Status

As far as the male and the coefficient of the marital dummies are concerned only the never married dummy variable is significant but negative. Using wage of married employees as base case, the mean wage of never-married employees was 15 % lower than the mean wage of the married workers, *ceteris paribus*. As stated earlier the economic reason could be family responsibility. If one is married he or she has a responsibility to feed the family and this pushes him or her either to work more hours in their current occupation or search for a better paying job.

Interestingly, the coefficients for the marital dummies for female are all significant but negative. It is also observed that the wage of the widowed, divorced, and never married was lower by 14.4 %, 10.3 % and 6.9 % respectively than the mean wage of married women employees. The economic reason might be because married women got more employment opportunity (35.77 %) compared to never married (26.11 %), divorced (24.66 %) and widowed (13.44 %).

Fighter

The dummy for fighter is positive and significant at 1 % level for both male and female coefficients. Employees, who belong to the fighter group, keeping all other variables constant, enjoyed 29.4 % higher wages than those employees who do not belong to the fighter group, Likewise, the wages for female workers belonging to the fighter group were 70.9 % higher than non-fighters.

University of Cape Town

4.3.4 Structural Test

After estimating the two earnings functions for male and female workers need to run a Chow test to check if the two functions are structurally different. The Chow-test was significant at the 1 % level **(F =6.27878)**[20] suggesting that the parameters in the male equations were significantly different from those in the female equations, which further implies that the male and female earnings functions are structurally different, hence the gender-wage differential can be measured using the Oaxaca-Blinder (1973) decomposition technique.

4.3.5 Measuring Gender Pay Gap

Tables17 and 18 present the log the gender-wage differential measured using equations (4) and (5) respectively.

Table 17: Measuring gender-wage gap eq (4)

Var X	Mean of Male (Xm)	Mean of Female (Xf)	Coef of Male (Bm)	Coef of Female (Bf)	H Capital Bm(Xm-Xf)	Discrimination Xf(Bm-Bf)
edulev1	5.5255	4.7280	0.0476	0.0436	0.0380	0.0192
edulev2	1.4817	1.3055	0.0585	0.1336	0.0103	-0.0980
edulev3	0.9464	0.4760	0.0606	0.0507	0.0285	0.0047
exper	23.8420	20.8743	0.0316	0.0414	0.0938	-0.2047
exper2	792.6000	606.7458	0.0004	-0.0006	-0.0758	0.1082
town1	0.0182	0.0259	-0.3448	-0.1617	0.0027	-0.0047
town3	0.0514	0.0367	0.0895	-0.0273	0.0013	0.0043
town4	0.1575	0.1176	0.3369	-0.0717	0.0134	0.0481
town5	0.0304	0.0453	0.0654	-0.0487	-0.0010	0.0052
town6	0.0273	0.0329	0.0316	-0.0187	-0.0002	0.0017
town7	0.0371	0.0108	0.2043	0.0477	0.0054	0.0017
town8	0.0700	0.0594	-0.0045	-0.1195	0.0000	0.0068
town9	0.2164	0.1840	0.2997	0.0976	0.0097	0.0372
town10	0.0344	0.0594	-0.3584	-0.2422	0.0089	-0.0069
town11	0.0100	0.0140	-0.1741	0.0912	0.0007	-0.0037
town12	0.0760	0.0745	0.2551	0.2227	0.0004	0.0024
occp1	0.1126	0.1371	0.1586	-0.0367	-0.0039	0.0268
occp2	0.0507	0.0216	0.2972	0.1250	0.0086	0.0037

[20] Chow-test was run as follows:
(ess1 – (ess2 + ess3)/k) / (ess2 + ess3) / ((N2 + N3) – 2*k)),where ess1 is the error sum of squares from the pooled (constrained) regression, ess2 and ess3 are the error sum of squares from the separate regressions, k is the number or estimated parameters(k=58 in this case), and N2 and N3 are the number of observations in the sub-groups.

University of Cape Town

occp3	0.0103	0.0016	0.2045	0.0879	0.0018	0.0002
occp4	0.1164	0.2267	0.0341	-0.2098	-0.0038	0.0553
occp5	0.0194	0.0205	-0.0975	-0.4007	0.0001	0.0062
occp6	0.0916	0.3718	-0.2637	-0.5032	0.0739	0.0891
occp7	0.0086	0.0022	0.5921	-0.1644	0.0038	0.0016
occp8	0.0521	0.0567	-0.0903	-0.0109	0.0004	-0.0045
occp9	0.3928	0.1576	0.1802	-0.2460	0.0424	0.0672
occp10	0.0877	0.0016	0.2040	-0.2634	0.0176	0.0008
ethn1	0.0265	0.0081	-0.0580	-0.0088	-0.0011	-0.0004
ethn2	0.0220	0.0097	-0.0265	-0.0126	-0.0003	-0.0001
ethn4	0.0146	0.0286	-0.1652	-0.0994	0.0023	-0.0019
ethn5	0.0220	0.0270	-0.0938	-0.0267	0.0005	-0.0018
ethn7	0.0301	0.0113	-0.0428	-0.0156	-0.0008	-0.0003
ethn8	0.1439	0.0443	-0.1731	-0.0021	-0.0172	-0.0076
ind2	0.0165	0.0043	0.1247	0.4485	0.0015	-0.0014
ind3	0.0206	0.0092	0.2137	0.3847	0.0024	-0.0016
ind4	0.1535	0.1468	-0.0462	0.2513	-0.0003	-0.0437
ind5	0.0426	0.0167	-0.0168	0.3361	-0.0004	-0.0059
ind6	0.1461	0.0281	0.0512	0.4822	0.0060	-0.0121
ind7	0.0540	0.0340	-0.1588	0.3641	-0.0032	-0.0178
ind8	0.0182	0.0961	-0.1023	0.1393	0.0080	-0.0232
ind9	0.1956	0.0880	0.0758	0.4607	0.0082	-0.0339
ind10	0.0390	0.0416	0.2155	0.3724	-0.0006	-0.0065
ind11	0.1499	0.1738	0.0123	0.3078	-0.0003	-0.0514
ind12	0.0526	0.0621	-0.1965	0.0727	0.0019	-0.0167
ind13	0.0258	0.1128	-0.0781	0.2279	0.0068	-0.0345
ind14	0.0385	0.1063	-0.1554	0.1715	0.0105	-0.0348
ind15	0.0017	0.0302	-0.6075	-0.0159	0.0173	-0.0179
ind16	0.0072	0.0070	0.3411	0.4891	0.0001	-0.0010
empl1	0.3517	0.3157	-0.0313	-0.1348	-0.0011	0.0327
empl3	0.2109	0.1360	-0.0488	-0.1252	-0.0037	0.0104
empl4	0.0418	0.0432	-0.1624	-0.1024	0.0002	-0.0026
f02bq13	48.6940	44.8910	0.0064	0.0028	0.0242	0.1607
mari2	0.0127	0.1344	-0.0339	-0.1560	0.0041	0.0164
mari3	0.0270	0.2466	0.0217	-0.1086	-0.0048	0.0322
mari4	0.2957	0.2612	-0.0728	-0.0720	-0.0025	-0.0002
Fighter	0.1804	0.1311	0.2575	0.5359	0.0127	-0.0365
				Sum	**0.3476**	**0.0665**

The log gross monthly wage of male employees was 1.34969 and the equivalent geometric mean was Nakfa 6.21. For the women the log gross monthly wage was 0.935621, and the geometric gross monthly wage was Nakfa 5.66.Therefore, the

University of Cape Town

resulting log wage differential was, 0.414069[21], and the mean ln wage difference was Nakfa 0.5489914[22].

Table 18: Measuring gender-wage gap eq (5)

Var X	Mean of Male (Xm)	Mean of Female (Xf)	Coef of Male (Bm)	Coef of Female (Bf)	H Capital Bf(Xm-Xf)	Discrimination Xm(Bm-Bf)
edulev1	5.5255	4.7280	0.0476	0.0436	0.0348	0.0224
edulev2	1.4817	1.3055	0.0585	0.1336	0.0235	-0.1112
edulev3	0.9464	0.4760	0.0606	0.0507	0.0238	0.0094
exper	23.8415	20.8743	0.0316	0.0414	0.1229	-0.2337
exper2	792.6017	606.7458	-0.0004	-0.0006	-0.1089	0.1414
town1	0.0182	0.0259	-0.3448	-0.1617	0.0013	-0.0033
town3	0.0514	0.0367	0.0895	-0.0273	-0.0004	0.0060
town4	0.1575	0.1176	0.3369	-0.0717	-0.0029	0.0644
town5	0.0304	0.0453	0.0654	-0.0487	0.0007	0.0035
town6	0.0273	0.0329	0.0316	-0.0187	0.0001	0.0014
town7	0.0371	0.0108	0.2043	0.0477	0.0013	0.0058
town8	0.0700	0.0594	-0.0045	-0.1195	-0.0013	0.0081
town9	0.2164	0.1840	0.2997	0.0976	0.0032	0.0437
town10	0.0344	0.0594	-0.3584	-0.2422	0.0060	-0.0040
town11	0.0100	0.0140	-0.1741	0.0912	-0.0004	-0.0027
town12	0.0760	0.0745	0.2551	0.2227	0.0003	0.0025
occp1	0.1126	0.1371	0.1586	-0.0367	0.0009	0.0220
occp2	0.0507	0.0216	0.2972	0.1250	0.0036	0.0087
occp3	0.0103	0.0016	0.2045	0.0879	0.0008	0.0012
occp4	0.1164	0.2267	0.0341	-0.2098	0.0231	0.0284
occp5	0.0194	0.0205	-0.0975	-0.4007	0.0005	0.0059
occp6	0.0916	0.3718	-0.2637	-0.5032	0.1410	0.0219
occp7	0.0086	0.0022	0.5921	-0.1644	-0.0011	0.0065
occp8	0.0521	0.0567	-0.0903	-0.0109	0.0000	-0.0041
occp9	0.3928	0.1576	0.1802	-0.2460	-0.0579	0.1674
occp10	0.0877	0.0016	0.2040	-0.2634	-0.0227	0.0410
ethn1	0.0265	0.0081	-0.0580	-0.0088	-0.0002	-0.0013
ethn2	0.0220	0.0097	-0.0265	-0.0126	-0.0002	-0.0003
ethn4	0.0146	0.0286	-0.1652	-0.0994	0.0014	-0.0010
ethn5	0.0220	0.0270	-0.0938	-0.0267	0.0001	-0.0015
ethn7	0.0301	0.0113	-0.0428	-0.0156	-0.0003	-0.0008
ethn8	0.1439	0.0443	-0.1731	-0.0021	-0.0002	-0.0246
ind2	0.0165	0.0043	0.1247	0.4485	0.0055	-0.0053
ind3	0.0206	0.0092	0.2137	0.3847	0.0044	-0.0035
ind4	0.1535	0.1468	-0.0462	0.2513	0.0017	-0.0457
ind5	0.0426	0.0167	-0.0168	0.3361	0.0087	-0.0150
ind6	0.1461	0.0281	0.0512	0.4822	0.0569	-0.0629
ind7	0.0540	0.0340	-0.1588	0.3641	0.0073	-0.0282
ind8	0.0182	0.0961	-0.1023	0.1393	-0.0109	-0.0044

[21] The log differential (0.414069) was found by adding the two components of the decomposition results i.e. 0.3476 and 0.0665 or by subtracting the log wage of women from the log wage of males (1.34969 -0.935621).

[22] The mean wage difference (0.5489914) was found by subtracting the mean ln female wage from the mean ln male wage (6.21 – 5.66). The mean ln wages are the same as the geometric means.

University of Cape Town

ind9	0.1956	0.0880	0.0758	0.4607	0.0496	-0.0753
ind10	0.0390	0.0416	0.2155	0.3724	-0.0010	-0.0061
ind11	0.1499	0.1738	0.0123	0.3078	-0.0074	-0.0443
ind12	0.0526	0.0621	-0.1965	0.0727	-0.0007	-0.0142
ind13	0.0258	0.1128	-0.0781	0.2279	-0.0198	-0.0079
ind14	0.0385	0.1063	-0.1554	0.1715	-0.0116	-0.0126
ind15	0.0017	0.0302	-0.6075	-0.0159	0.0005	-0.0010
ind16	0.0072	0.0070	0.3411	0.4891	0.0001	-0.0011
empl1	0.3517	0.3157	-0.0313	-0.1348	-0.0048	0.0364
empl3	0.2109	0.1360	-0.0488	-0.1252	-0.0094	0.0161
empl4	0.0418	0.0432	-0.1624	-0.1024	0.0001	-0.0025
f02bq13	48.6945	44.8910	0.0064	0.0028	0.0106	0.1743
mari2	0.0127	0.1344	-0.0339	-0.1560	0.0190	0.0015
mari3	0.0270	0.2466	0.0217	-0.1086	0.0239	0.0035
mari4	0.2957	0.2612	-0.0728	-0.0720	-0.0025	-0.0002
Fighter	0.1804	0.1311	0.2575	0.5359	0.0264	-0.0502
				Sum	**0.3396**	**0.0745**

Table 19 shows the estimates of the endowment and treatment components obtained by employing the Oaxaca-Blinder decomposition formulas of equations (4) and (5). Combining all ethnic groups within the age range of 15-65, and who worked full time, female employees earned, on average, about 66[23] % of what men earned in 1997.

Table 19: Decomposition results using log wage differential

Male – Female Log Wage Differential = 0.41407

Oaxaca–Blinder Decomposition Equation	Endowment Differential	Treatment Differential
(4) Male Coefficient	0.34761	0.06646
	(83.95)	(16.05)
(5) Female Coefficient	0.33960	0.07446
	(82.02)	(17.98)

Percentage of Wage Differential in Parentheses

Endowment differential: The first column of figures in table 19 shows the logarithmic wage differential due to mean difference in endowments (ie.difference in the average

[23] The antilog of the difference in log differential i.e. **-0.41407** (equal to the ratio of female and male mean earnings) equals 0.6603679 indicating that women earned 66 percent of what men earned.

University of Cape Town

characteristics of education, experience, industry and occupation, type of employer, marital status, hours worked, etc) between men and women. According to equations (4) and (5) from 82 % to 84 % of the difference of the log wage differential is explained by the difference in endowments between male and female workers in 1997. The overall mean differences in endowments can be seen to account for more than three quarters of the wage gap according to the analysis above.

Treatment differential: The second column in table 19 shows the contribution of discrimination to the gender-wage gap. According to equations (4) and (5) the contribution of discrimination varies from about 16 % to18 % respectively[24]. This confirms that women's pay is depressed by discrimination in the Eritrean labour market because the unequal treatment in the labour market accounts for a significant portion of the pay gap.

As suggested by Lissenburgh (2000), the figure for discrimination stated above can be interpreted as the percentage increase in wage that female employees would receive, given their stock of human capital attributes, if they were remunerated according to the male pay structure. It therefore represents the increase in women's pay that would occur if discrimination was avoided.

The Eritrean labour market results are explained by the fact that women in the sample have much lower average endowments (including not only differences in formal education and experience, but also a number of other characteristics) than men, which accounts for almost the entire male-female wage gap. Discrimination explained only a small portion of the wage gap implying that it is not a serious problem.

University of Cape Town

[24] Chiplin and Sloane (1982: 85) suggested that the true measure of discrimination is likely to lie closer to the male estimate, i.e. 0.07446. In other words, about 18 percent of the gender-wage differential is attributed to the unequal treatment in the labour market.

4.6 Empirical Findings

On the empirical side of labour market discrimination, a number of studies have been carried out. To better understand the extent of the gender-wage differential and the sources of the wage gap in the Eritrean labour market, the following studies from South Africa (carried out by Isemonger and Roberst, 1999[25], and Ethiopia, Côte d'Ivoire and Uganda studied by Appleton et al, 1999[26]) are considered.

To standardize the comparison, the studies considered were those that employ the Oaxaca-Blinder (1973) decomposition technique (apply the female and male wage structure) and have the basic human capital specification i.e. education and experience.

As displayed in table 20 below, all studies show that women in Africa earned less than their men counterparts. Women in Uganda, Côte d'Ivoire, Ethiopia and South Africa earned 61 %, 96 %, 74 % and 75 % of what their men counterparts earned respectively .The ratio of female to male earnings in Eritrea is relatively low compared to the other country's female –male earnings ratio.

University of Cape Town

[25] The data set examine for the study was derived from the Saldru study (Saldru 1994) 'South Africans Rich and Poor: Baseline Household Statistics', which detail the returns of 9000 South African households surveyed during a nine month period ending in April 1994.

[26] The Ethiopian data was taken from the 'Survey of Adolescent Fertility, Reproductive Behaviour and Employment Status of the Youth Population in Urban Ethiopia," conducted in June 1990.The Ivorian data was taken from the Living Standards Surveys of the Côte d'Ivoire in 1985, 1986, and 1987. And the Ugandan data was taken from the Integrated Survey of Uganda of 1992.

Table 20:Survey of empirical findings of F/M earnings ratio of different countries

	Ethiopia	Côte d'Ivoire	Uganda	South Africa	Eritrea
Female-male earnings ratio	**0.74**	**0.96**	**0.61**	**0.75**	**0.66**
Using Equation (5)					
Endowments	-9	139	-15	-25	82
Discrimination	109	38	115	125	18
Using Equation (4)					
Endowments	-19	312	26	-134	84
Discrimination	119	212	74	237	16

More than 100 % of the female –male earnings ratio in Ethiopia was explained by the unequal treatment in the labour market. Difference in human capital between men and women was a not a problem. Moreover, in Uganda from 74 % to 115 % of the female –male earnings ratio was attributed to discrimination in the labour market and the remaining from 15 % to 26 % was attributed to human capital differences between men and women. The South African study showed that women in South Africa earned 75 % of what their men counterparts earned. Difference in human capital was not a problem. In fact, according to Winter (1998), women possess more mean years of schooling than their men counterparts. However a significant portion (from 125 % to 237 %) of the gender-wage gap was explained by discrimination in the labour market. In addition, in Côte d'Ivoire female –male earnings ratio was very small. That is, women in Côte d'Ivoire earned 96 % of what men earned. However the small female –male earnings ratio was attributed to more than 100 % difference in human capital and the remaining from 38 % to 212 % to discrimination.

Unlike Uganda, Ethiopia and South Africa in Eritrea a significant portion of the gender-wage gap was explained by differences in human capital between men and women. The gender-wage gap that was explained by discrimination in the Eritrean

University of Cape Town

labour market was small compared to the three countries mentioned above. However, the female –male earnings ratio of Eritrea, explained by the differences in human capital and discrimination, is small in both cases compared to the Côte d'Ivoire.

4.4 Critique of the Oaxaca-Blinder (1973) model

Measuring the gender-wage differential and discrimination using Oaxaca-Blinder (1973) decomposition has the following limitations:

Over or under estimation of the extent of discrimination

Measuring the gender-wage differential and discrimination using Oaxaca-Blinder (1973) decomposition requires proper accounting for, presentation and accurate measurement of the agreed upon variables. If all the relevant observable differences between men and women cannot be controlled for, then differences in the wages of men and women will be erroneously interpreted as the result of discrimination. Sometimes, even though it is established that the acceptable variables that should be included in the model, because of data limitation relevant variables may be omitted (such as ability, family background, and luck). Each omitted variable's influence is reflected in the residual (unexplained component), which may cause an overestimation of the extent of discrimination.

Differences in observable characteristics may themselves be the result of discrimination. For instance, education might reflect pre-labour market discrimination by parents that may underestimate the extent of post-labour market discrimination or over-estimate the productivity difference.

Moreover, all the relevant variables might be included, but they may be poorly measured such as experience. Most of the time, because it is difficult for researchers to find the actual work experience, they calculate the potential experience (age – years

University of Cape Town

of education -6) for each individual. However, Altonji and Blank (1999) argue that calculating the potential experience using the standard Mincerian formula is misleading. This is because the above equation implicitly assumes that all people are working during all their adult years when they are not in school. This is not true in reality. Some people do not find a job and others; for instance, women withdraw from the labour market because of family responsibilities. This also understates the extent of discrimination by overstating the extent of productivity differences.

Index number problem

The index number problem can be expressed as follows. How much would women earn if they were paid according to the male wage structure, or how much would men earn if they were paid according to the female wage structure?

Many studies measuring the gender-wage differential employ equation (4), assuming in the competitive market (in the absence of discrimination) women will be paid equally like their men counterparts. In this study, if men and women are unequally treated, it was assumed it is because employers are exercising discrimination. However, Neumark (1988) presents a different argument, mainly that employers may offer different wages because they may practice nepotism and discrimination. If employers exercised favouritism (such as nepotism) women are paid a competitive wage while men are paid above the competitive wage. In this case the coefficients from the female earnings function reflect the non-discriminatory wage structure. If employers exercise discrimination men will be paid the competitive wage but women will be underpaid. In this case the coefficient from the male earning function will estimate the non-discriminatory wage structure. Therefore a proper decomposition depends on the type of discrimination hypothesized[27].

[27] Neumark (1988) shows that the non-discriminatory wage structure can be estimated from earnings function estimated over the pooled sample. Neumark proposes a general model of discrimination in which employers may have different preferences

University of Cape Town

As suggested by Appleton (1999) the decomposition can be quite sensitive to the wage structure employed but none of the two is preferable to the other *a priori*. Also, as shown in table 19 above, the gender-wage gap study in the Côte d'Ivoire revealed that 38 % of the wage gap was due to discrimination using the male wage structure but a 212 % differential using the female wage structure.

In addition, the gender-wage gap and the sources of the gender-wage gap are also sensitive to whether one uses the log wage differential or the mean wage difference. For instance, when the gender-wage gap in Eritrea is estimated using log differential is found to be 0.414096, implying that women earned 66 % of what men earned - whereas using the mean log differential is found to be 0.54896 implying women earned 58 % of what men earned. The gender-wage gap estimated using the two ways affects the estimation of the extent of discrimination and human capital differences between male and female. As shown in table 22 below, of the gender-wage gap 62 % to 63 % can be explained by differences in human capital between men and women, and the remaining 37 % to 38 % can be attributed to discrimination exercised in the labour market. The non-homogenous estimation will therefore affect the 'dosage' of corrective measures that should be taken regarding each components of the gender-wage gap.

Table 21: Decomposition results using mean log wage differential

Mean Male – Mean Female Log Wage Differential = 0.54896[28]

Oaxaca–Blinder Decomposition Equation	Endowment Differential	Treatment Differential
(4) Male Coefficient	0.34761	0.20135
	(63.33)	(36.68)
(5) Female Coefficient	0.33960	0.20936
	(61.86)	(38.14)

Percentage of Wage Differential in Parentheses

(nepotistic or discriminatory) toward different types of workers. For more information see the non-discriminatory decomposition model.

[28] It is calculated by subtracting the mean ln female wage (5.66) from mean ln male wage (6.21) estimated table 13.

University of Cape Town

4.5 Conclusion

From the descriptive and econometric analyses, it was observed that there is a gender-wage differential between male and female employees. However, this wage gap that existed between the two groups was elicited from both the supply side (that is differences in human capital investment in the form of education, experience) and unequal treatment in the labour market. To be more specific, women employees in 1996/7 earned about 66 % of the men workers. From this figure about 82 % of the difference could be attributed to differences in the average characteristics of men and women (including not only differences in formal education and experience, but also a number of other characteristics) between male and female employees whereas the remaining 18 % was attributed to the unjustified discrimination practiced in the Eritrean labour market.

From the descriptive statistics it was observed that male employees possess higher average education, experience and work more hours in the week than their female counterparts. Moreover, male workers (except for experience) enjoyed higher rewards in the labour market for each additional endowment they possess. Female employers were observed to earn (except for service workers) substantially less than their male counterparts across and within each occupation and sector. Hence, given the lower education level, experience, working hours it is not surprising those female employees on average earned less than men in Eritrea.

The results from the wage equation of female workers showed that human capital followed by the variable fighters (a dummy for those who participated in the army struggle or not), hours worked per week, marital status, industrial sectors, and type of employer were significant determinants of wage. Place of work and occupations were the least significant while ethnicity was insignificant in the wage determination process of the female employees. The human capital followed by the variable fighter, place of work and occupations were important variables in determining the male

University of Cape Town

wages. Ethnicity, industrial sectors, employer and marital status were least important in the wage determination process of the male employees in Eritrea in 1997.

University of Cape Town

CHAPTER FIVE

SUMMARY AND CONCLUSION

5.1 Summary and Implications

This study measuring the gender-wage differential and discrimination in Eritrea represents one of the first attempts to shed light on the determination of wages since Eritrean independence. Both the descriptive statistics and econometric analysis of the gender-wage gap reveal that women earned significantly less than men in the labour market. The gender-wage gap was observed to be higher for those workers in the 75^{th} percentile where male wage equals Nacfa 811 and female Nacfa 456. Women in the 50^{th} percentile earned 56 % of what men earned. Moreover, women's nominal wages were, on average, 61 % of men's nominal wages during the survey.

Econometric analysis with data on education, experience, experience squared, hours of work per week, place of work, occupation, industry, employer, marital status, fighter and ethnicity concluded that these measurable factors account for much, but not all of the log wage differential between men and women in the Eritrean labour market.

The results from decomposition show that women earned about 66 % of what men earned in 1997. About 82 % of the gender-wage gap can be explained by differences in human capital between men and women and the remaining 18 % was attributed to unequal treatment (discrimination) in the labour market. In other words, more than three quarters of the gender-wage gap was explained by human capital difference between men and women in 1997. As we have shown, women, on average, possessed lower educational attainment and work experience.

University of Cape Town

The relevance of human capital and experience were consistently significant for men and women in the determination of wages in Eritrean labour market. Interestingly, the rate of return on secondary education was higher than the rate of return on primary and tertiary education. Moreover, the rates of return on primary and tertiary education were higher for male employees than for female workers. The rate of return on secondary education for female workers is substantially higher than for male workers. The rate of return (13.36 %) on secondary education for female employees was about 228 % higher than the rate of return (5.85 %) for male workers .The rate of return to experience for women was marginally higher than the rate of return for men. This means experience overcompensated women. Moreover women, on average, worked fewer hours per week than men, and the rate of return of one additional hour of work was higher for men than women.

Most of the dummy variables representing marital status, fighter, occupation, industry, employer and towns (place of work) ethnicity, appear to be significant at conventional levels. In addition, fighters (both men and women) earned more than the non-fighter employees. The dummy for fighter is positive and significant at 1 % level for both male and female coefficients. Although the consideration of non-economic factors applies to both male and female fighters employees, because the proportion of male fighters was 38 % than the female fighters, the dummy variable 'fighter' was influencing the wage gap as a group.

The result suggests the existence of a significant gender-wage gap in Eritrea mainly caused by differences in average characteristics of men and women and unequal treatment (discrimination) in the labour market irrespective of the presence of legislation against it. According to Chapter 4, section 5 (article 65: 1) of the Eritrean Labour proclamation (2001, Revised), the law states that "Women may not be discriminated against as regards to opportunity or treatment in employment and remuneration, on the basis of their sex." What are the policy implications of the result?

University of Cape Town

Education

Having realised that more than three quarters of the gender-wage gap which prevailed in the Eritrean labour market could be attributed to differences in the average characteristics (including human capital, i.e., education and experience) between men and women there is need to:

a) Increase investment in education (especially in secondary education), and motivate female students to join the highly rewarding fields like engineering in order to control the gender gap that may arise from studying different fields. This means that steering female toward male fields may help balance wages. Special assistance can be offered if women are found to be weak in mathematics and related skills.

b) Investigate the factors (such as military service, home responsibilities) which prevent potential female employees from attending secondary and tertiary education.

c) Schools should also do away with gender stereotyped teaching materials dealing with family and home responsibilities.

e) Provide market-oriented education/training and incorporate employers in the curriculum development programme to facilitate access to and return of women in the labour market

Employers

As discussed in the literature review, employers are sometimes responsible for unequal treatment practices in the labour market. Employers can affect the wages of female employees directly by compensating difference or indirectly by clustering female employees into low-paying jobs and by not opening equal chances of enjoying on-the-job training. Employers, whose main concern may be profit, might not understand the seriousness of the problem. What is usually observed is that employers

University of Cape Town

look at things from a micro-level perspective. They are not aware of the macro-level effect of their individual decisions. Therefore, the concerned institutions need to reveal the significance of the problem to employers on the following issues through the media and other institutions (such as employers' associations):

a) Migration effect: Search and migration are activities that increase the value of one's human capital through increasing the price (wage) received for a stock of skills. If equally productive female workers are not rewarded equally to their male counterparts, they might leave the country and society and the country would be the poorer.

b) Feedback effect on education of women: What happens in the market place affects the potential and the current employees' decision of investment in themselves. If potential female employees observe that their investment in education is not rewarded well because of non-economic factors such discrimination, they will not be motivated to invest in themselves.

c) Inequality and growth effect: The existence of the gender-wage differential would imply that disparities in wages would be a source of inequality and aggravated poverty between groups in society.

Government

The government as a key player in the Eritrean economy should do the following to solve or minimise the gender-wage gap in the economy:

a) The government should stipulate policies in good collaboration and understanding with implementers (employers).

University of Cape Town

b) Follow-ups are needed in the event that employers are reported or caught applying discriminatory policies. In such cases, they must be punished strictly. Examples of such punishments might be revoking employers' licenses (if they are private enterprises) after short notice or tough disciplinary actions in financial term taken against those managers who practice discrimination against women employees.

c) Government should offer incentives in the form of tax exemption and rending training services to those firms or organizations that employ more women employees, especially in male-dominated occupations. Employers should be motivated to explore ways to make work schedules more flexible and explore new types of child-care provision (within the limits of their budgets) in order to ensure that employees with family responsibilities have equal access to all occupations and promotion opportunities.

c) Wage policies should take into consideration the factors that are related to productivity. Wages are the price of labour. Considering non-economic factors in the wage determination process would affect the productivity of labour and aggravate inequality and thereby reduce the economic growth of the country. If any form of pay-back is needed, it would be advisable that it takes other forms of compensation outside wages.

University of Cape Town

Society

Important factors outside the labour market that affects women's labour market performance and opportunities are beliefs and cultural practices. The organisation of family life in society may cause segregation of occupations. It is believed that family responsibilities have negative and positive effect on human capital investment and occupational segregation respectively. In Eritrea, the care of children and family members still appears to be largely the responsibility of women. This responsibility might clash with their plan of human capital investment and entrance into and

advancement in a number of occupations that routinely require overtime, job related travel and inflexible or irregular hours.

The prevalent belief that women rather than men should be primarily accountable for children and family care might contribute negatively to attitudes toward female workers and to discrimination against them in nearly all occupations and work situations causing occupational segregation. Societal stereotyping (i.e. labelling occupations as male or female occupations) might be a serious cause of segregation in the workplace. As long as societal stereotyping continues, it will be a good cover for the persistence of gender-wage discrimination. Therefore it is necessary to:

a) Change attitudes of society in general and the female workers in particular.

b) Motivate parents to positively influence their daughters and invest their boy and girl children equally.

In this case the national media, literature, live drama, religious institutions, and the educational system can play a leading role in achieving this goal.

5.2 Conclusion

This section concludes the discussion on measuring the gender-wage differential and discrimination. The discussion started by raising the following questions: Is there a significant gender-wage differential prevailing in Eritrean labour market? What are the variables that can explain the variation? To what extent does discrimination explain the discrepancy? What kind of public policies should be put in place or advocated for to correct this distortion in the Eritrean labour market?

In an endeavour to answer the questions above there was a need to look for the possible alternative theories that already attempted to explain the potential sources of gender-wage differentials. The discussion started off with the supply-side theories. Human capital and other supply-side theories argued that the sources of wage differentials between male and female employees are the differences in the acquisition

University of Cape Town

of human capital such as schooling, work experience and on-the-job training, difference in group preferences, innate difference (such as physical strength, ability), and pre-labour market discrimination practised by parents. However, theories outside the neo-classical paradigm suggested the sources of the gender-wage differential to be compensating differences, market imperfection, occupational segregation and labour market segmentation.

No one theory is dominant in explaining the gender-wage gap. Some countries' labour market may show a strong dominance of one theory over another, given the economic configuration and society's own history. In the case of Eritrea, given the strong cultural norms that prescribe women to do non-market jobs like child-rearing and take responsibility for the family and the incapability of employers to know the productivity of potential employees, pre-labour market discrimination theory and the ignorance of employers (statistical discrimination theory) could to some extent explain the gender-wage gap in Eritrean labour market.

For an accurate investigation of the sources of the gender-wage differential, all the potential sources of the wage gap must be considered; hence all the measurable variables that were available in the Income and Expenditure Household Survey of 1997 were considered. To come up with the measure of discrimination firstly, three wage equations were estimated. The equations included a pooled equation for both men and women and two separate equations for men and women. The conventional Oaxaca-Blinder (1973) decomposition technique was then used to decompose the wage differentials.

Moreover the descriptive analysis confirmed that women across and within the sectors and occupational groups earned less than what men earned in 1997.The decomposition results revealed that women in Eritrea earned 66 % of what men earned. About 82 % of the log wage differential was explained by variation of average characteristics of male and female workers (including not only differences in formal

University of Cape Town

education and experience, but also a number of other characteristics). On average, women's stock of human capital attributes is smaller than that of men. In the sample, working men had an average of 23 years experience compared to 20 for working women. Male employees had about a year and a half more schooling than female workers.

Overall, mean differences in average characteristics of men and women can be seen to account for about three quarters of the pay gap according to the above analysis. The remaining 18 % of the gender-wage differential is attributed to unequal treatment practised in the labour market (discrimination). This confirms that women's pay is still depressed by discrimination in the Eritrean labour market.

Finally, it was discovered that there exists a significant gender-wage gap in Eritrea compared to Uganda, Ethiopia, South Africa, and the Côte d'Ivoire. The main source of the gender-wage gap was found to be differences in the average characteristics of male and female employees in Eritrea. Moreover, the existence of unequal treatment in the labour market was also proved. Therefore, government intervention is required in order to begin correcting these distortions.

University of Cape Town

REFERENCES

Altonji, J. & Blank, R. (1999). Race and gender in the labour market. Handbook of Labour Economics. Vol.3, Chap.48, Amsterdam: Elsevier.

Appleton, S., Hoddinott, J. & Krishnan, P. (1999). The gender-wage gap in three African countries. Economic and Cultural Change, 47 (2), 288-304.

Arneber, M. & Pedersen, J. (1997). Urban household and urban economy in Eritrea. Analytical report from the urban Eritrean household income and expenditure survey (Unpublished report).

Barker, F. (1999). The South African labour market: Critical issues for renaissance. Pretoria: J.L. Van Schaik.

Becker, G. (1962). Investment in human capital: A theoretical analysis. Journal of Political Economy, 70(5), supplements (part 2), S9-S49.

Becker, G. (1964). Human capital: A theoretical and empirical analysis, with special reference to education. New York: National Bureau of Economic Research.

Becker, G. (1971). The economics of discriminination. Cambridge: Harvard University Press.

Becker, G. (1975). Human capital. Cambridge: Harvard University Press.

Bhorat, H. (2000). Wage premia and wage differentials in the South African labour market. DPRU Working Papers, No.00/43. Cape Town: Development Policy Research Unit.

Blackden, C. & Bhanu, C. (1998). Gender growth and poverty reduction: Special program of assistance for Africa, 1998 status report on poverty in sub-Saharan Africa. World Bank Technical Paper No.428. Washington: World Bank.

Blinder, A. (1973). Wage discrimination: Reduced form and structural estimates. Journal of Human Resources, 8,436-55.

Brixiova, Z., Bulir, A. & Comenetz, J. (2001). The gender gap in education in Eritrea in 1991-98: A missed opportunity? IMF Working Paper, WP.01.94.

Brown, C. & Corcoran, M. (1997). Sex-based differences in school content and the male/female wage gap. Journal of Labour Economics, 15 (3), 435-465.

University of Cape Town

Cain, G. (1986). The economic analysis of labour market discrimination: A survey. In Ashenfelter, O. & Layard, R. (eds.). Handbook of labour economics Vol.1. Amsterdam: North-Holland, Amsderdam: p. 693-785.

Card, D & Kruger, A. (1992). School quality and black-white relative earnings: a direct assessment. Quarterly Journal of Economics, 107,51-200.

Chiplin, B. & Slaone, P. (1976a). Sex discrimination in the labour market. London: the Macmillan Press Ltd.

Coate, S. & Loury, G. (1993b). Will affirmative-action policies eliminate negative stereotypes? American Economic Review, 83(2), 92-98.

Cotton, J. (1998). On the decomposition of wage differentials. The Review of Economics and Statistics, 70(2), 236-243.

Dex, S. (1985). The sexual division of work: Conceptual revolutions in the social sciences. England: Wheatsheaf Books Ltd.

Dickens, W. & Lang, K. (1985). A test of dual labour markets theory. American Economic Review, 75,792-805.

Ehrenberg, R. & Smith, R. (1985). Modern labour economics. London: Scott Foresman.

Erichen, G. & Wakeford, J. (2001). Racial wage discrimination in South Africa: Before and after the first democratic election. DPRU Working Papers. No.00/43.Cape Town: Development Policy Research Unit.

Faundz, J. (1994). Affirmative action: International perspective. Geneva: International Labour Organisation.

Glick, P & Sahn, D. (1997). Gender and education impacts on employment and earnings in West Africa: Evidence from Guinea. Economic Development and Cultural Change, 45 (4), 792-819.

Government of Eritrea (2001). The labour proclamation of Eritrea: Employment Relations Act Chapter 4:1, Asmara.

Graddy, K. & Pistagerri, L. (2000). Wage differences by gender: Evidence from recently graduated MBAS. Oxford Bulletin of Economics and Statistic, 62, Special Issue 0303-9049.

Gujarati, D. (1995). Basic econometrics. Singapore: McGraw-Hill.

University of Cape Town

Halvorsen, R. & Palmquist, R. (1980).The interpretation of dummy variables in semi-logarithmic equations. American Economic Review, 70(3), 358-70.

Hamermesh, D. & Rees, A. (1988). The economics of work and pay. New York: Harper & Row.

Isemonger, A. & Roberst, N. (1999). Post-entry gender discrimination in the South African Labour market. Journal for Studies in Economics and Econometrics, 23(2), 1-25.

Kennedy, P. (1998). A guide to econometrics. Cambridge: MIT Press.

Klasen, S. (1999). Does gender inequality reduce growth and development? Evidence from cross-country regressions, World Bank Policy Research Report on Gender and Development Working Paper No.7. Washington: World Bank.

Lissenburgh, S. (2000). Gender discrimination in the labour market: Evidence from the BHPS and EiB surveys, PSI Research Discussion Paper 3, London.

Marshall, F., King, A. & Briggs, C. (1980). Labour economics. New York: Richard D.Irwin.

McConnel, C. & Brue, S. (1989). Contemporary labour economics. New York: McGraw-Hill.

Mincer, J. (1962). On–the-job training: Costs, returns, and some implications. Journal of Political Economy, 70(5), part 2: 50-79.

Mincer, J. (1974). Schooling, Experience and Earnings. New York: Columbia University Press (for the National Bureau of Economic Research).

Mincer, J. (1994). Human capital: A review.

Mincer, J. (1958). Investment in human capital and personal income distribution. Journal of Political Economy, 66(4), 281-302.

Neumark, D. (1988). Employers' discrimination behaviour and the estimation of wage discrimination. Journal of Human Resources, 23, 279-95.

Oaxaca, R. (1973). Male-female wage differentials in urban labour markets. International Economic Review, 14(3), 693-709.

Paglin, M. & Rufolo, A. (1990). Heterogeneous human capital, occupational choice, and male-female earnings differences. Journal of Labour Economics, 8 (1), 125-145.

University of Cape Town

Polachek, S. (1978). Sex difference in college major. Industrial and labour relation review, 31 (4), 498-508.

Rosen, S. (1986). The theory of equalizing differences. In Ashenfelter, O & Layrd, R. (eds.), and Handbook of labour economics.Amsterdam: North-Holland.

Summer, L. (1994). Investing in all the people: Educating women in developing countries, EDI Seminar Paper, No.45. Washington: Economic Development Institute of the World Bank.

Thaler, R. & Rosen, S. (1975). The value of saving a life: Evidence from the labour market.In Terlechyj, N. (ed.), Household production and consumption. New York: National Bureau of Economic Research.

The UN State of World Population Report (2000). UN tallies the economic costs of gender discrimination online http://www.womenof.com/Articles/ai100200.asp.

Thomas, D. (1990). Intra-household resource allocation: An inferential approach. Journal of Human Resources, 25(4), 635-664.

Winter, C. (1998). Women workers in South Africa: Participation, pay and prejudice in the formal labour market. Unpublished World Bank (draft).

Wonacot, P. & Wonacott, R. (1986). Economics. New York: Mc Graw-Hil

University of Cape Town

Appendix 1: Estimating earning function using Heckman two stage

Var x	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
edulev1	0.0532205	0.0037992	14.01	0	0.0457742	0.0606667
edulev2	0.0773226	0.0060047	12.88	0	0.0655537	0.0890915
edulev3	0.0556123	0.0032713	17	0	0.0492007	0.062024
exper	0.0305836	0.0022463	13.62	0	0.026181	0.0349862
exper2	-0.0003759	0.0000358	-10.5	0	-0.0004462	-0.0003057
town1	-0.3349944	0.0489516	-6.84	0	-0.4309378	-0.239051
town2	-0.0458421	0.0364531	-1.26	0.209	-0.1172889	0.0256048
town4	0.1576311	0.0240436	6.56	0	0.1105065	0.2047557
town5	-0.0210688	0.0468908	-0.45	0.653	-0.1129731	0.0708355
town6	-0.0417413	0.0416195	-1	0.316	-0.123314	0.0398315
town7	0.134037	0.0444132	3.02	0.003	0.0469886	0.2210853
town8	-0.0860872	0.0316794	-2.72	0.007	-0.1481776	-0.0239968
town9	0.1791246	0.0216815	8.26	0	0.1366296	0.2216195
town10	-0.3516705	0.0354878	-9.91	0	-0.4212254	-0.2821157
town11	-0.0908277	0.0662051	-1.37	0.17	-0.2205873	0.0389319
town12	0.1972204	0.0323971	6.09	0	0.1337233	0.2607176
occp1	0.0214064	0.0328698	0.65	0.515	-0.0430172	0.08583
occp2	0.1400929	0.0386959	3.62	0	0.0642504	0.2159354
occp3	-0.0165473	0.080788	-0.2	0.838	-0.1748888	0.1417943
occp4	-0.1302174	0.0258954	-5.03	0	-0.1809714	-0.0794634
occp5	-0.3034422	0.0603052	-5.03	0	-0.4216381	-0.1852462
occp6	-0.4478826	0.0266879	-16.78	0	-0.50019	-0.3955753
occp7	0.3318924	0.0858984	3.86	0	0.1635346	0.5002502
occp8	-0.1206021	0.0582044	-2.07	0.038	-0.2346807	-0.0065235
ethn1	-0.0240232	0.049073	-0.49	0.624	-0.1202045	0.072158
ethn2	-0.0037473	0.0542173	-0.07	0.945	-0.1100113	0.1025167
ethn3	-0.2045002	0.2324264	-0.88	0.379	-0.6600477	0.2510472
ethn4	-0.1466412	0.0599043	-2.45	0.014	-0.2640515	-0.0292309
ethn5	-0.0557112	0.0532733	-1.05	0.296	-0.1601249	0.0487026
ethn6	0.978158	0.3690402	2.65	0.008	0.2548524	1.701463
ethn7	-0.0027174	0.0460057	-0.06	0.953	-0.0928869	0.0874521
ethn8	-0.1181019	0.0243011	-4.86	0	-0.1657312	-0.0704727
ind2	0.2425108	0.0819373	2.96	0.003	0.0819167	0.4031048
ind3	0.3411994	0.0853279	4	0	0.1739597	0.508439
ind4	0.0666043	0.0698452	0.95	0.34	-0.0702898	0.2034985
ind5	0.1255612	0.0767685	1.64	0.102	-0.0249023	0.2760247
ind6	0.2117187	0.0708847	2.99	0.003	0.0727873	0.3506501

University of Cape Town

ind7	0.0324328	0.076495	0.42	0.672	-0.1174945	0.1823602
ind8	-0.0457792	0.0760049	-0.6	0.547	-0.194746	0.1031875
ind9	0.2364344	0.0699818	3.38	0.001	0.0992727	0.3735962
ind10	0.3068564	0.0752905	4.08	0	0.1592897	0.4544231
ind11	0.160803	0.0680193	2.36	0.018	0.0274876	0.2941184
ind12	-0.0622805	0.0768605	-0.81	0.418	-0.2129244	0.0883634
ind13	0.0942464	0.074982	1.26	0.209	-0.0527156	0.2412083
ind14	0.0092991	0.0715451	0.13	0.897	-0.1309268	0.1495249
ind15	-0.2558911	0.0955441	-2.68	0.007	-0.443154	-0.0686281
ind16	0.4396387	0.0999787	4.4	0	0.2436842	0.6355933
empl1	-0.0526079	0.0210761	-2.5	0.013	-0.0939163	-0.0112995
empl3	-0.0753298	0.0216863	-3.47	0.001	-0.1178342	-0.0328255
empl4	-0.1313918	0.0384038	-3.42	0.001	-0.2066619	-0.0561218
f02bq13	0.0053216	0.0004751	11.2	0	0.0043905	0.0062527
mari2	-0.1618857	0.0340803	-4.75	0	-0.2286818	-0.0950896
mari3	-0.1143419	0.0262727	-4.35	0	-0.1658354	-0.0628483
mari4	-0.0920399	0.0213422	-4.31	0	-0.1338698	-0.0502099
Fighter	0.3301525	0.0199821	16.52	0	0.2909883	0.3693166
gender	0.1510893	0.0195174	7.74	0	0.112836	0.1893427
_cons	4.797381	0.0858811	55.86	0	4.629057	4.965705
lambda	**-0.1854721**	**0.1633803**	**-1.14**	**0.256**	**-0.505692**	**0.134748**
rho	-0.35949					
sigma	0.51593282					
N =	6033					
Chi2(56)=	6658.07					

University of Cape Town

APPENDIX 2

Appendix2A: Mean wages by ethnic groups and gender

Ethnic	Male	Female	Total	%Of Male
Afar	687.11	594.21	675.78	86.48
Billen	448.16	397.11	439.4	88.61
Hedareb	348.78	0	348.78	0
Kunama	406.08	292.89	352.03	72.13
Nara	376.82	275.55	340.81	73.12
Rashaida	988.54	0	988.54	0
Saho	566.22	391.95	540.26	69.22
Tigre	448.59	445.77	448.26	99.37
Tirigna	674.18	366.39	570.11	54.35
Average	615.15	376.14	541.78	61.15

Appendix 2B: Mean Monthly wages of employees by place of work and gender

Place of Work	Male	Female	Total	%Of Male
Adikeih	425.68	299.14	374.41	70.27
Akurdet	414.18	344.47	397.2	83.17
Asmara	671.82	402.42	577.45	59.9
Assab	812.99	427.25	721.22	52.55
Barentu	483.49	351.1	428.16	72.62
Decemhare	602.1	384.45	525.67	63.85
Ghinda	489.38	317.6	469.05	64.9
Keren	455.76	290.42	410.71	63.72
Massawa	661.67	363.04	581.98	54.87
Mendefera	429.48	252.11	350.48	58.7
Nakfa	398.07	440.11	415.02	110.56
Tesseney	512.53	317.05	454.39	61.86
Average	615.15	376.14	541.78	61.15

University of Cape Town