Income Distribution and Labour Market Discrimination: A Case Study of Namibia

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FOREWORD

Studies of income distribution and earnings using Swedish data have a long tradition at the IUI. In the present licentiate Erika Ekström pursues this line of research. However, this study focuses on the very young and rapidly developing country of Namibia. The analysis is based on a unique data set obtained from the first household survey conducted in Namibia, since the country gained independence in 1990. The survey was carried out in 1993/1994 by the Central Statistical Office in Namibia in co-operation with Statistics Sweden. Erika Ekström was employed at Statistics Sweden when the survey results were evaluated and she also participated in the compilation of the data set analysed in this thesis.

Two main issues are addressed in the thesis. First, the income distribution among the Namibian households where various socio-economic groups are examined, investigating the extent to which total income inequality is due to within-group or between-group inequality. Second, the male-female earnings differentials in the labour market using a recently developed method to decompose the male-female wage gap into components referring to productivity differentials and various aspects of discrimination.

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Stockholm in September 1998

Ulf Jakobsson
Director of IUI

Abstract

This thesis contains two studies. The first study investigates the income distribution among Namibian households. The second study examines the differences in earnings between males and females in the Namibian labour market. In both studies we use the 1993/1994 Namibia Household Income and Expenditure Survey.

The aim of the first study is to investigate what socio-economic variables that affect the Namibian income distribution. To measure this we use the Gini coefficient. To investigate the extent to which total income inequality is due to *within-group* inequality or *between-group* inequality we use both Theil's (1967) entropy index T and Theil's second measure L. Income inequality is much more pronounced in the Central/southern region than in the North/north-east region. The *within-group* inequality seems to be the principal determinant of total inequality. Education and main source of income are important variables in determining degrees of *between-group* inequality. We find that Namibia still suffers from a skewed income distribution.

The aim of the second study is to examine the differences in earnings between males and females in manufacturing, service and public sector. The estimated earnings differences are decomposed into endowment and discrimination components using techniques by Oaxaca (1973) and Oaxaca and Ransom (1994). Comparing Heckman's (1979) two-stage estimation procedure with ordinary least square estimates we find that accounting for selection does not affect the endowment component, but do affect the discrimination component. We also find that females have a productivity advantage over the males, which reduces the gross wage differential.

Keywords: Income distribution, Gender discrimination, Namibia

JEL Classifications: J31, J71, O15, R12

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In March 1997 I joined The Research Institute of Industrial Economics (IUI) as a research assistant in a project directed by Assoc. Prof. Eugenia Kazamaki Ottersten and Dr. Erik Mellander. They have given me great support and encouragement in my research. They have also continuously given me comments on my drafts. Dr. Erik Mellander has in a very pedagogical way explained the econometric issues that I had difficulties with, for which I am most grateful.

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1 Introduction and Socio-economic Framework

1.1 Introduction

Much has been written about the country Namibia,[1] but there is little that focuses on the area of income inequality. The obvious reason for the paucity of research in this field is the lack of data, but Namibia's late independence in March 1990 has also contributed to this. Many authors writing about Namibia do indeed suggest that the country suffers from a severely skewed income distribution, but go no further in studying it. A study from 1986 estimated a Gini coefficient of about 0.66, but this figure relates to the middle of the 1970's.[2] More recently, other studies on average incomes have been carried out on some of Namibia's thirteen regions.[3] One of the studies in this thesis analyses the income distribution among the Namibian households using the 1993/1994 Namibia Household Income and Expenditure Survey (NHIES). This survey, at last, provided data to make study of income distribution possible on a national level. Little is known about the sources of income inequality besides the main underlying cause, which is the income difference between population groups due to the earlier apartheid system. In addition to this source of inequality other aspects are important in explaining and examining the distribution of income. Thus, the aim of this study is to investigate the unequal incomes in terms of socio-economic variables. The issue is to find out what kinds of factors affect income inequality. This study uses the Gini coefficient to measure income inequality. To examine the contributions of the *within-* and *between-group* inequality to total inequality, we use Theil's (1967) entropy index T and second measure L. The objective here is to compare the relative contributions of *within-* and *between-group* inequality to total income inequality for the different socio-economic variables. The urban/rural differences and differences in the level of educational attainment are often argued to be the main explanations of income inequality in developing countries. Is this also the case in Namibia?

The second study in this thesis considers a topic seldom explored in the context of less developed countries, namely labour market discrimination. The study focuses on gender discrimination, investigating whether there exists a gender bias against women within the

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[1] See Eriksen (1989).
[2] van Ginneken (1986).
[3] For example, see University of Namibia (1995).

Namibian labour market. It is particularly interesting to asses gender discrimination in the labour market of a less developed country, because women have not always been involved in the labour market to the extent they now are. In this study our aim is to examine whether the differences in earnings between males and females are due to endowment differences or to discrimination. We focus on the earnings differences between males and females in three sectors: manufacturing, the service and the public sector. The aggregation of these sectors is also considered. These are also disaggregated into urban and rural areas. The estimated earnings differences are decomposed into components of endowment differences and discrimination using the techniques by Oaxaca (1973) and Oaxaca and Ransom (1994). The second technique allows us to further disaggregate the discrimination component into favouritism (overpayment) and pure discrimination (underpayment). The hypothesis is that males in general are better endowed than females, we would expect a positive sign on the endowment component when decomposing the gross wage differential between males and females. Further, we would expect some discrimination against females, because of past segregation in the labour market due to the fact that the Labour Contract System only contracted males.[4] Comparing discrimination between urban and rural areas we would expect females to be more discriminated in the urban areas, because of a more homogeneous labour market, i.e. more similar jobs, in the rural areas compared to the urban areas.

Since the study of income distribution is carried out on socio-economic variables, a descriptive analysis is relevant. For a better understanding of the labour market study it is important to know something about Namibia's economy and the characteristics of the labour force. Therefore, this introduction continues with an socio-economic framework, but first a brief historical background. Chapter 2 comments on the difficulties on measuring income in developing countries and describes the data used for the two studies. The income distribution analysis is presented in Chapter 3. Chapter 4 presents the study of labour market discrimination. Conclusions are made in Chapter 5.

1.2 Historical Background

In 1884 the Germans declared Deutsch-Südwest-Africa[5] as their protectorate. The territory

[4] See Section 1.2 regarding the Labour Contract System.
[5] The name of Namibia at that time.

was divided into the so-called Police Zone, and the North/north-east territory. The former area, with good land for farming and rich in minerals, was primarily for the white European settlers, and the latter, called the "homelands", was where the black indigenous African population lived. Labour was needed for the European-owned farms, to construct a basic infrastructure, and to extract minerals that had been found in the area. The Labour Contract System was created in three ways. First, the Germans made agreements with the northern population's chief/king in which the male workers would work for them in the so-called Police Zone and in exchange, the chief/king would receive gifts from the returning migrant workers. Second, legislative measures were introduced, such as "pass laws" that required all Africans to carry a pass. Third, movement restrictions were imposed on the African population within or outside the Police Zone. By 1913, 90 per cent of the Africans' adult males within the Police Zone were wage employed.[6]

The German period ended in 1915 when South African troops on behalf of Great Britain captured Deutsch-Südwest-Africa. In 1920 the League of Nations granted Great Britain a mandate to administer Deutsch-Südwest-Africa, which was then renamed South West Africa. However, Great Britain passed the mandate on to South Africa. Certain obligations were required by the mandate concerning the welfare of the domestic population, but in general, South Africa ignored these conditions. The Namibians' hope that the land would be returned to them by the government of South Africa was not fulfilled. In fact, they were further alienated with the result that the land in central and southern Namibia, with economically viable farming, became monopolised by the whites in 1926.

After 1945, the United Nations attempted to replace the mandate with a trusteeship, but South Africa did not accept this, and from 1948 Namibia was treated as South Africa's fifth province. South West African People's Organisation (SWAPO) was established in 1960 to fight for independence. The United Nations General Assembly withdrew South Africa's League of Nations mandate in 1966. This was, however, ignored by South Africa, and in 1971 the International Court of Justice declared that South Africa's occupation of Namibia was illegal. The United Nations Security Council Resolution 435[7] of 1978 formed the basis for all subsequent negotiations on Namibia, but it took another decade before South Africa accepted

[6] United Nations (1986), p. 34.
[7] The resolution called for free and fairs elections under the control and supervision of the United Nations for the whole of Namibia as one political entity.

the resolution. Finally, Namibia was able to gain independence in March 1990.

1.3 Economic Overview

Namibia is one of the richest countries in Africa in terms of natural resources. It possesses diamonds, uranium, copper, lead, zinc and other minerals; rich marine resources; and a large stock of cattle and karakul sheep. The economy is small and mixed.[8] Being heavily dependent on exports of primary products (diamonds, uranium, base metals, cattle, karakul pelts and white fish), the Namibian economy is highly vulnerable to external shock such as fluctuations in world market prices.

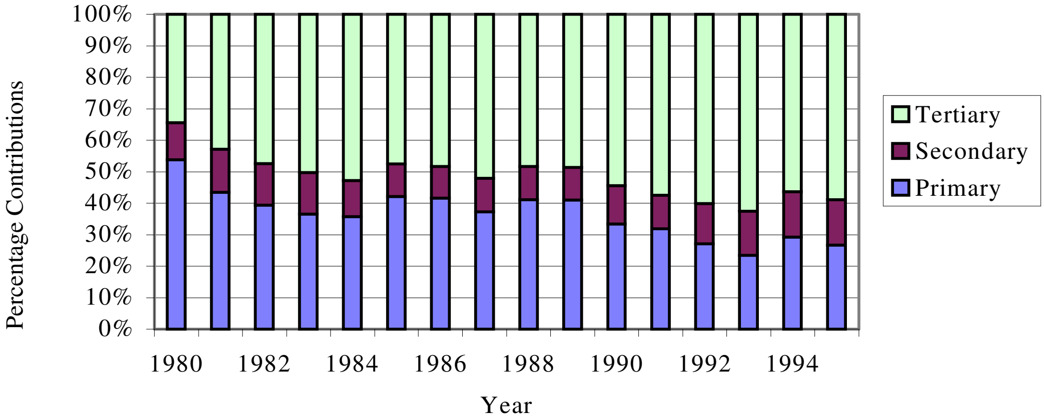
Economic growth remained slow for most of the 1980s, due to unfavourable development of world market prices for karakul and mineral exports; constraints on investments; the poor performance of the South African economy; and the severe drought from 1980 to 1984. The performance of the economy has improved since Namibia gained independence in 1990 showing only short interim of negative growth in 1993, about 2 per cent, because of drought.[9] The government and the primary sectors are still the main sources of economic growth.[10]

Figure 1.1 shows the percentage contribution to gross domestic product (GDP) by primary, secondary and tertiary industries during 1980 to 1995.[11] The relative contribution of the primary industries has decreased markedly from about 54 per cent in 1980 to about 27 per cent in 1995. The major part of this decrease is due to an unfavourable development of relative prices of primary sector output, in volume terms the share of the primary sector decreased only by nine percentage points, from 45 per cent in 1980 to 34 per cent in 1995. The droughts in the years 1980 to 1984, 1992 and 1995, which affected agricultural production adversely, have contributed, but this decline is mainly due to the falling relative importance of the mining industry. Nevertheless, mining is still the key sector of the economy in terms of export earnings and government revenue. The secondary sector's share of GDP has been fairly constant over the period except, after 1991, when the share increased slightly

[8] Mixed economy means that all the following forms of ownership are present: public, private, joint public-private, co-operative, co-ownership and small-scale family.
[9] Central Statistics Office (CSO, 1996b).
[10] National Development Plan 1 (1995).
[11] Primary industry includes agriculture, fishing, mining and quarrying; secondary industry includes

to around 14 per cent. In general, manufacturing expansion has been held back by competition from South African firms,[12] but there was a slight increase after 1991, the result of an expansion in the fish processing industry. The tertiary sector has increased over the period, and it has been the most important sector since 1982. The main reason for the increase is the expansion in government services.

Figure 1.1. Gross Domestic Product by Activity in Current Prices, 1980-1995.



Source: CSO (1996b).

1.4 The Population and the Labour Force

The population in Namibia is about 1.5 million.[13] The average annual population growth has been estimated to approximately 3 per cent for the period 1985 to 1993.[14] The population density is only 1.8 persons per square kilometre.[15] However, the density varies considerably across the country. The Oshana region in the North has a population density of about 31 persons, while in the Karas region in the South the population density is about 0.3 persons.[16] Since the country is arid, most of the population lives on the plateau. The majority of the population is black, 86 per cent, while coloured and white each represents 7 per cent of the

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manufacturing, electricity, water and construction; tertiary industry includes service, wholesale and retail trade.

12 United Nations Industrial Development Organization (1990).

13 According to the 1991 Population and Housing Census (CSO, 1995a) the institutional population counts to about 100,000 people. In the 1993/1994 Namibia Household Income and Expenditure Survey (NHIES) the population is estimated to be about 1.4 million, since the institutional population is excluded.

14 Sparks (1996).

15 Own calculations using the estimated population from the 1993/1994 NHIES including the institutional population from the 1991 Census based on Namibia's official area of 824,292 square kilometres (Sparks, 1996).

16 Own calculations using the estimated population from the 1993/1994 NHIES based on Oshana's and Karas' official area of 5,180 and 162,384 square kilometres, respectively (CSO, 1995a).

population.[17]

Table 1.1 presents the distribution of households and individuals by region and gender.[18] For the household population we find the highest share, 14 per cent, in the Khomas region. The reason for the small population in Hardap and Karas is the aridity of the land, which severely limits development and investment. For Erongo and Omaheke the low density is mainly due to the fact that these regions are covered by desert, the Namib and Kalahari cover, respectively. The North/north-eastern regions have a larger share of the household population than the Central/southern regions.

Table 1.1. Households and Individuals by Region and Gender.

Region/ Urban and Rural Areas	Households		Individuals					
			Females		Males		Total	
	Number	%	Number	%	Number	%	Number	%
Central/southern regions	117160	47.9	275085	37.6	275949	42.0	551037	39.7
Erongo	16611	6.8	36787	5.0	37607	5.7	74395	5.4
Hardap	12521	5.1	28468	3.9	25738	3.9	54206	3.9
Karas	11545	4.7	26750	3.7	27364	4.2	54114	3.9
Khomas	34101	13.9	78393	10.7	83360	12.7	161754	11.6
Kunene	10398	4.2	31466	4.3	27562	4.2	59029	4.2
Omaheke	9157	3.7	23658	3.2	23443	3.6	47101	3.4
Otjozondjupa	22827	9.3	49563	6.8	50875	7.7	100438	7.2
North/north-east regions	127667	52.1	456475	62.4	381505	58.0	837980	60.3
Caprivi	16884	6.9	50001	6.8	41433	6.3	91434	6.6
Ohangwena	25574	10.4	106632	14.6	84226	12.8	190858	13.7
Okavango	20394	8.3	65376	8.9	59657	9.1	125033	9.0
Omusati	21822	8.9	86081	11.8	66949	10.2	153030	11.0
Oshana	24198	9.9	87781	12.0	73709	11.2	161491	11.6
Oshikoto	18795	7.7	60604	8.3	55531	8.4	116134	8.4
Namibia	244827	100	731562	100	657454	100	1389017	100
Urban	82864	33.8	204514	28.0	196812	29.9	401325	28.9
Rural	161962	66.2	527048	72.0	460643	70.1	987691	71.1

Note: Sample weights are used.

Regarding the distribution of males and females by region, males are slightly over-represented in Khomas, but in the other Central/southern regions the distribution of the males and females is fairly equal. In the North/north-east regions, however, females are over-represented, due to earlier male labour migration to the Central/southern regions. Finally, approximately 70 per cent of the population live in the rural areas.

[17] Murray (1993/94).

[18] Appendix 1.A shows a map over Namibia and its regions.

Table 1.2 shows the age structure of the Namibian population. The young population dominates; about 65 per cent are under 25 years of age. The average age for females, males and the total population are 21.8, 23.1, and 22.5, respectively. The working population, defined as those aged 15-64, represents over 50 per cent of the population. Only about 5 per cent of the population are 65 years of age or older. The female population exceeds the male one by about 11 per cent, and the male/female ratio shows a deficit of males in all age groups. This under-representation of males was likely caused by the civil war prior to the independence or male migration to other countries. Comparing urban and rural areas with the total, the age structure is somewhat different. The main differences are in the age groups 0-14 and 25-64. In the urban areas about 34 per cent are in the 0-14 age group and about 41 per cent in the 25-64 category. In rural areas the corresponding figures are about 46 and 27 per cent.

Table 1.2. Age Structure by Gender.

Age Group	Females		Males		Total	
	Number	%	Number	%	Number	%
0-14	300719	41.1	292634	44.5	593353	42.7
15-24	156204	21.4	138576	21.1	294779	21.2
25-64	235354	32.2	194866	29.6	430220	31.0
65+	36299	5.0	27874	4.2	64173	4.6
Non-applicable	2986	0.4	3505	0.5	6491	0.5
Namibia	731562	100	657454	100	1389017	100

Note: Sample weights are used.

Table 1.3 presents detailed information on the population's activities.[19] About 55 per cent of the adults aged 15 years and over are economically active. Students and homemakers are the two largest groups in the economically inactive population. In the student category the females and males are rather equal in numbers. The economically active population, of which the males account for a larger share than the females, consists of the fully employed, the under-employed and the unemployed. Over 50 per cent of the employed (fully employed and under-employed) are paid employees. This high share of paid employees is not surprising, since the people entered wage employment through the Labour Contract System. Another factor that also has contributed to the growth of wage employment is the policy of promoting export-oriented commercial agriculture. The production of food crops was disregarded by policy-makers and in turn the income for the subsistence farmers in the north decreased. Thus, the farmers have to depend on wage employment in the modern sector as a source of income.

[19] See Appendix 1.B for definitions of the different activities.

Table 1.3. Activity Status of the Population.

Activity Status	Females		Males		Total	
	Number	%	Number	%	Number	%
TOTAL POPULATION	**731562**	**100**	**657454**	**100**	**1389017**	**100**
Children under 15 years	300822	41.1	292724	44.5	593545	42.7
Adults 15 years and over	430519	58.8	364731	55.5	795250	57.3
Not applicable	221	0	0	0	221	0
ADULTS	**430519**	**100**	**364731**	**100**	**795250**	**100**
Economically inactive	220063	51.1	133740	36.7	353802	44.5
Economically active	207299	48.2	227379	62.3	434678	54.7
Activity not stated	3157	0.7	3612	1.0	6770	0.9
ECONOMICALLY INACTIVE	**220063**	**100**	**133740**	**100**	**353802**	**100**
Students	68376	31.1	69843	52.2	138219	39.1
Homemakers	111784	50.8	31670	23.7	143454	40.5
Income recipient	392	0.2	495	0.4	887	0.3
Disabled, old, retired, others	38992	17.7	31465	23.5	70456	19.9
Not applicable	520	0.2	267	0.2	786	0.2
ECONOMICALLY ACTIVE	**207299**	**100**	**227379**	**100**	**434678**	**100**
Fully employed	76369	36.8	95782	42.1	172151	39.6
Under-employed	87178	42.1	90951	40.0	178129	41.0
Unemployed	43752	21.1	40646	17.9	84398	19.4
EMPLOYED	**163547**	**100**	**186733**	**100**	**350280**	**100**
Paid employee	70993	43.3	121799	65.2	192792	55.0
Employer	713	0.4	2356	1.3	3069	0.9
Own account worker	37156	22.7	32133	17.2	69289	19.8
Unpaid family worker	51500	31.5	27087	14.5	78587	22.4
Not applicable	3186	1.9	3358	1.8	6544	1.9

Note: Sample weights are used.

Paukert and Robinson (1992) compare wage employment in Africa, Asia, Latin America and the Caribbean with that of three industrialised countries and they show that, with some exceptions, wage employment is much less significant in Africa than in industrialised market economies. Namibia's percentage of the economically active population in wage employment is about 44 per cent which is comparable to Botswana's 41 per cent 1981 and Zambia's 43 per cent 1980. Paukert and Robinson also show that participation of females in wage employment is generally higher in Asia and Latin America than in Africa, and that the participation rate is still higher for the industrialised market economies. The Namibian female participation rate, about 37 per cent of total paid employees, is comparable with the Asian participation rate and thus high by African standards.

Employer and own account worker are both self-employed, where the latter does not have any paid employees, but can have unpaid family workers. The breakdown into employer and own account worker may be done according to differences in the type of jobs. For example, employers are more engaged in trade activities than are own account workers. Employers constitute about 1 per cent of the employed population, own account workers about 20 per cent, and unpaid family workers about 22 per cent. Females tend to be dominating in the two latter categories, because they have traditionally taken care of the farming business.

The statistics of employment are generally not so reliable in less developed countries, and for this reason it is difficult to measure changes in the employment status. Still, unemployment in Namibia has certainly risen since independence, due to the return of demobilised combatants, and repatriation of exiles.[20] From the 1993/1994 NHIES we know that males have higher employment participation rates, in all age groups, than females, which is not surprising, because during the colonial period females were excluded from many types of economic activities and thus from the labour market. The rate of unemployment is generally higher for females than males. When under-employment is added to unemployment, the gender gap widens. This is so both at the national level and between the age groups, because females tend to work more in own businesses that relate to agriculture activities, which is insufficient to keep them fully employed.

1.5 Social Indicators

It appears that health, education and living conditions in Namibia have not improved at the same rate as the economy has grown in the 1990's. In 1994 the GDP per capita was US$1,970, which is high for a country in sub-Saharan Africa. For example, in Mozambique GDP per capita was US$90, in Kenya US$250 and in Zimbabwe US$500. In fact, only Botswana and South Africa have higher GDP per capita, US$2,800 and US$3,040, respectively.[21] However, regarding social conditions, the Human Development Report (1996) ranks Namibia 116 out of 174 countries according to the Human Development Index (HDI), see Table 1.4.[22] This measure indicates that the average level of human development in Namibia is low by world standards. When compared with other sub-Saharan African

[20] World Bank (1992).
[21] World Bank (1996).
[22] The closer the HDI is to one (1), the better is the country's human capabilities, i.e. a long and healthy life, knowledge and a decent economic standard.

countries, Namibia is not so poorly developed, but there is a huge difference between the ranking according to the HDI index and according to real GDP per capita.

Table 1.4. HDI Rank and Real GDP per capita Rank for Developing Countries 1993.

Country	HDI Index	HDI Rank	Real GDP per capita (PPP$)[1] Rank
Botswana	0.741	71	60
South Africa	0.649	100	93
Namibia	0.573	116	79
Zimbabwe	0.534	124	120
Kenya	0.473	128	136
Zambia	0.411	136	144

[1] PPP is Purchasing Power Parity.
Source: UNDP (1996).

During colonialism the educational system was organised along racial lines, and provided very unequal access to schooling. While education was compulsory and free of charge for the whites, the Africans were not required to go to school and if, nevertheless, they choose to do so they had to pay for their education. This educational inequality is still seen in the country. However, the government has spent about 10 per cent of the GDP and about 27 per cent of government expenditures on education since independence.[23]

A comparison of school attendance figures from the 1991 Census and the 1993/1994 NHIES in Table 1.5 suggests that the percentage for the category "Never attended" has declined. However, one has to keep in mind the differences in the definition of the population.[24] The "Never attended" category has decreased from 23 per cent to 16 per cent, with the largest decrease being seen in the urban areas.

Table 1.5. School Attendance in Percent, Population 6 Years and Older.

School Attendance	Urban		Rural		Total	
	1991 CENSUS	1993/1994 NHIES[1]	1991 CENSUS	1993/1994 NHIES	1991 CENSUS	1993/1994 NHIES
Never attended	11	7	27	19	23	16
Still at school	31	32	40	45	37	41
Left school	58	60	33	36	40	43

[1] This column does not sum to 100 per cent due to a non-respond item.
Note: Sample weights are used for 1993/1994 NHIES.
Source: CSO (1995a) and CSO (1996a).

[23] Own calculations using Tables F4 and B1, CSO (1996b).
[24] Recall that the 1993/1994 NHIES is based on private households, while the 1991 Census includes the institutional population.

Table 1.6 shows that about one quarter of the population 6 years and older has "No formal education". One major finding in the table, contrary to expectations, is that females do not appear to be less educated than males. Note that in the category "Secondary education" the females even outnumber the males. In "Tertiary education" the number of males slightly exceeds that of females.[25] The same pattern of educational attainment is found when looking at urban and rural areas separately. Further, disaggregating on regional level this pattern still holds for most of the thirteen regions. The number of females is higher in the "Tertiary education" in Khomas, Ohangwena, Omusati and Oshana.

Table 1.6. Educational Attainment, Population 6 Years and Older.

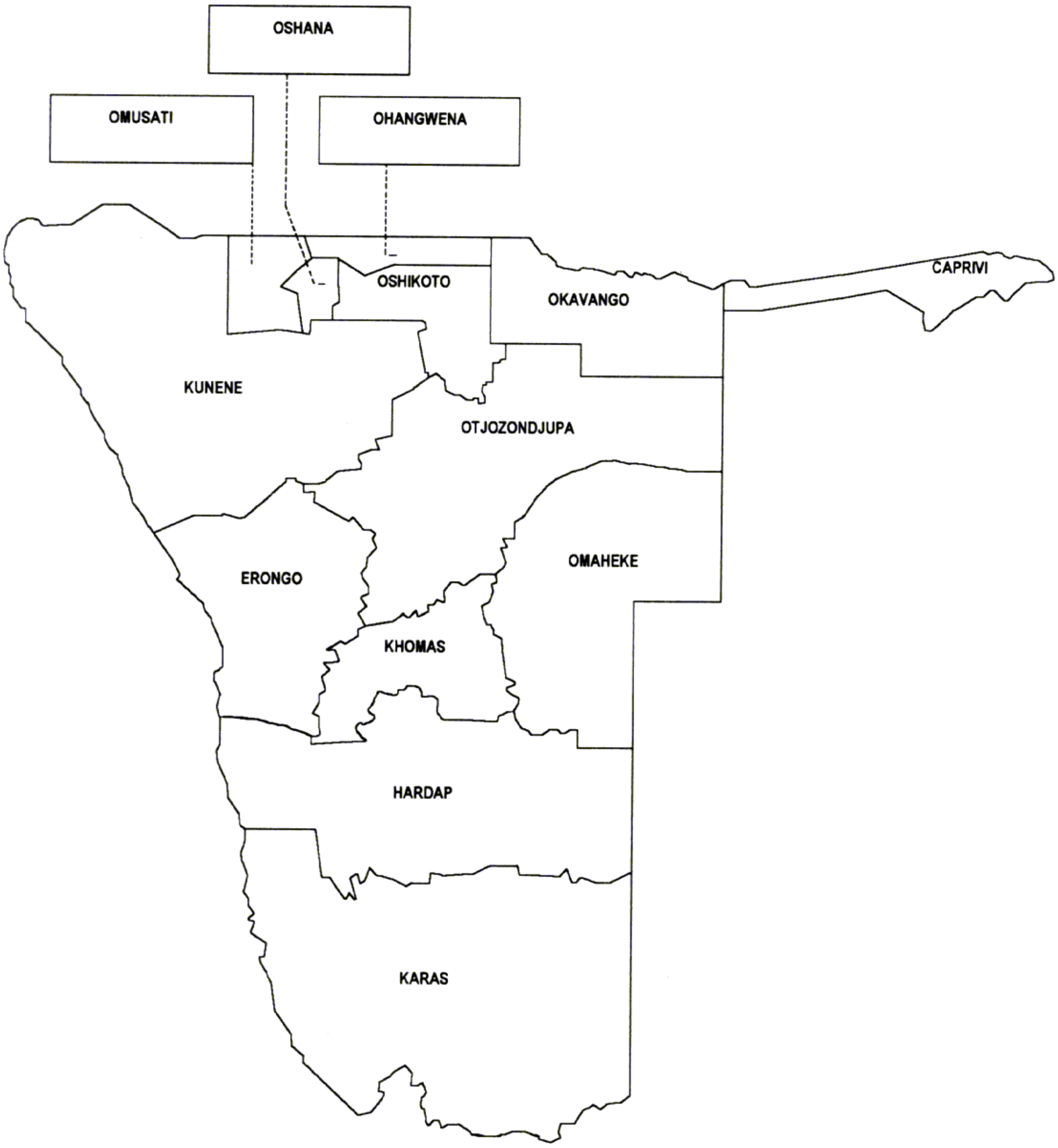
Level of Educational Attainment[1]	Females		Males		Total	
	Number	%	Number	%	Number	%
No formal education	144520	24.0	129537	24.8	274057	24.4
Primary education	256008	42.5	224743	43.0	480751	42.7
Secondary education	180385	30.0	145521	27.8	325906	29.0
Tertiary education	12399	2.1	12808	2.4	25207	2.2
Non applicable	8822	1.5	10460	2.0	19282	1.7
Namibia	602134	100.0	523068	100.0	1125202	100.0

Note: Sample weights are used.
[1] No formal education: No school experience or currently in Grade 1; Primary education: Grade 1-6; Secondary education: Grade 7-12; Tertiary education: Diplomas or certificate issued by a University or Technical Institutes, university courses leading to first degrees 1 to 4 years, post-graduate (diplomas, master degree, doctor degree) and teacher training.

It is rather unusual in the African context that females have higher school enrolment than males. However, it is so because males were often contracted for wage work or fought in the wars. Furthermore, since the chances recently have increased for females to receive a job in the areas of health and education, areas that require schooling, enrolment of females is increased. Looking at school enrolments in primary education as a percentage of age group, Namibia's female enrolment rate is the highest of the sub-Saharan countries.[26] In the case of secondary education South Africa has the highest female enrolments, 84 per cent compared to Namibia's 61 per cent.

[25] Our findings are comparable with other official statistics in Namibia. For example, see CSO (1995c).
[26] World Bank (1997).

Appendix 1.A A Map over Namibia and its Regions



Source: CSO (1995a).

Appendix 1.B Definitions of the Population's Activity Status

Economically inactive population: Persons aged 15 years and over that are not in the category economically active.

Student: A person who was engaged in studies for the last seven days, in any regular educational institution public or private for systematic instruction at any level of education.

Homemaker: A person who were strictly engaged in household duties during the last seven days, in their own homes like housekeeping, raising their own children, taking care of the old.

Income recipient: A person receiving some money income such as rents, interest from made investments, without actually engaging themselves in the related activities.

Disabled, old, retired and others: The two first categories are persons who receive public aid or private support and are living mainly on these receipts. Retired persons receive some sort of pension and are living mainly on these receipts. Others are persons not falling into any of the mentioned categories.

Economically active population: The labour force, i.e. persons employed, underemployed or unemployed.

Employed: A person working for pay, profit or family gain for at least one hour during the seven-day period before the interview or who did not work during that period, but had a job/business to go back to.

Fully employed: Employed person who was not available for more work.

Underemployed: Employed person who was available for more hours of work during the seven-day period.

Unemployed: A person who did not work during the seven-day period before the interview or had no job/business to go back to during that period, but who was available and looked for work during that period.

Paid employee: A person employed for wages, salaries, commission, tips or a payment in kind. Working either on a regular or casual basis, temporary or permanent basis, either on time rate or on piece rate by an employer who, for example, may be a government department or a private firm.

Employer: A person operating her/his own business or a business owned partially along with other partners with the aid of one or more paid employees.

Own account worker: A person operating her/his own business or a business owned partially along with other partners or who works for family gain without aid of paid employees, but can have unpaid family workers.

Unpaid family worker: A person who, for example, works in a household business operated by a related member of the person's household without any payment.

2 Income Measurement and Data

2.1 Income Measurement

The collection of income statistics has many conceptual and practical problems in developing countries. One of the first difficulties is that incomes are partly or fully received in kind. Further, commodities produced in the household for self-consumption do not enter the market, and thus do not involve any money transactions. In both cases imputed prices must be used. Already at this point errors appear, because of the difficulties to impute "true" values. Another problem arises in the estimation of incomes from the agricultural sector, which usually occupies a large proportion of the labour force. The flow of income in this sector is very erratic across seasons, and it is therefore important to use data for the entire year in the construction of income estimates. In this context measurement errors are likely to arise because of incorrect recollection.

In addition, price disparities exist between urban and rural areas, and hence money income differences may not coincide with real income differences. Defining income could also be difficult. For example, money received as a gift for non-economic reasons is not an income. Since people in developing countries do not record their income transactions to the same extent as people in developed countries do, it is often difficult to separate gifts from regular incomes.

Problems are also associated with the design of questionnaires used in income surveys. The questions should be asked in such a way that the respondent is able to answer without difficulties. However, many individuals have difficulty answering questions such as "What is your income from your own business?".

The unwillingness to answer questions relating to income is also a problem. Some poor people may not want to reveal how poor they are, and may thus overstate their income. The contrary may be the case for more wealthy individuals, who may understate their income for fear of higher tax liabilities.

Many developing countries record consumption expenditures rather than income in household surveys, because of the problems described above. Indeed, consumption may well be a more relevant basis upon which to decide economic status, since income may be temporarily high or low, whereas consumption behaviour may be smoothed across seasons by savings and dissavings.[27, 28]

2.2 Data

The data used in the two studies below are part of the 1993/1994 Namibia Income and Expenditure Survey (NHIES). This survey was done by the Central Statistics Office (CSO) within the National Planning Commission, Windhoek, during November 1993 to October 1994.[29] The data contains information about consumption and expenditure among Namibian private households. The so-called institutional households, i.e. hospitals, hostels, barracks and prisons are excluded. Data were also collected about demographic factors such as education and employment.

A private household may consist of one or several persons. A one-person household is a person living alone and catering for herself/himself. A multi-person household contains two or more individuals (relatives or non-relatives), who live together and have common catering arrangements. The definition of a household member is a person who has slept in the household during the last 24 hours before an interview, and who has had common catering arrangements with the household during these 24 hours. Other variables are defined in the course of the two studies.

Each household participated in the survey during one full month and recorded daily all their transactions into a record book. The original sample covered 4,752 households, but due to non-response or answers too poor to analyse, the final data from CSO covers 4,397 households of which 1,712 were in urban areas and 2,685 in rural areas. These households comprise 24,984 individuals, which form the individual data. In addition to characteristics such as education, employment etc., individuals also reported cash incomes, i.e. gross wages and allowances; income taxes and other wage deductions; pensions, and household business

[27] Fields (1994).
[28] For further discussion of income measurement see Bigsten (1987).
[29] In co-operation with Statistics Sweden.

income, interest, royalties and dividends, as well as cash gift/remittances received.

The sampling of the households has been done by a two-stage sampling procedure for Namibia excluding Walvis Bay. In the beginning of the survey Walvis Bay was still part of South Africa. The Primary Sampling Units (PSU's) were created from a frame of geographical areas. These geographical areas were created from the Census' enumeration areas (EA). To get sufficiently large PSU's, small EA's were combined with neighbouring EA's. The geographical areas contained 80 to 200 households. 192 PSU's, 81 in the urban areas and 111 in the rural areas were sampled.[30] The second stage of the survey sampled the households, the Secondary Sample Unit. They were listed, and a systematic equal probability random sample procedure was used to sample 24 households in each PSU's. The seasonality of the households' consumption and expenditure was taken care of in the sampling, since the sample was divided into 12 monthly equal-sized sub-samples.

On March 1, 1994 Walvis Bay was integrated into Namibia, but for logistic planning reasons Walvis Bay was only included in the NHIES during the last six months of the survey year, i.e. from May 1994. The sample of Walvis Bay is part of the Erongo region. The households for Walvis Bay were selected primarily by a stratified one-stage sampling procedure, since municipality registers of the households already existed.[31] There also existed areas or population groups that were not covered by the registers and for those household lists were then constructed. Unfortunately, some hostel areas had to be excluded for security reasons.[32]

The NHIES sample is provided together with probability weights, which vary across PSU's. Application of these weights makes the sample representative at the national level. The empirical analyses in this thesis employ these weights.

[30] The sample was basically proportionally allocated, but has a slight over-sampling in the urban areas and in the Omaheke region. The reasons for this are that the income level variation seemed to be larger between the households in the urban areas than in the rural areas, lower survey costs in the urban areas, and that each region should contain at least 10 PSU's in order to receive reasonably good statistics from each region.

[31] For five households a two-stage sampling procedure had to be used, since more than one household stayed in the sampled household, so-called backyard squattering.

[32] For more details and information of the sampling plan see CSO (1996c).

3 Income Distribution Analysis

3.1 Introduction

Reducing income inequality is one of the four goals of Namibia's national development policy, spelled out after the independence in March 1990. The country's skewed income distribution has been a problem for some time, but the lack of comprehensive data on income before 1993 made the problem difficult to discern util recently.[33] In this study we carry out an empirical analysis on the household income distribution nationally by using the 1993/1994 Namibia Household Income and Expenditure Survey. Differences between the population groups, an aspect more relevant in the past than it is today, may still exist in Namibia, but additional factors are important in explaining and examining the distribution of income. Two important aspects that are widely discussed in studies on income distribution in developing countries are the urban/rural differences and the differences in the level of educational attainment. We investigate whether these two aspects also are important in the case of Namibia.

The purpose in this study is to examine the distribution of income among the households in Namibia. Our main concern is to give answers to the question of what kinds of sources are causing income inequality in Namibia. Various socio-economic variables relating to the head of the household are examined, for example, age, urban/rural residence and the level of educational attainment. To measure the distribution of income we use the Gini coefficient and the income shares of the bottom 20 per cent of the population and the top 10 per cent of the population. To investigate the extent to which total income inequality is due to *within-group* inequality or *between-group* inequality we use both Theil's (1967) entropy index T and Theil's second measure L. By means of these measures we find that the distribution of income in Namibia is very skewed. The skewness is more pronounced in the Central/southern region than in the North/north-east region. The between-educational inequality seems to be the most important determinant of the skewed income distribution. Urban/rural residence and main source of income are also important variables in determining degrees of *between-group* inequality, particularly in the North/north-east region. Otherwise the *within-group* inequality seems to be the principal determinant of total inequality.

[33] National Development Plan 1 (1995).

The analysis is outlined as follows. Section 3.2 reviews previous studies related to income distribution in Namibia. In Section 3.3 we discuss how to measure and decompose income inequality. The data and the income concept used are presented in Section 3.4. The results, focusing on the different socio-economic variables, are reported in Section 3.5. Finally, Section 3.6 contains a summary and conclusions.

3.2 Previous Studies of Income Distribution in Namibia

Some quantitative studies on income distribution have been made in Namibia for some of the thirteen regions that Namibia constitutes of. They are review in this section.[34]

In the mid-1970's the Namibian population was grouped into about 245,000 households, where the Gini coefficient was estimated to 0.65, 0.67 or 0.69 depending upon which household income measure is used.[35] The poorest 40 per cent of the households received 5.9 per cent of the total income and the top 10 per cent received 61.1 per cent of the total income when the Gini coefficient was estimated to 0.67.

In 1989 another effort was made to investigate the distribution of income in the population. From Table 3.1 we can see that the population was then divided into two groups; the subsistence sector and the modern sector, where the latter sector is sub-divided into two subgroups.

Table 3.1. Income in Subsistence and Modern Sector 1988.

Sector	Share of GDP (per cent)	Share of Population (per cent)	Annual per capita GDP (US$)
Subsistence sector	3.4	54.8	85
Modern sector	97.6	45.1	2,531
blacks	25.4	40.0	750
whites	72.2	5.1	16,504

Note: The first two columns do not sum to exactly 100 per cent.
Source: World Bank (1992).

[34] Since there mainly seem to be small surveys that have been undertaken, it is possible that some previous studies regarding income distribution in Namibia have not come to our knowledge.
[35] van Ginneken (1986).

About 45 per cent of the population are employed in the modern sector, and about 55 per cent are employed in the traditional (subsistence) sector. There is a huge difference in per capita income between the two sectors as well as between the population groups. The white population (5.1 per cent) has an annual per capita GDP of about US$16,500, while the black majority has an annual per capita GDP of US$750 in the modern sector and only US$85 in the traditional sector. The table indicates that the Namibian economy is of a dual nature. An overall estimate of GDP per capita is a rather misleading welfare indicator, since it hides the great income differences between the population groups in these two economies.

Another study, see Table 3.2, shows the cash income shares of the bottom 40 per cent and the top 20 per cent of the population in Katatura and Owambo (Owamboland). Here Katatura is defined as the black township of the capital Windhoek and the area Owambo consists of the four regions Ohangwena, Omusati, Oshana and Oshikoto, all in the northern part of Namibia. This table suggests that the income inequality is greatest in Owambo, particularly in the rural area. This result mainly depends on the character of the income sources for the population in rural Owambo, where most of the population lives on subsistence farming and thus not much cash income are generated.

Table 3.2. Share of Income Distribution in Selected Areas 1990.

Area	Bottom 40%	Top 20%
Katutura	12.8	46.2
Peri-urban Owambo	5.8	65.9
Rural Owambo	4.7	67.4
Total sample	4.5	65.2

Source: World Bank (1992).

The bottom 40 per cent of the population in Katutura, peri-urban Owambo and rural Owambo in 1990 had an average cash income of 252, 104 and 27 Rands per month, respectively. The corresponding figures for the top 20 per cent of the population are 1,460, 986 and 425 Rands per month, respectively.[36] These income figures, which are in cash indicate that people in rural Owambo are poorer than the people in Katatura are. This is not surprising, however, since there are more cash income employment opportunities in geographically well-located Katatura.

A study carried out in January 1992 shows that there are income variations across regions, due to the regional segmentation in the economy.[37] For example, the monthly income in Owambo is N$683 and in Caprivi it is N$572, where crop farming is the main agricultural activity. Part of Omaheke at the border to Botswana and part of Kunene at the border to Angola had a monthly income of N$1,361 and N$827, respectively. In these two regions cattle rearing are the main agricultural activity. Different sources of income in the agricultural sector, and the region in which one lives seem to be important determinants of the income inequality in Namibia.

3.3 Measuring and Decomposing Income Inequality

The first part of this section considers the choice of adjusted income concept; total household income, per capita income and three versions of adult equivalent income are compared. The second part deals with the measurement of income inequality and the decomposition of total inequality into *within-group* inequality and *between-group* inequality.

3.3.1 The Choice of Adjusted Income Concept

In general, per capita income is preferred to total household income, because the per capita income measure takes household size into account.[38] Furthermore, adult equivalent income is preferred to per capita income, since the per capita income measure does not account for household composition. Adult equivalence scales recognise that, for example, a four person household cannot live as cheaply as a one person household, but in contrast a four person household does not need four times the resources of a one person household in order to reach the same level of economic welfare.

There is no official adult equivalence scale explicitly made for Namibia, but there is one scale that is used by the Central Statistics Office (CSO) in the context of poverty line.[39] Since this scale was adjusted from a poverty datum line from Botswana we think it is important to do a

[36] World Bank (1992).
[37] University of Namibia (1995).
[38] Datta and Meerman (1980).
[39] CSO (1995).

sensitivity test of the choice of adult equivalence scales.[40] There is a wide range of different adult equivalence scales that one could test, and the choice is not self-evident.

In Table 3.3 income distribution measures based on total household income and per capita income are compared to three kinds of adult equivalence scales that have been taken from different sources. Alm Stenflo (1992) uses the first equivalence scale in the case of poverty in urban Zimbabwe.[41] The second scale is commonly used in publications for OECD countries.[42] The third scale is the one that is used by the CSO.

Table 3.3. Income Distribution Shares and Gini Coefficients by Total Household Income, per capita Household Income and Adult Equivalent Income, 1993/94.

Decile	Total household income	Per capita household income	Adult equivalent income[1]		
			Scale 1	Scale 2	Scale 3
Decile 1	0.8	0.5	0.7	0.6	0.6
Decile 2	1.4	0.9	1.2	1.1	1.0
Decile 3	1.9	1.3	1.6	1.5	1.4
Decile 4	2.5	1.7	2.1	2.0	1.9
Decile 5	3.3	2.3	2.7	2.6	2.5
Decile 6	4.4	3.1	3.6	3.4	3.3
Decile 7	6.0	4.5	5.0	4.8	4.7
Decile 8	9.0	7.0	7.6	7.4	7.2
Decile 9	16.3	14.2	15.1	14.8	14.6
Decile 10	54.4	64.4	60.6	61.8	62.8
Mean income (N$)[2]	16236	4753	6587	6094	5184
Gini coefficient	0.6560	0.7334	0.7016	0.7118	0.7197

Note: See Section 3.4 and Appendix 3.B for the computation of the income measure.
[1] Scale 1: Head of household = 1.0; All other adults = 0.7; Children under 15 years = 0.3.
Scale 2: Head of household = 1.0; All other adults = 0.7; Children under 15 years = 0.5.
Scale 3: All adults = 1.0; Children between 6 and 15 years = 0.75; Children 5 years and below = 0.5.
[2] The exchange rate in December 1993 was 3.65 N$/US$.

The Gini coefficient for total household income is about 0.66 and for per capita income about 0.73, while adult equivalent income falls in between these income measures being 0.70, 0.71 and 0.72, respectively. Hence, it seems to be important to both take household size and composition into account. A closer look at the Gini coefficients and the income shares, indicate that the choice of weighting procedure in our case has a minor influence, since the results are roughly the same regardless of which adult equivalence scale is used. The particular choice of the adult equivalence scale is therefore of little consequence. In fact, there

[40] See Coulter, Cowell and Jenkins (1992) for a discussion about changing the weights of equivalence scale.
[41] See also Makonnen (1993).
[42] Atkinson, Rainwater and Smeeding (1995). Bigsten and Makonnen (1996) also use this adult equivalence scale.

is at most a 2.6 per cent increase of the Gini coefficient going from one scale to another. We choose the second scale and the reason for this is that since the three scales are almost identical one can always take the one in the middle.

3.3.2 The Income Inequality Measurement and the Decomposition

In the literature there exist various indices of income inequality.[43] Here the presentation is based on the Gini coefficient and income shares, which both can be derived from the Lorenz curve. The Lorenz curve shows the relationship between the cumulative percentage of households or individuals, ordered from poorest to richest, and the cumulative percentage of total income that accrues to the same households/individuals in the population. To investigate whether total inequality stems from *within-group* inequality or *between-group* inequality we use the additively decomposable inequality measures proposed by Theil (1967), the Theil entropy index T and Theil's second measure L.

The Gini coefficient is a measure that can take values between zero (0) and one (1), where 0 implies no inequality and 1 complete inequality. We can write the Gini coefficient (G) as follows

$$G = \frac{1}{2N^2\mu}\sum_{i=1}^{N}\sum_{j=1}^{N}\left|y_i - y_j\right| \qquad (1)$$

where N in our case is the household population, μ is the mean household income, and y_i and y_j denote the incomes of units i and j.[44]

The disadvantage of the Gini coefficient is that it is not additively decomposable.[45] An additively decomposable inequality index is a measure that can be written as a sum of inequality *within-group*s and inequality *between-group*s. In order to determine the *within-group* inequality and *between-group* inequality we make use of both the Theil entropy index T and Theil's second measure L. The weights used to calculate these two inequality measures

[43] See, for example, Nygård and Sandström (1981).
[44] This is the definition of the Gini coefficient that was proposed by Kendall and Stuart (1963).
[45] See Anand (1983), Appendix B.

are the income shares of the subgroups in the case of Theil's entropy index T while in the case of Theil's second measure L the population shares of the subgroups is used.

Theil's entropy index T or Theil's second measure L are given by

$$T(y, N) = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{y_i}{\mu}\right)\log\left(\frac{y_i}{\mu}\right) \qquad (2)$$

and

$$L(y, N) = \frac{1}{N}\sum_{i=1}^{N}\log\left(\frac{\mu}{y_i}\right) \qquad (3)$$

where N is the household population, μ the household mean income and y_i is the household income.

When the household population is divided into non-overlapping aggregated categorical subgroups, the Theil's entropy index T and Theil's second measure L can be decomposed into *within-group* inequality and *between-group* inequality according to

$$T(y, N) = \sum_{g=1}^{G} T(\mathbf{y}_g, N_g)\left(\frac{\mu_g N_g}{\mu N}\right) + \frac{1}{N}\sum_{g=1}^{G} N_g\left(\frac{\mu_g}{\mu}\right)\log\left(\frac{\mu_g}{\mu}\right) \qquad (4)$$

and

$$L(y, N) = \sum_{g=1}^{G} L(\mathbf{y}_g, N_g)\left(\frac{N_g}{N}\right) + \sum_{g=1}^{G}\left(\frac{N_g}{N}\right)\log\left(\frac{\mu}{\mu_g}\right) \qquad (5)$$

where g is the number of non-overlapping subgroups (g = 1,…, G), $\mathbf{y}_g$ is the vector of incomes in subgroup g, N is the household population, N_g is the household population in the g*th* subgroup, μ is the household mean income and μ_g is the mean income of subgroup g. For both equation 4 and equation 5 the first term on the right hand side represents the *within-group* inequality and the second term represents the *between-group* inequality.

3.4 The Data and the Income Concept Employed

Household data from the 1993/1994 Namibia Household Income and Expenditure Survey (NHIES) are used. The data comprise 4,397 households, 1,712 in urban areas and 2,685 in rural areas. We will use most of the information collected through this survey. Our data contains information on household composition and size, the main source of income for the household, the primary language spoken, sex and level of educational attainment of head of household, region, urban/rural residence and the household's access to grazing land.[46] The variables primary language spoken and grazing land will not be included into the analysis. With respect to the former variable we do not have a sufficient number of observations for each of the languages spoken in Namibia to perform a meaningful comparison between the different languages. The variable grazing land gives almost the same results, as the socio-economic variable main source of income, and thus it does not contribute much additional information. Total consumption, own produced goods or received in kind, imputed rents, remittances in cash given away, housing and domestic animal investments in cash and in kind, savings and other investments, income tax and other wage deductions, and finally the loan amount are available variables of the household. Also remittances in cash received are available, but only in the individual data of the NHIES. Thus, this latter variable had to be aggregated up to household level. It was reported both on a monthly and a yearly basis, but here we make use of the yearly, because remittances usually are made once or twice a year.[47]

It is not possible in our data set to compute household income by simply adding up income from different income sources. We therefore have to estimate income in a somewhat roundabout way. We build up our estimate of total annual household income by using available information on different types of expenditures and receipts. Total income is set equal to the value of consumption + remittances in cash given away – remittances received + housing investment financed by cash + investment in kind + animal investment in cash + savings and other investments including repayment of loans + taxes paid + other non-

[46] See Appendix 3.A for the definitions of the variables used in this study.
[47] The alternative of using the monthly measure multiplied by twelve was considered. This measure became considerable large compared to the yearly and since it is only about 4 per cent of the households in Namibia that

consumption expenditure – loans taken during the year. (See Appendix 3.B for further details). Our income measure is based on consumption expenditure during a year despite of that each household only participated in the survey during one month. For certain items of commodities the annual value was reported. Further, other items that were reported on a monthly base were estimated to annual values by CSO in Windhoek, Namibia. The measure computed here gives a more reliable estimate of income than cash income only, for example, because the rural households in Namibia are dependent on own produced commodities during at least certain parts of the year. The estimated proportions of own produced food or food received in kind of total average annual private household consumption is as high as 21.5 per cent in the rural areas.[48] An additional reason for choosing consumption rather than cash income is that the cash income from subsistence farming may fall drastically during drought periods, which are quite common in Namibia. Such fluctuations make cash income estimates more uncertain than consumption estimates.

By using the above-mentioned concept of income, six households came up with negative incomes. Since the computation of the Gini coefficient or Theil's second measure L allows only strictly positive incomes we had either to drop the households or change the negative values to zero. The latter alternative introduces bias in the estimates, and since there were only six households with negative incomes we decided to drop them from the sample. Further, 94 households were excluded due to missing data on the socio-economic variables that we use to investigate the income inequality among the households. Otherwise we include all participating households even the ones with low or high incomes. There were only four such households, two with extremely low incomes and two with extremely high incomes. However, to check if there were any differences in the results we dropped these four households, but the change in our results was minor. By means of the households location, level of educational attainment, and the main income source it seemed reasonable to include them in our analysis. Our final sample constitutes 4,297 households, where 1,670 are in urban areas and 2,627 are in rural areas.

There are thirteen regions of Namibia, which we aggregate into two major regions: the Central/southern region and the North/north-east region.[49] This aggregation is performed due

depend on remittances as a main source of income this was another reason for choosing the yearly base.

48 Own calculations based on Table 9.25, p. 198 CSO (1996a).

49 The Central/southern region constitutes of Erongo, Hardap, Karas, Khomas, Kunene, Omaheke and

to the fact that there are too few observations in each region when dividing the sample into the various socio-economic variables and its subgroups. Nevertheless, Table 3.4 presents descriptive statistics of the annual household income by Namibia's thirteen regions in order to give a picture of the imbalance of the income between the regions.

Table 3.4. Descriptive Statistics of Annual Household Income (N$)[1] by Regions, 1993/94.

Region/Urban and Rural Areas	n	Mean income	Median income	Mean/capita income	Min income	Max income
Central/southern regions	**2178**	**25018**	**10027**	**8121**	**143**	**1018811**
Erongo	371	19290	10839	6140	377	369454
Hardap	217	20877	7121	6299	599	375046
Karas	223	25170	8865	8500	480	510839
Khomas	572	44271	25963	13720	386	1018811
Kunene	227	10357	5624	2967	143	150131
Omaheke	209	16350	5839	6457	300	416710
Otjozondjupa	359	13286	7318	5187	317	285022
North/north-east regions	**2119**	**8141**	**4741**	**1649**	**258**	**190117**
Caprivi	228	6519	3779	1636	405	38620
Ohangwena	415	6345	3874	1028	646	178361
Okavango	300	8848	5940	1778	258	104818
Omusati	432	8201	5169	1304	566	98076
Oshana	401	10305	5444	2063	378	190117
Oshikoto	343	8527	4893	2241	336	172085
National average	4297	16236	6651	4753	143	1018811
Urban	1670	30274	14092	9365	300	1018811
Rural	2627	9092	4497	2406	143	510839

Note: Sample weights are used when we calculated the income statistics except for the first column showing the number of observations in the sample (n).
[1] The exchange rate in December 1993 was 3.65 N$/US$.

These variations are due in part to the fact that the varied climate and geographic segmentation in the country brings the regions into different income activities, which in turn give differences in the household income. These differences are reflected not only by the geographical segmentation, but also by the differences between the traditional and modern sector. This might particularly be true for the urban/rural difference. One has also to keep in mind that the disparities in prices and cost of living probably differ between the urban and rural areas causing some of the differences. The smallest ratio between mean and median income is observed in the regions of Okavango, Ohangwena and Omusati, which all belong to the North/north-eastern part of the country. A contributory factor to this is that there are no urban residences that bring up the mean, since the two latter regions consist of only rural areas

Otjozondjupa. The North/north-east region constitutes of Caprivi, Ohangwena, Okavango, Omusati, Oshana and Oshikoto. This is not the same definition that has been used by CSO, Windhoek (CSO, 1996a). The difference is that in our analyse we include Kunene into the Central/southern region, due to more similar characteristics, such as sources of income, geographic segmentation, population size, with the other regions included in the and in Okavango less than one quarter of the households is situated in urban areas. All regions that belong to Central/southern region, except Kunene and Otjozondjupa, have a mean above the national average. In terms of per capita income Ohangwena is the poorest region of them all, while, not unexpectedly Khomas, which has the capital, is the outstanding region with the highest per capita income.

3.5 Empirical Results

In this section we present the results of the Gini coefficients and the income shares of the bottom 20 per cent and the top 10 per cent of the households as well as the results of both Theil's (1967) entropy index T and Theil's second measure L. At the end of this section we briefly compare our results based on the income concept with a concept, which is only based on the variable total consumption (TCONS).

The Gini coefficients and the income shares of the bottom 20 per cent and the top 10 per cent of the households, by the two regions Central/southern and North/north-east, are presented in Table 3.5. The head of household is classified besides the regions into six socio-economic variables: urban/rural residence, main source of income, level of highest educational attainment, gender, age and household composition. The table suggests that income inequality, measured by the Gini coefficient, seems to be larger in the Central/southern region for all subgroups. Only in the case of single household is the Gini coefficient slightly larger in the North/north-east region.

The Central/southern region and the North/north-east region have a Gini coefficient of 0.68 and 0.55, respectively. The high Gini coefficient in the former region is partly explained by the fact that the region is of a more heterogeneous character, i.e. the economic sectors are a broader mix of activities involving unskilled, semi-skilled and skilled workers. The more heterogeneous the structure of an economic sector, the greater is the income disparities.[50] A reason for the lower Gini coefficient in the North/north-east region is that the majority of population is composed of people living in rural areas. The top 10 per cent of the households have about 54 per cent of the income share in the Central/southern region, while the

Central/southern region.
[50] Lecaillon *et al*. (1984).

corresponding figure for the North/north-east region is 46 per cent.

Table 3.5. Gini Coefficient, Mean Income, and Share of income (%), 1993/94.[1]

Subgroups	Central/southern region				North/north-east region			
	Gini coeffient	Mean income (N$)[2]	Income share of Bottom 20% of pop.	Income share of Top 10% of pop.	Gini coeffient	Mean income (N$)	Income share of Bottom 20% of pop.	Income share of Top 10% of pop.
Region	0.6845	10245	1.4	54.4	0.5529	2269	3.8	46.0
Urban/rural residence								
Urban	0.6223	13347	1.9	46.9	0.6119	5644	2.2	48.3
Rural	0.7342	6092	1.7	67.1	0.4852	1806	4.7	38.9
Main source of income								
Wages	0.6320	10323	1.9	47.9	0.5879	5118	2.7	47.5
Business	0.7197	23538	0.5	52.7	0.5745	2427	3.7	49.5
Subsistence farming	0.7709	5355	1.8	73.6	0.4337	1581	5.3	33.3
Pension	0.7523	6166	1.5	69.1	0.4832	1515	4.9	39.5
Cash remittances	0.5792	3452	3.2	49.4	0.3995	1357	6.7	33.3
Education of head of household								
No formal education	0.5141	2202	3.8	39.4	0.4192	1430	5.6	32.2
Primary education	0.5095	3649	4.0	40.1	0.4822	1738	4.6	38.3
Secondary education	0.6166	13978	2.0	47.5	0.5877	3856	3.1	49.0
Tertiary education	0.4524	33035	3.3	31.0	0.5033	8029	3.4	36.7
Gender of head of household								
Female	0.6601	7069	1.8	53.5	0.4596	1806	5.0	35.6
Male	0.6849	11470	1.3	53.9	0.6044	2685	3.1	51.7
Age of head of household								
Below 25	0.5184	4947	3.4	40.0	0.4541	2656	5.8	39.5
25-34	0.6255	10555	2.1	48.9	0.5743	3252	3.3	46.7
35-44	0.6381	10744	1.6	46.9	0.5744	2733	3.5	46.9
45-54	0.7334	12763	1.1	59.1	0.5513	2034	4.0	46.0
55-64	0.7378	7334	1.4	63.6	0.5584	1916	3.8	47.3
65+	0.7737	10669	0.9	66.2	0.4141	1419	5.7	31.9
Household composition								
Single	0.6078	13403	1.9	43.8	0.6132	7478	2.6	46.3
Single with children	0.5998	7634	2.0	45.8	0.4472	1919	4.9	32.9
Single extended family	0.5923	4571	2.7	47.2	0.4917	1866	4.6	40.1
Couple	0.7166	26071	1.0	56.9	0.5260	3103	5.0	44.0
Couple with children	0.6196	14655	1.2	42.3	0.6093	2673	3.4	52.4
Couple extended family	0.6464	5666	2.0	52.9	0.5127	1898	4.1	40.5

Note: Results for the subgroup other income is not reported in this table due to too few observations for computing the Gini coefficient.

[1] Adult equivalent scale, i.e. Head of household = 1.0; All other adults = 0.7; Children under 15 years = 0.5, is used when calculating this table.

[2] The exchange rate in December 1993 was 3.65 N$/US$.

The breakdown by urban and rural areas reflects the differentiation between the non-agricultural (modern) sector and the agricultural (traditional) sector. The Gini coefficient for the rural areas in the Central/southern region is higher than that of the urban areas, which contradicts the general findings, which are that income distribution is usually more unequal in urban areas than in rural areas.[51] This is, however, not the case in the North/north-east region. The urban Gini coefficient for both regions is about 0.60, which reflects that even the income disparities can be substantial between the traditional urban sector and the modern urban sector. The droughts that frequently afflict the country also contribute to the high urban inequality, because they force people in rural areas dependant on agriculture to move to urban areas to look for wage work. This has the effect of increasing urban unemployment, thus widening the urban income gap. Namibia's overall urban Gini coefficient is about 0.63, which is high compared to a study of urban Ethiopia with data from 1994 showing a Gini coefficient of about 0.56.[52] The overall Gini coefficient of Namibia is about 0.71, which is a very high Gini coefficient compared to other sub-Saharan African countries. For example, Kenya, South Africa and Tanzania have Gini coefficients of 0.575, 0.584 and 0.381, respectively.[53]

There is a considerable difference in the Gini coefficient between the rural areas of the Central/southern region, which have a Gini coefficient of 0.73 and the rural areas of the North/north-east region, which have a Gini coefficient of 0.49. This difference is essentially due to the co-existence of commercial and subsistence farmers in the Central/southern regions, where the commercial farmers in general have a much higher income than that of subsistence farmers. The two results may also reflect that the traditional sector has grown much faster in the Central/southern region than in the North/north-east region. Rural data from 1991 for Tanzania show a Gini coefficient of about 0.72,[54] which is more comparable to our rural Gini coefficient for the Central/southern region than for Namibia's overall rural Gini coefficient of 0.66.

In the Central/southern region, the highest Gini coefficient, according to main source of income, is found in the subgroup subsistence farming with a value of 0.77. The first reason that may explain this is the distinction between commercial farming and communal farming in size, ownership and the use of different techniques. The second reason is the drought during part of the survey year that affected production adversely, which in turn generated low income for some of the farmers and thus high inequality in this subgroup compared to the other income groups. In contrast, the North/north-east region has a Gini coefficient of 0.43 for the

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[51] For some empirical evidence see Sundrum (1990), p. 96 where Gini coefficients are estimated for urban and rural areas from nine countries, where only two of them show a slightly higher value of the rural Gini coefficient.
[52] Bigsten and Makonnen (1996).
[53] World Bank (1997).

same subgroup, suggesting a more homogeneous income structure in the agricultural sector. In this region, the subgroups wages and business have the highest Gini coefficient, 0.59 and 0.57, respectively.[55] One explanation of the high inequality in the subgroup wages could be the employment opportunities for high paid work in the public and administration services lately established in the region. In the North/north-east region, compared to the Central/southern region, the lower inequality in the subgroup pension may be explained by the fact that households in the latter region to a larger extent have pension from the state, i.e. private pensions. A study of South African income inequality with data from 1993 has estimated Gini coefficients for different income sources.[56] The results show a Gini coefficient of 0.655 for wage income, which is rather similar to our result. Furthermore, the result of the Gini coefficient for agriculture is 0.931 and for remittances it is 0.840, which is much higher than in our case.[57]

In the literature, education seems to be the most important determinant of income inequality,[58] and thus is of particular interest. In the Central/southern region there does not exist a pattern for the Gini coefficient. It is first high, then low; thereafter it increases and at the tertiary level it decreases. In the North/north-east region the Gini coefficient increases with increased level of educational attainment for the head of the household up to secondary education, whereas it decreases at the tertiary level.[59] In both regions we note that the head of households with secondary education have the greatest inequality. This result may reflect that some of the well-educated heads in this subgroup have low-paid jobs, because of the difficulties of finding a job that corresponds to their level of education. In other words, some persons have had to take a job that did not require their level of education and thus might have had to accept lower payment.[60]

Rather similar results of the Gini coefficients are obtained for the female- and male-headed households in the Central/southern region, 0.66 and 0.68 respectively.[61] The differences in income inequality between female- and male-headed household in the North/north-east region

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[54] Ferreira (1996).
[55] These values are, however, lower compared with the Central/southern region.
[56] Leibbrandt, C. Woolard and I. Woolard (1996).
[57] Some caution in our results for the subgroup remittances in the North/north-east region should be taken, because less than 60 observations are recorded.
[58] For example, see Nafziger (1988) or Sundrum (1990).
[59] The result in the subgroup tertiary education in this region may be inconsistent, because there are less than 60 observations in the sample. Therefore the result should be interpreted with caution.
[60] Note that mean income rises with education.

may first of all reflect differences in work opportunities. For example, women from the northern part of Namibia were historically excluded from the Labour Contract System, and thus from wage work. The results also suggest that women work less outside the household than men do. The Gini coefficient among females is substantially higher in the Central/southern region than in the North/north-east region. This probably reflects that some of the females in the former region to a higher extent work outside the household, not only with agriculture, but also, for example, as teachers, nurses and secretaries. This raises the inequality in this subgroup. The low average income that female-headed households have in the North/north-east region may be explained by the fact that they depend largely on agriculture. They have difficulties in cultivating large areas of land because they lack help from skilled labour. This in turn has the effect of lowering output, which gives a decrease in average income.

The Gini coefficients in the North/north-east region show Kuznet's pattern of the 'inverted U' between the age of the head of household and income distribution, i.e. low inequality in the young and the old age groups with a peak in the age group 35-44. The great inequality in the older age group in the Central/southern region may in part be a reflection of a more unequal distribution of education between the older generation compared to the younger age groups. Further, in this region the high value of the Gini coefficient in the age group 65 and over seems, at first sight, odd because it is assumed that this group should be more equalised than other age groups, with the exception of the age group below 25. One explanation to this result could be that some of the household population in age group 65 and over is still working, while others do not.[62]

In the Central/southern region the highest Gini coefficient is found among couples without children, while in the North/north-east region the highest Gini coefficient is found among single households. For both regions, single households with children and single extended families have the lowest Gini coefficients.[63]

Table 3.6 shows the decomposition of total inequality into *within-group* inequality and

[61] For the bottom 20 per cent and the top 10 percent of the population the income shares are almost identical.
[62] The highest average incomes go to the households with a head of an age between 45-54 in the Central/southern region, while in the North/north-east region the young generation 25-34 has the highest average incomes.
[63] The income share of the bottom 20 per cent of the household population is smaller for all subgroups in the

between-group inequality using both Theil's entropy index T and Theil's second measure L. Income and population percentages are also reported in the table. Our results suggest that the major contribution of total inequality stems from *within-group* inequality. Note that the last row in the table reports total inequality, which is the sum of the *within-group* inequality and the *between-group* inequality for each of the socio-economic variables.[64]

The *between-group* inequality (not shown in the table) for the two regions that we analyse, shows a contribution of about 20 per cent to total inequality using T, while using L the figure is about 26 per cent to total inequality. This contribution indicates that it makes sense to analyse our results in terms of two separate regions. However, the *within-group* inequality is the major component of total inequality.

The entropy index T and the second measure L in the Central/southern region suggests that only 6.7 per cent and 7.3 per cent of total inequality in urban/rural incomes is explained by the *between-group* inequality. The low contribution of the *between-group* inequality to total inequality for urban/rural residence contradicts the general argument that income inequality in less developed country stems mainly from urban/rural differences.[65] The corresponding figure for the North/north-east region is, however, higher with a contribution of 17.0 per cent or 16.9 per cent of total inequality using T and L, respectively. Still this is not high enough to warrant the suggestion that urban/rural income differences are main reasons for a high overall income inequality.

The *between-group* inequality for main source of income seems to be more important for the North/north-east region than for the Central/southern region. This is because equalising the *between-group* inequality would reduce total inequality by 15.3 percentage points in the former region and only 8.2 percentage points in the latter region. This socio-economic variable produces the highest *between-group* contribution to total inequality in the North/north-east region.

Central/southern region compared to the North/north-east region.

[64] Due to rounding of errors the sum does not always sum up exactly to the total inequality on the fourth decimal.

[65] See Lecaillon *et al.* (1984) or Sundrum (1990).

Table 3.6. The Decomposition of Total Inequality for Income by Subgroups, 1993/94.[1]

Subgroups	Central/southern region				North/north-east region			
	T	Inc. (%)	L	Pop. (%)	T	Inc. (%)	L	Pop. (%)
Urban/rural residence								
Urban	0.7617	76.5	0.7780	57.2	0.7138	24.4	0.7208	12.1
Rural	1.3103	23.5	1.0745	42.8	0.4851	75.6	0.4093	87.9
Within-group inequality	0.9012		0.9048		0.5537		0.4469	
Between-group inequality	0.0651		0.0709		0.1137		0.0907	
Main source of income								
Wages	0.7646	72.8	0.7995	70.5	0.6654	36.2	0.6602	18.9
Business	1.0825	16.5	1.3650	7.7	0.6651	4.8	0.5780	3.9
Subsistence farming	1.7805	3.1	1.2037	5.1	0.3508	49.5	0.3242	62.1
Pension	1.3445	5.9	1.1713	11.1	0.5714	7.5	0.4066	11.7
Cash remittances	0.6417	1.6	0.6062	5.4	0.3227	2.0	0.2714	3.3
Other income	0.3531	0	0.4752	0.2	0.0253	0	0.0254	0.1
Within-group inequality	0.8844		0.8938		0.5150		0.4053	
Between-group inequality	0.0819		0.0818		0.1525		0.1322	
Education of head of household								
No formal education	0.5204	5.9	0.4726	24.6	0.3248	25.8	0.3026	35.0
Primary education	0.4955	9.9	0.4543	24.2	0.4915	31.9	0.4069	40.2
Secondary education	0.7817	57.6	0.7514	42.5	0.6997	32.9	0.6198	22.0
Tertiary education	0.3690	26.6	0.4180	8.7	0.4688	9.4	0.5107	2.8
Within-group inequality	0.6271		0.5819		0.5301		0.4199	
Between-group inequality	0.3392		0.3938		0.1373		0.1177	
Sex of head of household								
Female	0.8489	17.7	0.8643	27.8	0.4051	38.2	0.3639	47.4
Male	0.9695	82.3	0.9884	72.2	0.7958	61.8	0.6572	52.6
Within-group inequality	0.9463		0.9539		0.6485		0.5182	
Between-group inequality	0.0200		0.0218		0.0190		0.0194	
Age of head of household								
Under 25	0.4987	2.9	0.4925	7.2	0.4241	3.5	0.3483	4.6
25-34	0.7520	25.4	0.7639	26.4	0.6535	22.2	0.6009	18.9
35-44	0.7510	31.4	0.8450	27.1	0.7039	25.0	0.5850	20.1
45-54	1.2313	23.1	1.1936	17.3	0.7258	16.9	0.5350	17.5
55-64	1.1632	8.2	1.1498	10.9	0.7394	14.1	0.5523	14.9
65+	1.3224	9.0	1.3715	11.1	0.3160	18.3	0.2937	23.9
Within-group inequality	0.9441		0.9499		0.6250		0.4937	
Between-group inequality	0.0222		0.0257		0.0425		0.0438	
Household composition								
Single	0.6520	7.3	0.7615	13.5	0.7005	4.0	0.7084	4.3
Single with children	0.6800	3.9	0.7061	5.9	0.3438	6.0	0.3459	9.8
Single extended family	0.6881	15.5	0.6456	26.5	0.5021	34.7	0.4198	38.3
Couple	1.0852	14.9	1.1701	8.3	0.5579	1.5	0.4703	2.4
Couple with children	0.6907	37.2	0.8793	22.3	0.8487	15.9	0.6580	14.5
Couple extended family	0.8811	21.2	0.8121	23.4	0.5163	37.9	0.4635	30.8
Within-group inequality	0.7914		0.7997		0.5816		0.4741	
Between-group inequality	0.1749		0.1760		0.0859		0.0635	
Total Inequality	0.9663		0.9757		0.6675		0.5376	

[1] Adult equivalent scale, i.e. Head of household = 1.0; All other adults = 0.7; Children under 15 years = 0.5, is used when calculating this table.

The between-educational contribution to total inequality in the Central/southern region is as high as 35.1 per cent and 40.4 per cent using T and L, respectively. Education gives the highest *between-group* contribution to total inequality of all socio-economic variables in this region. Equalising the *between-group* inequality would reduce the total inequality from about 0.97 to about 0.63. In the North/north-east region the corresponding between-educational contribution to total inequality is only 20.6 per cent using T and 21.9 per cent using L, but still the second highest contribution of the *between-group* inequality to total inequality compared to the *between-group* contribution of the other socio-economic variables. These results point out that the between-educational contribution to total inequality is of great importance, particularly in the Central/southern region. A comparative study on Lesotho using data from 1986/87 also finds that the between-educational contribution to total inequality is the most important one of all variables analysed.[66]

In the Central/southern region the lowest *between-group* contribution, about 2 per cent using either T or L, is received in the socio-economic variable gender of head of household. This is the case in the North/north-east region as well, but here the figures are somewhat higher, i.e. 2.8 per cent and 3.6 per cent using T and L, respectively. In both regions the male-headed households have more inequality compared to the female-headed households. In the North/north-east region the male-headed have inequality rates twice as high as their counterparts, suggesting that people in female-headed households work more inside the traditional sector than do people in male-headed ones.

Inequality increases with age of the head of household in both regions, with three exceptions. In Central/southern region the between-age inequality is of no importance, since the results suggest that total inequality would only decrease, using either of the measures T or L, with about 2.5 per cent if equalising between-age inequality. The result of the between-age inequality in the North/north-east region is more than twice as important, since equalising between-age inequality the total inequality would decrease with 6.4 per cent and 8.2 per cent using T and L, respectively.

The second highest contribution of the *between-group* inequality to total inequality in Central/southern region is found for the socio-economic variable household composition. The contribution is about 18 per cent of total inequality for both T and L. Hence, equalising the *between-group* inequality would reduce total inequality from about 0.97 to about 0.79. Highest inequality is found among couples, suggesting that for some of the couples both are

[66] Makonnen (1993).

working, while within other couples there is only one that is working. For the same socio-economic variable in the North/north-east region, the *between-group* inequality is contributing less to total inequality, about 13 per cent using T and about 12 per cent using L. In this region couples with children have the highest inequality.

In Table A3.1 of Appendix 3.C we present results of estimating the Gini coefficient, when the variable total consumption (TCONS) is used.[67] Comparing the results in Table A3.1 with the results in Table 3.5 we find that the Gini coefficients are lower in Table A3.1. Nevertheless, some subgroups still have a fairly high value of the Gini coefficient, indicating that Namibia is a country with a highly unequal distribution. The most striking differences between the Gini coefficients are found for subsistence farming in the Central/southern region and for business in the North/north-east region. The *within-* and *between-group* inequality contribution to total inequality does not change much if one uses the measure of total consumption, see Table A3.2 in Appendix 3.C. Worth noticing is that total inequality in the North/north-east region is higher using total consumption than our income concept.

3.6 Summary and Conclusions

In this study we have analysed the distribution of income among the Namibian households by using the 1993/1994 Namibia Household Income and Expenditure Survey. The household's income concept is adjusted by adult equivalence scales. To measure the distribution of income we calculated the Gini coefficient, and the income shares of the bottom 20 per cent and the top 10 per cent of the household population. We also calculated Theil's (1967) two measures, the entropy index T and the second measure L in order to investigate whether total income inequality stems from *within-group* inequality or from *between-group* inequality. We make an aggregation of Namibia's thirteen regions into two major regions, one containing the regions in the central and the southern Namibia and the other region containing the regions in the north. Hence, each of the two regions was divided into six socio-economic variables where each variable was further divided into various subgroups.

Our results indicate a highly unequal distribution of income in Namibia, particularly in

[67] Using the total consumption measure the Gini coefficients for overall Namibia, urban areas and rural areas are 0.67, 0.61 and 0.60, respectively (not shown in table A3.1).

Central/southern region. In this region the Gini coefficient for the various subgroups varied between 0.51 and 0.78, while the corresponding figures for the North/north-east region are much smaller varying between 0.40 and 0.64. The average income is also much lower for all household categories in the latter region than in the former region. The bottom 20 per cent of the household population in Central/southern region acquire 1.4 per cent of total income, while the top 10 per cent of the household population acquire 54.4 per cent of total income. In the North/north-east region the bottom 20 per cent of the household population acquire somewhat more of total income, 3.8 per cent. The top 10 per cent of the household population obtain 46 per cent of total income.

Our examination of the decomposition of inequality into *within-group* inequality and *between-group* inequality shows that the *within-group* inequality is the major contributory component to total inequality. Rather different results are obtained from the two regions regarding the contributory component of *within-* and *between-group* inequality to total inequality. The highest *between-group* component to total inequality is found for the variable education in the Central/southern region whereas in the North/north-east region main source of income gives the highest *between-group* contribution to total inequality. However, the between-education inequality is also high in the North/north-east region. The general presumption that most of the income inequality in developing countries stems from disparities between urban and rural areas does not hold in our case. Equalising the between-urban/rural inequality will only reduce total inequality by 6.5 percentage points in the Central/southern region using T. The corresponding figure is higher (11.4 percentage points) in the North/north-east region, but still fairly low.

Two main conclusions can be made from our analysis of income distribution in Namibia. First, the Central/southern region suffers from a more skewed distribution of income than the North/north-east region. Second, it is the *within-group* inequality that is causing the unequal income in the country.

In regard to policy intervention, the on-going investments in the area of education must continue. However, further education and training for people already at work, particularly in small-scale firms and in the informal sector, are also important to consider since most of the population is or will be involved in these areas of the labour market. Improvements of the access to the credit market for small-scale firms as well as for the informal sector would reduce barriers to expand the business. The small-scale firms and people in the informal sector have little access to credit, and thus access to more credit may improve their income and hence reduce the overall income inequality. Further, our results suggest that Namibia has to focus on policy concerning the income disparities between the thirteen regions. However, it will be difficult to apply a general policy for each region, because of the differences in the socio-economic development in the regions.

Appendix 3.A Definitions of the Variables

A private household: A private household may consist of one or several persons. A one-person household is a person living alone and catering for herself/himself. A multi-person household contains two or more individuals (relatives or non-relatives), who live together and have common catering arrangements. The definition of a household member is a person who slept in the household during the last 24 hours before an interview and who had common catering arrangements with the household during these 24 hours.

Urban/rural residence: The urban residences are the following 15 municipalities and 12 towns in Namibia.

Municipalities: Swakopmund, Windhoek, Gobabis, Grootfontein, Karibib, Karasburg, Keetmanshoop, Mariental, Okahandja, Omaruru, Otavi, Otjiwarongo, Outjo, Tsumeb, Usakos and Walvis Bay (except the area of the Topnaars).

Towns: Hentiesbaai, Lüderitz, Okakarara, Ondangwa, Ongwediva, Opuwo, Oshakati, Rehoboth, Rundu, Katima Mulilo, Khorixas and Arandis.

The other parts of the country are defined as rural residences including the Topnaars in Walvis Bay.

Main source of income: The question 'What income source is the most important for the wellbeing of the entire household?' has been the base of how to classify the households into this categorical variable.

Education: The level of highest educational attainment.

No formal education: No school experience or currently in Grad 1.

Primary education: Grade 1 to Grade 6.

Secondary education: Grade 7 to Grade 12.

Tertiary education: Diploma or certificate issued by a University, Technikon or Technical Institutes; university courses leading to first degrees 1 to 4 years; post-graduate (diploma, master degree, doctorate degree); Teacher training.

Household composition:

Single: A one-person household.

Single with children: A one-person household with one or more children.

Single with extended family: A one-person household, which includes own children's spouse, children's children, parents (including spouse's parents) or other relatives. Own children may or may not be include. Non-relatives are also included.

Couple: A two-person household.

Couple with children: A two-person household with one or more children.

Couple with extended family: A two-person household, which includes own children's spouse, children's children, parents (including spouse's parents) or other relatives. Own children may or may not be include. Non-relatives are also included.

Appendix 3.B The Income Concept

Using expenditure variables including the transactions in kind we can calculate annual income for each household. However, two problems arose when we did the computations. First, there were very high values for some households for investments during the last twelve months. This impelled us to do a careful analysis of the investment variable, to try to find out to what extent the household's investments had been made with borrowed money. Thus, an investigation of the loans for each household was performed, which showed that some households had loans that exactly or nearly corresponded to the invested amount. We then decided to adjust for this. We then faced a second problem, namely to find out what the amount borrowed was. The loan is just reported as a stock, and may therefore refer to previous years and not only to the year of the survey. This forced us to make some assumptions: a) if the household had no investments during the year, we assumed that a positive loan amount indicates that the loan had been taken during previous years and the amount borrowed during the year takes the value zero; b) if the loan amount is greater than the investments we assume that the loan taken this year equals the investments; and c) if there is no information about any loan then no adjustment is made to the investments. The reasons for choosing this approach is that we at least to some extent alleviate the overestimation of household income, but might still overestimate the income for the households that have not answered on the question regarding loans.

The total annual household income is established as follows:

TOTAL ANNUAL HOUSEHOLD INCOME = TCONS + CREMITG - CREMITR+ CINV + KINV + CDMANIM + CSAVE + CTAX + CNONCEXP – LOANAMNT

Total consumption (TCONS): Consists of food expenditure, which include bread and cereals; meat; fish; milk, cheese and egg; oil and fat; vegetables and potatoes; fruits and nuts; sugar; non alcoholic beverages; other food; meals. Own produced food or food received in kind includes bread and cereals; meat; fish; vegetables and potatoes; fruits and nuts. Other consumption items include total clothing and footwear; total housing, i.e. imputed rent in cash and kind, fuel, power, etc.; total furniture and utensils; total household operations; total medical care; total transport and communication; total education; total personal care; total recreation, i.e. cultural, entertainment; total other, i.e. insurance legal aid.

Remittances in cash given away (CREMITG): This includes ad hoc and regular gifts, remittances and maintenance payments to relatives and friends. Not included are contributions to cultural societies and common village equipment.

Remittances in cash received (CREMITR): The aggregation of individual remittances received within and outside Namibia.

Housing investments financed by cash (CINV): This item consists of cash investments in building materials, land and housing.

Investments in kind (KINV): This item consists of kind investments in building materials, cattle, donkeys, horses, goat, sheep, pigs, poultry and animal care received by the household.

Domestic animal investments in cash (CDMANIM): Cattle; donkeys, horses; goat, sheep, pigs, poultry and animal care.

Savings and other investments (CSAVE): Fees for life/pension insurance; loan and credits given away; repayment of loans and credits (car and mortgages along with clothing and furniture repayments are included as well as interest paid); saving deposit.

Income tax and other wage deductions (CTAX): This item also includes pension scheme and medical aid deductions.

Non-consumption expenditure (CNONCEXP): This item consists of bride prices or lobbola given away and fines or penalties.

Loan amount (LOANAMNT): The household's total borrowed amount during the year.

For the variables of housing, land and animals, an imputed value has been implemented in the following way. If the household has answered that they bought, for example, land during the last twelve months, but did not state the amount then a value is imputed based on corresponding values paid by households in the same or neighbouring PSU.[68]

Appendix 3.C Results of Consumption Distribution in Namibia 1993/94

Table A3.1. Gini Coefficient, Mean Consumption and Share of Consumption (%), 1993/94.[1]

Subgroups	Central/southern region				North/north-east region			
	Gini coeffient	Mean consum. (N$)	Consum. share of Bottom 20% of pop.	Top 10% of pop.	Gini coeffient	Mean consum. (N$)	Consum. share of Bottom 20% of pop.	Top 10% of pop.
Region	0.6509	7754	1.8	51.6	0.5174	2021	4.4	42.8
Urban/rural residence								
Urban	0.5953	10148	2.3	44.9	0.5835	4453	2.8	3.2
Rural	0.6801	4549	2.3	60.7	0.4624	1687	5.1	37.2
Main source of income								
Wages	0.5968	7732	2.3	45.4	0.5718	4171	3.2	46.8
Business	0.7123	18355	0.6	53.5	0.4977	1915	4.7	41.3
Subsistence farming	0.6767	3527	2.7	62.5	0.4179	1513	5.7	32.2
Pension	0.6998	4588	1.9	45.4	0.4658	1454	5.3	38.1
Cash remittances	0.5753	3534	3.3	62.5	0.3887	1393	7.2	32.6
Education of head of household								
No formal education	0.4870	1988	4.2	37.0	0.4007	1361	6.1	31.1
Primary education	0.4790	3136	4.5	37.5	0.4550	1633	5.1	36.0
Secondary education	0.5794	10259	2.6	44.2	0.5619	3268	3.6	46.7
Tertiary education	0.4568	24621	3.5	30.6	0.5083	6139	3.9	36.5
Gender of head of household								
Female	0.6335	5797	2.2	51.1	0.4364	1698	5.5	34.3
Male	0.6510	8509	1.8	51.0	0.5675	2312	3.6	48.0
Age of head of household								
Below 25	0.4795	4272	3.9	37.0	0.4146	2473	6.4	35.5
25-34	0.5940	8027	2.6	47.1	0.5325	2821	4.2	43.4
35-44	0.6008	7932	2.1	44.5	0.5282	2282	4.2	42.4
45-54	0.7080	9600	1.3	56.4	0.5256	1854	4.5	44.3
55-64	0.7066	5746	1.7	60.1	0.5467	1803	4.0	46.4
65+	0.7357	8027	1.2	61.1	0.3931	1340	6.1	30.2
Household composition								
Single	0.6004	11399	2.1	44.5	0.5891	6549	3.1	45.8
Single with children	0.5620	6322	2.5	42.8	0.4318	1875	5.4	31.9
Single extended family	0.5485	3667	3.3	42.7	0.4625	1720	5.2	37.8
Couple	0.6744	17785	1.5	52.2	0.5089	2981	5.3	43.0
Couple with children	0.5946	10624	1.6	40.8	0.5467	2184	4.2	45.5
Couple extended family	0.6020	4331	2.5	49.2	0.4758	1658	4.7	37.5

Note: Results for the subgroup other income is not reported in this table due to too few observations for computing the Gini coefficient.
[1] Adult equivalent scale, i.e. Head of household = 1.0; All other adults = 0.7; Children under 15 years = 0.5, is used when calculating this table.
[2] The exchange rate in December 1993 was 3.65 N$/US$.

[68] For a more detailed description of the variables see CSO, (1996c).

Table A3.2. The Decomposition of Total Inequality for Consumption by Subgroups, 1993/94.[1]

Subgroups	Central/southern region				North/north-east region			
	T	Con. (%)	L	Pop. (%)	T	Con. (%)	L	Pop. (%)
Urban/rural residence								
Urban	0.6841	76.8	0.6859	57.2	0.6506	21.8	0.6288	12.1
Rural	1.0940	23.2	0.8716	42.8	0.4479	78.2	0.3684	87.9
Within-group inequality	0.7653		0.7870		0.3998		0.5018	
Between-group inequality	0.0740		0.0678		0.0633		0.0775	
Main source of income								
Wages	0.6614	72.0	0.6806	70.5	0.6347	33.1	0.5991	18.9
Business	1.0529	16.8	1.2633	7.7	0.4687	4.3	0.4234	3.9
Subsistence farming	1.2462	3.1	0.8518	5.1	0.3246	52.4	0.2979	62.1
Pension	1.0523	5.9	0.9596	11.1	0.5414	8.0	0.3764	11.7
Cash remittances	0.6324	2.2	0.5967	5.4	0.3063	2.2	0.2501	3.3
Other income	0.3531	0	0.4752	0.2	0.0254	0	0.0253	0.1
Within-group inequality	0.7604		0.7714		0.3672		0.4688	
Between-group inequality	0.0789		0.0834		0.0960		0.1104	
Education of head of household								
No formal	0.4538	7.1	0.4174	24.6	0.2924	25.8	0.2741	35.0
Primary	0.4370	11.1	0.3980	24.2	0.4294	34.2	0.3581	40.2
Secondary	0.6834	55.9	0.6367	42.5	0.6494	32.0	0.5553	22.0
Tertiary	0.3475	25.9	0.4084	8.7	0.4648	8.0	0.4670	2.8
Within-group inequality	0.5051		0.5518		0.3750		0.4781	
Between-group inequality	0.3341		0.3030		0.0882		0.1012	
Sex of head of household								
Female	0.7909	18.8	0.7674	27.8	0.3701	39.7	0.3240	47.4
Male	0.8551	81.2	0.8477	72.2	0.6984	60.3	0.5661	52.6
Within-group inequality	0.8253		0.8417		0.4514		0.5677	
Between-group inequality	0.0139		0.0130		0.0118		0.0116	
Age of head of household								
Under 25	0.4571	3.3	0.4219	7.2	0.3294	3.7	0.2879	4.6
25-34	0.6661	25.5	0.6597	26.4	0.5642	21.9	0.4927	18.9
35-44	0.6540	30.2	0.7079	27.1	0.5911	23.6	0.4846	20.1
45-54	1.1203	23.3	1.0617	17.3	0.6430	17.1	0.4797	17.5
55-64	1.0588	8.8	1.0037	10.9	0.7327	14.6	0.5300	14.9
65+	1.1344	9.0	1.1747	11.1	0.2764	19.2	0.2613	23.9
Within-group inequality	0.8196		0.8372		0.4296		0.5465	
Between-group inequality	0.0196		0.0176		0.0336		0.0328	
Household composition								
Single	0.6431	8.2	0.7116	13.5	0.6472	4.0	0.6262	4.3
Single with children	0.6071	4.3	0.5956	5.9	0.3259	6.5	0.3185	9.8
Single extended family	0.5927	16.2	0.5411	26.5	0.4478	35.9	0.3672	38.3
Couple	0.9670	13.5	0.9675	8.3	0.5275	1.7	0.4367	2.4
Couple with children	0.6142	36.0	0.7570	22.3	0.6477	14.8	0.5142	14.5
Couple extended family	0.7563	21.7	0.6808	23.4	0.4498	37.2	0.3925	30.8
Within-group inequality	0.6838		0.7030		0.4042		0.4990	
Between-group inequality	0.1555		0.1518		0.0589		0.0803	
Total Inequality	0.8393		0.8548		0.4631		0.5793	

[1] Adult equivalent scale, i.e. Head of household = 1.0; All other adults = 0.7; Children under 15 years = 0.5, is used when calculating this table.

4 Labour Market Discrimination Analysis

4.1 Introduction

Gender equity has long been a subject of debate. This discussion becomes more and more relevant for the development not only in industrialised countries, but also to a greater extent of less developed countries. In the latter, women are now entering the labour market more frequently than in the past. Most of them are occupied in the informal sector of the economy, where their jobs are related to their home production. However, female involvement in other sectors of the economy is constantly growing. Because of the increasing female labour force participation we believe that gender discrimination in the labour market is an issue of growing importance, particularly in developing countries.

In this analysis we study the labour market discrimination in Namibia by using individual information, which was collected in the 1993/1994 Namibia Household Income and Expenditure Survey. The purpose in this study is to analyse if the earnings differences between males and females are due to endowment differences or to discrimination. We use methods developed by Oaxaca (1973) and Oaxaca and Ransom (1994) that has been widely used in developed countries. However, their methods have only been used in a few studies concerning developing countries in Africa.[69] A positive sign of the endowment component would be expected due to the fact that males usually are better endowed than females, for example, with education. In this study we pay particular attention to the manufacturing, service and public sector. The aggregation of the three sectors is, however, also considered. We also disaggregate these into urban and rural areas. We would expect females to be less discriminated in rural areas, because of more similarities between the jobs. We compare ordinary least square estimation with Heckman's (1979) estimation procedure in order to answer the question whether selectivity matters in explaining part of the earnings differences.

When previous authors have assessed discrimination in the Namibian labour market the emphasis has been on racial discrimination.[70] There is no doubt that the most important determinant of labour market discrimination in Namibia is ethnicity, because of the apartheid

[69] See Appleton *et al.* (1995) and Knight and Sabot (1991). For a study concerning Brazil see Birdsall and Fox (1991).
[70] For example, see Labour and discrimination in Namibia (1977) where average incomes are compared.

system that existed during the South African occupation.[71] However, we argue that, irrespective of race, the aspect of gender discrimination is interesting to study, because of the labour market segregation of the males, which followed from the Labour Contract System (contracting mainly males), that was implemented by the Germans, and later developed by South Africa.[72] Because of this we would expect some discrimination against females. Simon (1984) notes in his study of racial discrimination that within specific job groups, average female wages are often lower than the corresponding average wages of males.

The analysis is outlined as follows. Section 4.2 presents the framework of wage discrimination. In Section 4.3 we describe the data. Econometric considerations are discussed in Section 4.4. The results of the regressions are reported in Section 4.5. Finally, in Section 4.6 we make some concluding remarks.

4.2 Measuring Wage Discrimination

Discrimination studies are traditionally based on regression analysis in the form of earnings equations in which different income related characteristics, for example, education, region and sex, are used to explain wage differences. In this section we discuss the earnings equation briefly, and consider the formulas of wage discrimination used in this paper. We also consider the implementation on the Namibian data. Our analysis is based on the wage differential components introduced and used by Oaxaca (1973) and Oaxaca and Ransom (1994).

4.2.1 The Earnings Equation

Consider the traditional earnings equation[73]

$$\ln w_i = \beta_0 + \beta_1 s_i + \beta_2 e_i + \beta_3 e_i^2 + \beta_4 x_{1i} + \ldots + \beta_{4+j} x_{ji} + u_i \qquad i = 1, \ldots, n \tag{1}$$

where $\ln w_i$ is the natural logarithm of earnings or wages for the ith individual, s_i denotes

[71] Namibia gained independence in March 1990.
[72] Moorsom (1989).
[73] See Mincer (1974).

schooling, e_i is a measure of labour market experience, x_{ji} are other factors influencing earnings such as gender, geographical region and marital status for the *i*th individual, and u_i is a random disturbance term. The latter is assumed to be normally distributed with zero mean and constant variance. The quadratic experience term indicates that earnings are in general not constant after leaving school, but follow an inverted U-shaped curve, i.e. increase at a decreasing rate.

When analysing wage discrimination it is common to compare two groups, for example, union and non-union members, white and black, males and females. In our case gender is the base, and the two earnings functions will look like

$$\ln w_{\mathrm{m}} = \mathbf{x}'_{\mathrm{m}}\boldsymbol{\beta}_{\mathrm{m}} + \mathrm{u}_{\mathrm{m}} \tag{2}$$

$$\ln w_{\mathrm{f}} = \mathbf{x}'_{\mathrm{f}}\boldsymbol{\beta}_{\mathrm{f}} + \mathrm{u}_{\mathrm{f}} \tag{3}$$

where ln *w* is the natural logarithms of wages, $\mathbf{x}'$ is a vector of individual characteristics, $\boldsymbol{\beta}$ is a vector of coefficients, and u is a random disturbance term. The sub index *m* and *f* refers to males and females, respectively. For convenience, we exclude the individual sub index *i*.

In accordance with the properties of ordinary least square (OLS) estimates, the regressions go through the sample means. The wage differences between males and females can be expressed as

$$\ln \tilde{w}_{\mathrm{m}} - \ln \tilde{w}_{\mathrm{f}} = \bar{\mathbf{x}}'_{\mathrm{m}}\hat{\boldsymbol{\beta}}_{\mathrm{m}} - \bar{\mathbf{x}}'_{\mathrm{f}}\hat{\boldsymbol{\beta}}_{\mathrm{f}} \tag{4}$$

where ln $\tilde{w}_{\mathrm{i}}$ is the logarithm of the geometric mean of wages, $\bar{\mathbf{x}}'_{\mathrm{m}}$ and $\bar{\mathbf{x}}'_{\mathrm{f}}$ are the vectors of the arithmetic mean of the regressors, and $\hat{\boldsymbol{\beta}}_{\mathrm{m}}$ and $\hat{\boldsymbol{\beta}}_{\mathrm{f}}$ are the vectors of the estimated coefficients for males and females, respectively.

Let the difference between the male and female coefficient vectors be

$$\Delta\hat{\boldsymbol{\beta}} \equiv \hat{\boldsymbol{\beta}}_{\mathrm{m}} - \hat{\boldsymbol{\beta}}_{\mathrm{f}} \tag{5}$$

implying

$$\hat{\boldsymbol{\beta}}_{\mathrm{f}} \equiv \hat{\boldsymbol{\beta}}_{\mathrm{m}} - \Delta\hat{\boldsymbol{\beta}} \qquad (6)$$

Substitution of (5) and (6) in equation (4) yields the male wage structure. In the absence of discrimination the male wages will also be applicable to the females. Hence

$$\ln \tilde{w}_{\mathrm{m}} - \ln \tilde{w}_{\mathrm{f}} = \bar{\mathbf{x}}'_{\mathrm{f}}(\hat{\boldsymbol{\beta}}_{\mathrm{m}} - \hat{\boldsymbol{\beta}}_{\mathrm{f}}) + (\bar{\mathbf{x}}'_{\mathrm{m}} - \bar{\mathbf{x}}'_{\mathrm{f}})\hat{\boldsymbol{\beta}}_{\mathrm{m}}\,. \qquad (7)$$

The female wage structure is obtained in a similar way, using the fact that in the absence of discrimination the female wages will also be applicable to the males. Thus, by substituting equation (5) and $\hat{\boldsymbol{\beta}}_{\mathrm{m}} \equiv \Delta\hat{\boldsymbol{\beta}} + \hat{\boldsymbol{\beta}}_{\mathrm{f}}$ into equation (4) yields

$$\ln \tilde{w}_{\mathrm{m}} - \ln \tilde{w}_{\mathrm{f}} = \bar{\mathbf{x}}'_{\mathrm{m}}(\hat{\boldsymbol{\beta}}_{\mathrm{m}} - \hat{\boldsymbol{\beta}}_{\mathrm{f}}) + (\bar{\mathbf{x}}'_{\mathrm{m}} - \bar{\mathbf{x}}'_{\mathrm{f}})\hat{\boldsymbol{\beta}}_{\mathrm{f}}\,. \qquad (8)$$

The first term on the right-hand side of both equation (7) and (8) refers to differences in the returns that males and females receive for the same endowment of wage generating characteristics. The second term refers to differences in the endowments of wage generating characteristics, evaluated at the returns of the beta coefficients. Equation (7) and (8) are used as instruments when estimating wage discrimination, which we will now turn to.

4.2.2 A Decomposition of Wage Discrimination

Next we assess a decomposition of the total wage discrimination. The males are here taken to be the advantaged group, while the females are the disadvantaged group.

A labour market discrimination coefficient, D, was introduced by Oaxaca (1973):

$$\mathrm{D} = \frac{(w_{\mathrm{m}}/w_{\mathrm{f}}) - (w^{*}_{\mathrm{m}}/w^{*}_{\mathrm{f}})}{w^{*}_{\mathrm{m}}/w^{*}_{\mathrm{f}}} \qquad (9)$$

where

$w_{\mathrm{m}}/w_{\mathrm{f}}$ = the actual male-female wage ratio

$w_{\mathrm{m}}^{*}/w_{\mathrm{f}}^{*}$ = the male-female wage ratio in the absence of discrimination.

Taking the natural logarithms of equation (9) we obtain

$$\ln(\mathrm{D}+1) = \ln(w_{\mathrm{m}}/w_{\mathrm{f}}) - \ln(w_{\mathrm{m}}^{*}/w_{\mathrm{f}}^{*})\,. \tag{10}$$

The coefficient of discrimination in equation (10) shows the relative wage effects of labour market discrimination. It does not measure how much of the differential refers to overvaluation of the males and how much refers to undervaluation of females. Hypothetically, a further division of the discrimination coefficient into two components is possible.[74] One refers to male overvaluation, i.e. the favouritism component, and the other refers to female undervaluation, i.e. the pure discrimination component. Equation (10) can be extended to

$$\begin{aligned} \ln(\mathrm{D}+1) &= \ln(w_{\mathrm{m}}/w_{\mathrm{m}}^{*}) + \ln(w_{\mathrm{f}}^{*}/w_{\mathrm{f}}) \\ &= \ln(\delta_{\mathrm{m}*}+1) + \ln(\delta_{*\mathrm{f}}+1) \end{aligned} \tag{11}$$

where

$\delta_{\mathrm{m}*} \equiv (w_{\mathrm{m}}/w_{\mathrm{m}}^{*}) - 1$ measures the relative differential between the actual male wages and the wages that males would have received in the absence of discrimination, and

$\delta_{*\mathrm{f}} \equiv (w_{\mathrm{f}}^{*}/w_{\mathrm{f}}) - 1$ measures the relative differential between the wages that females would have received in the absence of discrimination and the actual female wages.

It is possible that the male-female wage differential is not entirely due to favouritism and/or (pure) discrimination. To some extent, the differential can reflect productivity differences. The total or gross male-female wage differential can be decomposed into a favouritism, a pure discrimination and a pure productivity component as follows. In equation (10) the second term on the right-hand side is the male-female wage differential in the absence of labour market discrimination reflecting pure productivity differences, Q;

[74] Originally, Cotton (1988) proposed this division.

$$Q = (w_m^* / w_f^*) - 1. \tag{12}$$

Taking natural logarithms of equation (12) we obtain

$$\ln(Q+1) = \ln(w_m^* / w_f^*). \tag{13}$$

Substitution of (13) into (10) yields

$$\ln(w_m / w_f) = \ln(D+1) + \ln(Q+1). \tag{14}$$

The sum of the right-hand side terms is the gross male-female wage differential, G, so (14) can be written

$$\ln(G+1) = \ln(D+1) + \ln(Q+1) \tag{15}$$

or (11)

$$\ln(G+1) = \ln(\delta_{m*} + 1) + \ln(\delta_{*f} + 1) + \ln(Q+1). \tag{16}$$

To implement equation (15) and (16), recall equation (7), which is the male wage structure. The left-hand side of (7) is equal to the gross male-female wage differential, i.e. ln(G+1). Further, assume that the male wage structure applies to both males and females in the absence of labour market discrimination. Then

$$\ln(D+1) = \bar{\mathbf{x}}_f' (\hat{\boldsymbol{\beta}}_m - \hat{\boldsymbol{\beta}}_f) \tag{17}$$

and

$$\ln(Q+1) = (\bar{\mathbf{x}}_m' - \bar{\mathbf{x}}_f')\hat{\boldsymbol{\beta}}_m. \tag{18}$$

Equation (17) shows the estimated differences of the coefficients and equation (18) shows the estimated differences in individual characteristics. Thus, the implementation of equation (15) only requires an application of equation (7).

To implement equation (16) we have to introduce the non-discriminatory wage structure, $\hat{\boldsymbol{\beta}}$, which is simply the pooled wage structure.[75] Equation (16) can now be expressed as

$$\ln(G+1) = \bar{\mathbf{x}}'_m(\hat{\boldsymbol{\beta}}_m - \hat{\boldsymbol{\beta}}) + \bar{\mathbf{x}}'_f(\hat{\boldsymbol{\beta}} - \hat{\boldsymbol{\beta}}_f) + (\bar{\mathbf{x}}'_m - \bar{\mathbf{x}}'_f)\hat{\boldsymbol{\beta}} \qquad (19)$$

where the first term on the right-hand side refers to the estimate of the wage advantage for males, the second refers to the estimate of wage disadvantage for females, and the third refers to the productivity differential estimate.

4.2.3 The Namibian Implementation

Above we have described the theory of earnings equation and wage discrimination. Next we implement it to the Namibian case. We include our explanatory variables into the earnings equation in accordance with the theory, except for the experience variable. Direct information on experience is seldom available and therefore a measure of potential experience is often used. This measure is estimated as the individual's age minus the individual's number of years of completed education minus 6, where 6 is supposed to be the individual's age in his/her last pre-school year. Our survey does not contain information on neither the number of years of education, nor on the final pre-school year. For this reason age and age squared are used as proxies for experience. These measures under-estimate both the first-order and the second-order effects of experience.

Because of the heterogeneity of the labour market in less developed countries we choose to analyse labour market discrimination by sector, but as a complement we will also analyse the discrimination for the aggregation of the three sectors. We pay attention to the manufacturing, service and public sector. The agricultural sector, the fishing industry, people involved in private households and people working in territorial organisations are not included into our analysis. This is because in the two former categories people work basically on a casual wage employment and for the latter category there are too few people in the sample. Further, individuals in the agricultural sector are in some form of self-employment. They do not necessarily generate cash income. Individuals working in private households mostly receive their incomes in kind. The income structure in the urban areas is usually different from the

[75] This is in accordance to the pooled structure proposed by Oaxaca and Ransom (1994).

rural income structure. Therefore we will also separate these two economies. In this study a dummy for the urban/rural residence has to be used in the manufacturing and service due to too few observations for females in the rural areas.[76]

4.3 Data

Individual data from the 1993/1994 Namibia Household Income and Expenditure Survey (NHIES) are used. The survey was conducted by the Central Statistics Office (CSO)/National Planning Commission, Windhoek, from November 1993 to October 1994. The data comprise 24,984 individuals. For our purposes the sample is reduced because only individuals of age 15 years and above and part of the labour force are included. Individuals with missing values are omitted. As already mentioned in the previous section, we also exclude individuals working with agriculture, fishing activities, activities in private household and those employed in territorial organisation. This reduces the data to 2,703 individuals, 1,633 males and 1,070 females. Almost one third of the individuals are not reporting any wages, thus 1,890 individuals, 1,208 males and 682 females, report a positive wage.

The individuals reported two types of wage measures. The first wage measure is a monthly wage referring to the survey month. The second wage measure is an annual wage, which was estimated by the individuals for the last twelve months, including the survey month. Further, a third wage measure can be estimated, the hourly wage. The estimates can be computed by means of available information about the number of hours worked during the last week.[77] However, the measures of hourly wages can be associated with considerable measurement errors, since working hours in Namibia are characterised by seasonal variations and day-to-day fluctuations. This is particularly the case for the unskilled and semi-skilled workers in the fishing and fish processing industries as well as in the agricultural industry. Since we have disregarded these industries the hourly wage probably becomes more reliable. While we are aware of the fact that the model by Mincer (1974), which we use, has been derived in terms of hourly wages, we will compare the three types of wage measures, hourly, monthly and annual

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[76] It would have been fruitful to distinguish between the formal and the informal sector, particularly in the manufacturing sector and in the wholesale and retail trade sector (included in the service sector). Since no such data are available, this is not possible.

[77] The number of hours worked during the week were recorded in intervals, which forced us to take the mid-point in each interval except for the interval, 40 hours or more, where 40 is used. To arrive at hours worked per

wages. The reason for comparing these three measures is that the monthly wage would be the measure with least measurement errors.[78]

The independent variables used for estimating wage discrimination are age, age square, education, region, urban/rural residence, marital status and children. Nationality, being a Namibian or not, is available but there were only about 2 per cent of the adjusted sample that were not Namibians.[79] Further, the few outliers that were found are included, since they had a minor impact on the estimated wage differential components. A more detailed description of the variables is presented below. Also the three sectorss that we are concerned with are described.

Level of educational attainment

This variable measure the highest level attained by the individual. We distinguish between four levels that are recorded in the CSO survey.[80] The first level is *No formal education*, comprising individuals with no schooling or primary school Grade 1. The second level, *Primary education*, includes individuals in Grade 1 to 6. The third level, *Secondary education*, comprises individuals in Grade 7 to 12, where Grade 7 to 9 refers to junior secondary high school and Grade 10 to 12 refers to senior secondary high school. The fourth level *Tertiary education* refers to individuals above Grade 12.[81] *No formal education* is the reference group.

Region

Namibia is divided into thirteen regions. In this study, however, we have divided Namibia into three regions. The first comprises the Windhoek City/Walvis Bay Centre. The second refers to Central/southern regions.[82] The North/north-east regions constitute the third region, which is the reference group.[83] The aim of this division is to capture the 'urban elite' in the first region, while the other two are supposed to capture the differences between

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month we multiplied weekly mid-point hours worked by 4.3.

[78] Wages are only measured as cash wages and the wages in kind that an individual might have received are not considered.

[79] Including this variable did not have any important impact on the measurement of wage discrimination.

[80] See CSO (1996a).

[81] This includes courses of study leading to a diploma or certificate issued by a university, technician or technical institute. University courses leading to first degrees, post-graduated courses leading to post graduate diploma, master degrees, doctorate degrees and teacher training.

[82] The Central/southern region includes Khomas (except Windhoek City), Erongo (except Walvis Bay Centre), Hardap, Karas, Kunene, Omaheke and Otjozondjupa.

[83] The North/north-east region includes Ohangwena, Omusati, Oshana, Oshikoto, Okavango and Caprivi.

central/southern regions and the north/north-east regions.

Urban/rural residence

A dummy variable being 1 if the individual is living in urban areas, and 0 otherwise.

Marital status

A dummy variable being 1 if the individual is married, and zero if not married. Not married includes never married, widowed, separated and divorced individuals.

Children

A question on the number of children was not available in the data, but by means of the variable relation to head of household we have derived the variable children. We created a dummy variable being 1 if the individual has one or more children, and zero otherwise.

Sector[84]

Three sectors are distinguished. Firstly, *Manufacturing*, which also includes individuals working with electricity, gas, steam and hot water supply, construction, and mining and quarrying. Secondly, *Service sector*, comprises individuals working in wholesale, hotels and restaurants, transport, storage and communications, financial intermediation, and real estate, renting and business activities. Thirdly, *Public sector*, comprises individuals working in public administration and defence, compulsory social security, education, health and social work, and other community and social service activities.

Distribution of monthly wages among females and males for the whole sample is shown in Figure A4.1 in Appendix 4.A. We find that most of the individuals have a monthly wage between N$200 up to N$4,000. Figure A4.2 in Appendix 4.A shows the level of educational attainment among females and males for the whole sample. We find that most of the females and males for the whole sample have secondary education. Female seems not to be less educated than their counterparts. Table A4.1 in Appendix 4.B presents means and standard deviations for the variables used in the aggregation of the three regressions as well as for the separately sectors. Worth noticing is the unusually result that the mean values of the females are higher in secondary education than the males. This is also the case for tertiary education in the public sector and in the aggregation of the sectors. In this case, however, we have to keep in mind the restriction that the individuals are part of the labour force and have reported a positive wage. Other available evidence supports our finding that the females have higher levels of education than the males.[85]

4.4 Econometric Considerations

Most of the studies that consider wage decomposition employ the OLS estimator, but if selectivity bias is present OLS estimation leads to biased and inconsistent parameter estimate and this property is carried over to the components of the decomposition. In our case the selection bias concerns possible systematic differences between those individuals that have reported positive wages and those who have not reported any wages. To correct for selection bias, Heckman's (1979) two-stage estimation procedure will be used.

In the presence of sample selectivity the wage differences between males and females using the male wage structure can be expressed as

$$\begin{aligned}\ln \tilde{w}_{\mathrm{m}} - \ln \tilde{w}_{\mathrm{f}} &= (\bar{\mathbf{x}}'_{\mathrm{m}}\hat{\boldsymbol{\beta}}_{\mathrm{m}} + \hat{\theta}_{\mathrm{m}}\bar{\hat{\lambda}}_{\mathrm{m}}) - (\bar{\mathbf{x}}'_{\mathrm{f}}\hat{\boldsymbol{\beta}}_{\mathrm{f}} + \hat{\theta}_{\mathrm{f}}\bar{\hat{\lambda}}_{\mathrm{f}}) \\ &= \bar{\mathbf{x}}'_{\mathrm{f}}(\hat{\boldsymbol{\beta}}_{\mathrm{m}} - \hat{\boldsymbol{\beta}}_{\mathrm{f}}) + (\bar{\mathbf{x}}'_{\mathrm{m}} - \bar{\mathbf{x}}'_{\mathrm{f}})\hat{\boldsymbol{\beta}}_{\mathrm{m}} + (\hat{\theta}_{\mathrm{m}}\bar{\hat{\lambda}}_{\mathrm{m}} - \hat{\theta}_{\mathrm{f}}\bar{\hat{\lambda}}_{\mathrm{f}})\end{aligned} \tag{20}$$

where $\ln \tilde{w}_{\mathrm{i}}$ is the logarithm of the geometric mean of wages, $\bar{\mathbf{x}}'_{\mathrm{m}}$ and $\bar{\mathbf{x}}'_{\mathrm{f}}$ are the vectors of arithmetic means of the regressors, $\hat{\boldsymbol{\beta}}_{\mathrm{m}}$ and $\hat{\boldsymbol{\beta}}_{\mathrm{f}}$ are the vectors of the estimated coefficients. The selectivity effect is captured by $\hat{\theta}_{\mathrm{m}}$ and $\hat{\theta}_{\mathrm{f}}$ which are estimates of $\rho\sigma_{\mathrm{u}}$, ρ and σ_{u} being the correlation between the random error terms in the probit and wage equation and the standard deviation of the error term in the wage equation, respectively. $\bar{\hat{\lambda}}_{\mathrm{m}}$ and $\bar{\hat{\lambda}}_{\mathrm{f}}$ are the means of the inverse Mill's ratios for males and females, respectively. Equation (20) corresponds to equation (7) shown in Section 4.2.1, but here the selectivity term is added.

The question is now how to interpret the selectivity term. Reimers (1983) suggests that the selectivity term is deducted from the observed wage differential. In a resent study, Neuman

[84] See CSO (1996d) for detail codes of the sectors.
[85] See CSO (1995).

and Oaxaca (1997) suggest a new approach of the decomposition issue. This approach decomposes the selectivity term into three components as follows

$$\hat{\theta}_m \overline{\hat{\lambda}}_m - \hat{\theta}_f \overline{\hat{\lambda}}_f = \hat{\theta}_m (\overline{\hat{\lambda}}^0_{fp} - \overline{\hat{\lambda}}_{fp}) + \hat{\theta}_m (\overline{\hat{\lambda}}_{mp} - \overline{\hat{\lambda}}^0_{fp}) + (\hat{\theta}_m - \hat{\theta}_f)\overline{\hat{\lambda}}_{fp} \qquad (21)$$

where $\overline{\hat{\lambda}}_{jp} = \sum_{i=1}^{N_{pj}} \hat{\lambda}_{ijp} / N_{jp}$ and $\hat{\lambda}_{ijp} = \phi(X'_{ij}\hat{\beta}_j) / \Phi(X'_{ij}\hat{\beta}_j)$ for $j = m, f$, $\overline{\hat{\lambda}}^0_{fp} = \sum_{i=1}^{N_{pf}} \hat{\lambda}^0_{ifp} / N_{fp}$ and $\hat{\lambda}^0_{ifp} = \phi(X'_{if}\hat{\beta}_m) / \Phi(X'_{if}\hat{\beta}_m)$.

$\overline{\hat{\lambda}}^0_{fp}$ is the female mean inverse Mills ratio if females face the same selection equation that the males face, where the sub index *p* denotes a positive wage. The first term in equation (21) measures the effects of gender differences in the parameters of the probit selectivity equation on the male/female wage differential. The second term measures the effects of gender differences in the variables that determine whether an individual has a positive reported wage or a non-reported wage. The last term captures the gender difference in the wage response to the having of a positive wage.[86]

4.5 Empirical Results

In this section we present the earnings equation briefly, before moving on to the wage decomposition results. Our investigation of the decomposition components will be considered based on the results from employing OLS estimation. At the end we also consider the decomposition with Heckman's estimation procedure. These decomposition components are compared with those employed by OLS estimation using the male wage structure.

4.5.1 Results of the Earnings Equation

The regression coefficients for the three aggregated sectors using monthly wage as the

[86] In addition to substitute (21) for the last term in (20) to obtain a decomposition of the selection effect. Neuman and Oaxaca (1997) also consider decompositions in which the three selection terms in (21) are allocated to either the discrimination or the endowment components of the wage differential. These latter alternative decompositions will not be considered here, however.

dependent variable are given in Tables A4.2 in Appendix 4.B. The general pattern for the variables age and age square is as expected, i.e. the inverted U-shaped curve indicating that age (a proxy for experience) has a decreasingly positive effect on income. The educational variables also follow the expected pattern, increasing with level of education.[87] In the urban public sector females appear to have higher average rate of return for secondary education.

Living in Windhoek City/Walvis Bay Centre seems to have a positive effect on the income both for females and males. For males there is no significant effect of living in the Central/southern region when we separately analyse the sectors, while there is a significant positive effect for females, but not in the public sector. The average positive effect of living in urban areas is considerable higher for males than for females.

Being married has a significant positive income effect for both males and females, but the coefficient is larger for males than for females.[88] This is, however, not true when we analyse the rural areas, in the public sector, and the aggregation of the three sectors. Having children or not, has significant positive effect on the income for males, but is insignificant in the total and rural public sector as well as in the service sector in urban areas.[89] This variable is not statistically significant in any of the female regressions.

To test whether the parameter values associated with the female data set are the same as those associated with the male data set we apply the Chow-test.[90] This test is applied to all sectors and the aggregation of the sectors. The observed F statistics for urban areas exceed the critical values and we can thus reject the hypothesis that the parameters in the two wage equations are equal. However, for rural areas we cannot reject the hypothesis, since the observed F statistics are less than the critical values.

4.5.2 Results of the Wage Decomposition

Table 4.1 shows the results of the decomposition analysis for manufacturing, services and the public sector as well as the aggregation of the three sectors. Here the discrimination

[87] Note that the parameter estimate of a dummy variable should be calculated as $e^{\beta} - 1$ before interpreting the percentage impact on the dependent variable. See Halvorsen and Raymond (1980) and Kennedy (1981).
[88] Dummy variables for marital status distinguishing between never married, married and widowed were also considered, but the estimated parameters were not statistically significant or only marginally significant.
[89] We also considered the number of children, but there was no change of the result.

component is further divided into the favouritism (overpayment) component (δ_{m*}) and into the pure discrimination (underpayment) component (δ_{*f}). Worth noticing is that we report the anti-logarithms, since the standard errors correspond to the anti-logarithms.

Table 4.1. The Decomposition of the Male-female Wage Differential in Manufacturing, Service, Public and All Sectors (Standard Error in Parentheses).

Sector and type of wage measure	Wage decomposition				
	G	D	δ_{m*}	δ_{*f}	Q
Manufacturing					
Annual wage	0,1263	0,4604	0,0529	0,3870	-0,2288
		(0,3735)	(0,1764)	(0,1613)	(0,0284)
Monthly wage	0,0521	0,3751	0,0443	0,3167	-0,2349
		(0,2758)	(0,1367)	(0,1208)	(0,0228)
Hourly wage	0,0306	0,3675	0,0435	0,3105	-0,2464
		(0,2728)	(0,1350)	(0,1207)	(0,0234)
Service sector					
Annual wage	0,2859	0,3524	0,1264	0,2007	-0,0492
		(0,2060)	(0,1094)	(0,0881)	(0,0264)
Monthly wage	0,2024	0,2873	0,1047	0,1653	-0,0660
		(0,1634)	(0,0887)	(0,0719)	(0,0219)
Hourly wage	0,1273	0,2043	0,0760	0,1192	-0,0640
		(0,1631)	(0,0928)	(0,0732)	(0,0229)
Public sector					
Annual wage	0,2011	0,2856	0,1181	0,1498	-0,0657
		(0,1333)	(0,0636)	(0,0614)	(0,0150)
Monthly wage	0,1110	0,1927	0,0815	0,1029	-0,0685
		(0,1035)	(0,0513)	(0,0494)	(0,0124)
Hourly wage	0,0633	0,1564	0,0667	0,0841	-0,0805
		(0,1127)	(0,0567)	(0,0547)	(0,0137)
All sectors					
Annual wage	0,1450	0,3180	0,1033	0,1945	-0,1313
		(0,1072)	(0,0511)	(0,0490)	(0,0115)
Monthly wage	0,0846	0,2601	0,0858	0,1605	-0,1393
		(0,0846)	(0,0413)	(0,0394)	(0,0095)
Hourly wage	0,0308	0,2122	0,0709	0,1319	-0,1496
		(0,0878)	(0,0440)	(0,0415)	(0,0100)

The calculations in Table 4.1 show that the gross unadjusted wage differential is varying between 3 and 29 per cent in favour of the males, depending on the sector analysed and wage measure used. Comparing the different wage measures it appears that the changes in the components of wage decomposition are larger when using the annual wage measure than when using the other two wage measures. The estimates of the decomposition components using the hourly wage measure are statistically insignificant, except for the endowment component. However, when analysing the aggregation of the three sectors the decomposition

[90] For example, see Green (1993), p. 211.

estimates are significant using the hourly wage. The endowment component (Q), the market discrimination coefficient (D), and the pure discrimination component (δ_{*f}) changes more between the sectors than the favouritism component (δ_{m*}). The endowment component are, however, changing marginally between the service and public sector. The service sector has the highest gross unadjusted wage differential of the three sectors. This might not be unexpected, since the service sector comprises rather different occupational activities by the individuals. This sector may also comprise individuals being part of the informal sector. The results of this sector using the monthly wage measure suggest that the males are overpaid by about 10 per cent and the females are underpaid by about 17 per cent. The female endowment advantage is about 7 per cent. The market discrimination coefficient is estimated to about 29 per cent. The estimated endowment component is statistically significant at the 1 per cent level, whereas the pure discrimination component is statistically significant at the 5 per cent level and the discrimination component at the 10 per cent level.[91]

The manufacturing sector produces the highest figure of the pure discrimination component, regardless of which wage measure used. This high figure might be a result of the low participation rate of females and their occupational distribution in this sector. Note also that this sector produces the lowest gross wage differential, 0.0521, since the female endowment advantage is as high as 23 per cent. A study by Knight and Sabot (1991) analyses discrimination in the urban manufacturing sector in Tanzania. Their results for the discrimination and endowment component using the male wage structure are 0.056 and 0.232, respectively. Thus, the gross wage differential is 0.288. In our case, also using the male wage structure, the Namibian manufacturing sector has somewhat different results. By means of the male wage structure the gross wage differential is 0.0508, the discrimination component 0.3588 and the endowment component -0.3080. The Namibian results show that the males would earn about 31 per cent less than the females if both males and females were rewarded according to male prices. This means that the females would have received about 36 per cent more than they actually received.

In the public sector all estimates of the decomposition are statistically significant, at least at the 10 per cent level, but only when using the annual wage measure. The females are underpaid by about 15 per cent using the annual wage. This figure decreases to 10 per cent

[91] The calculations of the standard errors have been carried out in accordance with the formulas given in Oaxaca and Ransom (forthcoming).

using monthly wage and to 8 per cent using the hourly wage. The latter is, however, insignificant, while the former is statistically significant at the 5 per cent level.

Comparing each separately gross wage differentials with the gross wage differential for the aggregation of the three sectors we only find a large difference between the service sector and the aggregation of the three sectors. However, comparing D, δ_{m*}, δ_{*f}, and Q our results indicate that it is fruitful to separately analyse the sectors. Including occupational dummies into the all-sector regression marginally changed the wage decomposition.[92]

We would expect that the wage structure of the urban areas is different from the rural wage structure, because of differences in economic activities and opportunities, or differences in level of educational attainment. Due to too small sample we are not able to divide the manufacturing sector into urban and rural areas. For the reason we can only analyse the service urban sector. Table 4.2 shows the results of the decomposition by urban and rural areas.

As expected the gross unadjusted wage differential is larger in the urban areas than in the rural areas. The results for the public sector in the urban areas investigating the monthly wage measure suggest that the males are overpaid by about 8 per cent, while the females are underpaid by about 10. The former is, however, insignificant while the latter is statistically significant but only at the 10 per cent level. Moreover, the female wage endowment advantage is about 5 per cent with statistically significance at the 1 per cent level. The corresponding figures in the rural areas are somewhat lower for the two latter components, but insignificant. The female wage endowment advantage is higher in the rural areas than in the urban areas. It is estimated to about 8 per cent, which is statistically significant at the 1 per cent level.

Investigating the aggregation of the three sectors divided by urban and rural areas we find small differences in the components, even in the gross wage differential particularly for the monthly and hourly wage measure. All of the estimates in table 4.2 relating to the urban areas are statistically significant except for the favouritism component when we use hourly wages.

[92] However, the inclusion of the occupational dummies reduced the effect of the educational variable, particularly for the tertiary level. See de Beyer and Knight (1989) for a discussion about the importance to include occupation into the earnings functions.

In this case the estimates suggest that the males are overpaid by 7 per cent and the females are underpaid by about 14 per cent. The market discrimination component is estimated to about 22 per cent and the female endowment advantage is estimated to about 14 per cent.

Table 4.2. The Decomposition of the Male-female Wage Differential in Service, Public and All Sectors by Urban and Rural Areas (Standard Error in Parentheses).

Sector and type of wage measure	Wage decomposition				
	G	D	δ_{m*}	δ_{*f}	Q
Service sector/Urban areas					
Annual wage	0,2949	0,3824	0,1385	0,2143	-0,0632
		(0,2186)	(0,1173)	(0,0901)	(0,0254)
Monthly wage	0,1883	0,2963	0,1095	0,1684	-0,0833
		(0,1727)	(0,0951)	(0,0740)	(0,0213)
Hourly wage	0,1204	0,2206	0,0831	0,1269	-0,0821
		(0,1740)	(0,1001)	(0,0759)	(-0,0224)
Public sector/Urban areas					
Annual wage	0,2173	0,2649	0,1121	0,1374	-0,0376
		(0,1581)	(0,0777)	(0,0722)	(0,0181)
Monthly wage	0,1472	0,2020	0,0867	0,1060	-0,0456
		(0,1282)	(0,0642)	(0,0605)	(0,0155)
Hourly wage	0,0820	0,1478	0,0643	0,0785	-0,0573
		(0,1393)	(0,0710)	(0,0676)	(0,0172)
Public sector/Rural areas					
Annual wage	0,1989	0,3133	0,1248	0,1675	-0,0871
		(0,2390)	(0,1101)	(0,1116)	(0,0280)
Monthly wage	0,0762	0,1672	0,0690	0,0919	-0,0780
		(0,1746)	(0,0865)	(0,0858)	(0,0227)
Hourly wage	0,0530	0,1596	0,0660	0,0878	-0,0920
		(0,1929)	(0,0968)	(0,0940)	(0,0246)
All sectors/Urban areas					
Annual wage	0,1643	0,3341	0,1087	0,2033	-0,1273
		(0,1211)	(0,0588)	(0,0539)	(0,0124)
Monthly wage	0,0936	0,2747	0,0908	0,1686	-0,1421
		(0,0961)	(0,0477)	(0,0438)	(0,0103)
Hourly wage	0,0426	0,2184	0,0733	0,1352	-0,1443
		(0,1000)	(0,0509)	(0,0464)	(0,0111)
All sectors/Rural areas					
Annual wage	0,1014	0,2975	0,0957	0,1842	-0,1511
		(0,2346)	(0,1089)	(0,1133)	(0,0285)
Monthly wage	0,0681	0,2311	0,0757	0,1445	-0,1324
		(0,1816)	(0,0878)	(0,0888)	(0,0233)
Hourly wage	0,0222	0,1900	0,0629	0,1195	-0,1546
		(0,1857)	(0,0925)	(0,0912)	(0,0237)

It is relevant to say something about what variables are contributing to the endowment part of the wage decomposition. In this study we find that education accounts for the highest contribution of the wage differences. Adding more explanatory variables to a model gives a decreasing effect of the educational variable.[93]

We next examine how the choice of estimation method effects the components in the decomposition of the wage differential. Specifically we compare the decomposition resulting from OLS estimation and Heckman's (1979) two-stage estimation procedure.

Table 4.3 reports the results of correcting the male and female wage equations for selection effects for several partitions of the data and for three different wage measures.

Table 4.3. The Significance of Lambda in the Male Regression and Female Regression in Manufacturing, Service, Public and All Sectors.

Sector and type of wage measure	Urban and rural areas		Urban areas	
	Lambda in male equation	Lambda in female equation	Lambda in male equation	Lambda in female equation
Manufacturing				
Annual wage	5% level	Not significant	-	-
Monthly wage	Not significant	Not significant	-	-
Hourly wage	Not significant	Not significant	-	-
Service sector				
Annual wage	Not significant	5% level	Not significant	5% level
Monthly wage	Not significant	1% level	Not significant	5% level
Hourly wage	Not significant	Not significant	Not significant	10% level
Public sector				
Annual wage	Not significant	Not significant	5% level	Not significant
Monthly wage	10% level	Not significant	1% level	Not significant
Hourly wage	Not significant	Not significant	Not significant	Not significant
All sectors				
Annual wage	Not significant	1% level	Not significant	5% level
Monthly wage	Not significant	1% level	Not significant	5% level
Hourly wage	Not significant	1% level	Not significant	1% level

The table shows that the significant selection effects are not occurring at the same time in the male's and the female's equations. Selectivity bias seems to be far more important for females than for males, particularly in the service sector, but also in the case of all sectors. When we consider urban areas we obtain rather similar results.[94] However, in this case selectivity bias seems to be important for the males in the public sector.

In Table 4.4 we compare the results of the wage decomposition components employing OLS estimation and Heckman's two-stage estimation procedure. In line with the results in Table 4.3 for urban and rural areas, we consider only the case of all sectors. The results for the male

[93] Ekström (1997).

[94] We do not consider rural areas, since we cannot reject the hypothesis of that the parameters in the two wage equations are equal.

and female selection, the selection corrected wage and OLS regressions are presented in Table A4.3 and Table A4.4 in Appendix 4.B. The magnitude of the selectivity term decreases when annual wages are used, compared to when hourly wages are used as the dependent variable. The main part of the selection effect turns out to be the result of gender differences in the coefficients of the probit equation (S3). Both methods yield similar results for the endowment component [ln(Q+1)]. Thus accounting for selectivity does not change our results with respect to this component. However, the discrimination component [ln(D+1)] changes quite dramatically when selection effects are accounted for. Comparing the discrimination components from the two methods we find that the selectivity term has captured the largest part of the discrimination component. In the case where we use hourly wages as the dependent variable the discrimination components even become negative. This means that allowing for selectivity females seems to be positively discriminated. This comparison suggests that it is important to account for selectivity bias in those cases where we obtain a significant lambda coefficient. However, a closer investigation of this issue has to be carried out, in order to explain why selection effects do not seem to matter for males.

Table 4.4. Comparison of the Decomposition Components by Employing OLS Estimation and Heckman's Two-stage Estimation Procedure in the Case of All Sectors.

Components of the decomposition	**Annual wage**		**Monthly wage**		**Hourly wage**	
	OLS	**Heckman's estimator**	**OLS**	**Heckman's estimator**	**OLS**	**Heckman's estimator**
ln(G+1)	0,1354	0,1354	0,0812	0,0812	0,0304	0,0304
ln(D+1)	0,3007	0,1460	0,2390	0,0100	0,1910	-0,0563
ln(Q+1)	-0,1653	-0,1687	-0,1578	-0,1563	-0,1606	-0,1598
Selectivity[1]	0	0,1581	0	0,2275	0	0,2465
S1		0,0130		-0,0054		-0,0030
S2		-0,0043		0,0018		0,0010
S3		0,1494		0,2312		0,2485

[1] $S1 = \hat{\theta}_m (\bar{\hat{\lambda}}^0_{fp} - \bar{\hat{\lambda}}_{fp}), S2 = \hat{\theta}_m (\bar{\hat{\lambda}}_{mp} - \bar{\hat{\lambda}}^0_{fp}), S3 = (\hat{\theta}_m - \hat{\theta}_f)\bar{\hat{\lambda}}_{fp}$.

4.6 Concluding Remarks

This analysis has addressed gender based labour market discrimination in three sectors, manufacturing, service and public sector. The aggregation of the three sectors was also considered. We have decomposed the earnings differences into components due to endowment and discrimination differences. The latter component was further divided into a favouritism component and a pure discrimination component when using the OLS estimation.

However, when we compared the results of the decompositions between using OLS estimation and Heckman's estimation procedure we used the male wage structure.

In each of the sectors we have applied three different wage measures as the dependent variable. These are annual, monthly and hourly wages. Our results illustrate that different wage measures yield rather different estimates. The monthly and the hourly wage measures produce the lowest wage differentials. The main differences lies in the favouritism component and the pure discrimination component. The endowment component is fairly constant.

A most interesting finding is that the Namibian females are better endowed than the males, a result manifested in a statistically significant sign on the endowment component. In part, higher levels of education for the females explain the negative sign. With respect to discrimination, the OLS-based results of the analysis of the differences in gross wages between males and females do suggest that females are discriminated in Namibia. Indeed, the fact that the females are better endowed than the males makes the estimated discrimination larger than the gross wage differential. The discrimination effect is reduced when we consider the three sectors separately. It appears that in the public sector the female workers are less discriminated than in the other two sectors. Our results also indicate that the gross wage differential might be higher in urban areas than in the rural areas, because of the fact that females are more productive in the rural areas compared to the urban.

Comparing Heckman's (1979) two-stage procedure with OLS-based results we find that accounting for selection does not affect the endowment component, but do indeed affect the discrimination component. The result indicates the fact that selection bias seems to explain a large part of the discrimination.

Appendix 4.A Figures

Figure A4.1. Distribution of Monthly Wages (N$) among Female and Males for the Whole Sample.

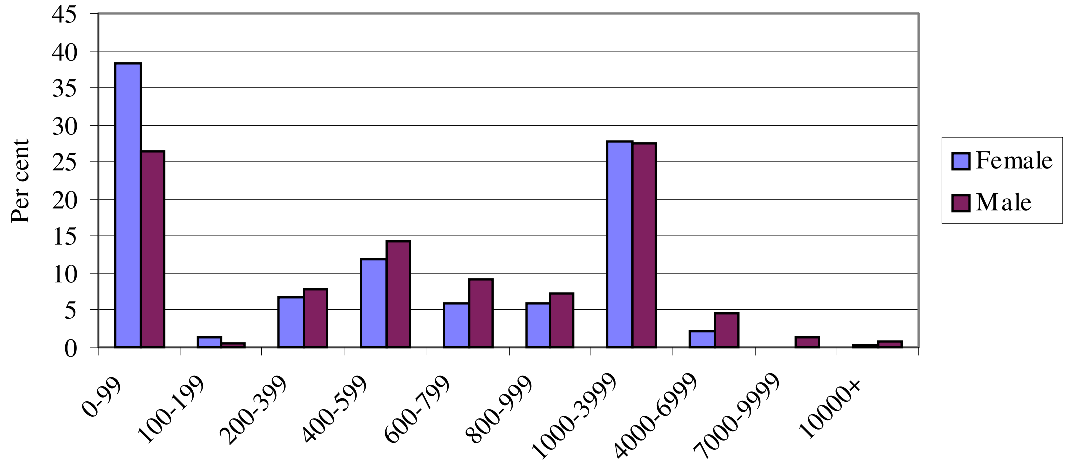
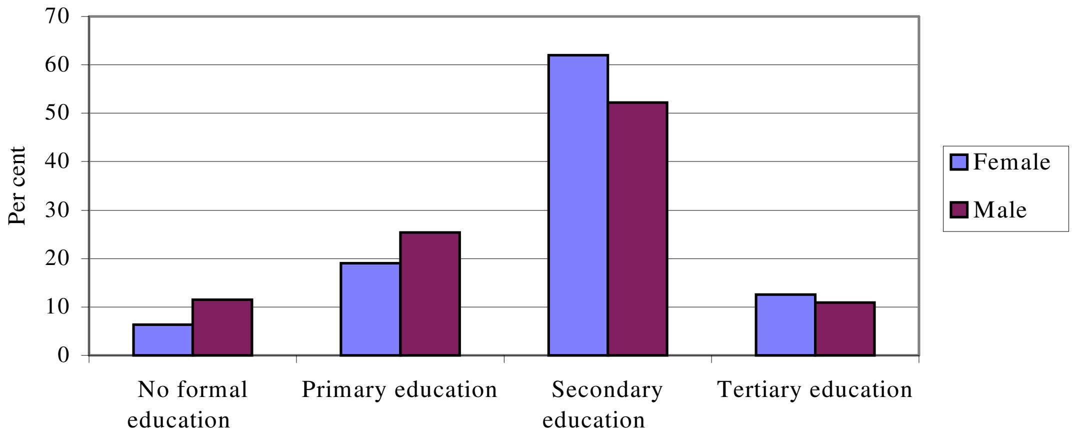


Figure A4.2. Highest Level of Educational Attainment among Females and Males for the Whole Sample.



Appendix 4.B Tables

Table A4.1. Means and Standard Deviations of the Variables.

Variables	Manufacturing				Service sector			
	Females		Males		Females		Males	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Annual wage (natural logarithms)	9,054	8,231	9,173	7,810	9,126	7,291	9,378	7,482
Monthly wage (natural logarithms)	6,758	6,781	6,808	6,755	6,795	6,439	6,979	7,062
Hourly wage (natural logarithms)	1,743	6,589	1,773	6,998	1,796	6,333	1,915	7,066
Age	33,963	72,433	36,419	74,617	31,583	66,553	36,296	76,218
Age square	1259,69	5551,48	1434,05	6016,69	1087,72	4958,24	1434,91	6397,74
No formal education	0,013	0,802	0,126	2,388	0,011	0,717	0,105	2,151
Primary education	0,125	2,325	0,321	3,357	0,049	1,506	0,213	2,877
Secodary education	0,813	2,743	0,513	3,593	0,894	2,155	0,592	3,455
Tertiary education	0,049	1,518	0,039	1,398	0,047	1,477	0,090	2,015
Urban=1 otherwise 0	0,847	2,527	0,761	3,064	0,903	2,069	0,880	2,284
Windhoek City/Walvis Bay Centre	0,118	2,270	0,038	1,377	0,255	3,052	0,175	2,669
Central/southern region	0,776	2,929	0,801	2,871	0,606	3,423	0,676	3,289
North/north-east region	0,105	2,157	0,161	2,642	0,139	2,426	0,149	2,503
Married=1 otherwise 0	0,630	3,394	0,681	3,350	0,480	3,500	0,692	3,245
Children=1 ohterwise 0	0,591	3,456	0,408	3,534	0,520	3,500	0,466	3,507

Table A4.1. Continued.

Variables	Public sector				All sectors			
	Females		Males		Females		Males	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Annual wage (natural logarithms)	9,298	6,078	9,481	7,018	9,218	6,760	9,354	7,466
Monthly wage (natural logarithms)	6,912	5,432	7,017	6,316	6,859	5,937	6,940	6,710
Hourly wage (natural logarithms)	1,941	5,840	2,002	6,707	1,874	6,102	1,905	6,936
Age	35,865	61,426	38,914	81,196	34,261	65,725	37,377	78,142
Age square	1359,23	4740,19	1638,69	6927,91	1259,45	4968,76	1515,7	6527,46
No formal education	0,037	1,362	0,086	2,045	0,026	1,134	0,104	2,191
Primary education	0,129	2,413	0,180	2,795	0,102	2,149	0,234	3,037
Secodary education	0,576	3,554	0,508	3,640	0,704	3,242	0,534	3,578
Tertiary education	0,257	3,144	0,226	3,046	0,168	2,655	0,128	2,398
Urban=1 otherwise 0	0,630	3,473	0,610	3,551	0,741	3,112	0,735	3,166
Windhoek City/Walvis Bay Centre	0,097	2,131	0,088	2,064	0,152	2,548	0,097	2,121
Central/southern region	0,580	3,550	0,561	3,613	0,606	3,470	0,670	3,372
North/north-east region	0,323	3,363	0,351	3,475	0,242	3,041	0,233	3,033
Married=1 otherwise 0	0,558	3,572	0,757	3,122	0,538	3,541	0,715	3,239
Children=1 ohterwise 0	0,678	3,360	0,558	3,616	0,617	3,452	0,484	3,585

Table A4.2. Estimated OLS Regression Coefficients for the Aggregation of the Three Sectors (Standard Errors in Parentheses).[1]

Variable	Total			Urban areas			Rural areas		
	Coefficient for pooled	**Coefficient for female**	**Coeffcient for male**	**Coefficient for pooled**	**Coefficient for female**	**Coeffcient for male**	**Coefficient for pooled**	**Coefficient for female**	**Coeffcient for male**
Intercept	4,3383*	4,0921*	4,4811*	4,7165*	4,3254*	5,0169*	4,0424*	4,0981*	3,982*
	(0,1752)	(0,3307)	(0,2164)	(0,1908)	(0,3937)	(0,2316)	(0,4298)	(0,7393)	(0,5373)
Age	0,0617*	0,0706*	0,0574*	0,0592*	0,0611*	0,0531*	0,0711*	0,0781**	0,0738*
	(0,0086)	(0,0164)	(0,0106)	(0,0091)	(0,0185)	(0,0110)	(0,0221)	(0,0373)	(0,0279)
Age squred	-0,0006*	-0,0007*	-0,0006*	-0,0006*	-0,0006**	-0,0006*	-0,0008*	-0,0009**	-0,0008**
	(0,0001)	(0,0002)	(0,0001)	(0,0001)	(0,0002)	(0,0001)	(0,0003)	(0,0005)	(0,0003)
Primary education	0,1777*	0,0848	0,2131*	0,1596**	0,0015	0,2084**	0,2472***	0,153	0,2623***
	(0,0662)	(0,1673)	(0,0722)	(0,0781)	(0,2275)	(0,0815)	(0,1284)	(0,2665)	(0,1508)
Secondary education	0,7543*	0,7629*	0,7992*	0,6972*	0,7559*	0,7240*	0,9070*	0,7378*	0,9893*
	(0,0609)	(0,1550)	(0,0674)	(0,0722)	(0,2111)	(0,0766)	(0,1174)	(0,2446)	(0,1395)
Tertiary education	1,5015*	1,4127*	1,62*	1,4426*	1,4166*	1,5255*	1,6845*	1,3769*	1,8946*
	(0,0719)	(0,1646)	(0,0847)	(0,0862)	(0,2227)	(0,0977)	(0,1381)	(0,2698)	(0,1725)
Urban=1 otherwise 0	0,1852*	0,0686	0,2373*	x	x	x	x	x	x
	(0,0390)	(0,0632)	(0,0483)						
Windhoek City/	0,9257*	1,0303*	0,9148*	0,8001*	0,9609*	0,7614*	x	x	x
Walvis Bay Centre	(0,0610)	(0,0885)	(0,0820)	(0,0657)	(0,2227)	(0,0849)			
Central/southern regions	0,1902*	0,3137*	0,1243**	0,0299	0,2526*	-0,0948	0,4043*	0,3630*	0,4220*
	(0,0404)	(0,0644)	(0,0505)	(0,0508)	(0,0847)	(0,0614)	(0,0733)	(0,1085)	(0,0966)
Married=1 otherwise 0	0,1993*	0,1351**	0,1524*	0,2096*	0,1691*	0,1491**	0,1154	0,0838	0,0352
	(0,0377)	(0,0529)	(0,0543)	(0,0416)	(0,0606)	(0,0579)	(0,0848)	(0,1154)	(0,1318)
Children=1 otherwise 0	0,0805**	0,0268	0,1767*	0,1151*	0,0295	0,2504*	0,0249	0,0174	0,0751
	(0,0343)	(0,0549)	(0,0446)	(0,0381)	(0,0624)	(0,0485)	(0,0774)	(0,1183)	(0,1027)
R-square adjusted	0,4513	0,4363	0,4849	0,473	0,4495	0,5215	0,3519	0,2974	0,3827
F-statistic	156,4	53,7	114,6	146,3	48,5	114	30,3	9,3	22,2
Number of observations	1890	682	1208	1458	524	934	432	158	274

[1] Monthly wage is used as the dependent variable.
* Indicates that the coefficient is significant at the 1 per cent level.
** Indicates that the coefficient is significant at the 5 per cent level.
x Indicates that the coefficient could not be computed.

Table A4.3. Estimated Regression Coefficients of the Selection Equation (Standard Errors in Parentheses).

Variables	Coefficient for females	Coefficient for males
Intercept	-2,0442*	-1,3297*
	(0,0669)	(0,0471)
Age	0,0405*	0,0527*
	(0,0033)	(0,0024)
Age squred	-0,0005*	-0,0007*
	(0,00004)	(0,00003)
Primary education	0,0702**	-0,0499*
	(0,0320)	(0,0171)
Secondary education	0,6632*	0,1160*
	(0,0306)	(0,0165)
Tertiary education	0,7516*	0,4627*
	(0,0359)	(0,0241)
Urban=1 otherwise 0	0,4762*	0,3146*
	(0,0157)	(0,0123)
Windhoek City/	0,5760*	-0,0280
Walvis Bay Centre	(0,0233)	(0,0198)
Central/southern regions	0,8008*	0,5816*
	(0,0154)	(0,0122)
Married=1 otherwise 0	-0,1171*	0,3231*
	(0,0158)	(0,0142)
Widowed/Separated/Divorced	0,1952*	0,1016**
	(0,0256)	(0,0418)
Children=1 otherwise 0	0,0676*	0,1223*
	(0,0142)	(0,0116)
Service sector	0,0423*	-0,0995*
	(0,0188)	(0,0120)
Public sector	0,9697*	0,5075
	(0,0196)	(0,0130)

* Indicates that the coefficient is significant at the 1 per cent level.
** Indicates that the coefficient is significant at the 5 per cent level.

Table A4.4. Estimated Regression Coefficients for the Aggregation of the Three Sectors (Standard Errors in Parentheses).[1]

Variables	Annual wage				Monthly wage				Hourly wage			
	OLS		Heckman's estimator		OLS		Heckman's estimator		OLS		Heckman's estimator	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Intercept	5,8632*	6,5727*	6,8745*	6,8373*	4,0673*	4,4365*	4,915	4,3261*	-0,6370***	-0,4871**	0,3549	-0,5475
	(0,4003)	(0,2571)	(0,5066)	(0,3918)	(0,3266)	(0,2174)	(0,4138)	(0,3183)	(0,3530)	(0,2337)	(0,4605)	(0,3379)
Age	0,0983*	0,0731*	0,0733*	0,0671*	0,0729*	0,0626*	0,0519*	0,0651*	0,0636*	0,0581*	0,0391**	0,0595*
	(0,0192)	(0,0125)	(0,0205)	(0,0160)	(0,0157)	(0,0105)	(0,0168)	(0,0121)	(0,0169)	(0,0113)	(0,0190)	(0,0126)
Age squred	-0,0010*	-0,0008*	-0,0007	-0,0007*	-0,0008*	-0,0008*	-0,0005**	-0,0007*	-0,0007*	-0,0006*	-0,0004*	-0,0006*
	(0,0003)	(0,0001)	(0,0003)	(0,0002)	(0,0002)	(0,0001)	(0,0002)	(0,0001)	(0,0002)	(0,0001)	(0,0002)	(0,0001)
Primary education	0,1343	0,2529*	0,1191	0,2576*	0,0874	0,2069*	0,0746	0,2049*	0,2143	0,2391*	0,1994**	0,2380*
	(0,2049)	(0,0859)	(0,1161)	(0,0820)	(0,1672)	(0,0727)	(0,0861)	(0,0580)	(0,1807)	(0,0781)	(0,0831)	(0,0623)
Secondary education	0,7576*	0,8901*	0,6224*	0,8740*	0,7631*	0,8218*	0,6498*	0,8285*	0,7817*	0,8505*	0,6491*	0,8542*
	(0,1899)	(0,0799)	(0,1144)	(0,0820)	(0,1549)	(0,0676)	(0,0864)	(0,0624)	(0,1675)	(0,0727)	(0,0885)	(0,0646)
Tertiary education	1,4265*	1,7872*	1,1930*	1,7336*	1,4137*	1,6385*	1,2180*	1,6609*	1,4218*	1,6812*	1,1928*	1,6934*
	(0,2016)	(0,1007)	(0,1451)	(0,1083)	(0,1645)	(0,08512)	(0,1119)	(0,0918)	(0,1778)	(0,0915)	(0,1156)	(0,0990)
Urban=1 otherwise 0	0,0780	0,2667*	0,0122	0,2518*	0,0672	0,2280*	0,0120	0,2343*	0,0899	0,2487	0,0254	0,2521*
	(0,0774)	(0,0575)	(0,0857)	(0,0706)	(0,0631)	(0,0486)	(0,0733)	(0,0608)	(0,0682)	(0,0522)	(0,0777)	(0,0621)
Windhoek City/	1,0002*	0,7819*	0,9072*	0,7967*	1,0266*	0,8834*	0,9486*	0,8772*	0,9706*	0,7594*	0,8794*	0,7560*
Walvis Bay Centre	(0,1080)	(0,0970)	(0,1188)	(0,0996)	(0,0881)	(0,0821)	(0,0983)	(0,0837)	(0,0953)	(0,0882)	(0,1049)	(0,0884)
Central/southern regions	0,3158*	0,0901	0,1282	0,0485	0,3125*	0,0996***	0,1553***	0,1169	0,1726**	0,0122	-0,0114	0,0217
	(0,0789)	(0,0596)	(0,1016)	(0,0829)	(0,0643)	(0,0504)	(0,0876)	(0,0728)	(0,0695)	(0,0542)	(0,0853)	(0,0732)
Married=1 otherwise 0	0,1047***	0,2191*	0,1376**	0,1902*	0,1417*	0,2334*	0,1692*	0,2454*	0,0896	0,2023*	0,1218**	0,2089*
	(0,0626)	(0,0599)	(0,0657)	(0,0722)	(0,0511)	(0,0506)	(0,0543)	(0,0613)	(0,0552)	(0,0544)	(0,0578)	(0,0651)
Lambda	x	x	-0,5461*	-0,1971	x	x	-0,4578*	0,0823	x	x	-0,5356*	0,0450
			(0,1781)	(0,2102)			(0,1461)	(0,1812)			(0,1477)	(0,1913)
R-square adjusted	0,348	0,411	0,358	0,411	0,437	0,479	0,447	0,478	0,377	0,436	0,390	0,436
F-statistic	41,3	94,6	39,0	85,3	59,7	124,1	55,9	111,6	46,8	104,8	44,5	94,3

1 The White (1980) heteroscedasticity consistent variance/covariance matrix is used to obtain corrected standard errors in the selection corrected wage regression.
* Indicates that the coefficient is significant at the 1 per cent level.
** Indicates that the coefficient is significant at the 5 per cent level.
*** Indicates that the coefficient is significant at the 10 per cent level.
x Indicates that the coefficient is not computed.

5 Conclusions

This thesis is composed of two empirical studies on Namibia. The first study investigates the distribution of income among Namibian households and the second examines whether there exists gender discrimination in the Namibian labour market.

The hypothesis of the income distribution study is that differences between educational levels and between urban and rural areas are the most important sources of income inequality in the context of a less developed country. We find that it is important to analyse income inequality by dividing Namibia into two regions, the Central/southern region and the North/north-east region, because socio-economic variables influence income inequality differently in these two regions. According to our estimates of the Gini coefficient income inequality is more pronounced in the Central/southern region than in the North/north-east region. By means of the Theil's entropy index T and Theil's second measure L we show that *within-group* inequality is the main determinant of income inequality in Namibia. Our results support the hypothesis that differences between educational levels are a very important source of inequality.

Regarding *between-group* inequality, we find that the educational level of the head of the household has the largest inequality impact of all socio-economic variables in the Central/southern region, while in the North/north-east region this variable ranks second, after main source of income. Our estimates of the between-urban/rural inequality do not indicate that this dimension contributes very much to total inequality, but it is still significant. We find that main source of income, particularly in the North/north-east region, is more important in explaining the skewed income distribution. Our main explanation for this result is the growing importance of wages as the principal source of income in the North/north-east region, where most of the population formerly has had subsistence farming as the main source of income. In the Central/southern region, the geographical segmentation explains why the main source of income is contributing so much to the income inequality. In this region many different economic activities co-exist, both high-paid jobs and low-paid jobs. The socio-economic variable household composition also turns out to be important, particularly in the Central/southern region. We conclude that Namibia still suffers from a highly unequal distribution of income.

Three hypotheses for the labour market study are emphasised. The first is that males are better endowed, implying that when the gross wage differential between males and females are decomposed into an endowment component and a discrimination component, the former should be positive. The second hypothesis is that we would expect discrimination against females, because of past segregation in the labour market favouring males. Finally, the third hypothesis is that we would expect females to be discriminated less in the rural areas compared to the urban areas, because the labour market in the rural areas is generally more homogeneous than in the urban areas. Our results illustrate that different wage measures yield rather different estimates. The monthly and the hourly wages produce the lowest gross unadjusted wage differential. It appears that females working in the public sector are less discriminated than those in the other two sectors. Our results do not support the first hypothesis of a positive sign for the endowment component. On the contrary, we obtain a negative sign indicating that the females are better endowed than the males. This is because females in Namibia are better educated than males. The hypothesis that females are discriminated is to some extent supported by our OLS-based results, a result manifested in statistically significance in the pure discrimination component. Our results also suggest, and thus support our third hypothesis, that the gross wage differential might be higher in urban areas than in rural areas, because of the fact that females are more productive in the rural areas compared to the urban areas.

Using Heckman's (1979) two-stage procedure, we also investigate to what extent OLS-based results are sensitive to selection bias.[95] We find that accounting for selection does not affect the endowment component, but the discrimination component changes dramatically. This result indicates that selection bias seems to explain a large part of the discrimination component.

[95] We use the male wage structure.

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