AN ECONOMETRIC ANALYSIS OF THE SOCIO-ECONOMIC DETERMINANTS OF HOUSEHOLD EARNINGS IN THE NORTH WEST PROVINCE OF SOUTH AFRICA

AN ECONOMETRIC ANALYSIS OF THE SOCIO-ECONOMIC DETERMINANTS OF HOUSEHOLD EARNINGS IN THE NORTH WEST PROVINCE OF SOUTH AFRICA

BY

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SUMMARY

The majority of households in the North West province of South Africa reside in rural areas and are living in absolute poverty. Knowledge of the determinants of household earnings in the province may inform policies aimed at poverty alleviation (such as expenditure reprioritisation by government) and may assist households' decision making (such as that pertaining to decisions to improve standards and levels of education).

Given the current lack of understanding into the determinants of household earnings and earnings inequality in South Africa in general and in North West province specifically, this study set out to identify the determinants of household earnings in the North West province of South Africa.

In order to identify these determinants, a structured questionnaire was developed. A multi-stage stratified cluster sampling design was used to draw a representative sample of 593 households from North West province. These households were interviewed by a team of enumerators between June and October 1997. The data collected in this manner were supplemented by relevant data pertaining to North West province. These were extracted firstly from the computer data files of the 1993 household survey conducted by the South African Labour and Development Research Unit (SALDRU) and secondly from the October 1995 Central Statistical Services (CSS) survey. Three data sets, for 1993, 1995 and 1997 were thus available for econometric analyses.

Using these three data sets, a standard Mincerian earnings function was firstly estimated to identify the determinants of household earnings. Based on a survey of the theoretical literature, this function was estimated in extended form. Since censored data were used, Heckman's (1976b) two-stage estimation

technique and a double - hurdle model (in which binomial probit models were fitted) were used to obtain unbiased and consistent regression estimates of the coefficients. Secondly, the wage gap decomposition method proposed by Oaxaca and Ransom (1994) was used to estimate the white/African and male/female labour market discrimination coefficients.

The regression results of the extended Mincerian function established that human capital (as proxied by education level and work experience) is the most important determinant of household earnings in North West province.

The other determinants that were found statistically significant in the regressions were the following : squared experience, the interaction of education and experience, the type of industry wherein employed, the nature of the occupation, work hours, the type of area of residence, region, place of work, dependency ratio, a wealth index, marital status, family type, gender, race, employer and former province. Union membership was found to contribute to the segmentation of the labour market in North West province.

The regression results from the decomposition model established that labour market discrimination against Africans do not seem to be statistically significant in North West province. It was however established that there exists labour market discrimination against males. Thus, the current earnings inequalities that exist in the province were found to be basically due to (a) significant productivity differentials between whites and other population groups, and (b) labour market discrimination against males. Labour market discrimination against males may be a consequence of the affirmative action currently being practised in North West province.

It was also established that there exists a significant productivity differential in favour of males. The "productivity differential" established here can be regarded as pre-labour market discrimination (or human capital discrimination) against Africans and females respectively.

It was concluded that efforts by the government of North West province to improve the quality of investment in human capital should be encouraged. Affirmative action without policies to increase the productivity of Africans (especially females) may have only a limited and short-term impact on earnings inequality and poverty alleviation in North West province. Improvements in the socio-economic infrastructure of rural areas, especially those which belonged to the former Bophuthatswana homeland can also be justified on the basis of the econometric results obtained.

CHAPTER 1 :

INTRODUCTION

1.1 PURPOSE AND HYPOTHESES

The purpose of this study is to identify the socio-economic determinants of household earnings in the North West province of South Africa. This may support economic development initiatives in South Africa as it will provide currently lacking information and estimates on a micro-economic level about households in the country.

The hypotheses that provide the points of departure for this study are the following. Firstly, household earnings are a function of human capital endowments (i.e. education and experience), age, marital status, type of area of residence, former province, region, place of work, patterns of industry, nature of occupation, employer, union membership, work hours, workers, male adults, female adults, family type (i.e. extended, nuclear or single family unit) and other family background and home environmental variables (including dependency ratio and wealth index). Secondly, no racial or gender discrimination is currently practised in the labour market of North West province. Political effects on earnings will not be investigated. Also, factors of production, namely land and capital will not be included in the earnings function because it is assumed that only a negligible fraction of the household population of North West province owns them.

Two core concepts from the purpose and hypotheses are households and household earnings. In this study, a household will be defined as a group of persons who live, cook and eat together, or a single person who lives alone and eats independently (Appleton, 1995:3).

Monthly household income and/or expenditure will be used as a proxy for household earnings. Household income will include all types of money received monthly by all the members of the household. It will consist of labour payments (i.e. wage/salary, bonus, sales commission and overtime), income from self-employment, in cash and in-kind income from cropping and livestock husbandry, non-labour monthly income (i.e. interest, rent and dividends) and transfers such as old age pensions and remittances. It is assumed that wages of the individual members of a household constitute a significant part of a household's earnings[1].

1.2 PROBLEM STATEMENT

South Africa's average annual per capita GNP of approximately US $3000 places it in the category of a higher middle-income developing country. However, the country's development challenge is far greater than its average per capita income may suggest. Labour market discrimination during the apartheid years has resulted in the country having one of the highest incidences of income inequality on record in the world, as measured for instance by the Gini-coefficient[2] (Bhorat *et al.*, 1995:1). The incidence of income inequality is most pronounced between race groups, with the average white income estimated

[1] In Africa, the share of income earned in the non farm sector ranges from 22 to 93% of the total rural incomes (in cash and in kind income) – the average is 45% (see Reardon, 1997). It is assumed that the majority of an average household earnings in North West province is earned from labour services because a negligible fraction of the household population owns property.

[2] According to Moll (1995) the Gini-coefficient during the 1980s has remained constant at 0.51 - although between-race inequality declined and discrimination declined during the 1980s and with the abolishment of apartheid, within-race inequality rose (see Moll, 1995; Knight and McGrath, 1987). Whiteford *et al.* (1995) find a Gini-coefficient of 0.68 using

to be almost 11 times larger than the average African income (Whiteford *et al.*, 1995:14).

In addition to inequality between races, there is also a significant spatial or regional dimension to income inequality. In terms of its new constitution, South Africa has nine new provinces. The richest province (Gauteng) has a per capita income that is significantly larger than the poorest province (Northern Province). Table 1 below summarizes the spatial inequalities in South Africa.

Table 1 : Spatial Inequalities in the New South Africa

Province	GGP per capita, 1995 (Rands)	Gini-coefficient 1993	Human Development Index 1991	Unemployment Rate 1995 (%) Males	Unemployment Rate 1995 (%) Females
Northern Province	2721	0.66	0.47	30	52
Eastern Cape	5078	0.65	0.51	36	47
North West	7019	0.60	0.54	25	44
KwaZulu Natal	7345	0.64	0.60	26	42
Free State	9331	0.67	0.66	19	35
Mpumalanga	11401	0.67	0.69	24	48
Northern Cape	11638	0.57	0.70	18	41
Western Cape	16416	0.58	0.83	14	25
Gauteng	23215	0.61	0.81	17	27

(Source of Data : WEFA, 1996 : 41-45)

Table 1 ranks South Africa's nine new provinces in terms of Gross Geographic Product (GGP) per capita. The province with the lowest per capita GDP in 1995 was Northern Province (R2721), and the province with the highest per capita GDP Gauteng Province (R 23215). The degree of spatial

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1991 Census data.

inequality is evident : average income in Gauteng is almost 10 times that of Northern province. Furthermore, indicators of access to education and health, such as the Human Development Index (HDI), is almost twice as high in Gauteng and the Western Cape as in Northern province. Employment opportunities are relatively more abundant in the Western Cape and Gauteng. Table 1 also gives an indication of inequalities between males and females: in all provinces the unemployment rate for females is more than 15% higher than that for males.

The current economic policies of the national government holds the potential to exacerbate spatial inequality. For instance, although it is the provincial governments that are responsible for provision of education, health and welfare services, in terms of Schedule 4 of the new Constitution (adopted 3 February 1997), all of which may lower income inequality, the provinces have little power to tax. Moreover, provinces have been forced to reduce expenditure on education and health due to national government's aim to reduce the budget deficit from its current level of 4.1% of GDP to 3.0% in 1999/2000. Furthermore, the national government has embarked on a substantial tariff reduction programme. Coetzee *et al.*(1997) have used a CGE model to determine that tariff reduction will be likely to impact more negatively in terms of employment and output on those industries (e.g. textiles, clothing, food processing and metal processing) that are relatively more concentrated in poorer provinces such as Northern province, North West and the Eastern Cape[3].

It is thus necessary for provincial governments to formulate their own particular economic development strategies in light of their constraints. This is currently hampered by a lack of reliable data and estimates. One reason for this state of affairs is that the provincial "borders" date back to

[3] These sectors are also the sectors characterised by labour intensiveness, use of relatively unskilled labour, and historically high rates of effective and nominal tariff protection. As argued by Johnson (1997:46) trade liberalisation can increase income inequality since the changes in relative prices caused by it will lead to a shift in the domestic production of tradeable goods away from unskilled-intensive towards skill-intensive goods, which forces unskilled labour to crowd into the non-tradeable sector, thus causing a decline in their relative wages. See also Freeman (1995), Richardson (1995) and Wood (1995).

1994 so that time series or cross-sectional data pertaining to a specific geographical area is still lacking. A second reason is that micro-economic data is almost absent, especially in provinces where large areas of a former "homeland" have been included such as in the North West province. Given the degree of income inequality and the wide differences in economic structure between provinces, it is particularly the lack of micro-economic data and estimates on a household and firm level data for provinces that may be currently constraining policy making towards the alleviation of poverty and inequality.

What is urgently needed are analyses of the determinants of earnings, labour force participation and the impact of labour market and even pre-labour market discrimination on households. There has so far been few attempts in South Africa (let alone the provinces) to analyse these determinants. Relevant previous papers include those of Donaldson (1986), Donaldson and Roux (1990), Hofmeyer (1995; 1997), Moll (1992) and Pillay (1991).

This situation, it is worth mentioning, does not only apply to South Africa. As recently stated by Glick and Sahn (1997:814) there have been "few attempts in the literature to analyse the determinants of labour force participation, sector of employment and earnings in a Sub-Saharan economy." The present study will therefore not only be of relevance to South African policy making and scientific community, but also the international community concerned about Sub-Saharan Africa's economic development.

1.3 MOTIVATION

In light of the development challenge facing South Africa in terms of spatial development and inequality, and the current lack of empirical estimates into the determinants of labour force

participation, sector of employment and earnings in Sub-Saharan Africa, this study will fill a vacuum in terms of policy analysis for poverty alleviation in South Africa.

Unless an environment of rapid and sustainable economic growth coupled with a more equitable income distribution is created in poorer provinces such as North West province, human oriented development may elude South Africans. In line with the national government's Growth, Employment and Redistribution (GEAR) strategy and the Reconstruction and Development Program (RDP), the North West provincial government has adopted a growth and development strategy (known as North West 2001) based on the creation of a climate conducive to private sector investment and human capital development (see SPDU, 1997). According to this strategy, the provincial government intends to create in excess of 40 000 new jobs annually, which requires a provincial GGP growth rate of at least 5%.

It may be argued that for national and provincial governments to design an effective delivery system within the fiscal discipline identified in the GEAR strategy, economic growth and development initiatives ought to be based upon scientifically validated knowledge of the targeted population groups. For policy makers and development agencies, a lack of sound statistical data on household behaviour in the province may be an obstacle in this regard. For instance, it is estimated that the informal sector contributes about 23% to North West's GGP (SPDU, 1997). Much of this takes place within households, but apart from aggregate indications, little significant concrete statistical evidence exists as to how, and why and what types of incomes are earned, why some household members find formal employment and others do not, what the determinants of these earnings are, and how various government policies will affect the earnings potential of the poor.

The last aspect is especially relevant in light of the possibility discussed by Fearn (1981) that government policies may have both negative and positive effects on earnings depending upon changes in the nature of the inputs available for given production functions (e.g. the withdrawal of managerial capital would bring about a negative effect on growth). Furthermore, econometric evidence on earnings determinants may be necessary to understand the causes and nature of income inequalities. According to Fearn (1981), gross earnings differences are often cited as evidence of wide-spread and/or systematic labour market discrimination against persons of a particular population group or gender, especially in South Africa. Such claims may not be convincing unless the many other factors determining earnings differences are accounted for.

Because the present study aims to identify and quantify the determinants of earnings in North West province, it may also inform policy makers as to the causes and nature of income inequalities in the province, and provide suggestions for labour market policies. The results from the study may also be of use to communities, households, businesses and social scientists. The effect of racial and gender differences in the occupational structure of the province's labour force on the size of racial and gender earnings differentials will be examined. The relative importance of the inter - occupational vis-a-vis intra - occupational effects will be evaluated. These results may have implications for affirmative action policies, such as the Employment Equity Bill, which intends inter alia to secure equal pay for the same occupation.

A study by Dolton and Kidd (1994) found that in the United Kingdom, the majority of the male/female earnings differential arises from intra - occupational effects. If this is also valid in South Africa, affirmative action, which aims to change the occupational distribution of female labour may not be effective. It would imply, as in case of white/African earnings differentials in the United States of

America (see Sexton and Olsen, 1994) that differences in human capital acquisition is more of a concern than the market responses to those characteristics.

1.4 METHODOLOGY

1.4.1 The earnings function

The human capital model will provide the theoretical basis for the econometric analysis of the determinants of earnings in North West province (see Mincer, 1974). According to this model, individuals are paid according to their marginal productivity (in a competitive labour market). The standard earnings function proposed by Mincer (1974) is of the following form:

$$InY = \beta_0 + \beta_1 S + \beta_2 X + \beta_3 X^2 + u \qquad (1)$$

where Y is the earnings (for each individual or the average for a group), S is the level of schooling (for each individual or the group average), X is work experience, and $\beta_i's$ are the coefficients and u is the random error that is assumed to be $N(0,\sigma^2)$. β_1 is the "school" coefficient, which is an estimate of the internal rate of return to education (IRR). In this specification it is assumed to be a constant. The coefficients β_2 and β_3 are coefficients for experience and experience squared. They are assumed to be positive and negative respectively. The coefficient for "squared experience" captures the concavity of the observed earnings profile (Willis,1986).

The Mincerian earnings function is often used to estimate an expected lifetime earnings profile for an individual or household of a given educational level with particular experiences. The function is based on the assumption that the worker or household attempts to maximize the present discounted value of lifetime earnings, net of the costs of investment. Maximization takes place subject to constraints of

ability to transform inputs of his own time and other inputs like tuition, into outputs of human capital, and time constraints requiring the individual to allocate time between leisure, learning and working.

Mincer's (1974) earnings function is subject to some limitations (Willis, 1986). Firstly, it assumes that individuals choose to invest in human capital so as to maximize the present value of lifetime earnings. Secondly, concepts underlying the function, such as that of "human capital", "competitive" economic conditions, rate of discount, inputs used in investment (like time and tuition), individual-specific coefficients of the production function representing the interaction between the individual's learning ability, and the home, school and work environment where learning takes place, are not easily observable or quantifiable. Thirdly, the human capital model on which it is based treats human capital as homogeneous units. This may be unrealistic since there are different types of human capital with different levels of productivity.

Despite these limitations the Mincerian earnings function is frequently used in earnings estimation because it approximates the functional form for life cycle earnings and is easy to implement in empirical work.

In the Mincerian earnings function, the importance of education as a determinant of earnings is measured in terms of IRR (see Willis, 1986:529). The IRR is that rate of discount, $\rho(S_1, S_2)$, such that the present values of the earnings streams (net of direct costs of education which are associated with two different schooling levels, S_1 and S_2) are equated. Ideally, statistical earnings function and IRR should be estimated from data consisting of complete longitudinal life histories of the earnings of individuals beginning with their age of entry into the labour force and ending with their retirement.

The data would also provide information about the direct costs of education such as tuition fees and costs of books. Unfortunately such ideal data are not easily obtainable (Willis, 1986:530).

In developing countries, an alternative is to use cross-sectional data. Such data basically contain information on current earnings of people (in the labour force), age, and education. Sometimes data on tuition paid and age of entry into the labour force or age of retirement can only be estimated or assumed. Because of data limitations some assumptions have to be made to facilitate the estimation of the earnings model. For example, it can be assumed that the only cost of education is forgone earnings, that individuals enter the labour force immediately upon the completion of schooling at age t = 6 + s, and that each individual's working life of n years is independent of his years of education. Given the additional assumption of a steady state with no productivity growth, the present value of the lifetime earnings of a representative individual with s years of education, evaluated at the age of school entry, can be calculated as follows:

$$V(s,r) = \int_0^n Q(s,x)e^{-r(s+x)}dx \qquad (2)$$

where $Q(s,x)$, the earnings, are based on the estimated statistical earnings function, s is the years of education, x is the working experience and r is a discount rate. By estimation, $\hat{\rho}(s,s+d)$ is the rate of discount that equates $V(s,r)$ to $V(s+d,r)$ where d is additional years of schooling. This implies that

$$\hat{\rho}(s,s+d) = 1/d\left\{\ln\left[\int_0^n Q((s+d),x)e^{-r(s+d+x)}dx\right] - \ln\left[\int_0^n Q(s,x)e^{-r(s+x)}dx\right]\right\} \qquad (3)$$

In practice, $\hat{\rho}(s, s+d)$ may be unique because the smoothed age-earnings profiles of two schooling groups typically only cross once. Supposing that the rate of growth of earnings at any given experience level is not correlated with the level of schooling, a statistical earnings function

$$Y = Q(s, x) + u \tag{4}$$

can be written as

$$Y = f(s)g(x) + u \tag{5}$$

where $f(s)$ is a function of education and $g(x)$ is a function of work experience, and the present value of lifetime earnings will then be

$$V(s, r) = f(s)e^{-rs}\int_0^n g(x)e^{-rx}dx \tag{6}$$

At a given (or constant) experience level, equation (3) can be written as

$$\hat{\rho}(s, s+d) = \{\ln[f(s+d)] - \ln[f(s)]\}/d \tag{7}$$

Letting d become arbitrarily small, it is clear from (7) that the estimated return to a small increase in schooling above a given level of s is equal to the logarithmic derivative of the statistical earnings function in (5) evaluated at s, i.e.

$$\frac{d\ln Y}{ds} = Q_s(s, x)/Q(s, x) = f'(s)/f(s) = \hat{\rho}(s) \tag{8}$$

where $\hat{\rho}(s)$ is the estimated marginal IRR and $Q_s(s)$ is the partial derivative of the earnings function. According to Willis (1986:532), if the profiles of log earnings with respect to experience of different

schooling groups are approximately parallel, this result would mean that regression methods can be used to estimate the IRR as follows:

$$\begin{aligned} \ln Y &= \ln(f(s)) + \ln(g(x)) + \varepsilon \\ &= b_0 + b_1 S + b_2 S^2 + b_3 X + b_4 X^2 + \varepsilon \end{aligned} \qquad (9)$$

where the $b's$ are parameters and ε is an error term. In this case $\hat{\rho}(s) = b_1 + 2b_2 S$.

In this study education is included in the earnings function firstly as a continuous variable (measured in years of schooling), secondly, as dummy variables and thirdly, as linear splines - including education as a continuous variable (in terms of years of schooling) at different levels of education.

There are six different levels of schooling to be reckoned with, namely, "zero schooling", "sub B to standard 4" (primary schooling), "standards 5-7" (middle schooling), "standards 8-9", "standard 10" (matriculation) and "a professional qualification of a diploma or a degree". Each of these levels of education will form a dummy variable.

Education splines allow the effect of education on earnings to vary. The coefficients on education splines are interpreted in the same way as is a coefficient on a continuous schooling variable, that is, approximately the percentage effect that the variable has on earnings. Moll's (1995) definitions of education splines for three different education levels, namely, primary, secondary and tertiary schooling will be used. The definitions are given in chapter four.

The Mincerian earnings function is also extended in this study to include all other variables that are thought to influence earnings of the people of North West province. These variables will be identified

in chapter three through a socio-economic profile of households in North West province. The dependent variable will be either natural log of "total monthly household income (or expenditure)", "per capita income (or expenditure)", or "hourly gross wage rate", as applied in North West province. Household expenditure is commonly preferred to household income in earnings function estimations because it is likely to be more accurately measured and it may reflect the longer term economic status better, following the permanent income hypothesis (Appleton, 1994:2). Per capita household income (or expenditure) is also thought to be a better indicator of the level of living than total household income (or expenditure) because it takes household size into account (Appleton, 1995:4).

In contrast, Visaria (1980) argues that household expenditure may be a better indicator of the level of living than per capita expenditure because household expenditure implies certain basic establishment costs and formation of assets, some of which are more or less independent of the size of household. Gross pay, rather than net pay, will be used in this study because, in South Africa, the latter does not correctly reflect earnings differentials among individuals - the deductions include, not only income tax and pension, but also other payments such as house bond and car instalments. In case of "total monthly household income (or expenditure)", education will be included in the function either as "total number of years of schooling" for the head of household or as the "total number of years of schooling for all the members of the household" excluding children in school. For the hourly wage rate model, only people who are working full-time and between 15 and 65 years of age will be considered.

Because cross-sectional data will be used, there will be heteroscedasticity and sample selection problems. Heteroscedasticity causes Ordinary Least Squares (OLS) estimates of the coefficients to be inefficient and biased. This problem will be avoided by using the natural log of earnings as the dependent variable in the function.

In order to use the econometric function to estimate the IRR, r, it is assumed that "r" approximates the educational and occupational opportunity set faced by a typical individual *ceteris paribus*. It would then be possible to use it to determine expected life cycle earnings paths for individuals, if they happen to follow particular school or university programs. However, it may be possible that statistical earnings functions do not in fact correctly measure individuals' opportunity sets because certain determinants of earnings such as ability are unobserved (Willis, 1986:534). The incapability of measuring ability causes an upward bias in r because it influences educational investments positively. It is also impossible to observe the life cycle earnings paths of the same individual who has made alternative schooling (or post-schooling) investments. What is possible is to observe the earnings path of a given individual who has chosen (or been assigned) a given level of schooling and any measure of r must then be based on the comparison of the earnings of different individuals who differ in levels of schooling (Willis, 1986:535).

Schooling levels are not assigned at random for each ability group according to an experimental design to make the residual, u, independent of s and x. Nevertheless, it may be assumed that economic agents will select the most preferred alternative from their opportunity set (Willis, 1986:535). If the full opportunity set cannot be observed and opportunities vary across agents, optimal choice implies that market data are systematically censored and there is no guarantee that estimates based on interpersonal differences in earnings and schooling will accurately estimate the opportunity set of any individual in the population (Willis, 1986). This is known as the "self-selection" problem.

1.4.2 Selectivity bias

Individuals and households participate in the labour market only if the market wage offered to them exceeds their reservation wage - the marginal valuation of their time. However, wages are observed

only for those who work. The sample therefore is not random and the use of OLS method to estimate regression coefficients would result in inconsistent and biased results.

In this study, in order to correct for possible selectivity bias[4] two different statistical techniques will be used. The first is Heckman's (1976b) two-stage estimation method. According to this method, labour supply complications are assumed away and individuals already in the labour market constitute the full sample[5].

The second is a "double-hurdle" model. This entails a specification whereby two "hurdles" need to be accounted for in the data. The first is a "labour supply" hurdle (i.e. to take account of individuals and households, which decide to enter the labour market) and the second is an "unemployment" hurdle. This specification provides earnings estimates for those households or individuals who cross both "hurdles" into the restricted or truncated sample of earners that is used. The "double-hurdle model" although statistically the most correct estimation method for the problem at hand suffers from the shortcoming that, information on the unemployment situation in North West province is lost.

1.4.2.1 Heckman's two-stage estimation technique

An example of married women's wage can be used to illustrate Heckman's (1976b) two-stage estimation method as follows (see Maddala, 1986:4). Let Y_1 represent the reservation wage based on a married woman's valuation of time in the household and Y represent the market wage based on an

[4] A simplified example in Falaris (1995, 341) can be used to show why one might obtain biased estimates of the rate of return to education if there is no control for selectivity.

[5] Individuals decide either to join the labour force or not. This is the first hurdle. The second hurdle is when they decide to work for an offered wage rate or when they are offered a job from a (job) queue. There may then be both voluntary and involuntary unemployment. These two types of unemployment may be existing in North West province. The selectivity

employer's valuation of her effort. The woman would participate in the labour market only if $Y > Y_1$. Survey data give observations for women who participate in the labour force, and give no information on those who do not. For these women what is known is only that $Y_1 \geq Y$. Then

$$Y_0 = \beta_0' X_0 + \varepsilon_0 \qquad (10)$$

$$Y_1 = \beta_1' X_1 + \varepsilon_1 \qquad (11)$$

where Y_0 is the observed wage rate, $X_i's$ are personal characteristics, $\beta_i's$ are coefficients, and $\varepsilon_i's$ are $N(0,\sigma^2)$. Wages $Y = Y_0$ are observed if and only if $Y_0 > Y_1$, otherwise wages are equal to zero.

If equation (10) is estimated by the OLS method, inconsistent estimates of the coefficients are obtained due to selectivity bias.

$$E(\varepsilon / Y_0 \geq Y_1) = -\sigma \frac{\phi(z)}{\Phi(z)} + v$$

where $z = (X\beta_0 - X\beta_1)$, and ϕ and Φ are density function and distribution function of the standard normal distribution respectively. Hence, it can be written that

$$Y = X\beta_0 - \sigma_{0\varepsilon} \frac{\phi(z)}{\Phi(z)} + v \qquad (12)$$

where $E(v) = 0$. Selectivity bias can be tested by the null hypothesis that $\sigma_{0\varepsilon} = 0$.

Because ϕ and Φ are not normally known, by using a dummy variable defined as

$$I_i = 1 \text{ if } Y_0 \geq Y_1 \qquad (13)$$

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problem refers to the employed versus unemployed issue.

$I_i = 0$ otherwise

A probit model (see Maddala, 1986) can be estimated to get the maximum likelihood (ML) estimate of β/σ, which consequently helps to get the estimates of the functions ϕ and Φ. The estimate $\hat{\phi}/\hat{\Phi}$ is then used in the place of ϕ/Φ (known as the Mill's ratio and also referred to as the "selectivity-correction" variable) as an independent variable in the earnings function.

Variables that are thought to influence the decision to join the labour market such as wealth index, father's education, socio-economic status based on father's occupation, mother's education, relationship to the head of household, number of brothers and sisters in the family, type of area of residence, and religious preference would be included in the probit model. Sprague (1994) found that excluding the "sample selection effect" in the earnings function appears to be of importance while according to Tannen (1991), the correction does not significantly disturb the differential among schooling levels.

1.4.2.2 The double-hurdle model

In the double-hurdle model labour supply will be defined as a subset of the population consisting of all persons aged between 15 and 65 years who are regarded as economically active. The sample thus consists of individuals who are in employment, those waiting to take up a job, those seeking employment, those who would normally be seeking work but are prevented from doing so by temporary illness and those who are able but not willing to participate in the labour force. Full-time students are not considered to be economically active.

Individuals firstly choose between labour and leisure, that is, between participating in the labour force and not participating in it (i.e. to supply labour or not). Secondly, an individual is chosen from the queue for a job. Unemployment can be either involuntary, when a person willing to work at the going wage rate fails to find a job, or voluntary, when the wage offer is less than one's reservation wage. The double-hurdle model consists of a wage model (Y_1) with two decision functions: the decision of individuals to join a queue for a job (I_1^*) and the decision of employers to draw individuals from the queue (I_2^*). The specification is

$$Y_1 = X_1\beta_1 + u_1 \qquad (14)$$

$$I_1^* = Z_1\gamma_1 - \varepsilon_1 \qquad (15)$$

$$I_2^* = Z_2\gamma_2 - \varepsilon_2 \qquad (16)$$

If $I_1^* > 0$ the individual decides to join the queue for a job, otherwise he/she does not. Likewise, if $I_2^* > 0$, the individual is chosen from the queue for a job. If $I_2^* < 0$ or $I_2^* = 0$ the individual is not offered a job and he/she does not work. This means that Y_1 is observed only if $I_1^* > 0$ and. $I_2^* > 0$ Var(ε_1)=Var(ε_2)=1 by normalization. Cov($\varepsilon_1, \varepsilon_2$) can be defined as ρ. Prob($I_1^* > 0$, $I_2^* > 0$)= Prob$(\varepsilon_1 < Z_1\gamma_1, \varepsilon_2 < Z_2\gamma_2) = F(Z_1\gamma_1, Z_2\gamma_2, \rho)$.

If it is assumed that model (14) is defined only on the sub-population for which $I_1^* > 0$ then, because the distribution of ε_2 that is assumed is considered on $\varepsilon_1 < Z_1\gamma_1$, the likelihood function to be maximized will be as follows.

$$L = \prod_{I=1} [\Phi(Z_1\gamma_1)\Phi(Z_2\gamma_2)] \prod_{I=0} [1 - \Phi(Z_1\gamma_1)\Phi(Z_2\gamma_2)] \qquad (17)$$

Assuming that the two decisions are independent, that is, $\mathrm{Cov}(\varepsilon_1, \varepsilon_2) = 0$ and defining $\lambda_{ij} = \mathrm{Cov}(u_i, \varepsilon_j)$ $(i = 1,2,\ j = 1,2)$, one obtains

$$E(u_1 \mid I_1^* > 0, I_2^* > 0) = -\lambda_{11} \frac{\phi(Z_1\gamma_1)}{\Phi(Z_1\gamma_1)} - \lambda_{12} \frac{\phi(Z_2\gamma_2)}{\Phi(Z_2\gamma_2)} \qquad (18)$$

Preliminary consistent estimates of γ_1 and γ_2 can be obtained by estimating equations 15 and 16 by the probit method. Next, Y_1 is regressed on X_1 and the constructed variables

$$\frac{\phi\left(Z_1\hat{\gamma}_1\right)}{\Phi\left(Z_1\hat{\gamma}_1\right)} \text{ and } \frac{\phi\left(Z_2\hat{\gamma}_2\right)}{\Phi\left(Z_2\hat{\gamma}_2\right)}$$

to obtain consistent and unbiased estimates of coefficients in the earnings function.

In multiple regression analyses one can minimize multicollinearity problems that may be present but this is for various reasons not an altogether satisfactory solution. According to Johnston (1963:250) one major reason for this is that "the data are produced by the functioning of the economic system, and the collinearities reflect the nature of that system". In this study, principal components were used to minimize multicollinearity problems.

1.4.3 Estimation of labour market discrimination

Two types of labour market discrimination can be distinguished. Overt labour market discrimination is defined by Terrell (1992: 391) as "different payment rules for, say, whites and Africans (or males and females) with the same productivity characteristics" or "valuation in the labour market of personal

characteristics of the workers that are unrelated to productivity". Pre-labour market (or human capital) discrimination is determined by differences in the endowments of whites (or males) and Africans (or females). Endowments refer to the amount of human capital (i.e. education and training, and experience) possessed by an individual. Terrell (1992) identifies job characteristics (e.g. private versus public, employer, size or location of firm) as part of such endowments. Both types of market discrimination will be investigated in this study using a method proposed by Oaxaca and Ransom (1994).

The ideal measurement of labour market discrimination should involve both current and lifetime earnings in the calculations. According to Jenkins (1994) the measurement and analysis of earnings discrimination should take into consideration the complete distribution of discrimination experienced. Jenkins (1994) compares the conventional method that uses "potential work experience" (which is equated to age minus the years of full-time education as a proxy for actual experience), and "imputed experience" (predicted from a cross-section probability-of-employment equation with adjustments for secular trends in participation which may be a superior proxy for actual experience) with his distributional discrimination analysis (i.e. actual experience). Jenkins (1994) finds that the "imputed experience" and "actual experience" estimates of discrimination are similar and each is different from "potential experience". Jenkins (1994) criticizes the use of an "average earnings differential" to measure discrimination and develops new distributional approaches to supplement those currently being used. These new approaches cannot be used in this study as they require time-series data.

The measurement of the relative importance of the two sources of earnings differentials, overt labour market discrimination and differences in endowments, will be done by firstly estimating separate semi-log earnings models for whites (or males) and Africans (or females). Overt discrimination will then be measured as white-African or male-female differences in the returns to human capital. The differences

in the distribution of whites and Africans or males and females across the human capital categories capture the portion of the earnings differentials accounted for by the differences in endowments. Part of this portion may be considered to arise from pre-labour market discrimination.

Terrell (1993) used an earnings decomposition method similar to that of Oaxaca and Ransom (1994) to decompose the earnings differential between the public sector and the private sector in Haiti. She established that the most important factor that causes earnings differentials is a premium or rent, which is the differential in the base wage (constant terms). Lindauer and Sabot (1983) also found that differences in the constant term rather than differences in coefficients, was the most important cause of public - private earnings differentials in Tanzania. By using the same method, Appleton (1995:24) found that an over-rewarding of male endowments accounts for about 21% of the gender earnings gap in Uganda.

The following is the conceptual framework of the approach according to Oaxaca and Ransom (1994):

The gross (unadjusted) wage differential can be defined by

$$G_{wb} = W_w / W_b - 1 \qquad (19)$$

where W_w is the wages of whites and W_b is the wages of Africans. In the absence of labour market discrimination, the white/African wage differential would only reflect productivity differences denoted

$$Q_{wb} = W_w^0 / W_b^0 - 1 \qquad (20)$$

where 0 denotes the absence of labour market discrimination.

The market discrimination coefficient, D_{wb} can now be defined as the proportionate difference between $G_{wb}+1$ and $Q_{wb}+1$, that is

$$D_{wb} = \left(W_w W_b - W_w^0 / W_b^0\right) / \left(W_w^0 / W_b^0\right) \qquad (21)$$

Equations (18), (19) and (20) result into the following logarithmic decomposition of the gross wage differential:

$$\ln\left(G_{wb}+1\right) = \ln\left(D_{wb}+1\right) + \ln\left(Q_{wb}+1\right) \qquad (22)$$

One can further partition the discrimination coefficient into white overpayment and African underpayment components as follows:

$$\begin{aligned} \ln\left(D_{wb}+1\right) &= \ln\left(W_w / W_b\right) - \ln\left(W_w^0 / W_b^0\right) \\ &= \ln\left(W_w / W_w^0\right) + \ln\left(W_b^0 / W_b\right) \\ &= \ln\left(\delta_{w0}+1\right) + \ln\left(\delta_{b0}+1\right). \end{aligned} \qquad (23)$$

where $\delta_{w0} = W_w / W_w^0 - 1$ is the differential between whites' current wages and the wages that whites would receive in the absence of discrimination and $\delta_{b0} = W_b^0 / W_b - 1$ is the differential between the wages Africans would have received in the absence of discrimination and the current wages of Africans. On substitution of (23) into (22) a more informative decomposition of the gross wage differential is obtained:

$$\ln\left(G_{wb}+1\right) = \ln\left(\delta_{w0}+1\right) + \ln\left(\delta_{b0}+1\right) + \ln\left(Q_{wb}+1\right) \qquad (24)$$

Using OLS estimation, the decomposition proceeds by estimating the following linear equations:

$$\ln(W_w) = X'_w \beta_w \qquad (25)$$

$$\ln(W_b) = X'_b \beta_b \qquad (26)$$

where W is the geometric mean wage, X' is the vector of mean values of the independent variables, and β is the conforming vector of estimated coefficients considered.

The gross wage differential in logarithms can be written as:

$$\begin{aligned} \ln(G_{wb} + 1) &= \ln(W_w / W_b) \\ &= \ln(W_w) - \ln(W_b) \\ &= X'_w \beta_w - X'_b \beta_b . \end{aligned} \qquad (27)$$

A further decomposition can be written as:

$$\ln(G_{wb} + 1) = X'_w(\beta_w - \beta^*) + X'_b(\beta^* - \beta_b) + (X_w - X_b)' \beta^*, \qquad (28)$$

where β^* is the estimated non-discriminatory wage structure. The first term on the right hand side of equation (28) is an estimate of the white wage advantage, $\ln(\delta_{w0} + 1)$, the second term on the right is an estimate of the African wage disadvantage, $\ln(\delta_{b0} + 1)$, and the third term on the right is an estimate of the productivity differential, $\ln(Q_{wb} + 1)$. The problem is to seek some representation of the competitive wage structure, which can be written as:

$$\beta^* = \eta \beta_w + (1 - \eta)\beta_b , \qquad (29)$$

where η is a weighting matrix. An OLS criterion to estimate the non-discriminatory wage structure from the pooled sample of whites and Africans (or males and females) proposed by Neumark (1988) will be used in this study in chapter four. In this case, the equations that will be estimated can be written as:

$$\beta^* = (X'X)^{-1}(X'Y) = \hat{\beta}, \qquad (30)$$

where X is the observation matrix of independent variables, Y is the observation vector containing the natural logarithm of the wage rate, and $\hat{\beta}$ is the OLS estimate obtained from the pooled sample of whites and Africans (or males and females).

1.4.4 Sources of data

Three different samples are used in this study, namely an own sample gathered during 1997, the SALDRU sample dating from 1993 and the CSS sample from 1995.

1.4.4.1 Own sample

Multi-stage stratified cluster sampling was used to select a sample of households for an own survey[6]. Stratification helped to draw an effectively representative sample from the population of the enumeration areas (EAs) of various magisterial districts in North West province and to reduce the standard error of the estimators by forming the strata as homogeneously as possible. However, some magisterial districts in North West province (e.g. Ventersdorp, Temba, and Brits) did not have complete lists of well established EAs in which case cluster sampling had to be used.

The sampling stages were as follows. Firstly, the information of EAs obtained from the government Department of Finance and Economic Affairs (statistics section) in Mafikeng served as a basis for the sample survey framework. Regions formed strata at the first stage of stratification. One, two or three

[6] See Stoker (1984) for details of this sampling method.

magisterial districts were then randomly selected from each of the five regions of North West province - drawing proportionately more districts in larger regions (i.e. proportional stratified sampling). For instance, since Klerksdorp region (with 6 districts) is larger than the Eastern region (with 3 districts), more districts were drawn from Klerksdorp than from the Eastern region. Three and two districts were selected from Klerksdorp and Eastern region respectively.

During the second stage, magisterial districts formed the strata. Clusters were then formed within magisterial districts according to geographic areas, degree of urbanization (i.e. city, town and rural areas) and socio-economic classes (which were judged by housing standards). The size and geographic distribution of households were also taken into account. A sample of non overlapping clusters was then drawn with approximate probabilities proportional to the sizes of the clusters. Finally, a sample of households was selected within clusters using systematic sampling. The number of households interviewed in each cluster (i.e. urban, semi-urban or rural) varied according to the total number of EAs it had. For instance, in the Kudumane magisterial district most of the EAs were in the rural areas cluster, so that most households interviewed in Kudumane district were rural households.

About fifty households were randomly selected from each magisterial district, with the exception of Mmabatho, which outweighed the other districts in terms of the number of EAs. For Mmabatho district, a total of 85 households were interviewed. The magisterial districts, which were included in the sample were: Kudumane and Huhudi in Huhudi region; Mmabatho, Delareyville and some parts of Lichtenburg in the Central region; Wolmaranstad, Ventersdorp and Potchefstroom in Klerksdorp region; Rustenburg in the Rustenburg region; and Brits and Temba in the Eastern region.

The personal interview method with a questionnaire[7] was used. Households were physically visited and persons were interviewed at their houses. Farms, hospitals, hostels and defense force camps were not included in the sample. Four postgraduate students from the University of North West were used as enumerators. These students were given training prior to the survey. A pilot survey was done as part of their training. The pilot survey also served to test the questionnaire. A letter of introduction of the survey to the respondent accompanied the questionnaire. The letter is included in Appendix B. The title of the research project and a notice declaring "confidential information to be used for research only" were displayed on the first page of the questionnaire.

The survey was conducted on weekends since the enumerators had to attend classes on weekdays and this was the time when respondents could most likely be found at home. The survey took three months, from June to October 1997. While in field, the enumerators were supervised by the author.

A total of 593 African households consisting of 2 900 persons were interviewed across North West province. Some questionnaires were incomplete so after preparing the data set for analysis, only 561 households with 2 878 individuals were finally used in the econometric analyses. Of these, 1 309 (45.5%) were males and 1 569 (54.5%) were females; 1 044 (34.5%) resided in urban areas, 769 (26.%) in semi-urban and 1 154 (39.30%) in rural areas.

One limitation of the survey is that some male heads of the households that were interviewed resided at their places of work in urban areas and were at home only on weekends and public holidays. This may have distorted the household expenditure figures.

[7] A copy of the questionnaire is included in appendix B.

1.4.4.2 The SALDRU sample

The SALDRU sample data set was obtained from the Southern African Labour and Development Research Unit (SALDRU) household survey, which was conducted by SALDRU, University of Cape Town, on people's socio-economic characteristics throughout South Africa in 1993. Only household data pertaining to North West province were used in this study. The sample consisted of 703 households with 3 342 persons. Of these persons, 1 666 (49.8%) were males and 1 676 (50.1%) were females and 2948 (88.2%) resided in urban areas while 394 (11.8%) resided in rural areas. The sample comprised 3 092 (92.5%) Africans, 2 (0.1%) coloureds, 1 (0.0%) Asians and 247 (7.4%) whites; 62.5% resided in the former Bophuthatswana homeland, while 3% and 34.5% resided in the former Cape and Transvaal provinces respectively. Almost all whites who were included in the sample resided in the former Transvaal and Cape provinces.

The following shortcomings of the SALDRU sample should be noted:

Firstly, the SALDRU data set is outdated. The survey was conducted before major political changes took place in South Africa. Particularly, the data were collected before the new provinces came into being. Secondly, the data may be biased in that the majority of households included in the sample were residing in urban areas. For instance, it is estimated from the sample that 89% of the population of North West province resided in urban areas, which is not accurate when compared to the findings of the 1997 census. Thirdly, one could conclude that valuable information is lacking, such as the source of earnings, place of work, actual work experience and marital status of households. Certain other information cannot be extracted from the processed data, such as "number of sons and daughters of over 15 years of age" and parent's occupation and education. Fourthly, the observations for some sub-groups are too few for a precise analysis and so the sub-groups had to be combined to form a dummy

variable. For instance, in the earnings function, the "indust3" dummy variable includes "manufacturing, electricity, water and gas, construction, trade and repair, transport, storage and communication, finance and community social service" industries. Ideally, each of these industries should have been included in the earnings function as a separate dummy in order to minimize the standard errors of the estimates of the regression coefficients. Finally, the SALDRU survey data does not allow one to alter the structure of the dummy variables.

1.4.4.3 The CSS sample

South Africa's Central Statistical Services (CSS) conducts annual surveys on socio-economic characteristics of households across South Africa. The North West province data used in this study were extracted from the most recently available at the time of writing, namely the October 1995 household survey. The sample consisted of 2 354 households which contained 10 495 persons. Of these 4 971 (47.4%) were males and 5 524 (52.6%) females; 797 (7.6%) resided in urban areas, 80 (0.7%) in semi-urban areas and 9 602 (91.6%) in rural areas; 8 735 (83.2%) were Africans, 566 (5.4%) coloureds, 195 (1.8%) Asians and 1 002 (9.5%) whites.

The following shortcomings of the CSS sample should be noted:

Firstly, as pointed out by Hofmeyr (1995:552), the CSS imputes a precise figure (the midpoint of the interval earnings) for those respondents who reported their earnings within an interval. According to Hofmeyr (1995:552) this reduces the data's utility for earnings-function studies. Secondly, certain variables that may be important determinants of household earnings are not included. For instance, data on land and other fixed assets, source of earnings, place of work and informal sector are not collected. It is also complicated to extract some other necessary information such as household

income, household expenditure, male adults and female adults in a household. Thirdly, the data were collected one year after major political changes had taken place and by this time many new government policies and programmes including affirmative action policies may not have been sufficiently implemented. Fourthly, the data do not provide sufficient flexibility for changing the structure of dummy variables in the earnings function.

1.5 OUTLINE OF THE STUDY

In chapter two an overview of the determinants of household earnings, labour market participation and wage discrimination are given. This chapter forms a framework for the socio-econometric profile of households in North West province in chapter three and the background against which econometric analysis in chapter four will be done. It is the chapter in which a priori theoretical expectations and functional specifications regarding the relationships between household earnings and other variables are established.

Chapter three provides a socio-economic profile of households in North West province as compiled from own and existing data sources, namely, SALDRU, and CSS. In this chapter, descriptive statistics concerning households in the province will be presented which will help to check the data for errors and the assumptions for the econometric methodology which will be used in the regression modelling in chapter four. The data will be checked for outliers and the statistical information will indicate the correlation structure among the socio-economic characteristics of households in North West province. The theoretical correlation structure of the variables as discussed in chapter two will then in a way be illustrated.

Chapter four contains the methodological description and results of an econometric estimation of the determinants of household earnings. The nature and extent of labour market discrimination will also be estimated.

The econometric results and its implications are interpreted and discussed in chapter five. The purpose of this chapter is to check the validity of the theories discussed in chapter two regarding the relationships between household earnings and other socio-economic variables. In other words, the a priori expectations will be cross - checked with the results of the econometric analyses of earnings determination. Chapter six contains a summary, and evaluation of the study and recommendations for policy making.

CHAPTER 2

OVERVIEW OF EARNINGS DETERMINATION AND WAGE DISCRIMINATION

2.1 INTRODUCTION

As motivated in the previous chapter, an econometric analysis of the determinants of household earnings in South Africa, particularly on a provincial level, could contribute towards policy making to alleviate poverty and reduce spatial inequalities in South Africa. Such an econometric analysis was argued in chapter one to be specifically relevant for North West province since it is one of the poorest provinces in South Africa and suffers from a lack of data on a micro-level about households' determinants of earnings, labour participation rates and the effect and existence of economic discrimination. In light of this, the purpose of this study was identified to be an econometric analysis of the socio-economic determinants of earnings in South Africa's North West province. This analysis is to be based on three household surveys : a survey conducted in 1993 by SALDRU, the 1995 October household survey of the CSS, and a specially designed own survey conducted by the author and a team of enumerators during 1997.

The econometric analysis and the design and interpretation of the survey data will proceed within the existing theory on the determinants of earnings and earnings inequality, as well as the documented experiences of other countries with household surveys. The purpose of this chapter is therefore to provide an overview of the theory and literature of earnings determination and earnings inequality. It establishes the necessary background against which the socio-economic profile of households in North

West province can proceed in chapter three, and against which the econometric analyses and interpretations of chapters four and five would be conducted.

The chapter will proceed as follows. In section 2.2 the marginal productivity theory is discussed. This is followed by a presentation of the human capital model and structure of household earnings in section 2.3. Section 2.3 also identifies determinants of earnings other than human capital. In section 2.4 labour market discrimination that gives rise to earnings inequality between population groups and genders is set out. Section 2.5 contains a summary.

2.2 THE MARGINAL PRODUCTIVITY THEORY[8]

There are different schools of thought on how earnings structures of households within a society are determined. According to the marginal productivity theory, wages are determined by the combination of the demand and supply of labour in a perfect competitive economic environment.

The demand for labour is assumed to be derived from the price of the product made utilizing labour. The demand curve for labour is downward sloping at both the firm level and industry level reflecting diminishing marginal returns. Aggregating the labour demands by firms yields the total labour demand functions by occupations. A rise in wages causes a substitution effect against labour, and a scale effect through decreased profits. These effects work in the same direction to decrease employment at the level of the firm, and the industry. The supply of labour comprises the population and capacities, together with the hours of effort and intensity of effort provided by that population. The supply functions of hours of effort by individuals, when aggregated, may yield a backward bending supply

[8] This section is based on Addison and Siebert (1979).

curve because of the dominance of income over the substitution effect. The supply of hours offered by individuals depends on the wage adjusted for changes in commodity prices; and the movements in this real wage determine the employee's choice between work effort and leisure through the substitution and income effects. It is thought that individuals are at best, suited to a limited number of occupations because of natural and contrived barriers to mobility (e.g. innate ability and education respectively) over a wider range (Addison and Siebert, 1979).

The demand and supply curves jointly determine the equilibrium wage and the level of employment of a particular occupation. The factors of demand for labour are favourable resources, skill, management, capital and technology because they determine marginal productivity of labour. For supply of labour, they are the size of population, labour force participation rate, average number of hours of work per year, the quantity and quality of effort and skill of labour and immigration. Because of limited opportunities for transference of individuals between occupations, the more immediate adjustments to equilibrium proceed chiefly through demand. Individuals apply the principle of equal net advantage to the choice of occupations, although emphasis is often placed upon the natural and contrived barriers to mobility.

From a micro-economic point of view, marginal productivity is thought to determine a firm's level of employment, and not the wage rate. The wage rate can be taken as given, being determined exogenously by aggregate forces such as the industry's supply and demand, government minimum-wage legislation, unemployment and the duration of unemployment, movements in the retail price index and cost of living[9]. Employment can then be adjusted so as to bring labour's combination of

[9] Time series data or data for different provinces are required to be able to estimate the effects of some of these determinants of earnings. For this reason, estimation of these effects is beyond the scope of this study. It should also be

various forces including demographic forces, and aggregate marginal product, into equality with the wage. It is at the macro-economic level, where the marginal product principle can determine the general wage rate through the demand and supply of labour.

The marginal product theory has been criticized because in practice, wages do not exhibit the degree of flexibility it implies, due to labour market imperfections, such as gender and racial discrimination and those caused by institutional forces. On the supply side, wage flexibility is often compromised due to bargaining by union organizations. The assumption of profit maximization is not valid either, in some instances, like in the public service sector. Some economists argue that money wage cuts cannot be a cure for unemployment. According to Addison and Siebert (1979) it is thought that money wage cuts might reduce the effective demand for commodities, which is detrimental to the economy. Addison and Siebert (1979) state that labour supply is the outcome of household decision making, and must consequently be treated integrally with household consumption behaviour.

Another school of thought believes that wages are a product of social, political and institutional forces. Developments in the neo-classical theory have introduced "uncertainty" in the wage calculus. Becker's (1975) human capital model is one of the most widely adhered to theories on which many studies of earnings determination are based. The model shows how net, or observed pay levels may be determined. It is this theory, in combination with the standard microeconomics theory of rural households, on which the present empirical study is based.

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noted that there seems to be a consensus among economists that it is only the short term unemployment that affects wage levels negatively (see Manning, 1994).

2.3 THE HUMAN CAPITAL MODEL

2.3.1 The concept of human capital

The stock of knowledge, skills and capacities (including health) embodied within a population or household constitutes its human capital. Human capital development is the process whereby the knowledge, skills and working capacities of a nation are improved. Human capital is analogous to physical capital and commands a potential monetary value. There are three basic aspects of human capital that may be distinguished, namely; (a) education and experience, (b) medical care, and (c) migration.

The first aspect, education and experience, takes place in three different ways. Firstly, formal education, which takes place in a planned way at recognized institutions such as schools, colleges, technikons, and universities. Secondly, non-formal education which also proceeds in a planned and structured, but highly adaptable manner in institutions, organizations and situations outside the spheres of formal and informal training (e.g. in - service training in the work situation). Thirdly, informal education and experience which are gained by households through situations in life that occur spontaneously in the household, community, and the neighbourhood. Often it is limited to improvement of skills (e.g. woodwork and knitting).

The second aspect, medical care and health, can increase a person's or household's productive capacity in that, healthy and strong persons are more productive than when suffering from illness.

A third aspect, migration, refers to individuals who migrate in search of more highly remunerated occupations and cheaper commodities, or opportunities for improving their household's level of

human capital. In this study, the emphasis falls on formal education and training and is accordingly a partial treatment of human capital formation.

According to the human capital model (Carling *et al.*, 1985:6) "Those who have been trained more, either at school or on the job, have incurred foregone earning costs. Their productivity will also have increased which enables them to be paid more, assuming that earnings equal marginal product. The amount that productivity and earnings must increase will be determined by the foregone earning costs of training. Since this cost is regarded as an investment, the extra payment should be just enough to secure the same return on the investment as on a comparably risky physical capital investment"[10].

Two key assumptions of the human capital model are that individuals and households will invest in human capital so as to maximize the present value of lifetime earnings, and that they will be paid according to their marginal product. Education and other forms of human capital can increase productivity by generating new ideas and techniques that can be embodied in production equipment and procedures, and by equipping workers to utilize the production techniques among customers, workers and managers (Schultz, 1989; Cooper and Cohn, 1995). Karodia (1996) claims that the level of education is an important indicator of the level of development and affluence of a society. For the purposes of this study, education in years of schooling is taken as the measure of human capital investment.

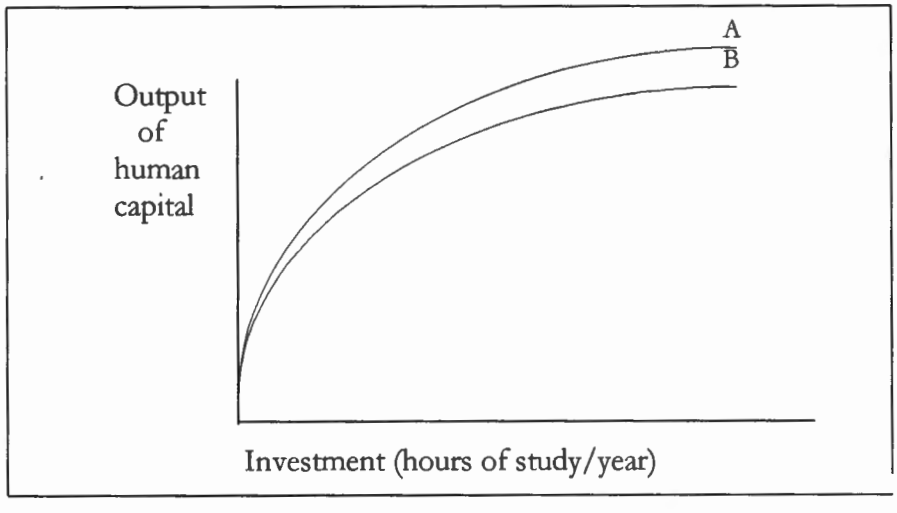
Natural ability is often regarded as a factor affecting the output associated with a given level of human

[10] It should be noted that there are no earnings forgone by attending early school at ages of less than 15, when, according to one of the assumptions of this study, individuals have not yet entered the labour market.

capital. More able or talented people are assumed to accumulate human capital at a higher rate than the less able, assuming that all other factors affecting education (such as home background, quality of schools and teachers, and other educational facilities such as books and transport to school) are held constant. It may thus be also assumed that there are diminishing returns to educational investments due to fixed brain capacity. This implies that when one plots human capital against educational investment (in terms of time actually spent on learning), on the horizontal axis, one gets a curve with a decreasing gradient as shown in **figure 1** below.

In **figure 1**, individual A is assumed to be more talented than individual B, so that his output curve is above that of B. The problem of finding an appropriate measuring unit for human capital output can be overcome by using estimates of marginal rates of return to education based on lifetime earnings streams, as a proxy for it (though earnings are also influenced by factors other than education).

Figure 1: The human capital production function



(Source: Carling et al.,1985: 11)

Plotting IRRs against years of schooling can therefore result in a human capital demand curve. The curve is negatively sloped because of the assumed diminishing returns to investment in education and

training. The position of the human capital curve depends on the innate abilities or talents of the individual or household in question. With a given amount of time and money devoted to educational investment, more able people produce more human capital and are consequently characterized by a more productive capacity and higher IRR than the less able. This implies that every individual has his or her own human capital demand curve.

On the supply side, household circumstances (i.e. household preferences and resource constraints) are a major factor of human capital investment as they determine the accessibility of schooling as far as financing education is concerned. Poor households, on average, do not normally invest much in education because it is difficult for them to avail or borrow money for human capital investment for the following reasons. Firstly, education is expensive (in the sense that the marginal utility the poor people attach to a Rand spent now, is higher than the present value of the future return that would be realized from it in case the Rand was invested). Secondly, human capital, unlike physical capital, cannot be separated from the owner. Thirdly, educational investments are indivisible (for instance, it is not feasible for one to invest in a fraction of a school course). Households with cheaper funds tend to invest more in human capital and for a given capacity to benefit from the investment, they obtain higher returns for human capital than others (Carling *et al.* (1985).

A human capital supply curve can be drawn by plotting costs of funds, the interest rates that must be paid for different amounts of educational investment (or alternatively, if a household is already endowed with these funds, the rates used would be the interest one could obtain on a comparably risky physical capital investments) against the amounts of schooling. The supply curve for human capital would reflect the availability of finance for educational investments. It would slope upwards because the marginal costs of borrowing (or abstaining from present consumption) is likely to increase as more

and more investment is undertaken, and its position would depend on the household's credit status and wealth. Lower income households would be associated with a leftward shift of the curve.

The intersection points of demand and supply curves of human capital would determine equilibrium rates of return and education investments for individuals. Because households have different demand and supply curves of human capital, partly depending on the factors discussed above, they may have different optimum rates of returns to human capital investment. Individuals and households would invest in human capital up to the point where its marginal IRR equals the marginal cost. Human capital investments and earnings also vary according to the correlation between human capital demand and supply conditions of individuals. For instance, Becker (1975) argues that, if the correlation were perfect and positive all the variation in earnings would be explained by investments in human capital. The smaller this correlation, the less the variation in earnings explained by the investments, and the more the earnings would vary among persons making the same investment.

The effect of government subsidy for education is to decrease the variation in the supply schedules and hence a bigger part of the difference in educational attainments would be brought about by differences in demand for education, which depends on natural ability. This means that, a subsidy would decrease the variation in earnings differentials and so narrow the differences in the IRR assuming that other factors affecting earnings are held constant.

2.3.2 Earnings structure

2.3.2.1 Human capital

The application of the human capital model to a household's earnings structure can be illustrated through an example (see Carling *et al.*, 1985). Consider two types of workers, namely unskilled and skilled labour. Assume that the unskilled worker enters the labour market at the age of 15 with a subsistence wage of R5 000 per annum on average throughout his life span and the skilled worker enters it with a university degree at the age of 21. The subsistence wage is determined exogenously, perhaps by government minimum wage legislation. Given the unskilled labour wage, it is possible to determine the university labour wage. The equation to be used is derived in its simplest way as follows. A wealth - maximizing individual is thought to compare the present value of the cost, C, with that of the revenue, R, from the extra year of education and training obtainable for the whole of his working lifetime (after training) before she decides on further education. If the latter outweighs the former, she goes for further training, otherwise she does not. The present value of the return from the extra year of education and training can be calculated as:

$$R = \sum_{t=1}^{n} k_t (1+i)^{-t} \qquad (31)$$

where k_t is the expected earnings increment in the t working year resulting from the extra schooling, i is the rate of discount, the rate of return available from the best alternative investment and n is the length of working life after leaving school. If i is taken as the market rate of interest, then the individual should invest if $R>C$ Alternatively, an internal rate of return r, can be computed where r is that rate of discount which equates R with C, that is,

$$C = \sum_{t=1}^{n} k_t (1+r)^{-t} \qquad (32)$$

and in this case, the individual should invest if $r>i$. The individual will end up investing in increased schooling until $r \approx i$. If the earnings increment is assumed to be constant, k, for each time period then the above equation simplifies as

$$C = \frac{k\left(1-(1+r)^{-n}\right)}{r} \qquad (33)$$

For large n it even becomes simpler as

$$C = \frac{k}{r} \qquad (34)$$

It can be shown then that a larger C calls for a larger k and the smaller is the required rate of return r. Also, the larger n is, the larger C will be. This demonstrates a key proposition of the human capital model namely that human capital investment becomes less worthwhile as one ages (if k is constant - but it may not be). In equilibrium, $r \approx i$; then, if i = 10 percent,

$$r = 0.1 = \frac{k}{(6 * 5000)} \qquad (35)$$

and hence,

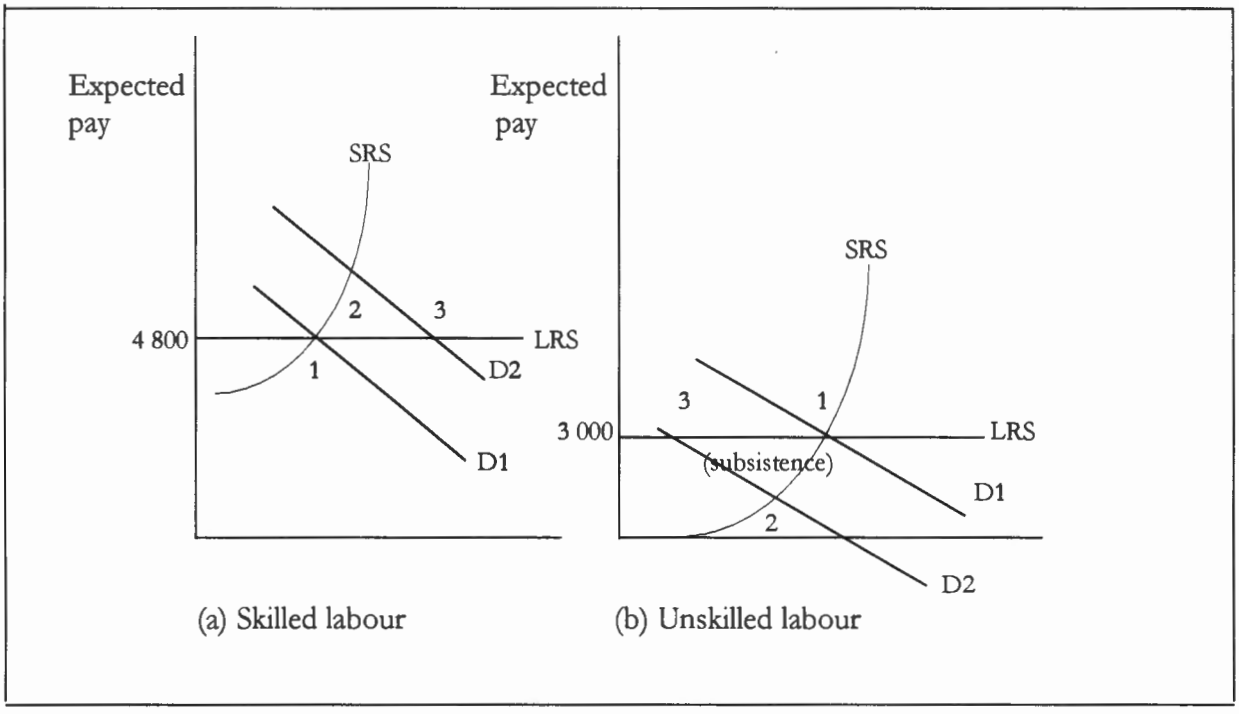
$$k = \text{R3 000 annum.} \qquad (36)$$

The result contained in (36) implies that given that the unskilled worker earns R5 000, the university graduate must earn R8 000 on average over his working lifetime in order for him to demand training. This assumes that there are no consumption benefits of education. This also implies that in order for both categories of workers to be equally satisfied with an interest rate of 10 percent, the unskilled worker must earn only 60% of the skilled wage.

The expected pay of a potential worker with a particular skill is determined by the intersection of the labour demand and supply curves assuming ideal competitive conditions. The equilibrium quantity of labour is determined by the price of that labour, namely the real wage relative to the price of a substitute, usually physical capital. In a long run competitive equilibrium, the relationship between lifetime earnings and schooling is such that the supply and demand for workers of each schooling level are equated and no worker wishes to alter his or her school level. As shown in **figure 2** below, skilled labour is expected to earn R4 800 per annum in equilibrium. If the demand for skilled labour increases, the demand curve 1 in figure 2 will shift rightwards. In the short run, the earnings of skilled labour will increase to **2**. However, in the long run, more and more people will be trained (assuming no restrictions on entry into the relevant training institution) and the labour market will experience an increase in skilled labour which will eventually force the equilibrium pay down to R4 800.

The increased demand for skilled labour will be accompanied by a decreased demand for unskilled labour as the desire for unskilled labour by the employers will decline (i.e. demand curve shifts to the left in figure 2) to result in a lower expected pay 2. A complication may arise if unskilled labourers are not permitted to earn less than R3 000 per annum say by minimum wage legislation. Unemployment of unskilled labour will then increase in this presentation. The increased probability of unemployment will reduce unskilled labourer's expected pay. The consequence will be a tendency for unskilled labour to move into the skilled labour market through training (Carling, *et al.*, 1985:9).

Figure 2: Determinants of the earnings structure



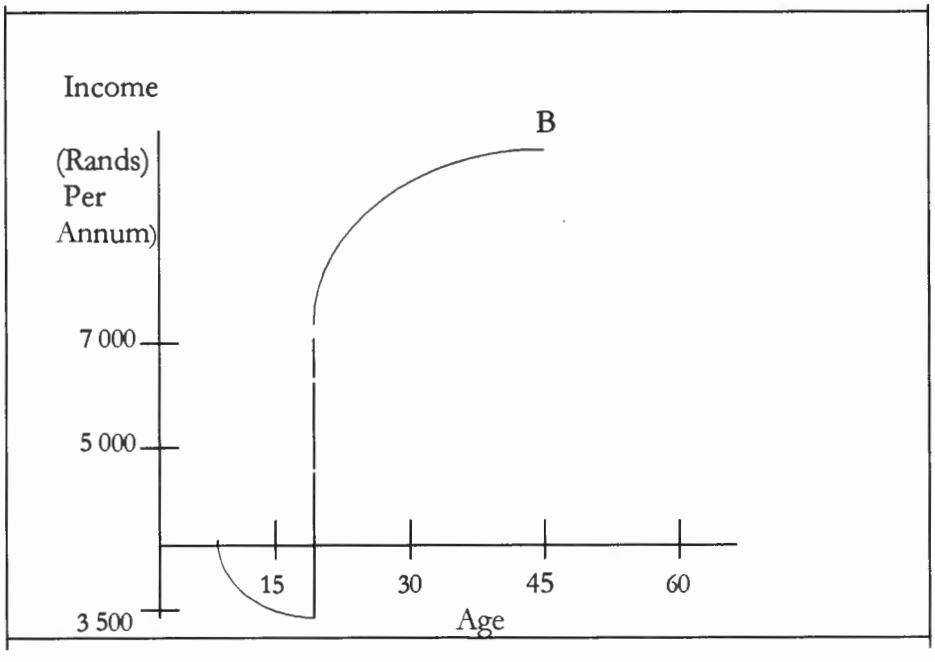
(Source: Carling et al., 1985:9)

2.3.2.1.1 Age-earnings profiles

Age-earnings profiles are determined by plotting mean or median earnings against ages. Their characteristics can be illustrated using Ben-Porath's (1967) example. During childhood (phase one), an individual's time is all devoted to human capital accumulation through formal education. Phase two starts when the individual graduates from school and stops investing all his potential earnings in human capital accumulation, spending only a fraction of his time, which somewhat reduces current earnings. This would for instance be the case when an individual takes a lower paying job in exchange for its further educational opportunities in order to raise expected future earnings.

Phase three starts when the individual is facing his retirement age and when investment in human capital accumulation becomes less worthwhile. During this phase, a smaller fraction of earning capacity is invested and so the stock of human capital grows at a slower rate. The growth of earning capacity and observed earnings declines and the two differ by an ever decreasing amount of time devoted to human capital accumulation. Eventually, investment in human capital will no longer offset depreciation and the stock of capital with its earning capacity will begin to shrink. For a few years further observed earnings will continue to increase as the reduction in the earnings foregone to accumulate human capital offsets the shrinkage of earning capacity. But eventually, the observed pay declines too. The theory is illustrated in **figure 3** below.

Figure 3: Hypothetical figure for lifetime earnings



(Source: Trotter, 1984:7)

In **figure 3** the individual devotes all his time to human capital production while at school. His last cost of education is R3 500 per annum. On leaving school, his starting pay is R5 000 per annum. The pay

grows to a peak at point B then goes down when he or she is about to retire. It has been shown empirically that, in general, the higher the education attainment the steeper the rise in earnings throughout the early phase of working life; usually the higher the starting pay, the later the year at which maximum points of the profiles are reached and the higher the retirement earnings (Blaug,1970).

2.3.2.1.2 Private rates of return to education

Private IRR relates the benefits which an individual receives from an educational program to the costs incurred by him personally in obtaining the education (Trotter, 1984). Post tax earnings are used. For perfectly competitive economic conditions, the private IRR to all forms of investment in human capital would be equalized, suitably compensated for risk; any discrepancy would mean inefficiency in the allocation of private resources. In reality such conditions do not exist and so the rates cannot be equal for all. Hence the need for IRR analysis which helps to give an indication of the appropriate direction of change in educational investments. The analysis should not be expected to indicate exactly the incremental magnitudes required (Trotter, 1984).

2.3.2.1.3 Social rates of return to education

One would not expect equality of social rates of return on various forms of investments even in a perfectly competitive situation due to, say, existence of externalities, the payment of public subsidies, and the non-maximizing behaviour of the state (Trotter, 1984). The comparison of the rates corresponding to various levels of education and other types of capital (including physical capital) would indicate the appropriate direction of change in a particular type of investment though without giving any indication of the incremental magnitudes required. To calculate the social IRR, pre-tax earnings replace post-tax earnings. In this case the cost of education, in addition to an individual's

private costs, involves all forms of government spending for educational facilities such as public subsidies, teachers' and administrators' salaries, school buildings, construction and maintenance, the provision of equipment and all other educational services.

Willis (1986) argues that if a tax is proportional, the use of post-tax earnings does not affect the IRR if there are no fixed costs (e.g. tuition). Part-time earnings of university students tend to offset the bulk of direct costs of college education and training so that direct costs can be ignored without significantly affecting the estimated IRR, as in this case, private and social rates of return to education should be equal.

2.3.2.1.4 Use of rates of return to education

A country should endeavour to allocate its scarce resources efficiently so as to achieve the highest rate of economic growth possible, taking into consideration objectives of equitable income distribution given technological endowment and constraints. In order to promote the economic development of a country educational and economic development planning is needed. King and Lillard (1987) found evidence that education policies in a country significantly influence education levels and the relative distribution of schooling among its population groups.

According to the human capital model, educational planning may have significant implications for people's earnings differentials and a country's income distribution in general (Becker, 1975). One way to conduct educational planning is by using the social IRR. This depends on the demand for skills, provided labour markets exist and function efficiently. For instance, the IRR analysis can be used to estimate full employment equilibria for labour with various educational levels, given projections of demand and supply of labour.

By using IRRs, a country can obtain information relevant to questions as to which direction and approximately what quantities of resources to allocate to education. For instance, if the IRR to primary education were higher than that of secondary education, it would be more efficient to spend relatively more on primary education. Also if the overall IRR is higher than the rate of return to physical capital investment the country should put more emphasis on human capital investment. Blaug (1970) argues that the private IRR can be an important tool to use in educational planning of a country if parents and students are keen about job opportunities and career prospects associated with various amounts and types of education. For instance, if the private IRR on a university degree is higher than the return parents can generate from some other comparably risky investment, then there will be a higher demand for the degree education and the government concerned will have to plan for future education accordingly.

Major alternatives to cost-benefit analysis in educational planning are the manpower requirements and the linear programming approaches. The manpower requirements approach is normally preferred by politicians and laymen to the cost-benefit analysis approach because the former is simple to formulate and understand, and appears to give exact figures. The data base for it is also relatively easy to generate. However, the cost-benefit approach would be preferable for a proper educational planning since its rival (i.e. the manpower requirement approach) does not consider the returns and costs of education (Blaug, 1970).

2.3.2.1.5 Evidence on rates of return to education

In South Africa, cost-benefit analysis has been used to investigate the role of education in the determination of earnings (e.g. Joubert, 1976; Vasar, 1980; Trotter, 1984; Donaldson, 1986; Serumaga-

Zake, 1990; Moll, 1995). The following are results from such studies for South Africa and other countries.

Joubert (1976) calculated the private IRR for coloureds, Asians and whites for the years 1960 and 1970. He combined male and female earnings together in the analysis. He found that in 1960, private rates ranged from -8% for whites holding diplomas, to 142% for coloureds with standard 10 certificates; whereas, for 1970, the range was from -9% for Asian diploma holders to 56% for coloureds with standard 10 certificates. Over the period between the years, some rates increased while others decreased. The reasons for the changes in the rates were not given by the author. For instance, it was revealed that, on average, the Asian private rates increased from 10% (in 1960) to over 15% (in 1970).

Vasar's (1980) survey dealt with IRR for Asians holding a three year teaching diploma. His results were as follows. Private rates were 14.8% for males and 20.3% for females. The corresponding social rates were 10.9% and 15.7% respectively.

In the Durban metropolitan region, Trotter (1984) conducted a survey and calculated males' social IRRs. His findings indicated that primary education was the most profitable investment for Asians, whereas it was standards six and seven for coloureds. Unlike other population groups, whites had an unusual pattern of increasing social IRRs for increasing levels of education. The rates ranged from 3.4% for Africans to 22.1% for coloureds for standards "6-7" level of education. For all population groups except coloureds, the rates of return to the highest school standards exceeded that of the middle standards (six and seven). On average, the IRRs fell to a minimum at around standards "6-7" then rose again with higher standards. Overall rates were 13.4% for whites, 14.0% for Asians, 14.2% for Africans, and 15.7% for coloureds.

Donaldson's (1986) Transkei survey for Africans indicated that the social rates for males ranged from 6% for people with standards "5-6" to 37% for matriculants after standardizing for ability and some other factors. The primary education (i.e. standards 2-4) rate was 9%. The rates followed the usual pattern of falling around standard seven, then rising with higher educational levels. For females, the range was from 8% for standards "2-4" to 28% for standard 10. In this case, the pattern of the rates was that they increased with levels of schooling.

Serumaga-Zake (1990) found that in South Africa, private IRR of African males was about 16% at primary level and 24% for secondary schooling. Corresponding social rates were about 6% and 15% respectively. The return estimates for females showed negative rates up to standard four with a private rate and social rate of -1% and -4% respectively. For standards "5-7", a private rate of 12% and a social rate of 4% were recorded whereas for the remaining school phases private rates of about 32% and social rates of about 15% were estimated. The study indicated that education is a major determinant of earnings for Africans.

According to Moll (1995), an increase in education by one year of schooling causes earnings to raise by between 3% and 30% depending on the sub-sample.

Thias and Carnoy (1972) used the IRR approach to determine the importance of education in determining income differentials in Kenya. By using male earnings, they found that there was a positive correlation between education and earnings such that those who were educated earned more than those who were not. They also found that primary and secondary education were the most profitable educational investments with private rates of more than 50%. The rates to standards seven and eight were the lowest at about 10%. The patterns of social and private rates were similar. For social rates, university education had the lowest IRR due to a significant government subsidy. They

corrected the rates for taxes, socio-economic factors, examination performance, mortality, union membership, public employment and education certificate effect.

In Venezuela, Psacharopoulos and Steir (1988) found that between the years 1975 and 1984, the IRRs decreased by 2 percentage points because of a rapid expansion in education. They argued that increased supply of educated persons contributed to the narrowing of earnings differentials and hence to a more equitable income distribution.

Psacharopoulos (1973) compared IRRs for a number of countries and some of his findings were as follows. Primary education was the most profitable educational investment, followed by secondary education. The high return to primary schooling was due to the interaction between the low costs of the education relative to the other levels of education costs and the substantial productivity differential between the illiterates and primary school graduates. Returns to particular levels of education also varied with average per capita incomes of countries. For instance, the returns to any level of education was typically higher in Africa and lowest in the advanced industrial countries. In all countries and levels of education, private returns exceeded social returns because education is publicly subsidized. Private distortions in the IRR results were greatest in the poorest groups of countries and in the higher levels of education. Returns on educational investment in the competitive economic setting exceeded those in the non-competitive sectors by about three percentage points, suggesting that the earnings of workers in the non-competitive sector cause the rates to be underestimated. The inclusion of public sector earnings in particular, because of a policy of equalizing pay scales, flattens the mean earnings differentials and hence depresses the returns to education.

Psacharopoulos (1973) found that women in most countries tend to earn, on average, less than men. However, because the rate of return is a relative concept, it could be the case that returns on

investments in women's education may exceed that of men in some cases. Psacharopoulos (1973) further found that in developing countries, the IRRs tend to be higher than the rates of return on physical capital investment. In developed countries the converse was found. Psachalopoulos (1973) claims that this advantage of developing countries over the advanced ones diminished from the 1960s to the 1970s following the relatively larger physical investments in the developing countries.

Ryoo *et al.* (1993) argue that there are some exceptions to Psacharopoulos' observations: private and social rates of return to lower levels of schooling may decline more than those to higher levels of schooling over time, especially during periods of rapid and sustained industrialization such as that occurred in Korea. For instance, Ryoo *et al* (1993) found that university education has relatively high and rising private and social rates. Trotter's (1984) rates for whites, female rates in the case of Donaldson's (1986) study and those of Tannen (1991) were also lowest for primary education. Ryoo *et al.* (1993) also found that social rates are higher than private rates, particularly for junior college and college education.

2.3.2.2 Other determinants of earnings

2.3.2.2.1 Motivation

Household earnings are thought to be affected by many variables other than education and training, and experience such as ability, traditions, nepotism, job entry restrictions, politically administered pay scales, former province, home background and environmental variables (such as households size, social class, characteristics of the head of household, parents' education and wealth index), type of area of residence (basically urban - rural segmentation), population group, gender, place of work, economic

status, industry, occupation, employer, motivation, union membership, mortality rate, migration and medical care.

Some of these variables affect earnings directly; others may affect an individual's educational achievement and therefore affect earnings indirectly. There are variables, which are interrelated, and those, which may have a two-way causation effect with earnings. Some variables are made known through others. There may be both negative and positive correlation between education, other variables and earnings. Hence, both multicollinearity and causation problems might occur during estimation.

Multicollinearity will cause OLS regression coefficients to be insignificant due to causing large mean square errors. In this study multicollinearity problems were dealt with by employing principal components. The causation problem could not be solved, urging caution in the interpretation of the results.

In this section, some socio-economic variables other than education that are thought to influence household earnings in North West province , and that ought to be included in an earnings function, will be discussed.

2.3.2.2.2 Home environmental variables

In rural areas of developing countries, the family plays an important role in the economic decision making process, hence variables such as gender of the household head, parents' education, household wealth, family size, labour force participation rate and family structure are thought to influence

earnings (see Ellis, 1993; Gabriel and Cornfield, 1995). Appleton (1995:39) found that in Uganda, earnings of female headed households are generally lower than those of male headed ones, while parents' education is positively correlated with earnings.

According to Gabriel and Cornfield (1995), a wealth index (or class standing) may reflect the amount of cultural capital and other resources that are available to the family member which can facilitate his/her search for a lucrative job. In this study, the imputed rental value or the value of the dwelling in which a household lives is used as a proxy for "wealth index". The variable is expected to be positively associated with earnings. Gabriel and Cornfield (1995) argue that the effect of wealth index in developing countries should be higher in urban areas than in rural areas because intangible resources such as cultural capital are less relevant in rural areas to find a higher paying job where manual jobs predominate and land is an important family resource.

Gabriel and Cornfield (1995) define labour force participation rate as the proportion of the respondent's family members, excluding the respondent himself or herself, who receive earnings, and household earnings as the monthly per capita family earnings. They argue that both labour force participation rate and household earnings are considered to be negatively related to individual's earnings because greater economic activity of one's family members allows the respondent to devote more time to non-work activities which lead to lower earnings.

According to Gabriel and Cornfield (1995) relatively high labour force participation rates are expected in rural areas because of lower rural unemployment rates, the greater family cohesion and possibilities of mutual aid within rural families, and the tendency of rural families to function as institutions of production and consumption in the highly seasonal, labour intensive rural economy (where family income may be maximized by the number of family members). The more traditional the family

structure and one's structural position are, the more prestige the individual will possess and the higher will be his or her income.

One way of standardizing earnings for family background is to include the variables mentioned above plus others such as "availability of a local school where one grew up" in the earnings model. Some of these variables will be used in the econometric analysis in chapter four as a proxy for the "household background" variable. Heckman and Hotz (1986), Lam and Schoeni (1993) and Krishnan (1995) found that "household background" plays a significant role in determining earnings. According to Heckman and Hotz (1986) home environmental variables represent the ability and out of school investment factors. Heckman and Hotz (1986) also state that household background reflects the return to a household's connections (or social capital) such that individuals with superior background obtain the most lucrative occupations. For instance, a better educated father may be able to guarantee access to occupations in the formal or government sector for his children. However, Heckman and Hotz (1986) argue that if the labour market is imperfect, or if the costs of acquiring information about occupations and vacancies are lower for parents from a better background, the significance of household background in earnings models no longer reflects productivity on the occupations.

A third explanation for the significance of household background as determinant of household earnings is that it may be due to measurement problems. Schooling could be measured with error and family background is correlated with "true" schooling. Hence, the inclusion of family background in the set of independent variables would bias estimates of returns downwards and may have a significant direct effect on earnings.

Krishnan (1995) found that the impact of family background on earnings became insignificant once selectivity bias was accounted for, and that correcting for the process of selection into employment

(see section 1.4.2.2) allows a clear and unambiguous interpretation of the usual impact of family background on earnings.

While some factors affecting earnings can be held constant by econometric methods, it is not possible to remove all the effects of ability and family background; these variables are believed to play a significant role in earnings determination (e.g. Hause, 1978:131; Becker, 1975:158). Although the effect of ability on earnings have been estimated by using I.Q. scores, Taubman (1978) mentions that such allowance for ability does not reduce the IRR significantly. Ability comprises two components, namely, genetic and acquired ability. The former is hereditary whereas the latter is determined by the home and other environmental variables such as occupation of the father, parents' education and facilities like quality of local school, some of which make up the social class of an individual (Blaug, 1970). As one ages, acquired ability may further increase.

Wolfle and Smith (as quoted by Blaug, 1970) studied the annual salaries of 3 000 males who had graduated from high school in three American states in 1930 and established that the effect of college education on earnings was larger for those from rich families and with superior I.Q.s at high school level. High school graduates with fathers in top occupation positions earned more than those with fathers in lower positions. This correlation was more significant at the college education level.

According to Blaug (1970) this study was criticized because it used I.Q. scores at high school level when the tests themselves were thought to have been influenced by previous education. On the basis of Wolfle and Smith's survey, Denison (1967) concluded that about 66% of the variance of gross earnings differentials between college and high school graduates is attributable to education and only about 33% to ability and environmental variables.

2.3.2.2.3 Former province

North West province comprises parts of the former Cape and Transvaal provinces of the Republic South Africa and parts of the former Bophuthatswana (Bop) homeland. In 1993, when the SALDRU survey was conducted, the Cape and Transvaal areas were still provinces of South Africa while Bophuthatswana (Bop) was still a "homeland". The purpose of the "former province" variable (in this study) therefore is to measure the effect of a whole socio-economic infrastructure on household earnings as by 1993 the Bophuthatswana homeland and South Africa were still regarded as two different sovereign states. Bophuthatswana was boasting about its quality education, and was generally producing good matriculation results. On the other hand, it was being alleged that in rural areas, people did not have the necessary socio-economic infrastructure to facilitate economic development. The general impression was that the former provinces of South Africa had better socio-economic facilities than Bophuthatswana.

2.3.2.2.4 Area of residence

Urban and rural segmentation is thought to be an important determinant of earnings in developing countries because the societal functions, economic strategies and labour supply behaviour of the household vary across urban and rural segmentation (Gabriel and Cornfield, 1995). Household economic strategies are thought to involve the choices households make for the present as well as future needs.

Gabriel and Cornfield (1995) argue that the continued contacts between the urban sector and western world through, say, international trade, has led to the infusion of western capitalistic values such as individualism, a work ethic, profit motive and personal accomplishment resulting in unevenness in

cultural traditionalism and in turn generating urban/rural differences in household characteristics, family labour-supply behaviour and consequently the determinants of earnings. For example, urban women tend to be better educated and participate in the labour market more actively than those in the rural sector. Urban households approximate individualistic consumption units while rural households may approximate collective production units.

The basic social and economic unit in South Africa is the nuclear family composed of the father, mother and married or unmarried children. There are also extended households, that is, a number of inter-related persons mainly with direct blood ties living together, as well as, in rare cases though, single person households (Kalule-Sabiti, 1995). In Africa, extended households are common especially in rural areas. However, due to financial constraints and influences from the west, societies have recently been changing towards nuclear families and single unit families. Africans tend to maintain strong family obligations (i.e. mutual assistance), and educational and employment decisions are usually made within the family obligation context. This is mostly practised in rural areas. For instance, it is not uncommon that when an African child completes schooling and starts to work, he/she is expected, as a family obligation, to assist his/her siblings financially (e.g. to pay their school fees).

Urban households tend to be less cohesive than rural families. Other reasons why earnings tend to differ between urban areas and rural areas are trade union affiliations, physical capital investment and technology differences. All of these may be argued to affect labour productivity. Households in urban areas tend to earn higher incomes than those in rural areas. Due to the above, econometric analysis should ideally be performed for both urban and rural sector sub-samples.

2.3.2.2.5 Population group

Under apartheid the education system biased in favour of the white population. As early as 1981 a report by the Human Sciences Research Council (HSRC, 1981a) identified the African population in South Africa as being markedly under-represented at all levels of education. As shown by the report, in 1978 about 69.2% of the total pupil population in ordinary schools were Africans, but they constituted only 53.9% of the secondary school pupils. Regarding public spending on education the De Lange report (HSRC, 1981b) established that in 1978 6.1% of the total public spending on education was on education for Asians, 16.3% on education for Africans, 12.7% on education for coloureds and 64.5% on white education. In addition to this imbalance, African pupils experienced double-shift classes in which pupils could only obtain about three hours' education per day.

The De Lange report (HSRC, 1981b), also established that in terms of measures of educational facilities and quality, there existed significant discrepancies between the different population groups, particularly between whites and Africans. Due to the above, it may be expected in the econometric analyses and interpretation in chapters four and five to find that one of the significant factors determining the earnings of Africans is education. The lack thereof may explain a significant portion of the inequality in earnings between Africans and whites.

2.3.2.2.6 Gender

In chapter four, earnings functions will be estimated separately for men and women due to the fact that many women in North West province may be significantly committed towards non-market household activities and may therefore exhibit a high degree of variability in terms of market labour participation over their life cycles. Social and cultural reasons are often cited for the difference between

the contribution of men and women in the household (Loots, 1978; Simkins, 1982; Gronau, 1986; Fallon and Verry, 1988:31; Ellis, 1993).

It is furthermore useful to distinguish between men and women in the earnings function in order to capture possible labour market discrimination against women (Serumaga-Zake, 1990; Terrell, 1992; Lee and Nagaraj, 1995; Dolton and Kidd, 1994; Schumann, *et al.*, 1994).

As described by Ellis (1993) women in rural developing areas contribute physically to farm production and provide for the household's livelihood in a number of ways, for instance in food processing and preparation and child caring. The division of labour between women and men in peasant societies, especially in Africa, is rigid; it reflects social customs, norms, and beliefs, which govern and circumscribe individual behaviour. The division of labour is characterized by inhibiting the substitution of women and men across categories of economic activity, control over the property, resources, and income of the household, which often resides in the male head of the household (Ellis, 1993).

In African societies, the tasks associated with the different categories of reproduction are traditionally assigned to women (e.g. upbringing of children, cooking, collecting firewood and water, mending and washing clothes, cleaning the house, food processing and weaving of mats); yet it is only child bearing and early nurturing of infants which are naturally or biologically restricted to women. Some of these activities are non-marketable.

In rural areas of developing countries, women often work longer hours than men (Ellis, 1993:177; Nafziger, 1988). Ellis (1993:178) claims that the contribution of men to household work varies from a mere 15 minutes to one and half hours, whereas it ranges from 5 to 7 hours for women.

Predominantly men engage themselves little in child-care and the daily maintenance of the household, and consequently make lower contributions than women to production for direct household use. On the other hand, there is often a high male participation in income earning activities. Because most of the work undertaken by women in the household is unpaid, the distribution of cash income within the household tends to favour men.

According to Ellis (1993:179) the amount of work performed by women throughout the developing world is inversely related to household earnings levels. Therefore, the poorer the household, the more women will be working on average. Longer working hours of women relative to those of men may also stem from differences in the degree of the substitutability of categories of activities. Social rigidity in the allocation of tasks between men and women, and female labour time across different tasks may lower farm output and inhibit the capacity of the household to respond to changes in technology and market prices, which has an implication for the efficiency of resource use in farm production.

In some societies in Sub-Saharan Africa women traditionally do not own land, and often do not have a say in household economic decisions. For instance, in Zimbabwe, it is a tradition that women do not air their views at co-operative societies' meetings (Mosadi, 1994). This traditional practice is particularly problematic especially in rural areas of developing countries (including South Africa) where husbands and economically active youth migrate to urban areas to look for wage employment, in search for better social and economic life, leaving women and elderly people behind. With the North west provincial government's support for gender equality since 1994, women in North West province have started to engage themselves, like men, in off-farm income generating activities. For instance, in some parts of the former Bophuthatswana, self-help projects largely run by women have been introduced in rural areas.

2.3.2.2.7 Marital status

Serumaga-Zake (1990:119) found that marital status is an important determinant of household earnings and that married people are likely to earn more than singles in South Africa. A justification for this finding may be that married people tend to be associated with a lower labour turn-over rate in their workplace than others (Serumaga-Zake, 1990:119). By remaining in a specific occupation for a longer time, married individuals acquire skills through "learning-on-the job" and consequently become more productive. As a result, they may be promoted earlier to higher earning positions than their single counterparts. Furthermore, because of being associated with a lower labour turn-over rate, employers tend to prefer married individuals to single individuals.

2.3.2.2.8 Industry

Members of households employed in different types of industries are likely to earn different incomes. It has been found that African workers in the agricultural industry in South Africa are likely to earn the lowest income (Serumaga-Zake, 1990). This is ascribed to factors predominant in rural areas such as illiteracy, low human capital and physical capital investments, lack of clinics, transport and markets for produce (Bembridge, 1987). Smaller, non unionized sectors such as farming and services tend to have relatively low wages while larger firms in manufacturing and communication have high wages. There are sectoral interactions in the labour market though. For example, Lee and Pesaran (1993:48) found that, expected outside wages exert an important influence on real wages in all sectors.

2.3.2.2.9 Occupation

As described in section 2.2, labour demand and supply jointly determine the equilibrium wage and levels of employment within each occupation, according to the marginal productivity theory. Some

occupations involve dirt, nerve strain, boredom, tiresome responsibility, low social prestige, irregular employment, seasonal layoffs, short working life and much dull training. Such unpleasant occupations tend to be less attractive and wages have to be raised to coax people into them. There are non-competing groups of labour markets, for instance, medical doctors and mathematicians. It is difficult and costly for a member of one professional group to enter into the other. This marginal productivity theory implies that for occupations where labour is relatively scarce, wages would increase.

For instance, there has recently been in South Africa a scarcity of medical doctors in government hospitals, leading to an increase in their salaries. Occupational structure may be significant in explaining the inequality of earnings between males and females[11]. According to Terrell (1992) this inequality often appears substantially smaller when domestic servants (a predominantly female occupation) are excluded from samples. In South Africa it has been established that in case of Africans with a standard 10 level of education or lower, those in managerial, professional and supervising occupations earn the highest salaries followed by drivers and other formal semi-skill occupations and lastly unskilled workers. Farm and domestic workers were found to earn the lowest wages (Serumaga-Zake, 1990:123). The importance of "occupation" as a determinant of earnings in other African countries is confirmed by Krishnan (1995).

A possible problem that may arise in an econometric analysis when using occupation as an independent variable in the earnings function is that it may be correlated with education. Its inclusion in the earnings function may thus bias the results because of multicollinearity.

[11] It should be pointed out that the degree to which differences in occupational distribution between males and females contribute to the observed earnings differentials is significantly affected by the type of occupational classification adopted for the analysis. According to Dolton and Kidd (1994) the more detailed the occupation break-down, the greater the contribution of gender differences in occupational distribution to the overall gender wage differential.

2.3.2.2.10 Work experience

Work experience (both in linear and quadratic forms) has been found to be a significant determinant of household earnings (Gilmour and Roux, 1984; Serumaga-Zake, 1990; Sexton and Olsen, 1994; Sprague, 1994; Light and Ureta, 1995). The quadratic form is specified in order to capture the convexity of an individual or household's lifetime earnings profile. In this study data limitations necessitated the use of a proxy variable for labour market experience ("potential" market experience) in the case of the SALDRU and CSS samples. "Potential" experience is measured as "age at time of survey, minus age left school". According to Sprague (1994) potential and actual experience are likely to coincide, at least approximately, for males since they mostly start work immediately after leaving school and remain continuously in employment. This is generally not the case with women (especially married women) due to household commitments such as childbearing and child-rearing. The periods of labour market non-participation by women exert a downward pressure on their potential earnings due to the depreciation of their market skills. Moreover, a woman's earnings are determined by the year during which children is born, the number of children she has, their timing and spacing as well as the duration of non-participation in the labour market.

Light and Ureta (1995) found that if variables measuring the employment histories of individuals are included in an earnings function it yields substantially higher estimated returns to experience, and lower returns to tenure. This is compared to regression specifications that measure experience cumulatively and use the standard quadratic functional form. In Light and Ureta's (1995) specification, about 12% of the male-female wage gap was due to differences in the timing of work experience. Unfortunately, because of non-availability of data on labour market participation histories of individuals or pattern of their work experiences, this kind of detailed analysis could not be done in this study. Care must therefore be taken when interpreting the results. The earnings function used in this study (see chapter

four) does not only assume that an individual works continuously after graduation from school (i.e. potential experience) but also that he/she starts working immediately after the graduation which may be unrealistic. Hence, the model might bias the return estimates of the coefficients. Work experience can be regarded as "training on the job" and so is expected to increase earnings.

2.3.2.2.11 Place of work

As discussed in section 2.3.2.2.4 above, individuals working in urban areas are likely to earn more than those working in rural areas possibly because of the differences in education and labour productivity associated with the variation in capital to labour ratio. This is assuming that wages are equal to marginal product (in equilibrium conditions).

2.3.2.2.12 Employer

The type of employer may determine earnings. For instance, wages in the public sector tend to be lower than those paid in the private sector because of governments' monopolistic and non-profit maximizing behaviour. In the public sector, because of many governments' policy of equalizing pay scales, earnings differentials among individuals are also likely to be of a less magnitude than in the private sector.

2.3.2.2.13 Trade union membership

The main function of a trade union is to bargain for its members over wage levels. According to Lee and Pesaran (1993) there are different types of union - firm bargaining behaviour in wage determination such as the "monopoly union", "right to manage" and "efficient bargaining" models. According to the monopoly union model, the union sets wage levels and the employer sets the level of

employment. The "right to manage" models enable the employers to set employment levels unilaterally but derive wages through a negotiation between the employer and the union. The outcome depends on the relative bargaining power of the two sides. For the "efficient bargaining" models, employers and employees bargain over both employment and pay levels so that the wage outcome is Pareto – efficient. This also depends on the relative bargaining power of the firms and unions (Lee and Pesaran, 1993).

Before the April 1994 general elections in South Africa, workers in the former Bophuthatswana were not allowed to be members of a trade union. After 1994 workers started to form or affiliate to different trade unions such as COSATU, NEHAWU, SADTU and NOWETU. It is likely therefore that there are relatively few union members in the former Bophuthatswana areas. The "Union membership" variable is thought to be positively related to earnings. This study does not differentiate between the unions and union bargaining models due to a lack of data.

2.4 LABOUR MARKET DISCRIMINATION

2.4.1 Motivation

Many developing countries, particularly South Africa, are faced with fundamental earnings differences among population groups classified by gender, race, and ethnicity. Earnings also differ across individuals or occupations for a number of reasons as was mentioned in section 2.3 above. These disparities seem to be systematic, persistent and are considered to be inequitable. For policy purposes, measures of the relative sizes of the factors of earnings differentials are important if any meaningful attempt to formulate anti-discrimination programmes is to be made. If it can be established that the sources of discrimination are pre-labour market factors, then these programmes should be aimed at

education and training. In South Africa, earnings disparities have been biased in favour of whites over a considerable number of years, due to apartheid. Affirmative action is subsequently claimed as necessary to undo the damage. This section is intended to review the theories and literature related to labour market discrimination.

According to Cain (1986) discrimination can occur in many forms and places. It can occur for example in educational institutions, labour markets, in childhood, religion and under the law. Past education and labour markets may have been instrumental in causing the kind of poverty or attitudes that are now being experienced in different communities in North West province and the country at large.

Discrimination in the human capital or education market can be regarded as pre-labour market discrimination that causes systematic earnings differentials among population groups due to different levels of labour productivity. Earnings differentials that are attributed to race or gender can be regarded as evidence of labour market discrimination.

When analysing discrimination, labour services are considered identical if they have the same productivity levels in the physical or material production process. According to Cain (1986:695), the concept of productivity, apart from education, training and experience, should also include such characteristics of workers as their regularity in attendance at work, dependability, marital status, health, turnover, area of residence and future productivity.

One way of determining how much of the overall differential in average earnings may be due to labour market discrimination is to calculate the African/white (or male/female) earnings ratio if Africans (or females), on average, had the same productive characteristics as whites (or males). In any regression model of earnings discrimination care should be taken that only variables regarded as exogenous to the

process of discrimination is included. An example of a multiple regression model that can be used to measure labour market discrimination is of the form

$$Y_i = BX_i + AZ_i + \varepsilon_i \qquad (37)$$

where Y_i is the outcome of the process, such as earnings for the i^{th} person, X_i is a vector of productivity characteristics of the i^{th} person that are presumed exogenous in that they do not depend on discrimination under study, Z_i is 1 if the person is, for example, white (or male) and it is equal to zero if it is African (or female), ε_i is a random error and A and B are coefficients representing the effects on Y of Z and X respectively. A regression with $A>0$ would be evidence of discrimination. Labour market discrimination could thus be defined as

$$D = (Y / X, Z = 1) - (Y / X, Z = 0) \qquad (38)$$

where Y is the predicted value conditional on X and $D = A$ in equation (37). The ideal measurement of labour market discrimination should take into consideration current and lifetime returns to work, pecuniary and non-pecuniary benefits of work, leisure evaluation, and rewards to housework. For example, if African workers appear to receive fewer non-pecuniary benefits from work than whites, the wage advantage of white workers would even be greater, which would result in a wider earnings gap between the two population groups, if the benefits were valued and included in the calculations. If working for fewer hours by, say, Africans and females is voluntary, this would compensate them for lower wage rates; otherwise, if it is imposed, the compensation would not be justifiable (Cain, 1986).

Historically, women's (market) work life has been shorter than that of men and in some countries, women have had fewer incentives to invest in schooling, and post-schooling and training than men have.

According to Ehrenberg and Smith (1991) women typically prepare for two careers in life, one at home and one in the labour market; so that they are as a consequence typically less specialized than men. Secondly, because of their traditional home responsibilities women are less likely to work overtime than men or choose occupations that offer jobs with high pay but long hours. Ehrenberg and Smith (1991) found that in the United States, the weekly hours for women who work full time throughout the year are 8 to 10% lower than those worked by comparable men. Home responsibilities cause women to prefer working closer to home than men, which implies lower earnings. They tend to follow their husbands in their choice of employment. This implies that unlike men, married women are not free to choose their best offers in the labour market, and thus would be likely to have lower earnings than men.

According to Ehrenberg and Smith (1991) there is a view that occupational distribution is responsible for more of the gender earnings gap than earnings differences between the same jobs in the same establishment held by men and women. For example, in the United States it has been established that women were less represented in the higher - paying grades of occupations. For Malaysia, Lee and Nagaraj (1995) found that differences in productive endowments account for only about 54% of the monthly earnings differential between males and females. A major part of the differential is attributable to occupational distribution. Generally favourable occupations are shared among men leaving the others for women of similar human capital endowments. This is contrary to Dolton and Kidd's (1994) findings. Dolton and Kidd (1994) argue that occupational segregation is not a major contributor to the

observed male/female earnings differentials but this conclusion may be sensitive to the level of occupational aggregation. Dolton and Kidd's (1994) study implies that anti-discriminatory policies aimed at decreasing the male/female earnings differentials might be most effective if focused on within occupation adjustments.

Quantitative data on all the factors that affect an individual's productivity and earnings are difficult to come by. For instance, factors like school quality, work habits, aspirations, degree of alienation, socio-economic status of one's parents and cultural background are not immediately observable. If some of these factors vary across population groups or gender and tend to depress the productivity of Africans (or women) relative to whites (or men), attributing all of the unexplained difference in average earnings to current labour market discrimination may overstate the extent of that discrimination.

On the other hand, if the unmeasured characteristics tend to raise the productivity of Africans (or women) relative to that of whites (or men), attributing all the unexplained differences in earnings to current labour discrimination would understate the extent of that discrimination.

2.4.2 Theories of labour market discrimination

The following is a discussion on the theories of economic discrimination based on their sources and causes. The discussion is based on the work of Ehrenberg and Smith (1991).

2.4.2.1 Employer discrimination

Employer discrimination is a type of labour market discrimination caused by personal prejudice. It is a function of the earnings gap, $W_w - W_b = d$ (where W_w is the wage rate for whites (or men) and W_b,

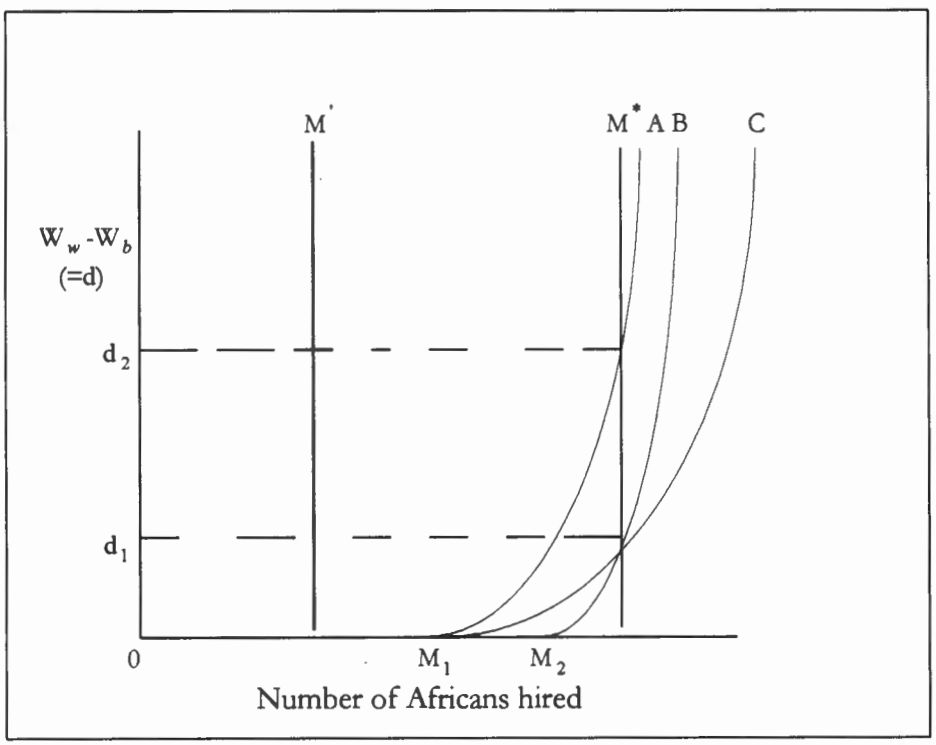
the wage rate for Africans (or women)) between white (or male) workers and African (or female) workers. Some employers hire Africans (or women) even if their earnings are equal to those of whites (or men), and these are the non-discriminatory (profit - maximizing) employers.

In **figure** 4 below, supply curve OM_1A assumes that these employers account for M_1 jobs in the market. If there are less than M_1 Africans (or women) seeking employment in that labour market (M', say), they would all be hired by the non-discriminators and no discrimination would be evident, (i.e. $W_b = W_w$). If the supply of Africans (or women) were greater than the number that could be absorbed by the non-discriminatory employers (M*, say), the average earnings gap would have to arise for all to become employed. Curve OM_1A in figure 4 indicates that the earnings gap would increase from 0 to d_2.

The equilibrium earnings gap between W_b and W_w depends on the distribution and extent of employer prejudice against Africans (or women). If the number of non-discriminating employers grew (as if the number of jobs offered by such employers grew), the job supply curve would shift to the right from OM_1A to OM_2B as pictured in figure 4. This shift would reduce the observed wage disparity at M* from d_2 to d_1. The same effect would result if the number of non-discriminatory employers stayed constant but the discriminatory preferences of the others were reduced. The discriminators would require less of wage disparity to hire a given level of Africans (or women), and the curve would shift to OM_1C in figure 4. If competitive forces were at work in the product market, discriminatory firms would be punished and discrimination could not persist unless their owners were willing to accept below - market rates of return and not maximizing profits (Ehrenberg and Smith, 1991).

Because of higher costs on the side of the firm, which discriminates, employers discrimination is most likely to persist when the owners or managers have the ability and the incentives to pursue a goal other than profit maximization. If extra costs of utility maximizing practices are hidden from regulators, they can be passed along to consumers if the product market is sufficiently monopolized such that were these practices abandoned, profits would rise and government regulators might insist on product price reductions (Ehrenberg and Smith, 1991). This kind of discrimination may be relevant in South Africa.

Figure 4: The supply of jobs to Africans



(Source: Ehrenberg and Smith, 1991:544)

2.4.2.2 Customer discrimination

Labour market discrimination which is caused by personal prejudice is referred to as "customer discrimination" (Ehrenberg and Smith, 1991). Customers may prefer to be served by whites (or males)

in some situations and Africans (or women) in others. If the preferences for whites (or men) extend to jobs requiring major responsibilities, the preferences for Africans (or women) would be confined to less responsible jobs, and occupational segregation would occur.

If Africans (or women) were to seek employment where customers preferences favour whites (or men) they must either accept lower wages or be more qualified than the average white (or man) because their value to the firm is lower than that of equally qualified white (or man) (Ehrenberg and Smith, 1991). This type of discrimination may also be prevalent in the current South Africa situation.

2.4.2.3 Employee discrimination

A further source of discrimination based on personal prejudice might be manifested on the supply side of the labour and goods markets (Ehrenberg and Smith, 1991). This will take place when whites (or males) prefer to avoid situations in which they will have to interact with Africans(or females) (e.g. sharing a responsibility with an African (or a female)). Whites (or males) will then quit or avoid non-discriminatory employers; otherwise the employers offer higher wages than those offered to African (or female) counterparts to keep them. Wage discrimination, i.e. different wages paid according to population group (or gender) within the same occupation, will then occur. If this type of discrimination is prevalent, then one could expect whites (or males) working in integrated environments to receive higher wages than those with exactly the same productive characteristics who work in segregated environments (Ehrenberg and Smith, 1991).

2.4.2.4 Statistical discrimination

According to Ehrenberg and Smith (1991) discrimination might sometimes be due to the kind and quality of statistical data used in making decisions. Employers typically try to guess the potential

productivity of applicants due to asymmetric information. The only information often available to them at the time of hire, such as education, age and test scores, are often thought to be correlated to productivity. These correlates are however, imperfect predictors of actual productivity. Because the employers realize this, they tend to supplement the correlates with subjective element depending on, say, group data research in making decisions, and it is this subjective element which could appear like discrimination even though it might not be rooted in personal prejudice (Ehrenberg and Smith, 1991).

An unfortunate side effect of employing group data in hiring decisions is that the candidate may not be typical of the group and so his or her productivity may wrongly be prejudged and fail to get the job or be hired but paid less (Ehrenberg and Smith, 1991). There is a general perception in South Africa that white workers work relatively hard and are productive and that this may be responsible in part for the earnings gap between whites and Africans. There is hence a possibility that this theory can be used to explain the kind of labour market discrimination allegedly still existing in South Africa.

2.4.2.5 Monopoly power models

2.4.2.5.1 Description

It can be argued that monopoly discrimination exists and persists because it is profitable for the discriminators (Ehrenberg and Smith, 1991). According to monopoly discrimination models, population group or gender divide the labour force into non - competing groups and thereby create a kind of perpetual worker caste system. Some of these theories, such as the "dual labour markets" suggest that labour market discrimination not only lowers the wages of Africans (or females) but also result in higher pay for the other groups. Oaxaca and Ransom (1994) state that models developed

along these lines can account for why the favoured groups resist anti-discrimination policies. The following are three versions of these models.

2.4.2.5.2 Crowding

According to the theory of crowding (Ehrenberg and Smith, 1991) the explanation for higher wages for whites than those of Africans is that for the white labour market, supply is small relative to demand, whereas for the African labour market supply is relatively large. It is argued that if whites and Africans were equally productive in a given occupation or industry, the lower wage of Africans would attract firms to hire more Africans and that such profit-maximizing behaviour would eventually eliminate any wage differential. In South Africa, this model may apply in the private sector. It implies that productivity across population groups is similar.

2.4.2.5.3 Dual labour markets[12]

The labour market can be divided into a primary and a secondary sector such that occupations in the primary sector offer relatively high wages, stable employment, good working conditions and opportunities for advancement; whereas in the secondary sector, occupations tend to be of low wage occupations with poor working conditions where the returns to education and experience are close to zero. Also, in the secondary sector, the workers are labeled as unstable, undesirable and are thought to have little hope of acquiring primary sector employment (Ehrenberg and Smith, 1991).

Proponents of dual labour markets argue that historically, a large proportion of Africans and women have been employed in the secondary sector and this has led to perpetuation of discrimination against them.

[12] See Ehrenberg and Smith (1991) for details.

They are discriminated against because they tend to have unstable work histories resulting from being unable to successfully enter the primary labour market. According to Ehrenberg and Smith (1991) the dual labour market discrimination theory does not adequately explain what initially caused Africans and women to be confined to the secondary sector. For women, the explanation for initially working in the secondary sector could be due to marriage and/or childbearing. Marxist economists view the existence of non-competing sectors as at least partially due to attempts by capitalists to divide labour and thus to discourage organized opposition to the system. They argue that recent empirical evidence suggests that there are distinct sectors of the labour market - one in which education and experience are rewarded for and another in which they are not (Ehrenberg and Smith, 1991).

2.4.2.5.4 Collusive action

Some non-orthodox theories claim that in the United States, white employers collude and become monopsonists with respect to the hiring of African labour (Ehrenberg and Smith, 1991:554). The African workers are subjugated and held immobile, while monopsonistic wages are forced on them. It is argued that when workers are divided on population group and gender lines, they are harder to organize and if unionized, are less cohesive in their demands. Further, it is said that antagonisms on the shop floor deflect attention from grievances related to working conditions. The result of this is that owners of capital gain while workers particularly Africans and women lose from discrimination.
According to Ehrenberg and Smith (1991) the discrimination theories discussed above appear to have as common element the realization that any persistence of labour market discrimination is the result of forces or motivations that are blatantly non-competitive or very slow to adjust to competitive forces. Government intervention could be useful in eliminating the non-competitive (or sluggish) influences.

2.5 SUMMARY

The purpose of this chapter has been to establish the theoretical background for the ensuing chapters. This has been done by setting out the theory of earnings determination and labour market discrimination. The chapter first presented the marginal productivity theory, then the human capital model with earnings structure, after which possible determinants of earnings other than education and experience were discussed. The final section dealt with theories of labour market discrimination.

According to the marginal productivity theory presented in section 2.2, the industry's demand curves and supply curves jointly determine the equilibrium wage rate and the level of employment for a particular occupation. According to this theory the determinants of earnings are occupational choice, natural and contrived barriers to occupation mobility (i.e. ability and human capital), government minimum-wage legislation, unemployment, movements in the retail price and cost of living, union organizations, and imperfections in the labour market such as race and gender discrimination.

The human capital model, outlined in section 2.3, postulates that human capital in the form of education, training and experience is the major determinant of earnings. It was pointed out that innate ability is a major factor driving the demand for education. It controls the output of human capital, such that, with a given amount of time and money devoted to educational investment, more able people produce more human capital and consequently are characterized by a more productive capacity and higher internal rate of return to education than the less able.

It was also shown in section 2.3 that family circumstances (i.e. family preferences and resource constraints) are a major determinant of human capital investment from the supply side. Poor people, on average, do not normally invest much in education because it is difficult for them to avail or borrow

money for human capital investment for reasons such as; the high cost of education and inability to separate human capital from the owner. The effect of government subsidy for education is to decrease variation in the supply of educational funds and hence, a bigger part of the difference in educational attainments would be brought about by differences in demand for education. Hence, subsidy would narrow the differences in IRR and decrease the variation in earnings differentials, *ceteris paribus*.

Section 2.3 presented empirical evidence on IRR in South Africa. It was shown that private and social IRRs in South Africa range from –4% to less than 40% depending on population group, gender and education level.

In section 2.3.2.2 other possible determinants of earnings, apart from education and experience, were discussed. They included home environmental variables, former province, type of area of residence, population group, gender, marital status, industry, occupation, place of work, employer and union membership. Some of these determinants will be included in the earnings function to be estimated in chapter four.

It was found that home environmental variables, such as gender of the head of household, parents' education, wealth, household size, labour force participation rate and family structure may determine household earnings. Earnings of female headed households are likely to be lower than those of male headed households. Educated parents tend to make sure that their children are also educated. Wealthier households and higher rates of labour force participation tend to be associated with higher earnings while the more traditional the family structure and one's structural position is the more prestige one will possess and the higher will be one's earnings. Labour force participation rate and family income are thought to be negatively related with individual's earnings because greater economic

activity of one's family members allows one to devote more time to non-work activities which leads to lower earnings. All these factors established family background as a major determinant of household earnings.

As far as former province is concerned, there is likely to be a significant difference between earnings of households residing in the former Transvaal and those for households in the former Bophuthatswana because of the difference in social and economic infrastructure. Households residing in Transvaal are, a priori, likely to be richer than those in Bophuthatswana.

As far as type of area of residence is concerned, section 2.3.2.2.4 showed that households residing in urban areas are likely to earn more than those in rural areas. This may be due to the difference in labour productivity, which is influenced by physical capital investment in relation to labour and level of technology. Other reasons for the difference between earnings in rural areas and urban areas that were noted were: the difference in trade union membership, cultural traditionalism, work ethic, profit motive and personal accomplishment.

As far as population group as a determinant of earnings is concerned, it was noted that there is likely to be racial differences in household earnings because of the historical imbalances in government education subsidies in South Africa.

Regarding gender as a determinant of earnings, section 2.3.2.2.6 pointed out that a number of studies have found that men tend to earn more than women. The reasons that were noted for this included rigid division of labour due to social customs, norms and beliefs which circumscribe individual behaviour, and the household responsibilities of women, which outweighs those of men.

In section 2.3.2.2.7 it was found that married people tend to earn more than others because of having lower labour turn over rates. This finding was earlier established in South Africa by Serumaga-Zake (1990).

In section 2.3.2.2.8 it was found that type of industry may determine earnings. Industries have varying levels of labour productivity possibly due to differences in physical capital investment in relation to labour. They also have different demand curves and supply curves for labour.

Regarding occupation as a determinant of earnings, section 2.3.2.2.9 found that labour demand curves and supply curves combine to jointly indicate equilibrium wage rates for particular occupations. Hence, different occupations are associated with different earnings. For example, people in managerial positions tend to earn more than others, and unskilled workers such as cleaners are expected to earn the least.

Place of work was shown in section 2.3.2.2.11 to determine earnings such that people who work in the urban sector tend to earn more than those employed in the rural sector. Some of the reasons for this may be the difference in labour productivity between the sectors and the bigger union membership for urban areas.

Earnings may vary according to employer. In section 2.3.2.2.12 it was shown that workers in the private sector tend to earn more than when they are employed in the public sector because of the governments' equalizing policy of pay scales and their monopolistic and non-profit maximizing behaviour. Finally it was established that members of trade unions are likely to earn more than non-

members.

The final section of this chapter (section 2.4) dealt with theories of labour market discrimination. It was found that there might be labour market discrimination in South Africa against Africans and against women. The customer discrimination model, the statistical discrimination model and the crowding model were set out as explanations for the kind of labour market discrimination that may be existing in South Africa. In chapter four, econometric estimation for labour market discrimination in North West province will be done.

Given the theoretical background provided in this chapter, the next chapter provides descriptive statistics on the socio-economic profile of households in North West province. This is needed before proceeding to econometric estimation of earnings function in order to check the data for methodological assumptions and errors, and to establish the relationships in the socio-economic profile which may be significant determinants of earnings of households in North West province.

CHAPTER 3

SOCIO-ECONOMIC PROFILE OF HOUSEHOLDS IN NORTH WEST PROVINCE

3.1 INTRODUCTION

Given the purpose of this study as stated and motivated in chapter one, the previous chapter gave an overview of the theory of determinants of household earnings. In light of the number of diverse determinants of household earnings identified in chapter two, the purpose of this chapter is to provide a profile of the current socio-economic circumstances of households in North West province. The chapter provides a descriptive profile of households in the province and identify the extent to which the possible determinants of earnings discussed in chapter two, may be relevant for inclusion in the earnings function to be estimated in chapter four.

The socio-economic profile presented in this chapter will serve the further purpose of informing the methodology (described in chapter four) and the interpretation of the results in chapter five by allowing errors in the data to be identified. This chapter thus forms a linkage between chapters two and four and provides a framework for the econometric analysis in chapter four. Data from all the three different samples (see chapter one) will be used[13] in compiling the socio-economic profile of households in North West province.

[13] It should be noted that the results presented in a number of frequency tables only apply to the specific sample of persons used. The findings cannot be generalized to the whole target population because they have not been subjected to statistical hypothesis testing.

The SALDRU sample data contained insufficient entries for coloureds and Asians in North West province so that these two population groups are not included in the discussions that concern this sample.

For the CSS sample, some regions in North West province were divided up into two sub-regions in order to separate areas between the former Cape and Transvaal provinces and the former Bophuthatswana homeland. Combining them could have distorted the results.

Before proceeding it is necessary to note the list of the regions and sub-regions which were used in the analysis :

- The Bophirima or Huhudi region. This consists of the Ganyesa, Kudumane, Taung and Vryburg magisterial districts. It is located in the central and southern parts of North West province and is a rural, arid and sparsely populated area.

- The Southern region. This includes the magisterial districts of Bloemhof, Christiana, Klerksdorp, Potchefstroom, Ventersdorp, Wolmarstaad and Sweizer-Reneke. The Southern region is more densely populated with significant industries and urban populations around Klerksdorp-Potchefstroom.

- The Eastern region. This includes the Odi, Moletele and Brits magisterial districts. These are the most densely populated areas, situated close to Johannesburg and Pretoria. This region contains the heaviest concentrations of manufacturing in the province.

- The Central1 sub-region. This region includes the Marico, Lichtenburg, Coligny and Delareyville magisterial districts. This area is rural in nature but with significant commercial farming activities.

- The Central2 sub-region. This region includes areas from the former homeland which are rural and lacking in infrastructure from the current districts of Molopo, Ditsobotla and Lehurushe.

- The Rustenburg1 sub-region. This sub-region stretches towards the north and east of the province and includes the Bafokeng, Madikwe and Mankwe magisterial districts (formerly part of the homeland), and

- The Rustenburg2 sub-region. This region includes the Koster, Rustenburg and Swartruggens magisterial districts.

Having stated the purpose and region definitions to be used in this chapter, the chapter outline is provided. In section 3.2 home background and environment as found in North West province are discussed. The type of area of residence of households in North West province is discussed in section 3.3, and socio-economic infrastructure in section 3.4. Labour market participation rates of household members in North West province are given in section 3.5 and employment status noted in section 3.6. Unemployment profiles are presented in section 3.7 while industry patterns are outlined in section 3.8. Occupation structures are discussed in section 3.9 and hours worked in section 3.10. The types of employer are presented in section 3.11 and the profile of small, medium and micro enterprise in section 3.12. Finally, an earnings and welfare profile is provided in section 3.14. The chapter concludes with a summary.

3.2 HOME BACKGROUND AND ENVIRONMENT

3.2.1 Family type

Table 2 illustrates that the patterns of family type in various regions of North West province are almost similar. There appears to be slight differences between the patterns of family types in the Eastern and those of other regions. For instance, the Eastern region appears to contain more single family units (11%) than other regions (4 or 5%).

Table 2: Family type by region (%)

Family Type	Huhudi	Central	Klerksdorp	Rustenburg	Eastern
Extended	38	35	35	45	29
Nuclear	59	60	62	50	60
Single	3	5	3	5	11
Total	100%	100%	100%	100%	100%

(Source: Calculated from own sample)

The Eastern region is closer to the metropolitan complex of Pretoria and so more urbanized and industrialized, which may be the reason for the relative prevalence of nuclear and single unit families in the region. This argument is consistent with the presentation in chapter two (section 2.3.2.2.4).

3.2.2 Dependency ratio

The dependency ratio is calculated by dividing the number of consumers by the number of workers in a household. Table 3 shows that the Huhudi region has the highest dependency ratio - 13% of families in Huhudi region have a dependency ratio of at least 9, which is more than twice as high as that in the Eastern region. It is likely that one of the factors that may have contributed to perpetual poverty in rural areas is high average dependency ratios (Cornelius, 1995).

Table 3: Dependency ratio by region (%)

Dep. Ratio	Huhudi	Central	Klerksdorp	Rustenburg	Eastern
1	5	10	9	7	14
2-3	24	43	27	38	46
4-5	37	30	37	24	22
6,7,8	22	9	21	28	16
9+	13	7	6	3	2
Total	100%	100%	100%	100%	100%

(Source: Calculated from own sample)

3.3 AREA OF RESIDENCE

Tables 4 and 5 show the distribution of type of area of residence by region and population group in North West province using the own sample generated in 1997 and the CSS sample dating from 1995 respectively. According to Table 4, in contrast to the Klerksdorp, Rustenburg and Eastern regions, the majority of households (89%) in the Huhudi region in North West province resides in rural areas. Table 5 below highlights the fact that the African population in North West province predominates in rural areas. The table specifically shows that 56% of the African population in North West province live in rural areas, compared to 10% of coloureds, 0% of Asians and 13% of whites.

It seems that households residing in urban areas of North West province tend to earn more than those in rural areas since they are also likely to work in urban areas. As discussed in chapter two (see section 2.3.2.2.4) urban areas are also associated with better social and economic infrastructure than rural areas which results in higher labour productivity. According to the human capital theory (see section 2.3), higher labour productivity would imply higher earnings.

Table 4: Type of area of residence by region

Type of area	Huhudi	Central	Klerksdorp	Rustenburg	Eastern
Urban	0	33	61	58	38
Semi-urban	11	21	16	42	62
Rural	89	46	23	0	0
Total	100%	100%	100%	100%	100%

(Source: Calculated from own sample)

Table 5: Type of area of residence by population group(%)

Type of area	Africans	Coloureds	Indians	Whites
Urban	36	90	100	85
Semi-urban	8	0	0	2
Rural	56	10	0	13
Total	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

3.4 SOCIO-ECONOMIC INFRASTRUCTURE

3.4.1 Road conditions

Table 6 below indicates that 80% of the roads in the former Bophuthatswana areas of North West province are dirt roads while only 36% of the roads in the former Transvaal province areas of North

Table 6: Road condition by former province (%)

Road condition	Former Transvaal	Former Bophuthatswana
Tarred roads	27	5
Dirt roads	36	80
Both tarred and dirt roads	27	15
Other	9	0
Total	100%	100%
Impassable roads – yes	18	70
No	82	30
Total	100%	100%

(Source: Calculated from the SALDRU sample)

West province are dirt roads. Table 7 below shows that in general, the former Transvaal province areas of North West province seem to have better general transport facilities than the former Bophuthatswana regions

Table 7 : Public transport and transport mode by former province(%)

Mode of transport	Former Transvaal	Former Bophuthatswana
Public transport yes	91	85
no	9	15
Total	100%	100%

(Source: Calculated from the SALDRU sample)

3.4.2 Primary schools

Table 8 shows that the former Transvaal regions of North West province are better endowed with primary schools than the former Bophuthatswana regions of North West province.

Table 8 : Primary school by former province (%)

School	Former Transvaal	Former Bophuthatswana
Primary school – yes	73	50
no	27	50
Total	100%	100%

(Source: Calculated from the SALDRU sample)

3.4.3 Ownership of assets

3.4.3.1 Dwelling

There does not seem to be a significant difference in the degree of ownership of the dwelling of a household between the population groups in North West province. Table 9 indicates that 56%, 41%, 63% and 55% respectively of Africans, coloureds, Asians and whites own at least one dwelling.

According to table 10 dwellings owned by Africans are on average relatively inexpensive. For example, 76% of Africans own dwellings worth less than R20 000 compared to 45%, 4% and 5% for coloureds, Asians and whites respectively.

Table 9: Ownership of site and Dwelling by population group (%)

Ownership	Africans	Coloureds	Asians	Whites
Own both site & dwelling	50	30	63	54
Only dwelling	6	11	0	1
Rent	12	52	38	42
Free accom.	31	6	0	3
Total	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

Table 10: Value of dwelling by population group (%)

Value of dwelling	African	Coloureds	Asians	Whites
R1-R10000	61	24	0	3
R10001-R20000	15	21	4	2
R20001-R200000	23	56	79	87
R200001-R400000	0	0	17	8
R400001 and over	0	0	0	1
Total	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

3.4.3.2 Farming assets[14]

Lack of ownership of production factors such as land and capital is positively associated with poverty (Standing and Szal, 1979). It is therefore necessary to be aware of the distribution of farming assets among the various population groups in North West province. Table 11 below indicates crop land size

[14] It should be noted that few observations were used in tables 11, 12 and 13, especially for whites. The percentage figure estimates are then likely to have large standard errors.

by population group. The table indicates that 80% of African farmers own crop land but of not more than 10 hectares. In comparison, all white farmers were found to own land measuring over 15 hectares. Table 12 shows that only 2% of African farmers own tractors or other vehicles compared to 75% of white farmers.

Table 11: Crop land size by population group (%)

Size (ha)	Africans	Whites
1 – 10	80	0
11 – 15	16	0
16 – 50	0	55
51 and over	4	45
Total	100%	100%

(Source: Calculated from the SALDRU sample)

Table 12: Ownership of tractors or other vehicles by population group (%)

Tractor/vehicle ownership	Africans	Whites
Yes	2	75
No	98	25
Total	100%	100%

(Source: Calculated from the SALDRU sample)

Table 13 below indicates that in contrast to white farmers, the majority of African farmers in North West province have to do without mechanized farm equipment and/or pumps. For instance only 5% of African farmers own mechanized equipment compared to 63% of white farmers. As far as non-mechanized tools are concerned, 67% of African farmers in North West province lack adequate access to such tools. This reflects the fact that the majority of African farmers in North West province are peasants and almost all white farmers are commercial farmers.

Table 13: Ownership of tools/pumps by population group (%)

Ownership of mechanized tools	Africans	Whites
Yes	5	63
No	95	38
Total	100%	100%
Ownership of other non-mechanized tools	**Africans**	**Whites**
Yes	33	63
No	67	38
Total	100%	100%

(Source: Calculated from the SALDRU sample)

3.5 PARTICIPATION RATE

Table 14 below shows that the labour market participation rates for African males and females are 95% and 89% respectively. The CSS sample data indicates that in 1995 the rate varied between 48% for white females and 97% for white males in North West province. Generally in North West province, it seems that females have a lower labour market participation rate than males. This finding is in accordance with theories of labour market participation set out in chapter two.

Table 14: Participation rate by population group and gender (%)

	Own Sample		CSS Sample	
	Males	Females	males	females
Africans	95	89	86	62
Coloureds	n.a.	n.a	93	68
Asians	n.a.	n.a	94	51
Whites	n.a	n.a	97	48

(Source: Calculated from own data set and the CSS sample)

3.6 EMPLOYMENT STATUS

As indicated in Table 15 below, households in urban areas in North West province have a higher probability of being employed than those in rural areas. This may explain why there are more non-economically active people in rural areas (46%) than in urban areas (16%). Some people give up searching for employment after being unsuccessful for a certain period of time. They then either return to school, or relax at home, and/or do intermittent jobs. These findings are consistent with theory as outlined in chapter two.

Table 15 : Employment status by type of area of residence and gender (%)

Emp.Status	Urban Males	Semi-urban males	Rural males	Urban Females	Semi-urban Females	Rural Females
Employed full time	77	80	39	43	19	21
Employed Part time	4	2	2	3	6	3
Unemployed	3	3	13	15	13	15
Non-economic active	16	15	46	39	63	61
Total	100%	100%	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

Table 16 indicates the distribution of employment status by former province and gender. The data indicate that the former Bophuthatswana regions of North West province have relatively substantial numbers of people who are non-economically active. For instance, in areas of the former homeland, 42% of males and 53% females are non-economically active. The corresponding figures for the former Transvaal areas of the province are 11% and 45% respectively for males and females.

Table 16: Employment status by former province and gender (%)

Employment Status	Transvaal (males)	Bop (males)	Transvaal (females)	Bop (females)
Employed	80	33	41	25
Unemployed	9	25	14	22
Non econ.Active	11	42	45	53
Total	100%	100%	100%	100%

(Source: Calculated from the SALDRU sample)

Table 17 below indicates that the highest percentage of non-economically active males are found in the Bophirima region (50%) and Central1 sub-region (34%) of North West province. Both of these sub-regions are predominantly rural. Also, relatively few males are employed full-time in these sub-regions.

Table 17: Employment status by region - males (%)

Employment status	Bophirima	Central 1	Central2	Eastern	Rusten1	Rusten2	Southern
Employed full time	34	92	51	78	82	89	84
Employed part-time	2	1	5	4	4	0	4
Un-employed	13	0	10	6	4	4	1
Non - econ.active	50	7	34	12	9	7	11
Total	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

Table 17 suggests further that males tend to be more likely to be economically active than females. In chapter two it was explained that such a finding may be due to the cultural and social obligations of women in households. Table 17 also shows that relative to other population groups, African males are relatively less likely to be economically active in North West province. Specifically, 43% of African males are non-economically active compared to 36%, 27%, and 26% of coloureds, Asians and whites

respectively. There does not seem to be a significant difference in the pattern of employment status between females of the different population groups.

3.7 UNEMPLOYMENT

3.7.1 Unemployment rate

Table 18 below shows the distribution of economic activity by population group and gender in North West province. In general, male unemployment rates are less than females' for all population groups. This is indicated most clearly in the case of Africans (with a difference of almost 20 percentage points between genders). The data indicate that male unemployment rates range from 24% for Africans and coloureds to 5% for whites. In the case of females, it ranges from 43% for Africans to 17% for whites. Thus, unemployment rates vary according to gender and population group. Africans and coloureds are the most likely to be unemployed.

The unemployed consist of those individuals who do not have, but are seeking full-time employment. It is assumed that part-time workers do not desire full-time employment. Otherwise, if part-time employees were regarded as individuals who are seeking full-time employment, the unemployment rates would have been inflated by the part-time percentage figures. For instance, the largest unemployment rate would have been 51% for African women and the smallest 7% for white males.

Table 18: Employment status by population groups and gender (%)

Employ. Status	African Males	Coloured Males	Asian Males	White Males	African Females	Coloured Females	Asian Females	White Females
Full time	41	45	55	69	20	29	22	29
Part-time	3	3	4	1	3	3	7	2
Un-employ	13	15	14	4	17	20	12	6
Non.eco active	43	36	27	26	60	49	59	63
Total	100%	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

Table 19 : Economic activity by population group and gender (%)

Econ. activity	African Males	Coloured Males	Asian Males	White Males	African Females	Coloured Females	Asian Female	White Female
Full time	72	71	75	93	49	56	54	78
Part- time	5	5	6	2	8	5	17	5
Un-employ	24	24	19	5	43	38	29	17
Total	100%	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

According to Tables 20(a) and 20 (b) below, the Huhudi region has the highest incidence of unemployment in North West province with a rate of 22% and 33% for males and females respectively. Female unemployment is highest in the Rustenburg region at a rate of 40%.

Table 20(a): Economic activity by region - males (%)

Economic activity	Huhudi	Central	Klerksdorp	Rustenburg	Eastern
Employed full time	71	77	75	79	82
Employed part-time	6	3	11	4	10
Unemployed	22	20	14	17	8
Total	100%	100%	100%	100%	100%

(Source: Calculated from own sample)

Table 20(b): Economic activity by region - females (%)

Economic activity	Huhudi	Central	Klerksdorp	Rustenburg	Eastern
Employed full time	58	66	43	21	79
Employed part-time	8	7	26	10	14
Unemployed	33	28	30	40	7
Total	100%	100%	100%	100%	100%

(Source: Calculated from own sample)

The Eastern region of North West province seems to offer the best likelihood for employment, possibly because of the proximity to Pretoria and the rest of Gauteng province. Only 7% of males and 8% of females are unemployed in this region.

3.7.2 The reasons for being unemployed

Table 21 shows that 55% of Africans in North West province consider themselves to be unemployed because of a lack of skills.

Table 21: Reasons offered for unemployment by population group (%)

Reasons cited	Africans	Coloureds	Asians	Whites
Lack of skill	55	42	31	34
Suitable job	39	56	69	66
Seasonal/contract	4	0	0	0
Other	2	2	0	0
Total	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

The results contained in Table 21 also indicate that the most common reason cited by coloureds, Asians and whites for being unemployed is failure to obtain a suitable job.

3.7.3 Unemployment by age

Table 22 below implies that unemployment in North West province is age selective. According to the CSS sample, the age group of "15-24" is relatively characterized by large numbers of unemployed males. This may partly be explained by lack of skill and experience, as described in section 2.3.

Table 22 : Employment status by population group and age(%)

a. Africans	Employed Males	Unemployed Males	Employed Females	Unemployed Females
15 yrs – 24 yrs	9	42	16	38
25 yrs – 34 yrs	28	27	30	27
35 yrs – 65 yrs	64	32	53	35
Total	100%	100%	100%	100%
b. Coloureds				
15 yrs – 24 yrs	20	56	12	33
25 yrs – 34 yrs	22	12	28	28
35 yrs – 65 yrs	58	32	60	39
Total	100%	100%	100%	100%
c. Asians				
15 yrs – 24 yrs	5	70	6	29
25 yrs – 34 yrs	16	20	24	14
35 yrs – 65 yrs	79	10	71	57
Total	100%	100%	100%	100%
d. Whites				
15 yrs – 24 yrs	8	67	17	32
25 yrs – 34 yrs	30	25	31	18
35 yrs – 65 yrs	62	8	52	50
Total	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

The age group which have the lowest unemployment rates in the province amongst the African and coloured population is the "25-34" age group while for the Asian and white population it is the

"35-65" age group. The reason for the difference between population groups needs further investigation.

3.7.4 Unemployment by gender of the head of household

In Africa male headed households tend to be better off economically than female headed ones (e.g. see Appleton, 1994). Table 23 demonstrates that relatively many female heads are unemployed across population groups in North West province. In case of Africans and whites, the unemployment rates are respectively 60% and 57% for females, while they are 19% and 11% for males.

According to table 24, 74% of female heads of households are in full employment compared to 91% for male heads. Table 25 indicates that female heads of households are concentrated in rural areas. This may partly be the legacy of the old migratory labour system in South Africa, which required adult males to migrate to urban areas in search of employment. The table further shows that in North West province Africans and coloureds have more female headed households than Asians and whites. The percentages of female headed households are 34%, 36%, 8% and 18% for Africans, coloureds, Asians and whites respectively.

Table 23: Unemployment rate: population group/gender of the head of household (%)

Employ. Status	African Males	African Females	White Males	White Females
Employed	81	40	89	43
Unemployed	19	60	11	57
Total	100%	100%	100%	100%

(Source: Calculated from the SALDRU sample)

Table 24 : Type of employment by gender of the head of household - Africans (%)

Type of Employment	Males	Females
Regular full employment	91	74
Casual employment	2	10
Self employment	7	16
Total	100%	100%

(Source: Calculated from own sample)

Table 25: Gender of the head of household: area of residence and population group(%)

Gender	Urban	Semi-urban	Rural		Africans	Coloured	Asians	Whites
Males	74	78	66		66	64	92	82
Females	26	23	34		34	36	8	18
Total	100%	100%	100%		100%	100%	100%	100%

(Source: Calculated from the CSS sample)

3.7.5 Unemployment by marital status

Table 26 below suggests that with the exception of white females, the employed in North West province are more likely to be married. The possible reasons for this may be the additional family financial responsibilities and the tendency of employers to prefer married to unmarried people because the former tend to have a lower labour turn over rate than the latter. The marital status of the head of household therefore is likely to have an effect on the household economic well being. As was discussed in section 2.3, married people tend to earn more than non-married people provided other factors are held constant (see also Serumaga-Zake, 1990). As shown in table 27 African and coloured households have proportionately less married heads than Asian and white households have. The percentages of households with married heads in North West province are 62% in case of Africans, 66% in case of coloureds, 88% in case of Asians and 78% in case of whites. The relationship between widowhood

and employment is not clear. There is not much difference in marital status between types of area of residence in North West province.

Table 26: Employment status by marital status and gender (%)

a. Africans	Employed Males	Unemployed Males	Employed Females	Unemployed Females
Never married	25	78	38	58
Married	70	20	48	38
Widowed/div.	5	2	14	4
Total	100%	100%	100%	100%
b. Coloureds				
Never married	22	72	28	44
Married	75	28	52	50
Widowed/div.	4	0	21	6
Total	100%	100%	100%	100%
c. Indians				
Never married	7	90	12	43
Married	93	10	88	43
Widowed/div.	0	0	0	14
Total	100%	100%	100%	100%
d. Whites				
Never married	10	92	15	23
Married	89	8	72	64
Widowed/div.	1	0	13	14
Total	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

Table 27: Marital status of household head: area of residence and population group (%)

Marital Status	Urban	Semi-urban	Rural		Africans	Coloured	Asians	Whites
Never Married	13	13	14		16	10	6	4
Married	65	75	64		62	66	88	78
Widowed/div.	21	13	22		22	23	6	18
Total	100%	100%	100%		100%	100%	100%	100%

(Source: Calculated from the CSS sample)

3.7.6 Unemployment by education

Table 28 below indicates that in North West province, the Africans who are employed are better educated than those who are unemployed. According to Table 29 the lowest levels of education in North West province are to be found amongst the African population in the Huhudi and Klerksdorp regions. Only 5% and 6% of the economically active population in the Huhudi and Klerksdorp regions have a professional qualification compared to 10%, 11% and 17% in the Central, Rustenburg and Eastern regions respectively. Table 30 shows that in North West province the employed tend to be better educated than the unemployed regardless of population group and gender. For both genders, the unemployed seem to be concentrated between 'No formal education' and standard 4 levels of

Table 28: Employment status by education (%)

Education level	Employed	Unemployed
No education	7	13
Sub A – std 4	16	24
Std 5 – std 7	25	24
Std 8 – std 9	13	15
Std 10	25	19
Over std 10	14	4
Total	100%	100%

(Source: Calculated from own sample)

Table 29: Education by region - Africans (%)

Educational level	Huhudi	Central	Klerksdorp	Rustenburg	Eastern
No formal education	11	9	15	4	4
Sub A/grade 1- Std 4	30	19	21	15	7
Std 5 – Std 7	21	27	27	20	24
Std 8 – Std 9	11	14	15	19	18
Std 10	21	21	17	32	31
Std 10 +	5	10	6	11	17
Total	100%	100%	100%	100%	100%

(Source: Calculated from own sample)

Table 30: Employment status by education, population groups and gender (%)

Education level	Employed males	Unemployed males	Employed females	Unemployed females
a.Africans				
No. formal education	36	38	32	35
Sub A/grade 1 – Std 4	47	50	46	48
Std 5 – Std 7	12	10	13	14
Std 8 – Std 9	5	2	8	2
Std 10 and over	1	0	1	0
Total	100%	100%	100%	100%
b.Coloureds				
No formal educ.	20	24	21	14
Sub A/grade 1- Std 4	61	60	62	69
Std 5 – Std 7	11	12	12	11
Std 8 – Std 9	8	4	5	6
Std 10 and over	0	0	0	0
Total	100%	100%	100%	100%
c. Asians				
No formal educ.	5	10	0	0
Sub A/grade 1 – Std 4	33	50	35	57
Std 5 – std 7	42	40	59	14
Std 8 – Std 9	21	0	6	29
Std 10 and over	0	0	0	0
Total	100%	100%	100%	100%
d.Whites				
No formal Educ.	0	0	0	0
Sub A/grade 1- Std 4	29	58	25	45
Std 5 – Std 7	46	42	53	50
Std 8 – Std 9	24	0	21	5
Std 10 and over	0	0	0	0
Total	100%	100%	100%	100%

(Source: calculated from the CSS sample)

education in the case of Africans and coloureds. For Asians, the unemployed are concentrated between sub A and standard 7 for males and between sub A and standard 9 for females while for whites, it is

between sub A and standard 7 for both genders. On average, whites and Asians seem to be better educated than Africans and coloureds.

3.8 INDUSTRY

Table 31 below indicates that in the former Transvaal areas in North West province, males and females are predominantly engaged in mining (51% and 17% respectively), agriculture, forestry and fisheries (24% and 29% respectively). In the former homeland areas of North West province males and females are predominantly engaged in services (25% and 27% respectively), wholesale and retail trade (20% and 20% respectively) and manufacturing (19% and 16% respectively). Thus people in the areas of the former Transvaal province are predominantly engaged in the primary sector while those in the areas of the former Bophuthatswana homeland are mainly employed in the secondary and tertiary sector.

Table 32 shows that different regions of North West province are dominated by different industries. In the Central1 sub-region (in the former Transvaal) agriculture is the dominant employer (50% of employment) whereas in the Central2 sub-region (in the former Bophuthatswana) the service sector (including SMMEs) is the dominant employer (54% of employment).

Table 33 below illustrates that in North West province, African males are predominantly employed in the agricultural industry (31%), coloured males in the trade and repair industry (26%), Asian males in trade and repair (36%) and manufacturing (25%), and white males in the mining industry (30%). In general, there does not seem to be much difference in industries between population groups as far as females are concerned. For females in North West province the trade and repair, and service industries are the dominant employers. The data indicate that while males in North West province are almost

equally engaged in all the three basic sectors of employment, females are predominantly employed in the secondary and tertiary sectors.

3.9 OCCUPATION

According to Table 34 below, there is a difference in the occupation distribution between genders in North West province. Males are mainly employed as craft and trade workers, plant and machine operators, and in elementary occupations (i.e. as labourers) while females are mainly employed as clerks, service personnel, shop, market and sales workers, and in elementary occupations (i.e. as cleaners and domestic workers).

Table 35 indicates that, in the former Transvaal areas of North West province, males are mainly employed as labourers (32%) and in other farm related occupations (21%) while females are mainly employed in service (24%) and clerical and sales occupations (19%). In the former Bophuthatswana areas of North West province, service workers (23% and 28%) and clerks and sales attendant occupations (18% and 22%) are the main occupations for males and females respectively.

Occupational distributions does not seem to differ between the various regions of North West province. In all regions and sub-regions except Central2 and Rustenburg2, elementary occupations are predominant[15]. This may be due to the relatively large numbers of African labourers and domestic workers.

According to Table 36, African males in North West province tend to be in elementary occupations (i.e. as labourers)(38%), coloureds males in craft related and trade occupations (29%), Asian males in

[15] The frequency table is not included due to space limitations. It is available from the author on request.

services and sales occupations (25%). Whites are overwhelmingly in craft related and trade occupations (41%).

African females in North West province are mostly in elementary occupations (i.e. as domestic workers and cleaners)(27%), coloured females predominantly in clerical (30%) and service and sales occupations (25%), Asian females in clerical (50%) and technical occupations (25%), and white females in clerical occupations (49%).

Table 31: Industry by former province and gender (%)

Industry	Transvaal males	Bop Males	Transvaal females	Bop females
Agric., Fish. & Forestry	24	3	29	5
Mining	51	8	17	6
Manufacturing	1	19	0	16
Elect. & Water	1	1	0	1
Construction	1	6	1	3
Wholesale & Retail	4	20	14	20
Restaurant & Hotel, Entert/sport	1	6	2	6
Transport & Communication	3	4	3	4
Finance, Educ, Medical & Legal services	7	25	15	27
Domestic service	6	4	15	9
Armed services	1	2	2	1
Other services	1	2	1	1
Other	0	0	0	0
Total	100%	100%	100%	100%

(Source: Calculated from the SALDRU sample)

Table 32: Industry by region (%)

Industry	Bophirima	Central1	Central2	Eastern	Rustenbg 1	Rustenbg 2	Southern
Agriculture	26	50	4	13	1	13	28
Mining	4	0	2	5	28	30	18
Manufac	4	13	6	24	5	2	5
Elect. & water & gas	2	0	1	1	2	0	0
Construc	4	2	5	6	4	7	3
Trade & repairs	26	14	17	19	21	23	13
Trans., Storage & Comm.	3	6	5	6	5	6	5
Finance	3	5	5	5	5	5	3
Comm., social & pers. Service.	28	7	54	22	31	13	24
Other	1	3	0	1	0	1	1
Total	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

3.10 HOURS WORKED

People work for different hours per week and this might have an effect on their earnings. Someone who works for more hours is supposed to be paid more than when he/she works for a shorter period of time, provided other factors are held constant (see section 2.3).

Table 37 indicates that in North West province, people residing in urban areas work for more hours per week than their counterparts in rural areas regardless of gender. It also suggests that, males work for longer periods of time than females in North West province. This is consistent with the discussion in chapter two (section 2.3.2.2.6) that females culturally tend to work for more hours in the household than males. For instance, in urban areas, 67% of males work for more than 40 hours a week, as against

50% in rural areas, and 49% of urban females. There are some differences in hours worked between regions too, according to table 38. For instance , 78 % of the people in the Central1 sub-region work for more than 40 hours a week compared to 41% of those in the Huhudi region.

Table 39 demonstrates that in North West province, Africans and coloureds work for fewer hours per week than Asians and whites. This might be one of the reasons why whites in North West province earn on average more than Africans. While males work for more hours than females in case of Africans, coloureds and whites, the opposite is true for Asians.

Table 33: Industry by population group and gender (%)

Indust	African males	Coloured males	Asian males	White males	African females	Colour. Females	Asian females	White females
Agric.	31	16	0	2	10	7	0	7
Mining	16	6	0	30	2	0	0	1
Manuf.	8	7	25	17	11	11	11	3
Elect., Water & Gas	1	0	0	1	1	0	0	0
Const.	5	14	7	4	2	2	0	1
Trade & Repairs	10	26	36	14	26	43	33	28
Trans., Storage & Comm.	7	6	0	7	2	2	0	6
Finance	3	4	11	5	3	4	11	11
Comm., Social & Pers. Service	17	20	21	21	42	30	44	43
Other	1	0	0	0	1	0	0	0
Total	100%	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

Table 34: Occupation by type of area of residence and gender (%)

Occup.	Urban Males	Semi-urban males	Rural males	Urban females	Semi-urban females	Rural females
Managers	3	7	3	3	0	2
Prof.	2	2	2	3	0	4
Technic.	8	7	7	15	0	18
Clerks	4	7	8	27	0	28
Service, shop & sales	11	7	9	23	0	18
Skilled agric. & fisheries	2	0	1	0	0	0
Craft relat. & trade	22	16	20	6	0	3
Plant & machine operators	16	20	17	2	0	5
Elementary	31	34	31	21	0	22
Other	2	0	1	0	0	0
Total	100%	100%	100%	100%	0	100%

(Source: Calculated from the CSS sample)

Table 35: Occupation by former province and gender (%)

Occupation	Transvaal Males	Bop Males	Transvaal Females	Bop Females
Prof, semi-prof. & technicians	3	11	6	12
Manager, exec. & administrators	2	2	2	0
Clerks and Sales	7	18	19	22
Transport, deliv. & communication	3	12	2	9
Service workers	13	23	24	28
Farm & related occupations	21	0	4	4
Artisan, apprent & related occup.	7	5	5	5
Prod. Foreman & super, min. & quary.	7	5	3	8
Operat., prod. & related semi-skill	5	12	10	12
Laborer	32	12	0	0
Total	100%	100%	100%	100%

(Source: Calculated from the SALDRU sample)

Table 36: Occupation by population group and gender (%)

Occupation	African males	Colour. males	Asian males	White males	African females	Colour. females	Asian females	White females
Manager	2	1	18	8	2	2	0	6
Prof.	1	3	14	8	3	5	13	7
Technique.	6	9	14	18	18	11	25	14
Clerks	8	13	4	4	18	30	50	49
Serv.shop market & sales	8	13	25	9	17	25	13	12
Skill agric & fisheries	1	0	0	1	0	0	0	0
Craft relat. & trade	15	29	14	41	8	5	0	3
Plant & machine operators	18	9	7	12	7	5	0	0
Elementary	38	23	4	1	27	18	0	9
Other	1	0	0	1	0	0	0	0
Total	100%	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

Table 37: Hours worked per week by type of area of residence and gender (%)

Hours	Urban Males	Semi-urban males	Rural males	Urban females	Semi-urban females	Rural females
Less than 40	9	6	15	30	40	27
40	23	31	35	21	20	39
More than 40	67	63	50	49	40	35
Total	100%	100%	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

Table 38: Hours worked per week by region (%)

Hours	Bophirima	Central1	Central2	Eastern	Rustenbg1	Rustenbg2	Southern
Less than 40	21	2	24	23	17	9	9
40	38	19	26	24	31	19	21
More than 40	41	78	50	53	51	72	70
Total	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

Table 39: Hours worked by population group and gender (%)

Hours	African males	Colour. males	Asian males	White males	African females	Colour. Females	Asian females	White females
Less than 40	15	24	12	5	31	32	21	13
40	31	22	33	19	35	28	16	29
More than 40	54	54	56	76	34	40	63	58
Total	100%	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

3.11 EMPLOYER

Table 40 below shows employer distribution by population group in North West province. The results indicate that 8% of Africans in North West province are employed by households (as domestic workers or housemaids) compared to 0% of whites.

On the other hand, 7% of white workers in North West province are self-employed compared to 0% of Africans. The difference in self-employment between population groups might be explained by the differences in human capital (i.e. skill acquisition) between population groups because, on average, whites in North West province also seem to be more skilled than Africans. It is easier for a skilled person to start his or her own business than for one who is unskilled, *ceteris paribus*. If this is generally true, there should then be government assisted efforts in North West province to train people and equip them with entrepreneurial skills so that they may be able to start their own businesses, as part of a job creation campaign.

Table 40: Employer by population group (%)

Employer	Africans	Whites
Government	19	13
Public Corporation	3	7
Private Sector	69	71
Self-employment	0	7
Non-profit organization	0	0
Householder	8	0
Total	100%	100%

(Source: Calculated from the SALDRU sample)

3.12 PARTICIPATION IN SMALL, MEDIUM AND MICRO ENTERPRISES (SMMEs)

In North West province, SMMEs are concentrated in urban areas as shown in table 41. Selling on street constitutes 78% of the businesses in rural areas. It seems that promotion of SMMEs in the rural areas of North West province is vital.

According to Table 42, Africans (95%) and coloureds (98%) are mainly engaged in the informal sector whereas whites (55%) and Asians (41%) are mainly employed in the formal sector.

Table 41: Type of area of residence by type of business activity (%)

Type of area	Shop	Selling on street	Shebeen	Herbalist	Sewing & Selling	Traditional healer	Transport	Building & repairs
Urban	97	22	67	89	100	88	75	100
Rural	3	78	33	11	0	13	25	0
Total	100%	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the SALDRU sample)

Table 42 : Formal or Informal occupation (or business) by population group (%)

Type of occupation/business	Africans	coloureds	Asians	whites
Formal	5	2	59	85
Informal	95	98	41	15
Total	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

Table 43 shows sources of financial support for households in North West province. For example, 60%, 67%, 90% and 69% of African, coloured, Asian and white families respectively are supported by employment (including that of SMMEs). Small differences between the figures may imply that the differences in the incidence of poverty between population groups cannot be explained by unemployment alone, but also by other factors such as acquisition of financial assets and transfer payments including remittances. The table indicates that relatively large numbers of African households depend on remittances from migrant workers (7%) and financial help from persons in their houses (9%) for livelihood. On the other hand, relatively many white households (7%) rely on past savings for their livelihood.

Table 43 : Financial support by population group (%)

Population group	job	By person in house	By relative outside house	Savings	Pension	Other	Total
Africans	60	9	7	1	23	0	100%
Coloureds	67	8	4	2	19	0	100%
Asians	90	4	2	2	2	0	100%
Whites	69	1	3	7	20	1	100%

(Source: Calculated from the CSS sample)

Table 44 shows the distribution of type of SMMEs by population group. According to the results, Africans (84%) are predominantly engaged in shops (i.e. cafes) while whites are mostly engaged in selling on the street (42%).

Tables 45(a) and 45(b) indicate that on average, people with low levels of education are also the ones who are predominantly engaged in SMMEs in North West province. For example, in case of males,

Table 45(a) indicates that the percentages of shop attendants are 46%, 23%, 20%, 16%, 6% and 5% for increasing levels of education respectively.

Table 44: Type of small business by population group (%)

Population	Shop	Selling on street	Shebeen	Herbalist	Sewing & selling	Traditional healer	Transport	Build repair	Tot
Africans	84	1	0	9	2	3	2	0	100%
Whites	5	42	16	11	0	16	5	5	100%

(Source: Calculated from the SALDRU sample)

Table 45(a): Education by type of small business - males (%)

Educ. Level	shop	Selling on street	Shebeen	Herbalist	Sewing & selling	Traditional healer	Transport	Building & repair
Illit.-Std 1	46	27	0	45	42	38	50	0
Std 2 – Std 4	23	13	0	28	17	0	0	0
Std 5 – Std 7	20	20	33	23	0	38	33	100
Std 8 – Std 9	6	20	33	0	17	0	0	0
Std 10 and over	5	20	33	5	25	25	17	0
Total	100%	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the SALDRU sample)

It has already been noted in chapter two (section 2.3) that education is positively correlated with employment, which may imply that people with low education levels engage themselves in small-scale industries after they have failed to be employed elsewhere (due to lack of skills or the necessary academic qualifications).

Table 45(b): Education by type of small business - females (%)

Educ. level	Shop	Selling on street	Shebeen	Herbalist	Sewing & selling	Traditional healer	Building & repair
Illit.- Std 1	47	20	0	24	20	50	38
Std 2 – Std 4	19	20	0	24	30	13	0
Std 5 – Std 7	20	13	0	31	20	13	25
Std 8 – Std 9	8	40	67	14	20	25	38
Std 10 and over	6	7	33	7	10	0	0
Total	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the SALDRU sample)

Some SMMEs in North West province are age selective. For example, selling on street and shebeens are mostly run by relatively old people according to Tables 46(a) and 46(b). In case of females, 73% of sellers on street and all shebeen attendants are over 34 years old.

Most SMMEs in North West province seem to earn between R100 and R500 a month. This is indicated in Table 47. The most profitable small businesses in North West province are shebeens, traditional healing and selling on street. These businesses can even earn more than R1000 a month.

Table 46(a): Age group by type of small business - males (%)

Age group (years)	Shop	Selling on street	Shebeen	Herbalist	Sewing & selling	Tradition al healer	Transport	Building & repair
Less than 15	33	33	0	35	31	25	50	0
15-24	25	0	0	20	23	13	17	0
25-34	13	0	33	23	15	0	0	0
35 and over	29	67	67	23	31	63	33	100
Total	100%	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the SALDRU sample)

Table 46(b): Age group by type of small business - females (%)

Age group (years)	Shop	Selling on street	Shebeen	Herbalist	Sewing & selling	Traditional healer	Building & repair
Less than 15	30	0	27	24	30	50	25
15-24	16	0	0	26	20	0	50
25-34	15	33	0	12	20	13	0
35 and over	37	67	73	38	30	38	25
Total	100%	100%	100%	100%	100%	100%	100%

(Source: calculated from the SALDRU sample)

3.13 EARNINGS AND WELFARE

3.13.1 Earnings

3.13.1.1 Description

This section intends to determine how and approximately to which degree may particular socio-economic variables affect earnings of households in North West province. The section illustrates some of the a priori expectations of the relationships between household earnings and other variables as presented in chapter two.

3.13.1.2 Earnings by former province

Monthly earnings of households in North West province vary according to former province, population group and gender as shown in Table 48. The table demonstrates that earnings differ only slightly between the former Transvaal and Bophuthatswana regions of North West province. It appears that, on average, workers in the former Bophuthatswana earn more than their counterparts in the former Transvaal which is inconsistent with the discussion in chapter two (section 2.3.2.2.3). For instance, only 48% of Transvaal workers earn more than R300 compared to 76% for Bophuthatswana. This inconsistency may be due to the fact that relatively many Africans work as labourers (on white

Table 47: Monthly earnings by type of small business (%)

Income (Rands)	Shop	Selling on street	Shebeen	Herbalist	Sewing & selling	Traditional healer	Transport	Building & repair
0-101	0	0	0	0	0	57	0	0
101-500	73	25	0	83	100	14	50	100
501-1000	26	25	33	17	0	0	50	0
1001-2000	1	50	33	0	0	14	0	0
2001 and over	0	0	33	0	0	14	0	0
Total	100%	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the SALDRU sample)

commercial farms) and as domestic workers in the former Transvaal which could have deflated the earnings figures for the former Transvaal province. The difference in earnings between population groups seems to be significant. On average, Africans in North West province seem to earn much less than whites. The difference in monthly earnings between genders is not clear from the frequency tables.

3.13.1.3 Earnings by region

Table 49 shows monthly earnings of households in various regions of North West province. It seems that Central2, Rustenburg1 and Rustenburg2 sub-regions are better off than others as far as male earnings are concerned. For instance, only 7% of Central2 workers earn R300 or less compared to 41% of those in the Huhudi region. The difference may be due to the fact that Central2 (i.e. Mmabatho, the provincial capital city and surrounding areas) is urban whereas Huhudi region is predominantly rural. Unlike most of the other sub-regions, Rustenburg sub-regions are near Pretoria and Johannesburg (which are cosmopolitan) and Rustenburg town, is one of the largest commercial centres in North West province.

3.13.1.4 Earnings by type of area of residence

Table 50 shows that there is a difference in monthly earnings between urban areas and rural areas in North West province. On average, the people residing in urban areas are seemingly richer than those in rural areas, as expected.

Table 48: Monthly earnings by former province and population group(%)

Monthly earnings(R)	Transv. males	Bop. males	Transv. females	Bop. females		African males	White males	African females	white females
0-300	52	24	48	27		44	3	41	3
301-1000	25	50	21	50		38	12	40	22
1001-2000	11	20	15	17		14	22	14	29
2001-3000	9	6	13	5		3	44	4	36
3001 and over	4	1	3	1		1	19	1	10
Total	100%	100%	100%	100%		100%	100%	100%	100%

(Source: Calculated from the SALDRU sample)

3.13.1.5 Earnings by population group and gender

Table 51 shows that there is a considerable difference in monthly earnings between population groups in North West province. The results indicate that very few Africans and coloureds earn more than R5 000 per month compared to Asians and whites. Whereas 13% of Asians and 45% of whites earn more than R5 000 per month, only 6% of coloureds and just 1% of Africans earn such an amount. It seems that on average, African males and coloured males earn slightly less than African females and coloured females respectively. It is the other way round for Asians and whites.

Table 49: Monthly earnings by region - males (%)

Monthly earnings (R)	Bophirima	Central1	Central2	Eastern	Rustenburg 1	Rustenburg 2	Southern
0-300	41	39	7	13	9	6	33
301-1000	20	25	22	32	24	16	20
1001-2000	19	11	24	32	36	29	16
2001-3000	10	7	24	7	20	8	8
3001-4000	1	7	8	8	7	11	7
4001-5000	6	6	8	2	4	14	4
5001 and over	4	5	7	6	0	16	12
Total	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

Table 50 : Monthly earnings by type of area of residence and gender (%)

Monthly earnings R)	Urban males	Semi-urban males	Rural males		Urban females	Semi-urban females	Rural females
0-300	26	23	27		13	100	24
301-1000	20	21	25		36	0	23
1001-2000	19	28	22		27	0	30
2001-3000	11	5	9		9	0	11
3001 and over	24	23	17		15	0	11
Total	100%	100%	100%		100%	100%	100%

(Source: Calculated from the CSS sample)

3.13.1.6 Earnings by age

According to Table 52 age is positively correlated with monthly earnings in North West province, perhaps due to the fact that age is correlated with work experience.

Table 51: Monthly earnings by population group and gender (%)

Monthly earnings (R)	African males	Coloured males	Asian males	White males	African females	Coloured females	Asian females	White females
0-300	30	21	4	1	22	14	0	7
301-1000	29	24	0	1	28	41	0	9
1001-2000	25	24	9	8	28	30	75	40
2001-3000	9	10	4	11	11	8	13	16
3001-4000	4	11	30	18	7	0	0	10
4001-5000	2	5	39	17	2	8	13	5
5001 and over	1	6	13	45	2	0	0	13
Total	100%	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

3.13.1.7 Earnings by education

Table 53 suggests that monthly earnings of households in North West province may be positively correlated with the level of education of the household.

Table 52: Monthly earnings by age (%)

Monthly earnings (R)		Age-males (years)			Age-females (years)	
	15-24	25-34	35-65	15-24	25-34	35-65
0-300	33	27	22	28	18	16
301-1000	21	24	23	24	21	28
1001-2000	21	18	23	34	31	30
2001-3000	14	10	9	6	13	13
3001 and over	12	21	23	7	18	14
Total	100%	100%	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

Table 53: Monthly earnings by education (%)

			Male					Female		
Rands	**No. educ.**	**Sub A - std 4**	**Std 5 – std 7**	**Std 8 – std 9**	**Std 10+**	**No. educ.**	**Sub A – std 4**	**Std 5 – std 7**	**Std 8 – std 9**	**Std 10+**
0-300	65	46	44	25	10	67	56	37	18	8
301-1000	28	44	39	34	29	22	32	43	47	35
1001-2000	4	8	12	29	29	8	8	11	23	30
2001-3000	4	1	5	11	21	2	3	7	10	21
3001 and over	0	1	0	1	11	0	0	1	3	6
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

(Source: Calculated from the SALDRU sample)

3.13.1.8 Age-earnings profiles

Tables 54(a) and 54(b) summarize the mean hourly wage rates of African males and African females in North West province according to age and education respectively.

Table 54(a): Mean earnings by age and educational level - males (%)

Age group (years)	**Illiterates**	**Sub B – std 4**	**Std 5 – std 7**	**Std 8 – Std 9**	**Std 10**	**Over std 10**
15 – 24	-	1.70	10.29	6.03	8.68	32.50
25 – 34	2.64	5.64	6.93	6.11	11.80	31.05
35 – 44	5.75	7.52	10.37	16.47	25.30	33.29
45 – 54	4.85	7.84	10.27	10.96	9.90	13.54
55 -- 65	5.51	8.57	9.20	13.80	12.82	-

(Source: Calculated from own sample)

Table 54(b): Mean earnings by age and educational level - females (%)

Age group (years)	Illiterates	Sub B – std 4	Std 5 – std 7	Std 8 – std 9	Std 10	Over std 10
15 – 24	-	1.63	4.86	-	7.50	-
25 – 34	-	2.21	8.38	6.11	12.64	27.62
35 – 44	1.54	2.22	4.48	8.88	21.53	25.63
45 – 54	1.29	5.26	10.49	14.00	10.07	27.82
55 – 65	0.89	9.64	13.45	15.35	-	-

(Source: Calculated from own sample)

Figures 5.1 (a) and **5.1 (b)** below illustrate the lifetime expected earnings for males and females respectively in North West province. The figures are typical of the flows of households' lifetime earnings as established in the literature (see section 2.3 of chapter two). They show that the earnings profiles of more educated households lie above those of the less educated. They also show that the higher a household's education level, the higher is the individual's starting pay, and that higher earnings during one's working life is associated with higher retirement age pay. A notable characteristic of the flows of lifetime earnings in North West province is that the higher the educational standard of an individual, the higher is the rate at which earnings or pay rises during his or her lifetime. Peak earnings in North West province are achieved between the ages of "35-44" years, especially for males.

3.13.1.9 Earnings by marital status

Table 55 below indicates that married people in North West province tend to earn more than the unmarried, *ceteris paribus*.

Figure 5(a) : Male age-earnings profiles

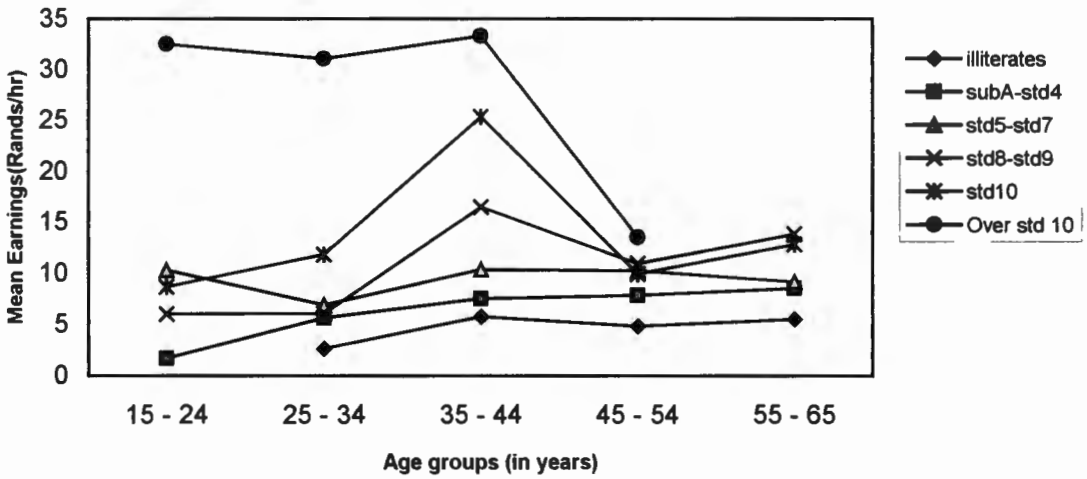


Figure 5(b):Female age-earnings profiles

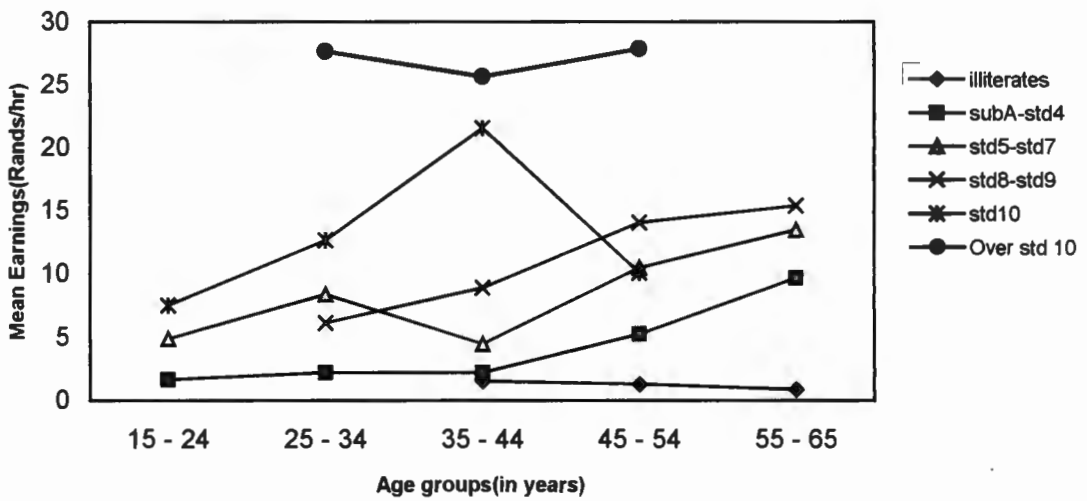


Table 55: Monthly earnings by marital status (%)

Monthly earnings (R)		Marital status – males			Marital status – females	
	Never married	Married	Divorced/ widowed	Never married	Married	Divorced/ widowed
0-300	32	21	43	24	16	15
301-1000	31	21	23	28	22	28
1001-2000	20	21	23	30	31	32
2001-3000	10	10	7	11	12	12
3001 and over	6	26	5	8	18	13
Total	100%	100%	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

3.13.1.10 Earnings by union membership

Table 56 shows that union membership is positively associated with monthly earnings in North West province, regardless of gender. This supports the recent finding by Hofmeyr (1997) that unionisation may contribute to labour market segmentation in South Africa.

Table 56: Monthly earnings by union membership (%)

Monthly earnings(R)	Member-males	Non-member - males	Member-females	Non-member-females
0-- 300	5	32	8	23
301–1000	17	26	19	27
1001--2000	30	18	36	29
2001–3000	15	8	22	7
3001 and over	33	16	15	13
Total	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

3.13.2 Expenditure

3.13.2.1 Household expenditure

Table 57 indicates that total monthly household expenditure differs significantly between white and African households in North West province. For instance, 49% of African households live below the poverty line of R750 per month compared to 1% of white households.

Table 57: Total monthly household expenditure by population group (%)

Total monthly household expenditure (R)	Africans	Whites
0–751	49	1
751–2000	41	21
2001–5000	9	60
5001 and over	1	18
Total	100%	100%

(Source: Calculated from the SALDRU sample)

3.13.2.2 Per capita expenditure

Per capita expenditure is often considered a better indicator of poverty than total household expenditure because the latter does not take household size into account.

Table 58 below indicates that urban areas in North West province are associated with smaller household sizes than rural areas. In the areas that belonged to the former Bophuthatswana, households are larger in size than those in areas that belonged to the former Transvaal. According to Table 58, the percentages for households having 5 or more people are 53 and 22 for areas of the former Bophuthatswana and former Transvaal respectively. Furthermore, about 50% of households in the former Transvaal areas of North West province consist of single person households compared to only 10% of households in the areas of the former Bophuthatswana.

Another striking characteristic of households in North West province is that African, coloured and Asian households on average seem to be larger than white households. According to Table 59, the percentages of households with 5 or more members are 45%, 47%, 41.5% and 14% for Africans, coloureds, Asians and whites respectively.

According to Table 60 it appears that households in rural areas in North West province enjoy higher standards of living than those in urban areas. This possible counter-intuitive finding might be due to price differences of the basic commodities such as food and clothes between rural and urban areas.

Households in the areas of North West province that belonged to the former Transvaal seem to be attaining higher standards of living than those in the areas that belonged to the former Bophuthatswana. African households are generally enjoying lower living standards than white households. For instance, only 6% of African households in North West province have a per capita household expenditure of more than R900 per month, compared to 51% of white households.

3.13.2.3 Food expenditure fractions

The food expenditure fraction can be used as an indicator of poverty (Appleton, 1994:6). It is calculated by dividing the monthly "household food expenditure" figure by the "total household expenditure" figure.

Table 58: Household size: area of residence, former province and population group (%)

Household size	Urban	Rural	Transvaal	Bop	Africans	Whites
1	29	6	50	10	28	14
2	10	20	10	11	10	19
3	10	12	10	11	9	22
4	12	15	9	15	11	25
5 and over	39	47	22	53	42	19
Total	100%	100%	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

Table 59: Household size by population group (%)

Household size	Africans	Coloureds	Asians	Whites
1	15	5	8	16
2	14	13	13	33
3	13	13	21	19
4	13	22	17	18
5 and over	45	47	42	14
Total	100%	100%	100%	100%

(Source: Calculated from the CSS sample)

Table 60: Per capita household expenditure: area of residence, former province and population group (%)

Per capita exp.(R)	Urban	Rural	Transvaal	Bop.	Africans	Whites
0-100	15	10	7	19	16	1
101-300	41	26	19	53	43	1
301-600	22	22	29	18	23	18
601-900	13	24	28	5	13	29
901 and over	9	17	17	5	6	51
Total	100%	100%	100%	100%	100%	100%

(Source: Calculated from the SALDRU sample)

According to Appleton (1994), the larger the "food expenditure fraction", the poorer the household is likely to be. According to Table 61 below, African households in North West province have relatively

large food expenditure fractions. Table 61 shows that 24% of African households in North West province have a food expenditure fraction of more than 0.6. The corresponding figure for white households is 4%.

Table 61: Food expenditure fractions: area of residence and Population group (%)

Food exp. Fraction	Africans	Whites
0--0.21	5	15
0.21–0.40	23	57
0.41–0.60	48	24
0.61–0.80	22	4
0.81 and over	2	0
Total	100%	100%

(Source: Calculated from the SALDRU sample)

To the degree that food expenditure fractions are indicators of poverty, it is clear that African households in North West province are significantly poorer than white households.

3.14 SUMMARY

This chapter contained descriptive statistics pertaining to households in North West province. This was necessary for econometric modelling of earnings determinants as it provides an overview of the data and an indication of the correlation structure of the socio-economic variables to be used. The statistics also allowed a checking to be done for errors in the data. The main findings were the following.

Firstly, as far as labour force participation and employment are concerned, it was shown that 43% of Africans are non-economically active compared to 36%, 27% and 26% for coloureds, Asians and

whites respectively. It was found that relatively many Africans, youths, women and people with low levels of education are unemployed in North West province. Unemployment in the province thus seems to vary according to population group, age, gender and education. For African and coloured males in North West province the lowest unemployment rate is in the "25-34" age group and for Asians and whites in the "35-65" age group. It was shown in this chapter that 74% of female heads of households in North West province are in employment compared to 91% of male heads of households. Two main reasons (according to the respondents) were noted for why people see themselves as not being employed in North West province, namely, lack of skills (predominantly for Africans) and failure to get suitable jobs (mostly for Asians and whites).

Secondly, as far as the headship of the household, marital status and education are concerned, it was shown that there are more female headed households in rural areas of North West province than in urban areas. Africans (34%) and coloureds (36%) have relatively large numbers of female headed households. On average, households with married couples in North West province earn more than others. The better educated households tend to earn more than the less educated ones, *ceteris paribus*. On average, Asian and white households are better educated than African and coloured households. This was stated as a reason why relatively many African men in North West province are employed as labourers and relatively many African women in the province work as cleaners and domestic workers.

As far as the situation in different former provinces of North West province is concerned, it was shown in this chapter that in the areas of North West province that belonged to the former Transvaal province, people are predominantly employed in the primary sector (46% - 75%) whereas in the areas of the province that belonged to the former Bophuthatswana homeland, they are mostly engaged in secondary (50% - 56%) and tertiary sectors (33% - 38%). The dominant industry of employment for

North West households also varies with magisterial district, population group and gender. For example, it was found that in the case of African males, agricultural industry is a major employer. For coloured and Asian males the trade and repair, and manufacturing sectors dominated as employers and for white males the mining industry. Females in North West province are mostly employed in the secondary and tertiary sectors of the economy.

As far as the existing occupational structure in North West province is concerned, it was shown in this chapter that population groups and genders tend to be in different occupations in North West province. Males are predominantly employed as craft and trade workers, plant and machine operators, and labourers. Females mostly work as service workers, clerks and sales workers. Occupation was also found to vary with former province. In the former Transvaal areas, males predominantly work as labourers or farm workers (32%), while they are employed as service workers (23%) and clerks and sales workers (18%) in the former Bophutatswana areas. Females were found to work as service workers (24%), and clerks and sales workers in the former Transvaal (19%) as well as in Bophuthatswana areas (22%) of North West province. It was furthermore established that in North West province African males are predominantly engaged in elementary occupations (38%), coloured males in craft and trade occupations (24%), Asian males in sales occupations (25%) and white males also in craft related and trade occupations (41%). African females in North West province are predominantly engaged in elementary occupations (27%), coloured females in clerical (30%), service and sales occupations (25%), Asian females clerks (50%), and secretaries and technicians (25%), and white females mostly in clerical occupations (49%).

It was shown in this chapter that in North West province, men generally work more hours than women. A difference in hours worked between magisterial districts was also noted. On average,

Africans and coloureds tend to work for fewer hours than Asians and whites. It was also found that urban areas are more associated with many hours worked per week than rural areas.

As far as socio-economic infrastructure in North West province is concerned, it was found in this chapter that the areas of the province that belonged to the former Transvaal are better off than the areas that belonged to the former Bophuthatswana. It was also established that Africans tend to own relatively inexpensive dwellings. According to the 1993 SALDRU sample, unlike white farmers (38%), most African farmers (about 95%) in North West province are engaged in subsistence farming and lack in many instances the basic factors of production, namely, land, capital and entrepreneurial skills.

It was established that most of the SMMEs in North West province are found in urban areas. Relatively many Africans and coloureds are engaged in the informal sector business activities. Seemingly, the type of SMME varies with population group, age and education. Africans (84%) predominantly engage themselves in cafes whereas whites (42%) mostly sell on street. Some SMMEs need elder, mature people to be run (e.g. shebeen and selling on street). In most cases, it is the people with low levels of education who enter the SMME sector - probably after failing to get employment in the formal sector. The most profitable SMMEs in North West province are shebeens, traditional healing and selling on street.

It was also shown in this chapter that in North West province, African households are the poorest and white households on average the wealthiest. It has also been found that about 49% of Africans in North West province live below the poverty line of a household monthly income of R750. The majority of these households also live in rural areas. Relatively many African families depend on

remittances and pension for their livelihood. This is aggravated by the fact that the African majority has large households. About 2% of African males and 21% of African females in the province are domestic workers and earn between R150 and R400 per month. Some domestic workers are breadwinners in their households. African females and coloured females tend to earn more than African males and coloured males respectively, but it is the other way round for Asians and whites. This is not consistent with the discussion in chapter two (section 2.3.2.2.6) in the case of Africans and coloureds.

To conclude, household earnings in North West province seem to be influenced by type of area of residence, former province, region, industry, occupation, hours worked, employer, population group, education, age, marital status, dependency ratio, wealth index and union membership. It is not clear whether earnings depend on gender or not. The wide earnings gap between African and white households is suggestive of labour market discrimination in the province. The next chapter will include these variables in an earnings function for statistical hypothesis testing and will attempt to determine the extent and nature of earnings inequality in the North West province.

CHAPTER 4

ECONOMETRIC MODELLING OF HOUSEHOLD EARNINGS IN NORTH WEST PROVINCE

4.1 INTRODUCTION

Chapters two and three allowed the identification of a number of possible determinants of earnings of households in North West province. In this chapter, these determinants will be included as independent variables in an earnings function (see section 1.4) based on the human capital model (see section 2.3). Their effects on household earnings will be estimated and tested for statistical significance. The nature and extent of earnings inequality in North West province (see section 3.13.2) will also be analysed econometrically.

In section 4.2 the econometric methodology to be used is discussed. In section 4.3 the results from regression analyses are presented. The chapter concludes with a brief summary. In the next chapter, the results are interpreted, and critically evaluated against the backgrounds of chapter two and chapter three.

4.2 THE ECONOMETRIC METHODOLOGY

4.2.1 The earnings function

As was mentioned in chapter one, the Mincerian earnings function was extended in this study to include other possible determinants of household earnings as follows:

$$InY = f(S, X, Z), \text{ where}$$

Y are the earnings, S is the level of schooling, X is the work experience and Z is a vector of other socio-economic variables that are thought to influence household earnings.

In the case of the own sample generated in 1997 through a household survey in North West province, separate earnings functions were fitted with per capita household income and per capita household expenditure as dependent variables.

A set of log "hourly gross wage rate" models was also estimated. Per capita household income (or expenditure) was calculated by taking the total household income (or expenditure) and dividing it by the household size. The log of "per capita household income (or expenditure)" and log of "hourly gross wage rate" were used as dependent variables in the earnings function. For the SALDRU and CSS samples, only the log of "per capita household expenditure" and the log of "hourly gross wage rate" were used as dependent variables in the function respectively. Separate sets of earnings functions were fitted for the three different samples.

4.2.2 Observations excluded from the sub-samples[16]

A number of observations were considered in the labour force participation and employment probit model estimations but were excluded from the sub-samples that were used in earnings function calculations. The purpose of excluding the observations from the earnings function calculations was to avoid distortions in the estimates of the regression coefficients. Some observations were discarded because they were too few (in the sub-groups) for a precise statistical analysis. Where possible, small sub-groups of data were combined to form justifiable dummy variables.

[16] Table 10 in Appendix A shows the number of observations used in the study according to original variable.

The data were also investigated for outliers and influential observations by adopting the "studentized residuals (Rstudent)" and "partial-regression coverage plots" diagnostic techniques following Belsley, Kuh and Welsh (1980). As a result more observations were excluded from the analysis. Some of the excluded observations were the following :

- Income. All observations associated with zero monthly earnings as well as those corresponding to earnings of more than R9 000 per month in case of Africans and coloureds, and of more than R15 000 per month for whites were discarded. This was done in order to exclude people who were not economically active, those able but unemployed and those who were earning extraordinarily large amounts of money.

- Age. All observations corresponding to people aged less than 15 and more than 65 years were excluded. The intention of this was to include only people that were normally part of the labour force.

- Education. All observations associated with unspecified academic qualifications were discarded. Also, rare cases, such as observations for people of ages of, say, less than 18 years but with educational level of standard 10 were discarded because they were regarded as extraordinary or outliers.

- Economic status. Observations relating to the non-economically active, the unemployed, part-time employees and "other" were excluded from the earnings function estimations.

- Occupation. All observations for "other" occupations were excluded.

- Industry. All observations for "other" industries were also excluded.

4.2.3 Definitions of the dummy variables

Separate regression models were fitted for former provinces, population groups, genders and types of area of residence (where possible) because, combining them together would not only have biased the results but also would have caused difficulties of interpretation. For example, relatively a large proportion of women has poor work histories, which tend to lower female remuneration packages. If the regression analysis was done for males and females combined together, the results would have been less precise.

Education levels were grouped in order to have reasonable numbers of observations in each category (or for each dummy variable), and to enable a distinction to be made between six educational phases, namely, "zero", "sub A to standard 4'", "standards 5 to 7", "standard 8 to 9", standard 10, and "professional qualifications including diplomas and degrees". These phases correspond to illiterates; primary; junior secondary or middle school; incomplete senior secondary; complete senior secondary or matriculation; and technicians and professionals respectively.

In the case of the SALDRU and CSS samples, "potential experience" was used as a proxy for "actual experience". It was calculated as "age - 15 years" for illiterates or people with less than or 9 years of schooling, and "age - 6 - years of schooling" for those with more than 9 years of schooling. For the earnings function estimated from the own sample data, "actual experience" was used. It was assumed that individuals start to work as soon as they graduate from school. It was also assumed that individuals start schooling at the age of 6.

Ideally, each distinct level of an original variable would have formed a dummy variable but this was not always possible - depending on the number of observations in the sub- sample and on the way the data

were recorded in the computer data files of the SALDRU and CSS surveys. For instance, it would have been preferred if the dummy for "agriculture, forestry and fisheries" could be separated to form three different industry dummies namely, agriculture, forestry and fisheries. This was not possible in this study. For a sub-group (of levels of an original variable) to form a dummy variable and be included in the model, it had to have a reasonable number of observations. Some original variables could not be included in the regression model (especially in the case of coloureds and whites) because of paucity of data. The following dummy variables were formed.

For the own sample generated 6 dummies were formed for education, 6 for industry, 5 for occupation, 6 for employer, 1 for gender, 5 for relationship with the head of household, 3 for type of area of residence, 3 for place of work, 3 for marital status, 5 for region, 3 for family type and 1 for union membership.

For the SALDRU sample 6 dummy variables were formed for education, 4 for occupation, 3 for employer, 1 for gender, 4 for industry, 3 for hours of work, 2 for type of area of residence, 5 for relationship with the head of household and 1 for union membership.

For the CSS sample 6 dummies were formed for education, 7 for region, 3 for marital status, 8 for industry, 7 for occupation, 3 for type of area of residence, 4 for ownership of dwelling, 5 for relationship with the head of household and 1 for union membership.

Another set of earnings functions was computed including education in the set of independent variables as "education splines". The own sample generated and the CSS sample were used in this case.

The definitions of the dummy variables and other variables are set out in tables 62(a), (b) and (c).

Table 62(a): Definitions of the dummy variables - own sample

Variable	Definition
Educ1	No education
Educ2	sub A – standard 4
Educ3	standards 5 - 7
Educ4	standards 8 - 9
Educ5	standard 10
Educ6	over standard 10 (i.e. diploma and degree)
S_{prim}	$\begin{cases} x & , \ 0 \subseteq x \subseteq 7 \\ 7 & , \ x \supset 7 \end{cases}$
S_{sec}	$\begin{cases} 0 & , \ x \subseteq 7 \\ x-7 & , \ 7 \subset x \subseteq 12 \\ 5 & , \ x \supset 12 \end{cases}$
S_{ter}	$\begin{cases} 0 & , \ x \subset 12 \\ x-12 & , \ x \supseteq 12 \end{cases}$
migrant	migrant = 0 for a migrant but migrant=0 for a non migrant
indust1	agriculture
indust2	mining
indust3	manufacturing; electricity, gas and water; and construction
indust4	wholesale and retail; restaurant, hotels /entertainment / sport; and transport and communication
indust5	finance; and community and social services (i.e. education, medical, legal and security services)
indust6	domestic services
occup1	administrators, managers, supervisors and professionals (including nurses, teachers, medical doctors)
occup2	technicians, clerks, secretaries, cashiers insurance agents, assistant nurses, etc
occup3	service, shop market and sales (including security officers, hairdressers, waitresses/bartenders, salesmen etc)
occup4	skilled agriculture, forestry and fisheries; craft related and trade; and plant and machine operators(including miners, cooks, bakers, welders, dressmakers, drivers etc)

TABLE 62(a) (CONTINUED)

variable	definition
Occup5	elementary jobs (i.e. housemaids, cleaners, labourers, etc)
Employer1	central, provincial and local governments
Employer2	public corporation
Employer3	private sector employer
Employer4	self employed
Employer5	household
Employer6	non-profit making institutions
Gender	gender=1 for a male but gender=0 for a female
Urban	urban area of residence
Semiubn	semi-urban area of residence
Rural	rural area of residence
Relat1	resident head or absent head of the household
Relat2	wife or husband or partner
Relat3	son or daughter
Relat4	other relatives
Relat5	other members of the household, e.g. friends
Place1	country side (village) or farm; and small rural town or trading centers
Place2	small urban town and big rural town or trading centre
Place3	big urban town but not city, and city
Marital1	never married
Marital2	married or living together
Marital3	divorced/separated, or widower/widow
Huhudi	Huhudi region (i.e.Huhudi, Kudumane, Vryburg and Pokwane magisterial districts)
Central	Central region (i.e.Mmabatho, Madikwe, Lichtenburg and Delareyville magisterial districts)
Klerksdorp	Klerksdorp region (i.e. Schweezer-Reneke, Wolmaranstad, Christiana, Klerksdorp, Ventersdorp and Potchefstroom magisterial districts)
Rustenburg	Rustenburg region (i.e. Mankwe and Rustenburg magisterial districts)
Eastern	Eastern region (i.e. Brits, Ga-Rankuwa and Temba magisterial districts)

TABLE 62(a) (CONTINUED)

variable	definition
Ftype1	extended family
Ftype2	nuclear family
Ftype3	single family unit
union	union = 1 for a union member but union = 0 for a non member
dvalue	value of the dwelling in which the household is living (as a proxy for 'wealth index')
workers	Number of workers in the household
depratio	dependency ratio (which was calculated by dividing the number of consumers by the number of workers in the household)
madults	number of male adults in the household
fadults	number of female adults in the household
schlyears	total number of years of schooling (calculated by adding all the years of schooling for all the members of the household excluding children in school)
exp	experience (in years)
sqexp	squared experience
educexp	interaction of education and experience
nlbincm	non labour income (the value calculated by taking the total monthly household income, excluding the respondent's earnings, and dividing it by the household size figure – used as a proxy)

Table 62(b): Definitions of the dummy variables – SALDRU sample

variable	Definition
Education	Same as for the own sample
Occup1	professionals and technicians; managers and administrators; clerical and sales, and transport, delivery and communication
Occup2	service
Occup3	farming, artisan, apprentice and production, and mining and quarrying
Occup4	labourers
Employer1	central government, provincial administration, local authority or regional authority and public corporation
Employer2	private sector employer
Employer3	other employers including householder and self-employed
Gender	same as for the own sample
Indust1	agriculture, forestry and fisheries
Indust2	mining
Indust3	manufacturing, electricity, water and gas; construction; trade and repair; transport, storage and communication; finance and community social service
Indust4	domestic or personal service
Whours1	less than 8 hours per day
Whours2	8 hours per day
Whours3	more than 8 hours per day
relationship with the head	same as for the own sample
type of area of residence	same as for the own sample
union membership	same as for the own sample

Table 62(c): Definitions of the dummy variables – CSS sample[17]

Variable	Definition
Education	same as above
Region1	Huhudi region (i.e.Ganyesa, Kudumane, Taung and Vryburg)
Region2	part of the Central region belonging to the former Transvaal province (i.e. Marico, Lichtenburg, Coligny and Delareyville)
Region3	part of the Central region belonging to the former Bophuthatswana (i.e. Molopo, Ditsobotla and Lehurushe)
Region4	Eastern region (i.e. Odi, Moletele and Brits)
Region5	part of the Rustenburg region belonging to the former Bophuthaswana (i.e. Bafokeng, Madikwe and Mankwe)
Region6	part of Rustenburg region belonging to the former Transvaal province (i.e. Rustenburg, Koster and Swartruggens)
Region7	Southern region (i.e. Klerksdorp, Potchefstroom, Bloemhof, Christiana, Ventersdorp, Wolmarstaad and Schweizer-Reneke)
Marital status	same as for the own sample
Indust1	agriculture
Indust2	mining
Indust3	manufacturing, electricity, water and gas, and construction
Indust4	trade and repair
Indust5	transport, storage and communication
Indust6	finance
Indust7	community and social services
Indust8	domestic service

[17] Two sub-regions were formed for central region and Rustenburg region because some magisterial districts of these regions belonged to the former Bophuthatswana and others to the former Republic of South Africa. It would have been improper to combine them to form one dummy variable because they have different socio-economic characteristics and this could have increased the standard errors of estimates of the regression coefficients.

TABLE 62(c) (CONTINUED)

Variable	definition
Occup1	managers and professionals
Occup2	technicians, secretaries
Occup3	clerks
Occup4	service, shop and sales
Occup5	skilled agriculture, forestry and fisheries, craft related and trade
Occup6	plant and machine operators
Occup7	elementary
Type of area of Residence	same as above
Ownship1	site and dwelling owned by the household
Ownship2	only dwelling owned by the household
Ownship3	dwelling rented
Ownship4	free accommodation
Relationship with the head of household	same as above
Union membership	same as above

For the own sample surveyed in this study, the first dummy variable for every original independent variable was used as a reference group. It was therefore excluded from the regression model to avoid dependence. Dummy variables: educ1, indust4, occup1, employer1 and whours1 were excluded from the regression model for the SALDRU sample; and educ1, region1, marital1, indust1, occup7 were excluded for the CSS sample.

The Statistical Association Software (SAS) was adopted to analyze the data. The estimation results are presented in section 4.3 below.

4.3 ESTIMATION RESULTS[18]

4.3.1 Per capita household income and expenditure

Firstly, the maximum R^2 improvement (MAXR) SAS technique was used to find the significant determinants of household earnings in North west province. This technique determines the best one-variable model, the best two-variable model, and so forth. Two sets of regression models were computed, one for the log of per capita income and the other for the log of per capita expenditure.

Table 63: Regression results (own sample) – log of per capita income and expenditure

Variable	Estimate – per capita income	Estimate – per capita expenditure
intercept	6.078*** (16.352)	5.462*** (15.664)
migrant	-0.089 (-0.754)	-0.102 (-0.917)
Marital2	0.286 (1.625)	0.310* (1.880)
Marital3	-0.272 (-1.597)	-0.202 (-1.264)
dvalue	0.000*** (4.907)	0.000*** (6.201)

[18] All significance statements refer to the 10% level of significance. Coefficient figures with one asterisk are significant at 10% level of significance, those with two asterisks are significant at 5% and those with three asterisks are significant at 1% level of significance. **Figures in parentheses are t-ratios.**

TABLE 63 (CONTINUED)

variable	Estimate – per capita income	Estimate – per capita expenditure
age	0.006 (1.466)	0.002 (0.585)
workers	-0.015 (-0.146)	-0.128 (-1.276)
madults	-0.114*** (-2.262)	-0.167*** (-3.538)
fadults	-0.100*** (-2.216)	-0.102 (-2.405)
schlyears	0.140*** (7.075)	0.177*** (9.570)
gender	-0.185 (-1.058)	-0.089 (-0.539)
semiubn	0.031 (0.229)	0.031 (0.243)
rural	-0.051 (-0.397)	-0.054 (-0.449)
Central	0.032 (0.233)	0.012 (0.090)
Klerksdorp	-0.236 (-1.630)	-0.034 (-0.253)
Rustenburg	0.101 (0.486)	0.094 (0.479)
Eastern	0.034 (0.204)	0.138 (0.879)
Ftype2	-0.063 (-0.633)	-0.120 (-1.284)
Ftype3	1.041*** (3.981)	0.788*** (3.183)
depratio	-0.153*** (-4.411)	-0.104*** (-3.183)
No.	289	289
R^2	0.69	0.69
Adj. R^2	0.63	0.67

(Source: Calculated from own sample)

For per capita income, the results, which were obtained by using the MAXR statistical technique indicated that education (schlyears) is the most important determinant of household earnings (R^2 = 0.37), followed by dependency ratio (depratio), then wealth (dvalue). Including all the three variables in

the model yielded an R^2 of 0.56. Table 63 shows that the other significant determinants of earnings are male adults (madults), female adults (fadults) and family type (ftype3). The R^2 figure for the full model is 0.69. The results indicate that the effect of education is to increase household earnings (by 14%). The effect of dependants in the household is to decrease household earnings (by about 15%) while wealthier households tend to earn more than poorer ones. It is also shown that having male and female adults in a household in North West province seem to significantly decrease its earnings. Male and female adults tend to decrease household earnings by about 11% and 10% respectively, *ceteris paribus*. The reason for this needs a further investigation. Family type is another important determinant of household earnings in North West province. Its effect is such that an average single family unit tends to earn more than an average extended family by 104%.

Regarding per capita expenditure, again it is education which is indicated to be the most important determinant of per capita household expenditure with an R^2 of 0.44. The best three determinants of per capita household expenditure are education, wealth and female adults. Including all the three variables in the model yielded an R^2 of 0.59. The results for the best one – variable and best three – variable models are not included in the text due to space limitation but are available upon request from the author. The other significant variables (see table 63) in the model are marital status (i.e. marital2), male adults, family type and dependency ratio. For the final model, R^2 is 0.69.

The effects of these variables on per capita household expenditure are as follows: Education and wealth seem to be positively correlated with per capita household expenditure. Education is shown to increase per capita household expenditure by about 18%. As in the case of per capita household income, male and female adults and dependants tend to be negatively correlated with per capita household expenditure and the effect of marital status is such that married households tend to earn

more than those headed by singles. Male and female adults tend to decrease per capita household expenditure by about 17% and 10% respectively. On average, single family units seem to be more associated with large figures of per capita household expenditure than extended families.

Because the SALDRU sample data were inadequate, only the values of the characteristics of the head of household were used in the per capita household expenditure model. Table 64 presents the regression results by population group and former province. Only observations of households whose heads were working, were considered in the regression analysis. The results indicate that for Africans experience, industry, work hours and area of residence are significant determinants of household earnings in the areas of the former Cape and Transvaal provinces whereas in the areas of the former Bophuthatswana they are experience and education.

The effect of an increase in work experience in North West province is to decrease household earnings. This means that households with heads who have accumulated more years of work experience on average enjoy a lower standard of living than those with heads having less work experience. This finding seems counter-intuitive and may need further investigation. African households whose heads are employed in the mining industry earn more than those headed by domestic workers by about 39%. Fewer hours of work are associated with less per capita household expenditure and vice versa (but this is a weak association at 10% level of significance).

It is surprising that rural areas seem to be better off than urban areas in terms of per capita household expenditure - the difference is about 31%. This would imply that rural households on average enjoy a higher level of standard of living than urban households. However, when the analysis was repeated using "total household expenditure" as the dependent variable and with the former provinces combined together (table 1 in Appendix A), a negative significant coefficient of -0.15 was obtained for

"rural" which implies that, on average, households in the rural areas spend 15% less than those in urban areas. Hence, the relationship between "type of area of residence" and earnings in North West province needs further investigation. The coefficient of "gender" is not significant -- implying that the gender of the head of household does not affect household earnings in North West province. According to the coefficient of determination, R^2, the model explains 67% of the total variation of household earnings.

For areas in the former Bophuthatswana the model explains 99% of the variation of the log of African per capita household expenditure. As with areas in the former Transvaal the effect of work experience is to decrease per capita expenditure, *ceteris paribus*.

For white households, the significant determinants of per capita household expenditure are experience and education. The corresponding R^2 is 79%. Work experience is positively correlated with per capita expenditure, as expected given the discussions in chapters two and three. Education tends to increase white household earnings in North West province as expected. For instance, on average the per capita household expenditure of a white household headed by someone with standards "8-9" level of education is about 68% higher than that of a white household headed by someone with no formal education.

Table 64: Regression results (SALDRU) – log of per capita household expenditure

Variable	Estimate – Africans in Transvaal & Cape	Estimate – Africans in Bop (urban)	Estimate – whites in Transvaal and Cape
intercept	2.947*** (13.425)	1.743*** (48.006)	1.953*** (3.798)
exp	-0.020*** (-3.037)	-0.033*** (-19.227)	0.015 (0.606)
sqexp	-0.000 (-0.434)	-0.000*** (-4.662)	-0.001** (-2.233)
Educ2	0.009 (0.192)	0.093*** (7.206)	0.175 (0.373)
Educ3	-0.062 (-1.203)	0.235*** (18.104)	-
Educ4	-0.010 (-0.128)	0.339*** (23.038)	0.675* (1.709)
Educ5	-0.082 (-0.802)	0.389*** (26.215)	0.647 (1.639)
Educ6	0.086 (0.495)	0.450*** (25.415)	1.033** (2.589)
Occup2	-0.032 (-0.252)	-0.008 (-0.838)	-0.209 (-0.837)
Occup3	0.068 (0.795)	0.003 (0.354)	0.058 (0.350)
Occup4	0.026 (0.314)	-0.014 (-1.029)	-
Employer2	-0.187 (-1.495)	-0.010 -1.289)	-0.026 (-0.152)
Employer3	0.229 (1.190)	0.016 (0.755)	-0.056 (-0.116)
gender	0.050 (0.325)	0.003 (0.365)	0.396 (1.061)
Indust1	0.068 (0.493)	-0.002 (-0.043)	-0.308 (-0.759)
Indust2	0.386*** (2.752)	0.009 (0.377)	-0.317 (-0.728)
Indust3	-	0.013 (0.594)	-0.172 (-0.398)
Whours1	-0.098 (-0.775)	0.014 (1.158)	-0.163 (-0.631)
Whours2	-0.247* (-1.859)	-0.001 (-0.104)	-0.238 (-0.906)
rural	0.309*** (3.800)	-	0.074 (0.408)
Union	-0.013 (-0.251)	0.008 (0.916)	0.133 (0.961)

TABLE 64 (CONTINUED)

	Africans – Transvaal & Cape	Africans – Bophuthatswana	whites – Transvaal & Cape
No.	236	138	48
R^2	0.67	0.99	0.79
Adj. R^2	0.64	0.99	0.66

(Source: calculated from the SALDRU sample)

4.3.2 Hourly wage Rate (education included in the regression models either as a continuous variable or dummy variables)

4.3.2.1 Heckman's two – stage estimation technique.

For hourly wage rate, firstly, education was included (alone) in the regression model as a continuous variable and R^2's of 0.31 and 0.44 were obtained for African males and African females respectively.

Table 65: Preliminary regression results (own sample) - log of hourly wage rate (adjusted for employment selectivity bias)

variable	Estimate – males	Estimate – females
intercept	0.113 (0.558)	-0.414 (-1.653)
Education	0.177*** (8.673)	0.230*** (7.133)
Experience	0.120*** (6.317)	0.089*** (2.863)
sqexp	-0.002*** (-3.727)	-0.001*** (-1.185)
educexp	-0.005** (-2.363)	-0.003** (-0.890)
Lambda1	0.241* (1.700)	0.223* (0.996)
No.	234	175
R^2	0.47	0.53
Adj. R^2	0.45	0.52

(Source: Calculated from own sample)

Secondly, experience, squared experience, interaction of education and experience, and the employment selectivity variable, lambda1 (or Mill's ratio), were also included. The results are shown in table 65 below. The model explains 47% and 53% of the total variation of the log of hourly gross wage rate for African males and females respectively. The table indicates that the IRR is approximately 18% and 23% for African males and females respectively. Education is shown to be a major determinant of earnings.

Table 66: Preliminary regression results (CSS) – log of hourly wage rate (adjusted for employment selectivity bias)

Variable	Estimate - African males	Estimate - African females	Estimate - coloured males	Estimate - white males	Estimate - white females
intercept	-1.180** (-2.261)	-0.538 (-0.963)	-0.309 (-0.294)	-0.486 (-0.617)	-1.675 (-0.943)
education	0.340*** (7.921)	0.237*** (4.832)	0.295*** (2.969)	0.276*** (3.773)	0.366** (2.310)
experience	0.070*** (2.611)	0.075** (2.498)	0.028 (0.436)	0.131*** (3.317)	0.134 (1.351)
sqexp	-0.001 (-1.610)	-0.001* (-1.787)	0.000 (0.101)	-0.001*** (-3.013)	-0.001 (-1.033)
educexp	-0.004** (-3.338)	-0.003* (-1.908)	-0.001 (-0.489)	-0.006* (-1.935)	-0.009 (-1.385)
Lambda1	-0.210** (-2.490)	-0.473 (-1.579)	-0.182 (-0.742)	-0.022 (-0.933)	-0.019 (-0.561)
No.	628	320	48	128	67
R^2	0.32	0.17	0.52	0.25	0.11
Adj. R^2	0.32	0.16	0.46	0.22	0.04

(Source: Calculated from the CSS sample)

With the CSS sample, R^2's of 0.29 and 0.13 were obtained for the one - variable model for African males and African females respectively. For coloureds, R^2 was 0.44 and for white males and white females 0.07 and 0.05 respectively. Table 66 shows the regression results when experience and the employment selectivity variable are also included in the model. According to the table, the IRR is

approximately 34%, 24%, 30%, 28%, and 37% for African males, African females, coloured males, white males and white females respectively.

In the following sections, education is combined with many other possible determinants of earnings in the regression model.

Table 67(a) shows employment probit results by population group and gender. The table includes columns, which indicate the percentage point change in the estimated probability of wage employment when a particular variable is changed and all other variables are evaluated at their mean values. The changes in the probability for coloureds and whites were not included in the table because they are negligible. A change for a dichotomous variable reflects a change from 0 to 1, while for the continuous variable, it reflects the normal partial derivative.

Following Terrell (1992), evaluating all other variables at their mean values, the probability that an average African male in North West province will be employed is about 75%. For an average African male, an additional year of age, evaluated at the mean, decreases the probability of wage employment by about 1%, *ceteris paribus*. A separate earnings function for males aged between 24 and 34 years indicated that the probability of wage employment increases significantly with age. An increase in education by one year of schooling increases the probability of being in employment by about 1%. Marriage or being a widower (or divorcee) raises the probability of employment in North West province - may be because of more family responsibilities.

Being married and being a widower raise the probability of wage employment in North West province by 22% and 28% respectively. On average, the probability is higher (by about 1%) in a semi-urban area, but lower (by about 8%) in a rural area than in an urban area. Renting a dwelling for the household to live in affects the decision to work positively obviously because, without working there will not be

Table 67(a): Employment probit results (CSS)[19]

variable	Estimate-African males	Change in probability	Estimate -African females	Change in probability	Estimate-coloured males	Estimate – white Males	Estimate – white Females
intercept	-1.269*** (39.597)		0.541*** (6.488)		-0.311 (0.092)	-11.463 (4.73E-7)	-4.639 (3.17E-8)
age	0.027*** (57.649)	-0.01	-0.004 (1.681)	0.00	0.025 (2.381)	0.129*** (44.465)	0.016* (3.756)
education	-0.035*** (12.461)	0.01	-0.055*** (39.721)	0.02	-0.052 (1.348)	0.229*** (10.979)	-0.227*** (16.263)
Marital2	-0.594*** (28.890)	-0.22	0.311*** (6.778)	0.11	-0.907 (2.106)	6.100 (1.34E-7)	0.489 (9.4E-11)
Marital3	-0.747*** (16.735)	-0.28	0.073 (0.296)	0.02	-1.533* (3.457)	5.225 (9.83E-8)	6.432 (5.92E-8)
semiubn	-0.040 (0.020)	-0.01	0.831** (3.779)	0.32	-	0.153 (0.005)	5.764 (4.94E-9)
rural	0.269* (3.510)	0.08	0.182 (0.755)	0.06	-0.232 (0.105)	-0.214 (0.211)	-7.497 (8.60E-9)
Ownship2	0.063 (0.071)	0.02	-0.193 (0.150)	-0.06	0.208 (0.048)	-6.308 (6.91E-8)	6.661 (1.46E-8)
Ownship3	-0.522** (6.547)	-0.19	-0.597** (4.088)	-0.16	-0.581 (1.205)	0.352 (0.598)	-7.118 (6.04E-8)
Ownship4	-0.226* (3.308)	-0.08	-0.029 (0.027)	-0.01	-0.312 (0.165)	0.431 (0.871)	7.381 (8.33E-9)
Relat2	1.251*** (20.135)	0.22	0.116 (0.992)	0.04	7.925 (3.15E-7)	15.744 (4.03E-8)	6.381 (1.26E-8)
Relat3	2.107*** (329.605)	0.25	0.921*** (60.531)	0.35	1.789*** (7.766)	11.482 (4.75E-7)	7.249 (7.73E-8)
Relat4	1.927*** (205.677)	0.25	0.794*** (38.975)	0.30	2.271*** (8.148)	17.989 (4.73E-7)	12.860 (8.44E-8)
Relat5	1.816*** (8.482)	0.25	0.513 (0.601)	0.10	-0.081 (0.008)	16.889 (1.32E-7)	-0.192 (5.0E-12)
No. 0 =	1404		2220		85	92	239
Total =	2330		2791		150	312	335
P>Chisq	0.000		0.063		0.362	0.880	0.037

(Source: Calculated from the CSS sample)

[19] The R^2 of a probit model is not a reliable measure of the amount of variation of a dependent variable explained by the model because there are different ways of measuring it which also yield different results (Maddala, 1992:333).

money for the rent. In North West province, being related to the head of household lowers the probability of employment by almost 25%. An increase in household size tends to lower someone's probability of being employed (Table 3 in Appendix A).

Table 67 (b): Regression results (CSS) – log of hourly wage rate (adjusted for employment selectivity bias)

Variable	Estimate – African males	Estimate – African females	Estimate – coloured males	Estimate – white males	Estimate – white females
intercept	-0.238 (-1.413)	-0.472* (-1.716)	0.174 (0.174)	0.609 (1.596)	0.986 (1.301)
exp	0.010 (0.930)	-0.006 (-0.445)	0.030 (0.606)	0.048** (2.491)	0.105* (1.953)
sqexp	-0.000 (-0.700)	0.000 (0.260)	-0.000 (-0.266)	-0.001* (-1.712)	-0.003** (-2.178)
Educ2	0.115 (1.526)	0.062 (0.381)	0.914 (1.236)	-	-
Educ3	0.320*** (4.171)	0.232 (1.449)	0.712 (1.192)	-	-
Educ4	0.262** (2.496)	0.205 (1.072)	1.594** (2.504)	-0.166 (-0.841)	-0.522 (-0.713)
Educ5	0.652*** (5.456)	0.133 (0.681)	0.317 (0.373)	0.028 (0.141)	0.510 (-0.246)
Educ6	0.756*** (4.509)	0.264 (1.166)	0.493 (0.538)	0.290 (1.209)	-0.246 (-0.326)
Region2	0.413*** (4.372)	0.467** (2.504)	0.458 (0.813)	0.321 (1.324)	-0.349 (-0.786)
Region3	0.335*** (3.014)	0.365** (2.360)	-	-	-
Region4	0.343*** (3.675)	0.394*** (2.829)	1.253 (1.622)	0.049 (0.186)	-0.484 (-0.759)
Region5	0.112 (0.876)	0.202 (1.142)	-	-	-
Region6	0.518*** (4.467)	0.329 (1.343)	1.914* (1.860)	0.165 (0.719)	-0.219 (-0.581)
Region7	0.030 (0.356)	0.205 (1.336)	0.776 (1.586)	0.190 (0.882)	-0.128 (0.318)
semiubn	0.138 (1.123)	-0.309 (-0.428)	-	-0.095 (-0.365)	-
rural	0.021 (0.363)	0.208 (1.255)	-0.607 (-1.742)	0.042 (0.430)	-0.553 (-1.342)

TABLE 67(b) (CONTINUED)

variable	Estimate- African males	Estimate – African females	Estimate- coloured males	Estimate – white males	Estimate – white females
Marital2	0.134 (1.551)	0.185* (1.880)	0.135 (0.220)	0.134 (0.692)	-0.066 (-0.138)
Marital3	0.158 (1.195)	0.403** (2.589)	-1.849 (-1.518)	-0.263 (-0.521)	-0.339 (-0.565)
Indust2	1.445*** (14.368)	1.576*** (5.413)	1.291 (1.628)	0.542* (1.927)	2.122** (2.292)
Indust3	1.233*** (13.045)	1.185*** (6.137)	1.006* (2.047)	0.228 (0.763)	1.340 (1.580)
Indust4	0.951*** (8.517)	0.830*** (-0.033)	-0.016 (-0.033)	0.441 (1.556)	0.703 (1.256)
Indust5	1.351*** (10.820)	1.154*** (3.870)	-0.027 (-0.041)	-0.081 (-0.261)	1.311** (2.099)
Indust6	1.155*** (7.487)	1.191*** (4.324)	-0.522 (-0.500)	0.690** (2.110)	0.902 (1.516)
Indust7	1.302*** (12.689)	1.323*** (8.169)	0.411 (0.853)	0.459 (1.581)	0.944* (1.862)
Indust8	0.081 (0.284)	0.508 (1.236)	-	-	-
Occup1	0.810*** (4.163)	1.373*** (6.433)	1.624 (1.618)	1.183*** (3.841)	1.192** (2.486)
Occup2	0.598*** (3.872)	0.957*** (6.343)	1.683** (2.526)	1.211*** (3.889)	1.401*** (3.036)
Occup3	0.412*** (3.886)	0.573*** (4.171)	0.718 (1.124)	0.886** (2.355)	1.045** (2.504)
Occup4	0.245** (2.110)	0.308** (2.335)	0.493 (0.937)	0.604** (2.076)	0.837* (1.719)
Occup5	0.048 (0.588)	0.598*** (3.405)	-0.179 (-0.394)	1.046*** (3.644)	0.770 (0.799)
Occup6	0.019 (0.270)	0.437* (1.894)	-0.014 (-0.031)	0.918*** (2.912)	-
union	0.275*** (4.312)	0.103 (1.086)	0.210 (0.524)	0.252** (2.335)	-
Lambda1	-0.026 (-0.324)	0.133 (0.480)	-0.463 (-1.386)	0.008 (0.340)	-0.072 (-1.475)
No.	588	298	43	124	64
R^2	0.76	0.61	0.89	0.62	0.68
Adj. R^2	0.75	0.56	0.66	0.51	0.47

(Source: calculated from the CSS sample)

On average, the probability that an African female in North West province is in wage employment is 26%. In general, age does not affect the probability of employment for females. However, a separate earnings function, which was estimated for females with ages of between 34 and 65 years showed that the probability of wage employment increases significantly with age. An additional year of schooling increases the probability by about 2%, *ceteris paribus*.

It is noticeable from Table 67(a) that, unlike for males, marriage or being a widow decreases an average female's probability of wage employment. The reasons for this may be dependence on a husband, responsibilities towards children as well as other home responsibilities. Insurance pay-outs in case of a husband's death may also be a reason. It is alleged that women in South Africa make a fortune out of pay-outs from their husbands' life insurance policies in the event of death. It is likely that females' urge to work decreases as a result of this. Being a widow in North West province decreases the probability of employment by 2%. As with males, living in rural areas lowers the probability by 8%.

In conclusion, the significant determinants of wage employment of Africans in North West province are age, education, marital status, type of area of residence, ownership of the dwelling and/or site in which the household is living and relationship with the head of household.

For coloured males the probability of being employed in North West province was found to be 72%. The significant determinants of the decision to work or probability of wage employment for coloured males are marital status and relationship with the head of household. Marriage is likely to increase the probability of being employed amongst coloured males. As with Africans, being related to the head of household lowers the probability of employment. This may be due to the fact that the existence of

money earners in the household (including the head) often leads to a situation where other household members can devote more time to non-work activities.

The results also indicate that, for both white males and white females, age and education influence the probability of wage employment in North West province significantly. The probabilities were found to be 100% and 81% for white males and females respectively. For white households in North West province, age was found to be negatively correlated with the probability of being employed, and education positively.

Table 67(b) shows the estimated coefficients of the log of wage rate regression model by population group and gender. For all the population groups and genders the inclusion of an employment selectivity variable (the Mill's ratio) in the model did not change the coefficients significantly. The variable itself was found to be insignificant. This implies that it cannot be concluded that there is any correlation between unobserved factors that affect the probability of employment or decision to work and the individual's earnings.

For African males, the significant determinants of earnings in North West province are education, region, marital status, industry, occupation and union membership. It was found that, on average, better educated Africans earn more than the less educated, *ceteris paribus*. Africans residing in regions and sub-regions 2, 3, 4 and 6 are better off economically than those in region 1 (i.e. Huhudi). Earnings are likely to be the highest in region 6 (i.e. Rustenburg sub-region that consists of areas in the former Transvaal province). The worst regions in terms of earnings are region 1, sub-region 5 and region 7. The results suggest that it does not matter economically whether someone is living in a rural area or urban area in North West province since the earnings are likely to be more or less the same, *ceteris paribus*. This may be due to the fact that a large number of men permanently living in rural areas of North West province are employed in urban areas (as migrant workers) in the mining industry. The

implication of this is that it is the "place of work" and not the "type of area of residence" which matters as far as household earnings in North West province are concerned.

In North West province, the individuals employed in the agricultural and domestic services industries are likely to earn the least. In case of African males there is no significant difference in wage levels between skill occupations in agriculture, forestry and fisheries, craft related and trade occupations and plant and machine operating occupations on one hand, and elementary occupations on the other.

Similar results were obtained for African females. The only notable exceptions are firstly that the coefficient on education is not large and the coefficient on "union" is not significant. Education became insignificant when lambda1 (the selectivity variable) was included in the model - possibly because the selectivity variable is correlated with it. This may imply that the unobserved factors of the probability of employment for African females such as ability and attitude are correlated with education. The regression models explain 76% and 61% of the total variation of the log of wage rates for African males and females respectively.

An African male worker with standards "5-7" level of education earns 65% more than one with no formal education, *ceteris paribus*. On average, an African male working in sub-region 6 earns about 52% more than one who works in region 1. In North West province, when an average African male works in the mining industry his earnings will be about 145% more than the earnings he would receive if he worked in the agricultural industry, holding other factors constant. An African male engaged in a managerial or supervising occupation on average earns about 81% more than one in elementary occupation, *ceteris paribus*. It is implied on average that when an African male becomes a union member his earnings increase by about 28%.

Statistically, there does not seem to be a difference between the agricultural industry and the domestic industry, and between plant and machine operating occupations (e.g. driving) and elementary occupations in North West province for African males.

For coloured males education, region, industry and occupation are the significant determinants of earnings. The effects of these variables on earnings are similar to those for African males. The R^2 is 0.89.

For white males, industry, occupation, union, experience and squared experience are significant determinants of earnings. Of these, occupation was found to be the most important. Work experience of white males in North West province is positively correlated with earnings as expected. Except the mining and finance industries, all industries are likely to offer similar earnings to white males[20]. Whites employed in the mining and finance industries seem to be earning more than those engaged in other industries especially agriculture.

The results indicate that when the work experience of an average white male increases by one year, his earnings tend to increase by about 5%. On average a white male who works in the mining (or finance) industry earns 54% (or 69%) more than one who works in the agricultural industry, *ceteris paribus*. On average a white male engaged in a managerial or supervising occupation earns about 118% more than one in an elementary occupation, *ceteris paribus*. The second lowest pay occupations for white males in North West province are service, shop and sales occupations.

[20] It should be noted that the domestic industry was not compared with others because of paucity of data.

For white females it is experience, squared experience, industry and occupation which are significant determinants of earnings. Earnings of females in the mining, transport, storage and communications, and community and social services differ significantly from earnings they can obtain in the agricultural sector. The difference between earnings of females in service, shop and sales, skilled agriculture, forestry and fisheries or craft related and trade occupations on one hand, and those of females in elementary occupations on the other was found to be insignificant in North West province. The negative sign of the coefficient of the squared experience implies that experience contributes to the downward curving of earnings profiles as expected. The effects of these variables on white females' earnings are similar to those in case of white males. It is worth noting that while the difference between the earnings of an average white male who works in the mining industry and those of the one working in the agricultural industry is 54% it is 212% for an average white female. This may indicate labour market discrimination against males. The R^2's are 0.62 and 0.68 for white males and white females respectively.

Table 68(a) shows the results from a probit regression using data obtained from the own sample. There is no difference between the signs of the coefficients on the significant variables, whether data from the own sample (table 68(a)) or those from the CSS sample (table 67(a)) were used. Table 68(a) indicates that 'region' is a significant determinant of the probability of employment too for African females. On average, for individuals residing in the Central or Eastern regions of North West province, the chances of being employed are more than the chances of individuals in Huhudi region.

With the maximum R^2 improvement SAS technique, it was found that occupation is the most important determinant of earnings of African males with an R^2 of 0.19. The best five determinants of the log of hourly wage rate are region, education, industry, occupation and union membership. The

corresponding significant dummy variables are Klerksdorp, educ6, indust5, occup5 and union. The model yielded 0.52 for the R^2. The significant variables in the final earnings model (Table 68(b)) are experience, squared experience, education, interaction of education and experience, place of work, industry, occupation and union membership with an R^2 of 0.68.

Table 68(a): Employment probit results (own sample)

Variable	Estimate - males	Estimate – females
intercept	0.890** (6.102)	3.325*** (59.338)
age	-0.013 (2.208)	-0.045*** (25.309)
education	-0.071*** (10.853)	-0.863*** (41.863)
Marital2	-0.661*** (12.179)	-0.319 (1.031)
Marital3	0.246 (0.197)	-0.248 (0.552)
Central	-0.013 (0.004)	-0.480** (4.920)
Klerksdorp	-0.277 (1.917)	-0.330 (2.394)
Rustenburg	0.159 (0.317)	-0.156 (0.298)
Eastern	-0.239 (0.775)	-0.483** (3.830)
Relat2	0.850 (2.586)	0.155 (0.225)
Relat3	0.969*** (8.833)	-0.263 (0.784)
Relat4	0.851*** (7.965)	0.277 (0.725)
Relat5	-	-0.590 (0.433)
No. 0 =	145	246
1 =	243	182
Total =	388	428
Prob>Chisq	0.026	0.009

(Source: Calculated from own sample)

Table 68(b): Regression results (own sample) – log of hourly wage rate (adjusted for employment selectivity bias)

variable	Estimate - males	Estimate – females
intercept	0.568 (1.400)	0.763 (1.400)
exp	0.086*** (4.512)	0.070** (2.330)
sqexp	-0.001** (-2.360)	-0.001 (-0.707)
educexp	-0.006*** (-3.064)	-0.003 (-1.010)
Marital2	-0.043 (-0.200)	0.127 (0.894)
Marital3	-0.134 (-0.346)	-0.460* (-1.857)
Central	0.192 (1.253)	0.489** (2.218)
Klerksdorp	-0.182 (-1.105)	0.066 (0.300)
Rustenburg	0.064 (0.316)	0.384 (1.523)
Eastern	-0.004 (0.000)	0.216 (0.860)
Educ2	0.305 (1.568)	0.246 (0.608)
Educ3	0.605*** (2.843)	0.550 (1.389)
Educ4	0.821*** (2.895)	0.773* (1.803)
Educ5	0.847*** (2.978)	0.923** (2.083)
Educ6	1.417*** (3.981)	1.515*** (2.995)
Employer2	-0.155 (-0.656)	-0.047 (-0.141)
Employer3	-0.206 (-1.393)	-0.570** (-2.322)

TABLE 68(b) (CONTINUED)

Variable	Estimate - males	Estimate - female
Employer4	-0.007 (-0.000)	0.043 (0.100)
Employer5	-0.429 (-0.872)	-0.284 (-0.728)
Pwork2	0.306** (2.112)	-0.008 (-0.089)
Pwork3	0.416*** (2.997)	-0.115 (0.686)
Indust2	0.439** (2.071)	0.501 (0.943)
Indust3	0.439** (2.071)	0.501 (0.943)
Indust4	0.441** (2.202)	0.057 (0.141)
Indust4	0.430** (2.229)	0.039 (0.100)
Indust5	0.689*** (3.072)	0.167 (0.500)
Indust6	0.263 (0.624)	-0.617 (-1.625)
Occup2	-0.071 (-0.361)	-0.106 (-0.424)
Occup3	-0.525*** (-2.805)	0.394 (1.277)
Occup4	-0.476*** (-2.613)	0.558* (1.780)
Occup5	-0.825*** (-4.000)	-0.241 (-0.938)
union	0.342 (3.330)	0.125 (0.849)
Lambda1	0.222 (0.678)	0.149 (0.557)
No.	95	148
R^2	0.68	0.74
Adj. R^2	0.62	0.67

(Source: Calculated from own sample)

For African males an additional year of work experience is likely to increase his earnings by about 9%, *ceteris paribus*. The negative effect of the interaction of education and experience on earnings may imply

that the more one is educated the less work experience one requires to earn the same amount of money and vice versa. Positive estimates of education coefficients indicate that education increases earnings. Positive estimates of the coefficients of the dummy variables for "place of work" imply that on average, people earn more when they work in big towns or cities than when they work in villages, small rural towns or trading centres. The results indicate that someone who works in a city in North West province earns about 42% more than when he/she works in a small rural town, *ceteris paribus*.

African males employed in the agricultural and domestic industries earn relatively low wages in North West province. African males employed in managerial positions earn more than those in elementary occupations, as expected. On average, members of trade unions in North West province earn 34% more than non-members, *ceteris paribus*.

For African females industry is the most important determinant of earnings according to a one-variable model. The three best variables are interaction of education and experience, industry and occupation. Including all the three dummy variables in the model yielded an R^2 of 0.56. When the other variables were included in the model, "educexp" and "indust5" became insignificant, which may imply that these variables are somehow correlated with some of the variables, which had not been included in the model previously. According to the final model (table 68(b)), the significant variables for African females are experience, marital status, region, education, employer and occupation with an R^2 of 0.74 This implies that the important determinants of African female earnings in North West province are experience, marital status, region, education, employer and occupation.

According to the own sample the effects of education on African female earnings are similar to those for African males. The only difference is that education seems to be valued more for females than for males at higher levels schooling but it is the other way round for low levels of schooling. For example,

the coefficient of educ6 is estimated at 1.515 for females but at 1.417 for males, and it is 0.821 for educ4 in the case of males and 0.773 for females (see table 68(b)). It may be necessary to determine whether the differences between coefficient figures are statistically significant or not. Significant differences would indicate labour market discrimination against males at high and against females at low levels of schooling. The general impression from the results is that education is not an important determinant of female earnings differentials especially at low levels of schooling.

The Central region of North West province seems to be better off economically than Huhudi region. On average females residing in the Central region earn about 50% more than those in Huhudi region. Apparently private employers pay females 57% less than what they would have been paid had they worked in the public sector, *ceteris paribus*. This may imply that females are discriminated against in the private sector in North West province.

Surprisingly, it was found that females are paid more for "skilled agriculture, fisheries and forestry" occupations, craft related and trade occupations, and "plant and machine operating" occupations than for "administrative, management and supervisory" occupations, *ceteris paribus*. However, the difference is weakly significant, at the 10% level of significance.

4.3.2.2 The double-hurdle model[21]

The results in table 69(a) indicate that the probability of labour force participation of Africans in North West province increases with schooling and age, but decreases when a woman is married. Similar

[21] A double-hurdle model could not be fitted for coloureds, Asians and whites because of lack of data.

results have been found in previous studies based on data from other countries (e.g. see Falaris, 1995). Per capita income (i.e. nlbincm), which excludes the individual's earnings, was used as a proxy for non-labour income. The variable is significant for males. Its positive coefficient implies that non-labour income is inversely proportional to the probability of labour force participation[22].

Similar results (table 70(a)) were obtained when the CSS sample was used. The only exception is that the male participation probit model finds many significant coefficients of the dummies for relationships with the head of household in case of the CSS sample. Positive estimates of the coefficients imply that being related with the head of household lowers the probability of participation in the labour force. This may imply that African males are either lazy, reluctant or do not have the urge to work when there is some one who will provide for them – the tendency is then for them to devote more time to non - work activities. This argument is consistent with that of a positive coefficient of non-labour income in the labour force participation model.

Regarding earnings functions in Table 69(b), the selectivity variables (i.e. lambda1 and lambda2) are significant for females. A significant selectivity variable gives evidence of a selectivity bias if the earnings model were estimated using the OLS method. In the table, lambda1 represents the employment selectivity variable and lambda2, the participation selectivity variable. The coefficients of the selectivity terms are functions of the correlations of the error terms of the earnings function, and the participation and employment probit models respectively. Hence, a positive coefficient of the participation selectivity variable implies that women who are more likely to participate in the labour force earn higher wages than would have been earned by observationally identical women who are less

[22] According to SAS algorithm, the probit model calculates the probability for y = 0, the probability that an average person will not participate in the labour force.

Table 69(a): Participation and employment probit results (own sample)

Variable	Estimate – Participation (males)	Estimate – Participation (females)	Estimate – Employment (males)	Estimate – Employment (females)
Intercept	3.503*** (6.795)	1.687* (2.729)	3.904*** (15.712)	5.839*** (28.551)
age	-0.257*** (14.304)	-0.145*** (7.718)	-0.178*** (12.931)	-0.193*** (11.595)
sqage	0.003*** (14.665)	0.002*** (9.440)	0.002*** (11.630)	0.002*** (6.692)
education	-0.088** (5.861)	-0.130*** (18.878)	-0.076*** (11.557)	-0.147*** (29.093)
Marital2			-0.492** (5.954)	-0.249 (0.538)
Marital3			0.344 (0.358)	-0.298 (0.611)
Central			-0.152 (0.531)	-0.553** (5.299)
Klerksdorp			-0.293 (2.046)	-0.333 (2.028)
Rustenburg			0.057 (0.040)	-0.412 (1.724)
Eastern			-0.269 (0.893)	-0.483* (3.143)
Relat2	0.849 (1.944)	0.709*** (10.597)	1.005* (3.563)	0.207 (0.342)
Relat3	-5.839 (1.422E-7)	0.195 (0.266)	1.104*** (10.635)	-0.143 (0.194)
Relat4	0.533 (2.077)	0.156 (0.153)	0.800** (6.603)	0.333 (0.887)
Relat5	-	-4.708 (8.648E-8)	-	-
nlbincm	0.000* (3.887)	-0.000 (0.045)	-	-
No. 0 =	20	47	137	213
1 =	368	375	244	182
Total =	388	422	381	395
Prob>Chisq	0.707	0.329	0.264	0.000

(Source: Calculated from own sample)

Table 69(b): Regression results (own sample) – log of hourly wage rate (adjusted for participation and employment selectivity bias)

Variable	Estimate - males	Estimate – females
intercept	0.448 (1.215)	0.643 (1.140)
exp	0.073*** (3.839)	0.084*** (2.961)
sqexp	-0.001 (-1.439)	-0.001 (-0.611)
educexp	-0.008*** (-3.585)	-0.005** (-2.041)
Marital2	-0.007 (-0.040)	0.271* (1.820)
Marital3	-0.044 (-0.121)	-0.749*** (-2.844)
Central	0.129 (0.876)	0.368 (1.656)
Klerksdorp	-0.207 (-1.382)	-0.091 (-0.414)
Rustenburg	0.068 (0.349)	0.205 (0.794)
Eastern	-0.166 (-0.921)	0.004 (0.016)
Educ2	0.299 (1.580)	0.075 (0.187)
Educ3	0.577*** (2.850)	0.202 (0.511)
Educ4	0.643** (2.512)	0.309 (0.700)
Educ5	0.820*** (3.157)	0.477 (1.041)
Educ6	1.390*** (4.225)	0.838 (1.566)
Employer2	-0.053 (-0.234)	0.026 (0.075)
Employer3	-0.209 (-1.465)	-0.666*** (-2.733)
Employer4	0.005 (0.008)	0.125 (0.231)
Employer5	-0.234 (-0.497)	-0.409 (-1.051)
Pwork2	0.268* (1.895)	0.136 (0.641)

TABLE 69(b) (CONTINUED)

variable	Estimate - males	Estimate - females
Pwork3	0.414***	-0.070
	(3.037)	(-0.412)
Indust2	0.385*	0.862
	(1.873)	(1.485)
Indust3	0.474**	0.186
	(2.436)	(0.440)
Indust4	0.345*	0.008
	(1.828)	(0.025)
Indust5	0.668***	0.008
	(3.070)	(0.023)
Indust6	0.246	-0.688
	(0.611)	(-1.853)
Occup2	-0.061	-0.221
	(-0.335)	(-0.919)
Occup3	-0.484***	0.342
	(-2.778)	(1.139)
Occup4	-0.439**	0.218
	(-2.527)	(0.685)
Occup5	-0.866***	-0.284
	(-4.401)	(-1.137)
union	0.413***	0.109
	(4.078)	(0.756)
Lambda1	0.310	0.463*
	(1.328)	(1.823)
Lambda2	0.052	0.228**
	(0.958)	(2.197)
No.	191	143
R^2	0.71	0.76
Adj. R^2	0.66	0.68

(Source: Calculated from own sample)

likely to participate in the labour force. Similarly, a positive coefficient for the employment selectivity variable implies that women who have a higher probability of being employed earn more than those who are less likely to be employed, *ceteris paribus*. It is likely then that the variables which are not included in the participation and employment probit models such as children under the age of 15, ability, attitude and commitment affect the wages earned by women and that, on average, these variables affect earnings of those employed positively.

Education coefficients (Table 68(b)), adjusted for only the employment selection bias, are different from those obtained in the double-hurdle model (Table 69(b)). The education coefficients estimated by using the Heckman's (1976b) two-stage estimation technique are larger than those calculated in the double-hurdle model. Those in the double-hurdle model are not significant for females. For instance, the estimate of the coefficient for the 'standards 8-9' dummy (i.e. educ4) is 0.773 in the regression model in Table 68(b) while it is 0.309 in the double-hurdle model in Table 69(b). This means that estimating a female earnings model by the OLS method biases education coefficients upwards.

Table 70(b) contains the results from the double-hurdle model using the CSS sample data. The results indicate that the estimation could have been done without correcting for selectivity biases and the same inference could have been obtained - because the selectivity variables are not significant for both genders. The regression estimates in the earnings function are similar to those obtained in Table 67(b) when only the employment selectivity bias had been removed.

Table 70(a): Participation and employment probit results (CSS)

Variable	Estimate – Participation (males)	Estimate – Participation (females)	Estimate – Employment (males)	Estimate – Employment (females)
intercept	-0.383 (0.767)	0.587 (2.574)	-0.031 (0.006)	1.351*** (13.210)
age	-0.107*** (27.017)	-0.071*** (17.462)	-0.075*** (14.654)	-0.058*** (11.146)
education	-0.008 (0.266)	-0.066*** (43.553)	-0.026** (4.181)	-0.067*** (43.953)
Marital2	-0.235 (1.524)	0.604*** (19.200)	-0.413*** (8.988)	0.623*** (19.390)
Marital3	-0.774** (5.731)	0.315** (3.834)	-0.806*** (10.557)	-0.017 (0.012)
semiubn	-4.953 (4.064E-7)	0.764* (2.887)	0.183 (0.214)	0.784 (2.625)
rural	0.101 (0.243)	0.423** (5.432)	0.553*** (7.442)	0.022 (0.008)
Ownship2			0.070 (0.052)	-0.223 (0.144)
Ownship3			-0.876** (4.573)	-0.666* (3.712)
Ownship4			-0.203 (1.676)	0.074 (0.130)
Relat2	1.794*** (34.959)	0.087 (0.583)	1.419*** (22.919)	-0.004 (0.001)
Relat3	1.358*** (48.581)	0.090 (0.436)	1.586*** (124.251)	0.527*** (14.670)
Relat4	1.376*** (41.213)	0.179 (1.518)	1.404*** (69.803)	0.451*** (9.027)
Relat5	2.380*** (9.352)	0.305 (0.171)	1.502** (3.882)	0.606 (0.673)
No. 0 =	203	626	484	1048
1 =	1246	1024	926	570
Total =	1449	1650	1410	1618
Prob>Chisq	1.000	0.492	0.000	0.673

(Source: Calculated from the CSS sample)

Table 70(b): Regression results (CSS) – log of hourly wage rate (adjusted for participation and employment selectivity bias)

variable	Estimate - males	Estimate - females
intercept	-0.296 (-1.263)	-0.735 (-1.164)
exp	0.005 (0.340)	-0.012 (-0.391)
sqexp	0.000 (-0.096)	0.000 (0.242)
Educ2	0.152* (1.960)	0.139 (0.692)
Educ3	0.390*** (4.902)	0.172 (0.662)
Educ4	0.341*** (3.184)	0.164 (0.452)
Educ5	0.783*** (6.468)	0.091 (0.209)
Educ6	0.864*** (5.279)	0.177 (0.339)
Region2	0.402*** (4.315)	0.588*** (2.887)
Region3	0.335*** (3.050)	0.475*** (2.832)
Region4	0.359*** (3.912)	0.441*** (2.911)
Region5	0.184 (1.452)	0.206 (1.084)
Region6	0.508*** (4.506)	0.401 (1.557)
Region7	0.045 (0.543)	9.295* (1.752)
semiubn	-0.040 (-0.071)	-0.031 (-0.035)
rural	-0.020 (-0.277)	0.280 (0.980)
Marital2	0.133 (1.746)	0.347 (1.022)
Marital3	0.157 (1.162)	0.530** (2.010)
Indust2	1.416*** (14.417)	1.357*** (4.485)
Indust3	1.281*** (13.405)	1.051*** (5.004)

TABLE 70(b) (CONTINUED)

variable	Estimate - males	Estimate - females
Indust4	0.917***	0.719***
	(8.406)	(4.111)
Indust5	1.349***	0.979***
	(11.158)	(3.162)
Indust6	1.143***	1.077***
	(7.642)	(3.544)
Indust7	1.317***	1.202***
	(12.823)	(6.928)
Indust8	0.092	0.669
	(0.334)	(1.307)
Occup1	0.844***	1.372***
	(4.535)	(6.253)
Occup2	0.578***	1.046***
	(3.763)	(6.650)
Occup3	0.396***	0.609***
	(3.817)	(4.168)
Occup4	0.180	0.375***
	(1.583)	(2.667)
Occup5	0.111	0.753***
	(1.354)	(3.992)
Occup6	0.019	0.537**
	(0.291)	(2.129)
union	0.244***	0.135
	(3.908)	(1.376)
Lambda1	-0.042	-0.106
	(-0.402)	(-0.275)
Lambda2	0.034	0.394
	(0.290)	(0.477)
No.	574	281
R^2	0.78	0.61
Adj. R^2	0.77	0.56

(Source: Calculated from the CSS sample)

4.3.3 Hourly wage rate with education Splines[23]

By employing the Heckman's (1976b) two-stage estimation technique, the results (table 7(a) in Appendix A) indicate that primary schooling increases someone's probability of being in wage employment for both genders. Secondary schooling does only for females. An additional year of primary and secondary schooling (Table 7(b) in Appendix A) increases the log of wage rate by approximately 11% and 9% for African males, and 9% and 17% in the case of African females respectively. After matriculation, further education does not seem to add to wages for either gender. The participation probit results (table 8(a) in Appendix A) indicate that primary schooling increases the probability of participating in the labour force for males whereas secondary schooling does, only for females. For males, non-labour income in North West province vary negatively with the probability of participation in the labour force. African males in rural areas of North West province tend to have a higher probability of labour force participation. The reason for this may be "disguised employment" which is a common characteristic in rural areas of developing countries.

The double-hurdle model results (Table 8(b) in Appendix A) demonstrate that, for males in North West province an additional year of primary and secondary schooling is likely to increase wages by approximately 9.7% and 10.4% respectively. According to the table, the employment selectivity variable, lambda1, (in case of males), and that of labour force participation, lambda2, (for females) are significant (though weakly at 10% level of significance). The positive coefficients of the selectivity variables imply that the variables excluded from the employment and participation models affect wages positively for males and females respectively.

[23] The regression results are shown in tables 7(a) and (b), 8(a) and (b), and 9(a) and (b) in Appendix A to avoid crowding the text with tables.

The results (Table 9(b) in Appendix A) indicate that an additional year of primary schooling adds to the wage by about 5.4% for African males while that of secondary schooling increases the wage by between 9.4% for white males and 10.3% for African males. Estimates calculated from the CSS sample data (table 9(b) in Appendix A) indicate that schooling does not contribute to females' wages in North West province, but an additional year of secondary schooling may increase the probability of being employed regardless of population group. This may be due to the poor labour market participation of women as well as discrimination against women. The poor labour market participation of females tends to cause a depreciation of their human capital, which consequently decreases their earnings. Schooling does not seem to affect wages in case of coloureds. The coloured sub-sample may have been too small to detect the effect.

4.3.4 Discrimination analysis[24]

As was mentioned in chapter one, the Oaxaca and Ransom's (1994) method was used in this study to estimate the components of earnings gaps in North West province. Following Neumark (1988) the non-discriminatory earnings structure was computed from a pooled sample of white males and African males for white/African earnings gap decomposition and a pooled sample of African males and African females for the male/female earnings gap decomposition.

The regression results are shown in Appendix A (Tables 5(b) and 6(b)). The discrimination coefficients were calculated using the regression estimates in table 67(b)(for white/African discrimination) and

[24] White /African comparisons are confined to males while those of male/female are confined to Africans.

Table 69(b) (for male/female discrimination), the mean values of the variables in Tables 71 and 72 and the regression estimates computed from the pooled samples respectively.

The estimated discrimination coefficients are shown in Table 73. In the table, columns 2 and 3 show the logarithmic decomposition of the gross earnings differential into the total discriminatory differential and the measured productivity differential respectively. Column 4 indicates the estimate of the overall labour market discrimination coefficient. Columns 5 and 6 give the white (or male) discriminatory earnings advantage and the African(or female) discriminatory earnings disadvantage respectively. Column 7 indicates the estimate of the productivity differential.

Table 71: Mean values of the variables (CSS)[25]

Variable	Mean (African males)	Mean (African females)	Mean (white males)
Salary (in Rands per month)	1137.160 (1105.800)	1419.180 (1153.930)	5061.080 (2575.390)
Experience (in years)	24.197 (10.412)	20.387 (12.212)	21.233 (10.410)
Experience squared	693.722 (541.543)	564.296 (583.780)	558.391 (478.539)
Age (in years)	39.428 (10.358)	35.958 (12.114)	37.414 (10.238)
Education (in years)	5.143 (3.493)	6.562 (3.749)	9.790 (1.750)
Educ1	0.167	0.106	0.000
Educ2	0.218	0.172	0.000
Educ3	0.354	0.305	0.068

[25] **Figure in parentheses are standard deviations**

TABLE 71 (CONTINUED)

variable	African males	African females	white males
Educ4	0.127	0.136	0.293
Educ5	0.086	0.154	0.406
Educ6	0.048	0.127	0.233
Region1	0.074	0.103	0.053
Region2	0.162	0.079	0.256
Region3	0.087	0.187	0.000
Region4	0.201	0.296	0.075
Region5	0.054	0.097	0.000
Region6	0.096	0.042	0.256
Region7	0.306	0.184	0.361
Marital1	0.210	0.426	0.098
Marital2	0.739	0.462	0.895
Marital3	0.051	0.112	0.008
Indust1	0.395	0.119	0.030
Indust2	0.142	0.025	0.311
Indust3	0.122	0.085	0.218
Indust4	0.090	0.266	0.158
Indust5	0.048	0.021	0.090
Indust6	0.028	0.030	0.045
Indust7	0.151	0.435	0.143
Indust8	0.020	0.009	0.000
Occup1	0.022	0.044	0.131
Occup2	0.045	0.163	0.128
Occup3	0.079	0.175	0.023
Occup4	0.079	0.190	0.113
Occup5	0.143	0.076	0.414
Occup6	0.166	0.033	0.143
Occup7	0.418	0.272	0.030
urban	0.264	0.088	0.414
semiubn	0.045	0.003	0.030
rural	0.691	0.909	0.556
Ownship1	0.245	0.100	0.282
Ownship2	0.029	0.006	0.052
Ownship3	0.111	0.031	0.180
Ownship4	0.618	0.864	0.496
Relat1	0.897	0.333	0.948
Relat2	0.008	0.349	0.000
Relat3	0.061	0.221	0.052
Relat4	0.032	0.097	0.000
Relat5	0.002	0.000	0.000
union	0.261	0.586	0.444
Lambda1	1.091	0.586	1.862

(Source: Calculated from the CSS sample)

Table 72: Mean values of the variables (own sample)

Variable	Mean - males	Mean - females
Gross salary (in Rands per month)	2017.000 (1695.000)	1976.000 (1735.000)
Age (in years)	38.309 (10.157)	38.265 (9.535)
Education (in years)	6.575 (3.824)	7.956 (3.304)
Experience (in years)	8.442 (6.876)	8.106 (7.417)
Experience squared	118.348 (212.509)	120.417 (204.255)
educexp	54.452 (57.509)	67.887 (69.990)
Marital1	0.295	0.436
Marital2	0.687	0.469
Marital3	0.017	0.092
Huhudi	0.178	0.168
Central	0.278	0.276
Klerksdorp	0.304	0.276
Rustenburg	0.087	0.103
Eastern	0.152	0.178
Educ1	0.110	0.033
Educ2	0.171	0.132
Educ3	0.261	0.249
Educ4	0.104	0.141
Educ5	0.248	0.232
Educ6	0.100	0.200
Employer1	o.243	0.473
Employer2	0.043	0.038
Employer3	0.657	0.287
Employer4	0.022	0.016
Employer5	0.013	0.151
Employer6	0.004	0.027
urban	0.383	0.492
semiubn	0.335	0.260
rural	0.283	0.249
Pwork1	0.162	0.210
Pwork2	0.265	0.195
Pwork3	0.544	0.510
Indust1	0.074	0.060
Indust2	0.236	0.016

TABLE 72 (CONTINUED)

Variable	Mean - males	Mean - females
Indust3	0.161	0.027
Indust4	0.257	0.168
Indust5	0.248	0.530
Indust6	0.022	0.195
Occup1	0.127	0.355
Occup2	0.117	0.141
Occup3	0.139	0.092
Occup4	0.422	0.070
Occup5	0.191	0.335
union	0.563	0.518
Lambda1	1.173	0.919
Lambda2	1.926	2.022

(Source: Calculated from own sample)

Table 73: Decomposition of the white/African and male/female earnings differentials

	$\ln(G_{wb}+1) = 1.419$ $\ln(G_{mf}+1) = -0.300$		$G_{wb} = 3.132$ $G_{mf} = -0.350$			
	$\ln(D_{wb}+1/\ln(D_{mf}+1)$	$\ln(Q_{wb}+1/\ln(Q_{mf}+1)$	D_{wb}/D_{mf}	δ_{wo}/δ_{mo}	δ_{ob}/δ_{of}	Q_{wb}/Q_{mf}
(1)	(2)	(3)	(4)	(5)	(6)	(7)
white/African[26]	0.123	1.296	0.131	0.102	0.026	2.586
Male/female	-0.398	0.097	-0.490	-0.170	-0.275	0.100

(Source: Calculated from the CSS sample and own sample)

The table indicates that the white/African gross earnings differential in North West province is about 313% and the productivity differential is 259%. This indicates that almost the whole white/African gross earnings differential is due to the difference in labour productivity between whites and Africans.

[26] The coefficients for the White/African wage decomposition were estimated from the CSS sample and only the employment selectivity bias was removed from the estimates due to paucity of data. For the male/female wage decomposition, own sample was used and the estimates were corrected for both selectivity biases (i.e. for labour force participation and employment).

There is an insignificant labour market discrimination against Africans in North West province - measuring about 13%.

The white discriminatory earnings advantage is about 10% while the African discriminatory earnings disadvantage is about 3%. The results also indicate a male/female gross earnings differential of about -35%. The male/female labour market discrimination coefficient is about -49%. There is a productivity differential in favour of males of 10%. The male discriminatory earnings advantage is about -17% while the female discriminatory earnings disadvantage is –27.5%. The labour market discrimination coefficient of –49% may indicate labour market discrimination in reverse (i.e. against men) if originally labour market discrimination against females existed. The positive productivity differential in favour of males (of 10%) is countered by the (negative) discrimination against females of –49%. This results in an overall gross earnings differential of –35%. One limitation of this method of earnings gap decomposition is that it does not make allowance for statistical significance (Appleton, 1995).

4.4 SUMMARY

In this chapter the econometric methodology and results thereof were presented. The results consisted of regression estimates of the coefficients of socio-economic variables in an earnings function which was based on the theoretical overview of chapter two and the socio-economic profile of households in North West province. It was found that human capital in the form of education and experience is the major determinant of household earnings in North West province, followed by "nature of occupation".

Other significant determinants of household earnings in North West province are former province, wealth, workers, male adults, female adults, family type, dependants, region, area of residence, place of work, industry, employer, hours of work, marital status and union membership. These are generally

consistent with the theory of earnings determinants discussed in chapter two and consistent with the socio-economic profile of households in North West province presented in chapter three.

It was also established that there exists a gross earnings differential of 313% and -35% between whites and Africans, and males and females respectively in North West province. Labour market discrimination against Africans was found to account for only 9% of the earnings gap. On the other hand, it was established, surprisingly, that a significant labour market discrimination against males exists, accounting for about 80% of the male/female earnings gap, which is in favour of females. Productivity differentials explain 91% of the earnings gap between white and African households and 20% of the earnings gap between males and females in North West province.

The results found through the econometric analyses in this chapter will be interpreted and critically evaluated in the next chapter.

CHAPTER 5

DETERMINANTS OF HOUSEHOLD EARNINGS IN NORTH WEST PROVINCE

5.1 INTRODUCTION

This chapter interprets and critically discusses the results of the study as found in chapter four given the theoretical background presented in chapter two and the socio-economic profile of households in North West province as described in chapter three. The purpose of the chapter is to point out whether the findings in chapter four conform to the theories and a priori expectations as discussed in chapter two and are consistent with the socio-economic profile of households in North West province as presented in chapter three. In other words, the discussion is intended to find out whether the theories of earnings determination as discussed in chapter two are valid and applicable to the North West province's earnings structure.

A theoretical correlation structure of the relationships between socio-economic variables and households earnings was discussed in chapter two. In chapter three descriptive statistics pertaining to households in North West province were presented. After the econometric analyses in chapter four, the results are now cross-checked with the a priori expectations.

In section 5.2 the determinants of African household earnings in North West province are interpreted and discussed. The determinants of coloured household's earnings are interpreted and discussed in section 5.3, while those of white households are interpreted and discussed in section 5.4.

The evidence with regard to labour market discrimination and earnings inequality in North West province is interpreted and discussed in Section 5.5. Section 5.6 concludes with a summary.

5.2 DETERMINANTS OF EARNINGS OF AFRICAN HOUSEHOLDS

In chapter two (section 2.3.2.2.6) it was hypothesized that males tend to have a higher labour market participation rate than females due to cultural and social reasons. This was illustrated in chapter three (section 3.5). It was found in chapter four that the probability of an average African male being employed in North West province is 75% while that of an African female is 26% as expected. Age increases the probability of wage employment for middle aged African males (i.e. between 24 and 35 years) but in general, an additional year of age was found to lower the probability of being employed by 1%. Age was found to increase African females' probability of wage employment for females aged between 34 and 65 years but not to affect the probability for those of other ages, contrary to what might have been expected given the theoretical discussion in chapter two and the observation in chapter three.

It was found that an increase in education by one year of schooling tends to raise the probability of African males' employment by about 1% and that of females' employment prospects by 2%. This is consistent with the theoretical discussion in chapter two and with the observation in chapter three (section 3.7.6). On average the African population in North West province perceives a lack of skills to be their most significant obstacle to being employed.

Non-labour income and a relationship with the head of the household were found likely to lower the probability of labour market participation by Africans in general. From the discussion in chapter two (section 2.3.2.2.2) this finding may be explained with reference to the observation that a higher general

level of economic activity in the household may allow some members (including the head) more time for non-work activities.

The results in chapter four indicate that marriage and loss of a spouse will both encourage African males to seek employment. It was found that being married and losing a spouse will increase the probability that an African male is in employment by respectively 22% and 28%. The discussion in chapter two suggested that this may be expected given the increased financial obligations on the head of a household when married or when managing household affairs without a spouse.

In contrast to African males, marriage and loss of a spouse decreases African females' probability of being employed by 11% and 2% respectively. Based on the discussion in chapter two (section 2.3.2.2.6) this finding may be explained with reference to females' dependency on a husband, their tasks of raising children, other family-cultural and social obligations as well as insurance pay -outs in the event of the death of a husband.

In the urban and semi-urban areas of North West province the probability of African males being employed is respectively 8% and 1% higher than in rural areas. This finding is consistent with the a priori theoretical expectation as discussed in chapter two (section 2.3.2.2.4). However, the finding may suggest labour market discrimination when a distinction is made between the probability of male/female employment. For instance, if African females reside in semi-urban areas of North West province, rather than in urban areas, their probability of finding employment will decrease by about 32%. Further evidence of labour market discrimination against women were found in the result that the wages of women who work in the private sector tend to be less than those they would have earned had they worked in the public sector.

For African households in general the probability of being employed in North West province also depends on the region of the province in which they reside. For instance, households and individuals residing in the Central or Eastern regions of the province have a higher probability of being employed. In chapter three it was pointed out that these regions of the province are the most highly urbanized and industrialized in the province. This finding is therefore consistent with the profile of households in North West province as presented in chapter three. Furthermore, as far as earnings determinants are concerned, households in the former Transvaal was found to earn more than those in the former Bophuthatswana (see Table 1 in Appendix A). This finding is also consistent with the discussion in chapter two (section 2.3.2.2.3). The effect of "former province" on earnings is such that, an average household in the former Bophuthatswana earns about 11% less than that in the former Transvaal province, *ceteris paribus*. Some variables affect household earnings differently depending on whether a household resides in the former Transvaal province or Bophuthatswana. For example, unlike for the Transvaal province, industry, hours of work and type of area of residence are not significant determinants of household earnings in the case of the former Bophuthatswana.

As indicated in chapter four, the size of African households in North West province have a negative effect on the probability of being employed. Based on the discussion in chapter two, this could be interpreted as suggesting that a smaller household may face a lower financial burden and finds it easier to save and improve its level of schooling.

For those Africans in North West province already in employment, the econometric analysis in chapter four determined that the significant determinants of their earnings are the following.

Firstly, education. Apart from improving the probability of an African being employed in North West province, it was found that African households with better educated heads earn more than those with less educated heads, *ceteris paribus*. It was also established that the higher the general level of education of a household the higher the household's likely earnings. Education affects hourly wages differently depending on the gender of the earner. For instance, education is not a major determinant of earnings of African females at low levels of schooling. An extra year of primary and secondary schooling increase earnings of males and females respectively. Beyond matriculation, further education does not seem to increase earnings of either gender. This finding supports the human capital model discussed in chapter two (section 2.3.1) as far as education levels below (and including) standard 10 are concerned. In terms of the interaction between education and experience it was found in chapter four that the more educated one is, the less experienced one should be in order to earn the same wage and vice versa. This is consistent with the idea discussed in chapter two that work experience may often be regarded as "training on the job".

Secondly, experience (and squared experience). Experience of the head of an African household in North West province was found to be inversely proportional to the household's likely earnings. This finding is contrary to what is expected from the theoretical discussion in chapter two. Further research might be needed to determine the reason for this finding. The coefficient of squared experience is negative, indicating the curving of the age-earnings profile. This is consistent with the theory of household earnings structure as set out in chapter two.

Thirdly, type of industry. The earnings of African households whose heads work in the mining industry in North West province are approximately 39% higher than those of households whose heads are employed in the domestic services industry. Workers in agriculture and domestic service industry

relatively seem to be low-wage earners. This finding is consistent with the discussion in chapter two (section 2.3.2.2.8) because workers in these two industries are also, on average, endowed with relatively low human capital.

Fourthly, occupation. According to the discussion in chapter two (section 2.3.2.2.9) the a priori expectation was that occupations with a large labour supply would be bad earners and that scarce skills and unpleasant occupations would be rewarded highly in relation to others. In chapter four it was found, as expected, that the people engaged in elementary occupations, skilled agriculture, forestry and fisheries, in occupations related to craft and trade as well as machine operating occupations (including driving) are the poorest earners.

Fifthly, hours of work. It was established in chapter four that fewer hours of work are associated with less household earnings and vice versa. Although this was found to be a weak association, only at a 10% level of significance, it is consistent with the theory of earnings structure as set out in chapter two.

Sixthly, the type of area of residence of the household. It was initially found, making a distinction between former "homeland" areas and former South African provinces, that rural households in North West province earn about 31% more than urban households. This conflicts with the theoretical discussion of household earnings set out in chapter two, where a number of reasons were given for expecting urban households to earn higher incomes than rural households. The finding here obtained can probably be ascribed to sampling problems, since when the analysis was performed based on the former provinces and homeland aggregated, a negative (as expected) coefficient of -0.154 was obtained for "rural". This implies that households residing in rural areas of North West province are likely to earn 15% less than those in urban areas.

Seventhly, dependency ratios. In chapter four the coefficient on the dependency ratio was found to be negative. This implies that the higher the dependency ratio the lower the expected earnings of a household. According to the theory of household earnings set out in chapter two, a high dependency ratio tends to make a household unable to save for investment, which would result in more employment opportunities and more earnings. Large dependency ratios may be one of the reasons why households in rural areas tend to be perpetually poor.

Eighthly, a number of further determinants of African household earnings in North West province were found to be in accordance with a priori theoretical expectations. For instance, wealthier households tend to earn more than poorer ones, households with married heads tend to earn more than those headed by unmarried people. It was also found that a single family unit is likely to earn a higher income than an extended family.

Finally, it was established that in the case of males, a trade union member is likely to earn more in North West province than a non-member, *ceteris paribus*. The variable was found not to be significant for females.

The selectivity variables in the male earnings function are not significant implying that it cannot be concluded that there is any correlation between the unobserved factors that affect participation in the labour force and employment, and an average male's earnings. Thus more or less the same estimates of coefficients for the determinants of male earnings would have been obtained if the selectivity variables were not included in the regression model. The selectivity variables are significant in the case of African females. This implies that some unobserved variables, which determine labour force

participation and wage employment are correlated with female earnings. Positive selectivity variables mean that these unobserved variables affect earnings positively. The variables may include ability, attitude and commitment. According to the human capital model and other discussions in chapter two (section 2.3.2.2.2) the unobservables (including ability) are expected to influence household earnings.

5.3 DETERMINANTS OF EARNINGS OF COLOURED HOUSEHOLDS

It was found that the probability of being employed in North West province is 72% for the average coloured male. The significant determinants of coloured males' probability of being employed in North West province are marital status and relationship with the head of household. It was found that marriage has a positive effect on the probability of the employment of African males. As with Africans, being related to the head of household lowers the probability of being employed. This may be due to the non labour income effect discussed in 5.2 above and elaborated in chapter two.

The coefficients of marital status and relationship with the head of household in the coloured males' probit model have the a priori expected signs, which are the same as those for the coefficients in the African males' probit model so the interpretations given in case of African males above also apply to the coloured males' case.

For coloured males, the significant determinants of their earnings in North West province were found to be broadly similar to those of Africans, namely education, region and type of area of residence. However, whilst better-paid Africans were predominantly employed in mining, coloured males in the manufacturing industry, electricity, water and gas, and construction earn more than those employed in the domestic industry. Education coefficient is positive which is consistent with the human capital

model. This indicates that households with a better educational standard earn more than those with a lower educational standard. Coloured households residing in rural areas tend to earn less than those in urban areas as expected according to the discussions in chapter two (section 2.3.2.2.4). Also expectedly, coloured households residing in the Eastern, Rustenburg and Southern regions, which are more urbanized and industrialized earn more than those in Huhudi, a predominantly rural region.

5.4 DETERMINANTS OF EARNINGS OF WHITE HOUSEHOLDS

In North West province, age and education exert the most significant influence on the employment probabilities of both white males and females. The probabilities are 100% and 81% for an average white male and female respectively. The high wage employment probabilities were expected in case of whites according to the socio-economic profile of households in North West province presented in chapter three. As for Africans, in chapter four it was found that ageing decreases the whites' wage employment probability but education increases it.

The significant determinants of white households' earnings in North West province are broadly similar to that of African households (see 5.2 above) and consistent with theoretically based expectations (see chapter two). They are the level of education in a household, its experience, and the type of industry in which it is employed. The following notable difference from other population groups was found, however. In the case of white females only persons employed as administrators, professionals, technicians, clerks and secretaries earn more than elementary workers. On average, earnings of white females in other occupations such as service, shop market and sales occupations do not differ significantly from those of white females in elementary occupations, counter to a priori expectations. This may be attributed to the inadequacy of data, which may have been too few to reveal all the significant determinants of the white females' earnings.

5.5 LABOUR MARKET DISCRIMINATION IN NORTH WEST PROVINCE

The discussion about labour market discrimination in chapter two (section 2.4) suggested that racial and gender discrimination may exist in the labour market of North West province, and that models namely "customer discrimination", "Statistical discrimination" and "crowding discrimination" may be applied to the South African labour market situation. In chapter three it was noted that significant earnings inequalities exist in North West province. For instance, the average monthly earnings of white males (R5061) was about four times that of African males (R1137) , according to the CSS sample taken in 1993. The base log hourly wage rate for African males (-0.238) was found to be significantly below that of white males (0.609) (see table 67(b)). Thus, although the percentage increase in earnings for an additional unit of investment in human capital is larger in case of Africans, the latter's initial or starting earnings are relatively low. The difference in the initial logarithmic hourly wage rate between whites and Africans found in chapter four is suggestive of labour market discrimination against Africans.

In case of white households, work experience seems to be more rewarded than that of Africans. For white males, the estimated coefficient of experience in the earnings model in chapter four was determined to be 0.048 compared to 0.010 in the case of African males.

Within white households in North West province there is also likely to be significant earnings inequality. For instance it was found in chapter four when comparing results from the earnings equations of whites and Africans that an average white professional or manager and an average white plant or machine operator would be likely to earn 118% and 91.8% respectively more than a white elementary labourer in North West province. The corresponding figures for Africans are 81% and 1.9% respectively.

Regarding human capital, chapter three indicated that white households in North West province have higher levels of education than non-white households. For instance, white males had an average schooling of almost 10 years in 1995, compared to about 5 years for African males, according to the CSS sample. In chapter four it was determined that the standard deviation of years of schooling for whites in North West province is only 1.750 years, compared to 3.5 years for Africans. It was also established that the minimum level of education for white males is standard 4, and that more than 60% of all whites in the labour force have at least a matriculation certificate compared to about 13% of Africans (see Table 71 in chapter four). It was also shown that 17% of all African males in the labour force are illiterate. The above highlight the fact that the average white household in North West province is far better educated than the average African household. This is therefore likely to be a significant reason for the large earnings disparities between white and African households.

Another reason may be the finding that there are proportionately more married white males (90%) than married African males (74%) in North West province. It has been established in chapter four (see also 5.2 above) that married individuals in North West province tend to earn more than single individuals or households.

According to the CSS sample taken in 1995, white males in North West province are predominantly engaged in the mining industry (31%) compared to 14% of African males. The long-term decline in the prospects of mining in North West due to declining ores and rising mining costs, as well as the secular decline in mineral commodity prices suggest therefore that white households in North West province may be relatively more vulnerable to the declining prospects of the sector than other population groups.

In case of African males in North West province agriculture was found to be the most important sector in terms of employment (almost 40%). Only 3% of white males are engaged in agriculture in North West province.

As far as occupation is concerned, white males in North West province are predominantly employed as skilled personnel in agriculture, forestry and fisheries, craft and trade (41%) while African males are predominantly engaged in elementary occupations (basically as labourers) (42%). About 13% of white males occupy managerial positions compared to 2% of African males.

As far as organized labour is concerned, it was found that about 44% of white males are trade union members. The corresponding figure for African males is 26%. This difference in union membership between population groups is another major factor that may contribute to the labour market segmentation since it has been established that in North West province union members are paid more than non - members, *ceteris paribus*.

The average monthly earnings of African males (R2017) are slightly higher than those of African females (R1976), according to an own sample taken in 1997. The extent of male/female labour market discrimination can firstly be investigated by comparing the econometrically estimated coefficients of the determinants of earnings (see table 68(b) in chapter four). It was determined in chapter four that the initial wages of males and females in North West province are different. For the average male the logarithmic initial hourly wage rate is 0.448 compared to 0.643 for an average female (which is suggestive of labour market discrimination against males). However, the econometric analysis found that males are better rewarded in the labour market for human capital and union membership than females. The latter finding is particularly disconcerting in that it suggests that labour unions' stated advocacy of gender inequality may not be practised on a shop floor level. For instance, the estimated

coefficients for standard 10 and a professional qualification, say, a diploma are 0.820 and 1.390 for males, but only 0.477 and 0.838 for females respectively. For females, human capital does not seem to be well rewarded.

There are certain occupations in North West province where females seem to be more highly rewarded than males. These are skilled agriculture, forestry and fisheries; craft related and trade jobs and plant, and machine operating jobs. This finding may be due to affirmative action currently being implemented in the North West province in favour of women. It may be regarded as discrimination in reverse.

Regarding human capital, males have an average schooling of 6.575 years (with a standard deviation of 3.824) compared to 7.956 years (with a standard deviation of 3.304) for females, according to an own sample taken in 1997. About 34.78% of African males in the labour market have at least a matriculation certificate compared to about 43.24% of African females. According to the own sample (see table 72 in chapter four), it has been found that males are predominantly engaged in the mining industry (24%), trade, restaurant, transport, etc (26%) and finance, community and social services (25%). The corresponding figures for females are 2%, 17% and 53% respectively. The proportion of males that is engaged in the domestic industry is 2% compared to 20% for females. This means that females dominate the community and social service industry as well as the domestic service industry. Regarding occupation, the proportional percentage figures for the managerial positions, skilled and semi-skilled, and elementary occupations, are 13%, 42% and 19% for males, while they are 36%, 7% and 34% for females respectively.

When the "gender" variable was included in the earnings function based on the CSS sample data from 1995 (see Table 2 in Appendix) it was found to be highly significant. The coefficient indicates that

males earn 14% more than females, *ceteris paribus*. In the earnings function based on own sample data from 1997 the coefficient (0.027) was found insignificant, implying that, on average, there is no statistically significant difference in earnings between genders in North West province. The difference between the CSS and the own sample estimates of the 'gender' coefficient may be due to affirmative action in favour of females since 1995, although if this is the case it would suggest a fairly rapid and significant affirmative action.

It has been found that the estimate of the coefficient of white/African gross earnings differential in North West province is about 313%. The productivity differential of 259% between whites and Africans contributes greatly (91%) to the earnings gap. The white/African labour market discrimination coefficient is estimated at only 13%, which is due to a white discriminatory wage advantage of 10% and an African discriminatory wage disadvantage of 3%. The wide earnings gap may be explained by the fact that African households in the sample have a much lower average human capital endowment than white households.

Regarding the male/female discrimination, the results in chapter four indicate that a male/female gross earnings differential of -35% exists in North West province, and this implies that, the earnings gap is in favour of females. The male/female labour market discrimination coefficient is about -49%. There is a male discriminatory earnings advantage of -17% and a female discriminatory earnings disadvantage of about –27.5%, which are likely to have been caused by the affirmative action policy. Some personal characteristics of males, such as experience and occupation, are seemingly being under-rewarded, and those of females over-rewarded. The other possible reason is the difference between the base wage rates – that of males is less than that of females. The productivity differential, which is in favour of males, is countered by the negative male discriminatory earnings advantage, and the negative female

discriminatory earnings disadvantage. An important finding of this study is therefore that currently there is evidence of labour market discrimination against males in North West province.

It seems that the significant productivity differential between whites and Africans is the cause of the racial difference in occupational structure. For example, whites are predominantly employed in relatively high-paying, responsible employment positions, whereas Africans, in most cases are in lower-paying, occupations. The study found that of all managerial and professional job positions for males in North West province, 44%, 9%, 18% and 29% are occupied by Africans, coloureds, Asians and whites respectively. This implies that Africans are not well represented at the top ranks of the occupational distribution considering the racial contribution to the population of the province of 83%, 5%, 2% and 10% for Africans, coloureds, Asians and whites respectively.

Regarding gender inequality in North West province, about 82% of all managerial positions are occupied by males, leaving only 18% (of the positions) for females. Females are predominantly dependent on elementary, low-earning employment positions as is evident by the finding that 39.5% of elementary occupations in North West province are currently filled by males and 60.5% by females. Although one cannot rule out occupational choice, it is likely that the major cause of this skewed occupational distribution is the productivity differential between genders.

Finally, the econometric analysis in chapter four established that there is little significant labour market discrimination currently being practiced against Africans in North West province. It was found that earnings inequality between population groups is likely to be due to significant productivity differentials between population groups. These productivity differentials may be described as "pre-labour market (or human capital)" discrimination. Regarding gender discrimination, the econometric analysis in

chapter four found evidence of significant earnings inequality in North West in favour of females. Econometric evidence suggests that this may be due to labour market discrimination against males in the province.

The finding of a significant earnings gap in favour of females is not consistent with the a priori expectation by the discussion in chapter two (section 2.3.2.2.6) but is in the case of the presentation in chapter three (see section 3.13.1.4) for Africans and coloureds. The finding may possibly be explained by the affirmative action policy currently being implemented in favour of females in North West province. The productive differential is however in favour of males. This is not compatible with the finding that there is a likelihood that females are on average better educated than males in North west province (see Table 72) considering the discussion of the human capital model in chapter two (section 2.3.1). If both these findings were valid, that is to say, if females are generally better educated than males but males are more productive than females, one could conclude that the poor labour market participation of females causes their efficiency at work to decline due to a depreciation of their human capital. The decline of work efficiency results in a decrease in females' productivity. Another possible reason is that females often take job offers nearest to their home and tend to follow where ever their husbands go for employment. The tendency is for them not to take their best job offers as argued in chapter two (section 2.4).

It appears that there are two opposing forces acting on the earnings differential between genders, one being the affirmative action in favour of females and two, the productivity differential in favour of males. Because the earnings gap is in favour of females it is likely that the "affirmative action" force overpowers that of the productivity differential. It will therefore be recommended in chapter six that regular refresher courses be organized for female workers, and that equal treatment in terms of equal pay for the same occupation be given by employers.

5.6 SUMMARY

The purpose of this chapter has been to interpret and discuss the results of the econometric analysis of the determinants of earnings of households in North West province as set out in chapter four. This was done against the background of the theoretically identified determinants of household earnings and the socio-economic profile of households in North West province in chapters two and three respectively.

The significant determinants of household earnings in North West province have been discussed in this chapter according to the various population groups in North West Province. The discussion also took pertinent notice of the earnings determinants according to gender. This has been done since the socio-economic profile of households in chapter three established significant differences in earnings between various population groups and between male and female.

The results were generally consistent with the theoretical literature on the determinants of household earnings. Given that a double-hurdle estimation methodology was followed in chapter four, the determinants of household earnings in North West province first had to take into account the likelihood that members of households would be in paid employment. In this regard it has been found that the probability of labour force participation of Africans increases with their level of schooling and their age (only for middle aged males (i.e. 25 – 34 years) and in the case of females aged between 35 and 65 years). Generally ageing decreases the probability. Also the probability decreases in case of married women and widows, where non-labour income is earned and where there is a relationship to the head of household for the former, and where there are insurance pay-outs in the case of the latter.

As far as the determinants of earnings of those in paid employment in North West province are concerned it was established that the following factors significantly determine household earnings : human capital (i.e. education and experience in terms of years of schooling, years of work experience, squared experience and interaction of education and experience), industry, occupation, hours worked, former province, type of area of residence, place of work, dependency ratio, wealth index, marital status, male adults, female adults, family type, region, employer and union membership.

Although there are significant earnings inequality between population groups in North West province, particularly between whites and Africans, little statistically significant labour market discrimination against Africans are still practised. Some econometric evidence was found of labour market discrimination against males in North West province.

It was found that the major cause of earnings inequality between population groups in North West province is significant productivity differentials between them. This was described in this chapter as pre-labour market (or human capital) discrimination against Africans and reflects the effects of apartheid. It was shown that the productivity differential, which contributes 91% to the earnings gap has caused different racial occupational structures in the province.

The reason for gender earnings inequality in North West province is also productivity differentials between males and females. This has also caused a skewed occupational distribution in the province. Another cause of the gender difference in occupation structure may be occupational choice.

This chapter has thus shown that although the major determinants of household earnings in North West province are generally consistent with those found elsewhere, such as human capital, occupation

and place of work, there are some particular features perhaps unique to North West province that should be taken into consideration in policy making. These are the findings that pre-labour market discrimination is significant, that significant discrimination is being practised against males (or that affirmative action in terms of gender is successful) and that the region of North West province in which households are resident determines their earnings. The next chapter concludes with a summary and identification of possible policy measures to improve the level and equality of earnings of households in North West province.

CHAPTER 6

SUMMARY AND CONCLUSIONS

6.1 INTRODUCTION

The aim of this study was to identify the socio-economic determinants of household earnings in the North West province of South Africa.

Whilst the identification of earnings determinants in any part of the African continent, including South Africa remains topical, the current challenges facing newly established regional/provincial governments in South Africa require urgent identification and rigorous analysis of these determinants on a provincial level. These challenges were briefly outlined in chapter one and the degree of spatial inequality in South Africa noted.

Provincial policy making, and steps by central government to rectify South Africa's substantial degree of spatial inequality is currently hampered by a lack of reliable data and estimates. One reason for this was noted in chapter one that the provincial "borders" date back to 1994 so that time series data or cross-sectional data which accurately reflect on a specific geographical area are largely lacking. A second reason that was noted in chapter one is that micro-economic data are almost completely lacking, especially in provinces, which contain large areas of a former "homeland". The North West province is a typical example of such a province, its territory having included the former Bophuthatswana homeland.

Given the seriousness of income inequality and the wide differences in economic structure between provinces, it is particularly the lack of household and firm-level data and estimates of earnings determinants based thereon for provinces that are currently a significant constraint to the alleviation of poverty and inequality in South Africa. It was noted in chapter one that there has so far been few attempts in South Africa (let alone the provinces) to analyse these determinants and moreover that there has been few attempts in the literature to analyse the determinants of labour force participation, sector of employment and earnings in any Sub-Saharan economy. This provided the motivation and background to the present study.

The methodology was discussed in chapter one. At the core of the methodology was the design and implementation of an own household survey questionnaire. A copy of this questionnaire is included in Appendix B. The questionnaire was designed in such a way as to gather a unique set of data pertaining to North West province, but also in a manner that will facilitate comparison with other less useful household surveys such as those of the SALDRU and CSS. More than 500 households in North West province were surveyed by the author and a number of trained enumerators between June and October, 1997.

The data gathered from the uniquely designed questionnaire as well as the data from the SALDRU and CSS questionnaires were analysed econometrically by fitting standard earnings functions to it. Furthermore, Oaxaca and Ransom's (1994) recent wage decomposition method was used to determine labour market discrimination.

In chapter two a theoretical overview of household earnings determination and labour market discrimination were given. The chapter discussed the marginal productivity theory, human capital

model as well as determination of earnings structure. This provided a list of a priori determinants of household earnings and laid the basis for the econometric methodologies used in chapter four. For purposes of the latter, these determinants were isolated for the case of North West province in chapter three where a socio-economic profile of the households in North West province was given. Chapter three illustrated the correlation structure of the socio-economic characteristics of the households. Also the data were checked for errors and methodological assumptions that were to be employed in the econometric analyses in chapter four. In chapter four earnings functions were fitted and the degree of labour market discrimination against Africans and females econometrically estimated. Chapter five interpreted and discussed these findings in the context established in chapters two and three.

6.2 METHODOLOGY

The standard Mincerian earnings function formed the basis for the econometric analysis in chapter four. Since censored data on earnings were used, the two-stage Heckman's (1976b) estimation method and a double-hurdle model (for which binomial probit models were fitted) were adopted to obtain unbiased and consistent estimates of the coefficients of the independent variables in the earnings function. Separate earnings functions were estimated for genders, population groups, and former provinces (including the former Bophuthatswana homeland). Because of insufficiency of data, the function could not be computed for Asians, and the double-hurdle model was fitted only in the case of Africans. Separate sets of regression models were fitted to the three different data sets, namely that of the own sample, SALDRU sample and CSS sample.

Total monthly household income (or expenditure) was used as a proxy for household earnings. The log of "per capita income (or expenditure)" was the dependent variable. It was assumed that wages of

individual members of a household are a big part of the household earnings, so log of "hourly wage rate" functions were also fitted to identify the significant determinants of household earnings in North West province. The socio-economic variables that were identified as possible determinants of earnings in chapters two and three were included in the earnings function as independent variables.

Only observations on members of households who were employed and of ages 15 to 65 years, were involved in the "hourly wage rate" function calculations. Potential experience was used in the case of the SALDRU sample and the CSS sample as a proxy for actual experience. It was calculated as "age – 15 years" for illiterates or people with 9 years or less of schooling, and as "age - 6 - years of schooling" for those with more than 9 years of schooling. It was assumed that an individual starts schooling at the age of 6 and that he/she starts to work immediately after graduation from school. For the own sample data gathered, actual experience on the job was used. Economic discrimination was dealt with separately. Oaxaca and Ransom (1994) wage gap decomposition method was used to estimate the discrimination coefficients.

Following the standard human capital theory, it was postulated that household earnings are a function of human capital (i.e. education and experience), marital status, age, industry patterns, nature of occupation, type of area of residence, former province, region, place of work, hours of work, union membership and family background or home environmental variables (i.e. wealth index, workers, dependency ratio, male adults, female adults, family type). It was also hypothesized that there is no labour market discrimination against Africans and women in North West province.

In the case of the own survey conducted for purposes of this study the multi-stage stratified cluster sampling was used to select a representative sample of households, who were interviewed in the survey. Enumerators physically visited the households and interviewed them with a structured questionnaire.

6.3 RESULTS

6.3.1 Determinants of earnings

6.3.1.1 Of African Households

It was found in chapter four that the probability of labour force participation of Africans in North West province generally increases with education and age but decreases when a woman is married. Non-labour income and relationship with the head of household also decrease the probability of participation in the labour force.

The results showed that the probability that an average African male will be employed is 75% whereas it is only 26% for an African female. For a coloured male, white male and white female, the probability of wage employment in North West province is 72%, 100% and 81% respectively.

For African males the factors that affect the decision to work or the probability of wage employment in North West province are: age, education, marital status, type of area of residence, ownership of site and/or dwelling, region and the relationship to the head of household. The effect of age on the probability of employment is generally to decrease it. Education, marriage and being a widower increase the probability. The probability of wage employment is higher in urban areas than in rural areas of North West province, as expected. The probability of finding employment is higher in some

regions of North West province than in others. For instance the probability of finding employment is higher in the Rustenburg or Eastern region than in the Huhudi or some parts of the Southern region. Renting and free accommodation were found to increase the probability of wage employment.

For Africans a relationship to the head of household lowers the probability of being in wage employment. For an average African female employment is dependent on similar factors as in the case of an African male, with the exception of age and marital status. On average, age did not seem to affect the decision to work in the case of African females aged less than 35 years, but to increase the probability of wage employment for women aged between 35 and 65. While marriage and widowhood tends to increase the probability of wage employment for males, they decrease it in the case of African females probably due to cultural and social obligations for the former and insurance pay-outs in the event of death of the husband for the latter.

It was found that education, experience, squared experience, interaction of education and experience, patterns of industry, nature of occupation, work hours, former province, region, type of area of residence, place of work, dependency ratio, wealth index, marital status, male adults, female adults, family type, employer and union membership are significant determinants of household earnings for Africans. Education and nature of occupation seem to be the most important determinants of household earnings.

Education increases household earnings in North West province. Work experience was found to raise earnings. The coefficient of "squared experience" contributes to the curving of the age-earnings profiles. The coefficient of the interaction of education and experience was found to be negative. This was taken to imply that employers substitute education and training with work experience in such a

way that if someone is less educated but has more work experience, his human capital endowment is equated to that of another who is more educated but with less work experience, *ceteris paribus*. These two individuals may compete for the same occupation because the potential employer regards them as people who are equally endowed with human capital or as people with the same labour productivity.

Those household members employed in the agricultural, forestry and fisheries industries, and the domestic service industry in North West province were found to earn less than those working in other industries, *ceteris paribus*. Those household members engaged in elementary occupations such as domestic workers and labourers on farms are the least paid, as could be expected. On average, hours worked are positively correlated with earnings. Households residing in urban areas of North West province are richer than those in rural areas. On average, households in the former Transvaal province are better off economically than those in the former Bophuthatswana. This might have been caused by the fact that the former Transvaal has a better socio-economic infrastructure (in terms of roads and primary schools) than the former Bophuthatswana. Households in regions such as Huhudi, which are predominantly rural, are worse off economically than those in other regions like Rustenburg, which are more urbanized and industrialized. Union membership increases earnings.

The effect of "type of area of residence" on earnings is not well understood in this study because of conflicting results. People who work in urban areas of North West province earn more than those working in villages, trading centres or small towns, *ceteris paribus*. Dependency ratio is negatively correlated with household earnings. Wealthier households tend to earn more than poorer ones. Households with married heads tend to earn more than those with single heads.

There does not seem to be a significant difference in earnings between male headed households and female headed ones. The effects of the male adults and female adults on household earnings are the same - they are that, the larger the number of male (or female) adults in the household the lower the figures of household earnings and vice versa. In other words, the number of male adults or female adults is negatively correlated with household earnings. The reason for this was not identified in this study. Single family units seem to be better off economically than extended families. Employers in the private sector tend to pay females less than what they would have been paid had they worked in the public sector, *ceteris paribus*.

6.3.1.2 Of Coloured Households

For coloured males, the factors that affect the probability of employment are: marital status and relationship to the head of household. The effects of these factors on the probability are the same as in the case of African households (see 6.3.1.1).

Education, region, type of area of residence, industry and occupation were found to be significant determinants of coloured household earnings in North West province. Education increases household earnings. Coloured households in the Huhudi region of North West province were found to earn less than those in the Eastern region, part of the Rustenburg region (i.e. Rustenburg, Koster and Swartruggens) and Southern region. Coloured households in urban areas of North West province tend to earn more than those in rural areas.

6.3.1.3 Of White Households

The variables that affect the probability of wage employment for both white males and white females are age and education. Age decreases the probability of white wage employment while education increases it.

For white households , the significant determinants of household earnings in North West province are education, experience, industry and occupation. The nature of occupation was found to be the most important determinant of white household earnings in North West province. As with the other population groups, white households with more educated heads tend to earn more than those with less educated ones, *ceteris paribus*. The effect of work experience of the head on earnings is similar to that of education, that is, to increase them. White males who are employed in the mining and finance industries earn more than those working in the agricultural industry, *ceteris paribus*. All other occupations are more rewarding than elementary jobs, which was expected from the theoretical background given in chapter two.

White females who are engaged in the mining, transport, storage and communication, and community and social services industries are better off economically than those working in the agricultural industry. For white females the only occupations that differ significantly from the elementary ones are the white collar jobs such as administration, professional, technician, clerical and secretarial occupations. Occupations like shop market and sales do not differ significantly from the elementary ones.

6.3.2 Labour market discrimination

Labour market discrimination against Africans or females were found not to be significant in North West province. The coefficient of the overall labour market discrimination against females was found in chapter four to be negative. This implied that discrimination is currently being practised against males in North West province. The negative male discriminatory earnings advantage and the negative female discriminatory earnings disadvantage were ascribed to the under-rewarding of some personal characteristics of males, such as experience and occupation, and over-rewarding those of females respectively. The results imply that pre-labour market (or human capital) discrimination against Africans and against females exists in the North West province.

It was found in chapter four and discussed in chapter five that the major cause of earnings inequality between white and African households in North West province is a significant productivity differential between them. This may partly explain the different racial occupational structures that exist in the province. Whites dominate high-paying occupations while Africans are mostly employed in lower-paying ones. In other words, as a result of pre-labour market discrimination African males are proportionately less represented in the top ranks of occupational distribution than white males. Specifically, the proportions of managerial and professional positions in North West province are 13% and 3% for whites and Africans respectively. According to the CSS sample data of 1995, of the managerial and professional positions then available in the North West province, 44%, 9%, 18% and 29% were occupied by Africans, coloureds, Asians and whites respectively.

Turning to male/female discrimination, the positive productivity differential is countered by the significant labour market discrimination against males thus making discrimination the major cause of

the negative earnings inequality between genders. The productivity differential has brought about a gender difference in occupational structure. Males are engaged in all sectors of employment almost equally while females dominate the tertiary sector (i.e. finance, and community and social services as well as personal service). Females are under-represented in the primary and secondary sectors of employment. They are also under-represented at the top ranks of the occupational distribution. However proportionately, while a large number of females occupy managerial and professional employment positions (36%) and are engaged in elementary occupations (including domestic work and cleaning)(34%), males are predominantly employed in skilled and semi-skilled ones (including agriculture, craft related and trade, and transport and communication) (42%) and elementary occupations (including farm labour)(19%).

According to the own sample survey done in 1997, of all the managerial and professional occupations in North West province, almost 82% are occupied by males - leaving only 18% for females; and of all elementary occupations available, 39.5% are occupied by males and 60.5% by females. Also, occupational choice (or employee discrimination) is likely to play a part in causing a gender difference in occupational structure.

The possible causes of the productivity differential in favour of males are: one, the poor labour force participation of women in the labour market which may bring about a depreciation of their human capital resulting in a decline in their work efficiency, and two, the fact that often women do not take their best work offers because they tend to follow wherever their husbands go for employment and tend to work closer to home.

The white/African gross wage differential is 313% while that of male/female is -35%. The positive productivity differential in favour of males of 10% is countered by the negative male/female labour market discrimination of –49 resulting in a negative gross wage differential of –35%. The earnings gaps are basically caused by the difference in human capital endowment between the population groups and the labour market discrimination against males respectively. The productivity differential, which is likely to be caused by a difference in human capital endowments between whites and Africans contributes 91% to the white/African earnings gap. The white/African and male/female productivity differential coefficients (in favour of whites and males) are 259% and 10% respectively. The labour market discrimination against Africans and females are 13% and –49% respectively. Labour market discrimination against males contributes about 80% to the earnings gap between genders.

To conclude, the study has found that human capital (i.e. education and experience) is the most important determinant of household earnings in North West province, followed by the nature of occupation. Other significant determinants are: squared experience, interaction of education and experience, former province, type of area of residence, place of work, region, marital status, industry patterns, hours of work, male adults, female adults, wealth index, family type, dependency ratio, employer and union membership. It has also been established that pre-labour market discrimination against Africans and females, and labour market discrimination against males exist in North West province. The productivity differential in favour of males, is exceeded by the negative male discriminatory earnings advantage and the negative female discriminatory earnings disadvantage. The major cause of the earnings gap between whites and Africans is the significant difference in human capital endowment between them, and of that between males and females is labour market discrimination against males. The labour market discrimination against Africans was not considered to be significant.

6.4 EVALUATION, POLICY IMPLICATIONS AND RECOMMENDATIONS

6.4.1 Evaluation of the findings

For the own sample, some male heads of households were not present during the time of the survey. They lived at their place of work and came back home only on weekends. This might have distorted the results somehow, especially as far as total household expenditure is concerned.

The SALDRU and CSS samples have serious limitations. The 1993 SALDRU sample data are outdated and biased in that the majority of the households interviewed resided in urban areas - for a target population which is predominantly rural. This means that the population was not well represented in the sample. Also the number of observations for some sub-samples were too few for a precise analysis.

Regarding the 1995 CSS sample data, some earnings figures were approximated. The assumption that individual wages constitute a major part of household earnings, which ignored intra-household inequality, may have understated the poverty situations of some sections of the population.

According to the own sample, about 86% of the household population of North West province do not have access to land for farming and about 92% do not own property. Therefore, on average household earnings in North West province consist of labour income and transfer payments. According to the CSS sample data collected in 1997 (see Table 43 in chapter three), the percentages of households that rely on labour income for financial support are 60%, 67%, 90% and 69% for Africans, coloureds, Asians and whites respectively.

Turning to the econometric methodology, the standard Mincerian earnings function is being used world-wide and has become one of the most popular and most commonly used function in earnings studies. However, the technique has a serious shortcoming of not taking the quality of education into account. Furthermore, certain cultural characteristics and ability cannot be taken into account.

The Oaxaca and Ransom (1994) earnings gap decomposition method is one of the most recent developments in the labour market discrimination estimation. One limitation of this technique is that it does not account for non-pecuniary aspects of occupations such as culture, dependability and regularity in attendance, which are related to labour productivity. The other limitation is that accurate statistical significance tests cannot easily be computed. In any case, the productivity differential between population groups, and the labour market discrimination against males are too large to be statistically insignificant. It must however be pointed out that the finding of labour market discrimination against males is not likely to apply to Asians and whites since it was demonstrated in chapter three (section 3.13.1.4) that for these population groups on average males seem to be earning more than females.

The author is not aware of any econometric study, recently done in South Africa, which is similar and comparable to this study especially as far as the econometric discrimination analysis is concerned. This makes evaluation of this study difficult indeed. All those studies reported on in chapter two are outdated, let alone having used different study methodologies. Moll's (1995) study is an exception in certain respects. For this study, an extra year of schooling raises earnings by between 24% for an average African female to 37% for an average white female compared to Moll's (1995) estimates of between 3% and 30% for Africans. This kind of comparison is not appropriate unless one is sure that the same kinds of sub-samples and same assumptions and methodologies according to which estimates are made were used in other similar studies.

6.4.2 Policy implications and recommendations

The results obtained in this study imply that government programmes and policies that are intended to increase human capital in North West province should be encouraged and intensified. This means that, the elements in "North West 2001", the provincial government's officially adopted economic development strategy (adopted 27 November 1997), focusing on developing human resources is correct.

The results are suggestive of policies that would intend to re-deploy Africans and women across occupations. Parents should also be encouraged to educate their children and emphasis should be put on primary and secondary schooling. Affirmative action policy should be applied carefully in that Africans should first be suitably educated and trained to acquire the necessary skills for the employment positions they have to occupy. Affirmative action without policies to increase the productivity of Africans (especially females) is likely to have limited impact on earnings of poor households in the North West province of South Africa.

Evidence found in favour of discrimination against males suggests that the government and other employers must be more careful when implementing affirmative action to avoid excessive labour market discrimination in reverse. The government and other employers must make sure that equal treatment is given to both genders in terms of job offers and payments for occupations to avoid gender discrimination in the labour market. The results suggest policies, which aim to alter the female occupational distribution, and these may need to target female educational decisions made prior to labour market entry. Regular refresher courses should be organized for females in order to make up

for the depreciation of their human capital during the times of their non-participation in the labour force.

The public should be urged to consider family planning to reduce family sizes. Remuneration in the agricultural and domestic service industries should be investigated further as these are the worst as far as earnings are concerned but employ relatively large numbers of people. Economic activity should be promoted and diversified, say, through rural industrialization and development of SMMEs in the Huhudi and some parts of Klerksdorp region, which will help to create more jobs for the residents. Also, workers should be urged to join trade unions. The socio-economic infrastructure in the province should be improved too and areas in the former Bophuthatswana ought to be given first priority.

Finally, although poverty may be alleviated in North West province if appropriate attention is given in policy making to the determinants of household earnings identified in this study, a significant obstacle to poverty alleviation remains in the form of high unemployment. Unless members of households can overcome the first "hurdle" and enter the labour market, attention to earnings determinants alone might not be an optimal development strategy in South Africa. Although this study focussed on determinants of earnings, it was established that North West province is characterized by relatively high unemployment rates which depend on the type of area of residence, region in which one is residing, population group, gender and age. It has been found that relatively many people in rural areas, many people in predominantly rural regions such as Huhudi, many Africans, many women and many young people are unemployed. The unemployment rate ranges between 5% for white males and 43% for African females.

In North West province in particular the manufacturing sector has to be more developed especially in terms of producing skill-intensive goods which may even compete favourably in the international trade, the tourism industry to be developed to its full potential, the economy to be more diversified and the informal sector to be assisted financially. North West province depends overly on the mining sector, leaving its economy vulnerable. Production in the mining sector has been declining since 1991 so that the sector cannot be expected to contribute significantly towards alleviating unemployment. The service sector (including community, social and personal services) is the largest employer of the population of North West province. Hence, the civil service rightsizing currently taking place may exacerbate unemployment. Because of the importance in terms of employment in the informal sector, it is imperative that the SMME sector be promoted, especially in rural areas.

APPENDIX A

Table 1:Regression results (SALDRU) - log of total monthly household expenditure (former provinces combined)

variable	estimate
intercept	2.445*** (37.209)
Exp	-0.036*** (-18.376)
Sqexp	0.000 (0.810)
Educ2	-0.010 (-0.681)
Educ3	-0.021 (-1.350)
Educ4	0.011 (0.503)
Educ5	0.010 (0.350)
Educ6	-0.126*** (-3.998)
Occup2	-0.013 (-0.637)
Occup3	0.020 (1.082)
Occup4	0.004 (0.215)
Employer2	-0.013 (-0.779)
Employer3	0.128*** (2.593)
union	0.007 (0.575)
gender	-0.029 (-1.428)
Indust1	-0.016 (-0.284)
Indust2	0.072 (1.313)
Indust3	0.062 (1.202)
Whours1	0.008 (0.304)
Whours2	0.051*** (3.501)

Table 2: Regression results (CSS) – wage rate (all Africans)

variabel	Estimate
intercept	-0.474*** (-2.900)
exp	0.001 (0.096)
sqexp	-0.000 (-0.005)
Educ2	0.124* (1.702)
Educ3	0.334*** (4.501)
Educ4	0.271*** (2.843)
Educ5	0.571*** (5.575)
Educ6	0.593*** (5.365)
Region2	0.512*** (5.864)
Region3	0.383*** (4.199)
Region4	0.388*** (4.860)
Region5	0.223** (2.161)
Region6	0.494*** (4.607)
Region7	0.128* (1.662)
semiubn	0.153 (1.164)
rural	0.064 (1.184)
Marital2	0.192*** (3.445)
Marital3	0.261*** (2.773)
Indust2	1.476*** (15.094)
Indust3	1.234*** (14.301)

TABLES 1 AND 2 (CONTINUED)

Variable	estimate		variable	Estimate
rural	-0.154*** (-6.895)		Indust4	0.972*** (12.420)
Bop	-0.110*** (-5.277)		Indust5	1.315*** (15.981)
No.	363		Occup1	1.124*** (8.049)
R^2	0.96		Occup2	0.657*** (8.816)
Adj. R^2	0.95		Occup3	0.253*** (3.032)
			Occup4	0.214*** (2.743)
			Occup5	0.112 (1.603)
			union	0.230*** (4.306)
			gender	0.142*** (2.744)
			No.	913
			R^2	0.69
			Adj. R^2	0.68

(Source: Calculated from the SALDRU sample

(Source: Calculated from the CSS sample)

Table 3: Employment probit results (SALDRU)

Variable	estimate
intercept	-2.735*** (76.713)
Age	0.038*** (30.358)
education	-0.005 (-0.063).
hhsize	0.064*** (7.431)
No. 0 =	100
1 =	440
Total =	540
Prob>Chisq	0.109

(Source: Calculated from the SALDRU sample)

Table 4(a): Employment probit results (CSS) - African males and females pooled sample

Variable	Estimate
intercept	-0.412*** (8.663)
age	0.009*** (14.075)
education	-0.048*** (55.324)
Marital2	-0.334*** (19.788)
Marital3	0.022 (0.047)
semiubn	0.297 (2.164)
rural	0.326*** (8.583)
Ownship2	-0.131 (0.400)
Ownship3	-0.520*** (11.296)
Ownship4	-0.173* (3.328)
Relat2	1.154*** (295.272)
Relat3	1.595*** (417.315)
Relat4	1.452*** (275.988)
Relat5	1.300*** (8.505)
No. 0 =	3625
1 =	1508
Total =	4133
Prob>Chisq	0.005

(Source: Calculated from the CSS sample)

Table 5(a): Employment probit results (CSS) - white males and African males pooled sample

Estimate
-1.576*** (68.146)
0.035*** (104.182))
-0.038*** (18.015)
-0.655*** (37.263)
-0.842*** (21.712)
0.139 (0.338)
0.275* (3.756)
0.012 (0.003)
-0.429** (5.942)
-0.190 (2.575)
1.320*** (22.865)
2.190*** (371.955)
2.057*** (240.853)
1.913*** (9.335)
1494
1146
2640
0.000

(Source: Calculated from the CSS sample)

Table 4(b): Regression results (CSS) - log of hourly wage rate (adjusted for employment selectivity bias – African males and females pooled sample)

Table 5(b): Regression results (CSS) - log of hourly wage rate (adjusted for employment selectivity bias – white males males and African males pooled sample

Variable	Estimate	Estimate
intercept	-0.383*** (-2.951)	-0.244 (-1.469)
exp	0.003 (0.351)	0.005 (0.486)
sqexp	-0.000 (-0.121)	-0.000 (-0.142)
Educ2	0.114 (1.633)	0.131* (1.664)
Educ3	0.321*** (4.584)	0.414*** (5.251
Educ4	0.285*** (3.153)	0.547*** (5.502)
Educ5	0.448*** (4.584)	1.000*** (9.369)
Educ6	0.511*** (4.237)	1.124*** (8.237)
Region2	0.484*** (5.688)	0.421*** (4.587)
Region3	0.377*** (4.237)	0.190* (1.693)
Region4	0.392*** (5.047)	0.213** (2.275)
Region5	0.160 (1.560)	-0.173 (-1.333)
Region6	0.474*** (4.516)	0.398*** (3.795)
Region7	0.123* (1.652)	0.057 (0.679)
semiubn	0.176 (1.350)	0.029 (0.241)
rural	0.066 (1.109)	-0.016 (-0.284)
Marital2	0.185*** (3.175)	0.219** (2.450)
Marital3	0.247*** (2.678)	0.142 (1.032)
Indust2	1.499*** (15.621)	1.518*** (15.739)

TABLES 4(b) AND 5(b) (CONTINUED)

variable	estimate		estimate
Indust3	1.214***		1.197***
	(14.202)		(13.441)
Indust4	0.832***		1.023***
	(9.620)		(9.781)
Indust5	1.286***		1.314***
	(10.950)		(11.503)
Indust6	1.157***		1.204***
	(8.650)		(8.334)
Indust7	1.247***		1.280***
	(15.260)		(12.709)
Indust8	0.191		-0.024
	(0.815)		(-0.078)
Occup1	1.140***		0.897***
	(8.228)		(6.032)
Occup2	0.804***		0.605***
	(7.975)		(4.794)
Occup3	0.509***		0.333***
	(6.248)		(3.143)
Occup4	0.287**		0.226**
	(3.435)		(2.038)
Occup5	0.226***		0.282***
	(2.982)		(3.609)
Occup6	0.116*		0.067
	(1.696)		(0.949)
union	0.195***		0.268***
	(3.694)		(4.597)
Lambda1	0.029		-0.039
	(0.406)		(-0.490)
No.	892		713
R^2	0.70		0.79
Adj. R^2	0.69		0.78

(Source: Calculated from the CSS sample) *(Source: calculated from the CSS sample)*

Table 6(a): Participation and employment probit results – African males and females pooled sample

Variable	Estimate – participation (own sample)	Estimate – participation (CSS)	Estimate – employment (own sample)	Estimate – employment (CSS)
intercept	2.225*** (7.172)	-0.026 (-0.009)	4.985*** (57.890)	0.506* (3.615)
age	-0.184*** (19.059)	-0.074*** (33.911)	-0.199*** (35.490)	-0.061*** (23.128)
sqage	0.002*** (20.059)	0.001*** (33.403)	0.002*** (26.406)	0.001*** (22.910)
Education	-0.109*** (22.233)	-0.051*** (40.898)	-0.102*** (42.929)	-0.054*** (49.721)
Marital2		0.046 (0.203)	-0.558*** (17.418)	-0.156* (3.012)
Marital3		0.355*** (7.343)	-0.039 (0.020)	-0.011 (0.009)
Central			-0.342** (5.796)	0.400* (2.724)
Klerksdorp			-0.333** (5.765)	
Rustenburg			-0.151 (0.637)	
Eastern			-0.348** (3.961)	
Relat2	0.911*** (26.962)	1.097*** (200.151)	0.765*** (28.460)	1.195*** (248.572)
Relat3	-0.028 (0.007)	0.621*** (35.864)	0.495** (5.836)	1.119*** (140.637)
Relat4	0.428 (2.341)	0.709*** (39.429)	0.619*** (8.480)	1.0224*** (91.811)
Relat5	-4.360 (1.772E-7)	1.151** (4.725)		1.071** (3.969)
nlbincm	0.000 (0.689)			
semiubn		0.350 (1.552)		0.400* (2.724)
rural		0.409*** (11.030)		0.388*** (7.930)
Ownship2				-0.103 (0.162)
Ownship3				-0.559*** (7.418)

TABLE 6(a) (CONTINUED)

variable	Own sample	CSS	Own sample	CSS
Ownship4				-0.086 (0.562)
No. 0 =	66	829	349	1533
1 =	738	2270	426	1507
Total =	804	3099	775	3040
Prob>Chisq	0.053	0.900	0.230	0.005

(Source: Calculated from the own sample and the CSs sample)

Table 6(b): Regression results – log hourly wage rate (adjusted for participation and employment bias using African males and females pooled sample)

Variable	Estimate (own sample)	variable	Estimate (CSS)
intercept	0.347 (1.143)		-0.417** (-2.061)
exp	0.080*** (5.111)		-0.011 (-0.081)
sqexp	-0.001** (-2.332)		0.000 (0.221)
educexp	-0.005*** (-3.496)		
Marital2	0.128 (1.137)		0.231*** (3.477)
Marital3	-0.572*** (-3.097)		0.296*** (2.718)
Central	0.349*** (2.806)	region2	0.501*** (5.795)
Klerksdorp	-0.031 (-0.254)	region3	0.411*** (4.528)
Rustenburg	0.208 (1.396)	region4	0.405*** (5.132)
Eastern	0.017 (0.118)	region5	0.185* (1.788)
Educ2	0.308* (1.814)	region6	0.497*** (4.718)
Educ3	0.539*** (3.156)	region7	0.155** (2.074)
Educ4	0.7132*** (3.506)	semiubn	0.166 (1.269)
Educ5	0.898*** (4.254)	rural	0.042 (0.635)

TABLE 6(b) (CONTINUED)

variable	Estimate (own)	variable	(CSS)
Educ6	1.392***	indust2	1.427***
	(5.267)		(14.882)
Employer2	-0.089	indust3	1.205***
	(-0.464)		(13.645)
Employer3	-0.308**	indust4	0.779***
	(-2.529)		(8.898)
Employer4	0.315	indust5	1.259***
	(0.822)		(10.703)
Employer5	-0.097	indust6	1.109***
	(-0.360)		(8.228)
Pwork2	0.153	indust7	1.206***
	(1.388)		(14.414)
Pwork3	0.160	indust8	0.231
	(1.570)		(0.923)
Indust2	0.298	occup1	1.150***
	(1.612)		(8.448)
Indust3	0.299*	occup2	0.852***
	(1.723)		(8.424)
Indust4	0.236	occup3	0.524***
	(1.434)		(6.373)
Indust5	0.437**	occup4	0.299***
	(2.445)		(3.526)
Indust6	-0.364	occup5	0.316***
	(-1.424)		(4.055)
Occup2	-0.161	occup6	0.120*
	(-1.142)		(1.749)
Occup3	-0.161		
	(-1.110)		
Occup4	-0.122		
	(-0.821)		
Occup5	-0.559***		
	(-3.663)		
union	0.312***		0.197***
	(3.769)		(3.725)
Lambda1	0.197		-0.095
	(1.266)		(-0.582)
Lambda2	0.098		0.095
	(1.122)		(0.513)
No.	334		861
R^2	0.68		0.72
Adj. R^2	0.65		0.71

(Source: Calculated from the own sample and the CSS sample)

Table 7(a): Employment probit results (own sample) – with education splines

Variable	Estimate - males	Estimate - females
Intercept	3.868***	5.361***
	(14.251)	(21.571)
Age	-0.182***	-0.195***
	(13.062)	(11.623)
Sqage	0.002***	0.002***
	(11.624)	(6.757)
S_{prim}	-0.079**	-0.124**
	(4.261)	(5.854)
S_{sec}	-0.063	-0.144**
	(0.948)	(5.718)
S_{ter}	-0.353	-13.329
	(0.280)	(3.402E-7)
Marital2	-0.507**	-0.097
	(5.869)	(0.076)
Marital3	0.037	-0.210
	(0.003)	(0.302)
semiubn	-0.168	0.117
	(0.727)	(0.298)
rural	0.155	0.451*
	(0.440)	(2.916)
Central	0.050	-0.425
	(0.045)	(2.473)
Klerksdorp	-0.113	-0.007
	(0.187)	(0.001)
Rustenburg	0.262	-0.128
	(0.591)	(0.112)
Eastern	-0.010	-0.179
	(0.001)	(0.281)
Relat2	1.024*	0.086
	(3.704)	(0.054)
Relat3	1.139***	-0.139
	(10.728)	(0.186)
Relat4	0.739**	0.366
	(5.391)	(1.023)
Relat5		6.476
		(1.502E-7)
No. 0 =	132	207
1 =	237	176
Total =	369	383
Prob>Chisq	0.026	0.009

(Source: Calculated from own sample)

Table 7(b): Regression results (own sample) – log of hourly wage rate (adjusted for employment selectivity bias with education splines)

Variable	Estimate - males	Estimate – females
intercept	0.498 (1.429)	0.635 (1.247)
exp	0.950*** (4.902)	0.095*** (2.972)
sqexp	-0.001** (-2.378)	-0.002* (-1.781)
educexp	-0.007*** (-3.662)	-0.003 (-1.085)
Marital2	-0.007*** (-3.662)	0.215 (1.627)
Marital3	-0.056 (-1.072)	-0.391 (-1.650)
Central	0.219 (1.456)	0.547** (2.550)
Klerksdorp	-0.141 (-0.959)	0.168 (0.800)
Rustenburg	0.134 (0.688)	0.314 (1.226)
Eastern	0.077 (0.429)	0.227 (0.937)
S_{prim}	0.106*** (3.398)	0.086* (1.663)
S_{sec}	0.092** (2.225)	0.171*** (2.834)
S_{ter}	0.123 (0.523)	1.063 (1.160)
Employer2	-0.191 (-0.823)	0.073 (0.203)
Employer3	-0.242 (-1.623)	-0.601** (-2.254)
Employer4	-0.038 (-0.059)	0.070 (0.122)
Employer5	-0.826 (-1.311)	-0.448 (-1.070)
Pwork2	0.205 (1.416)	0.136 (0.641)
Pwork3	0.323** (2.285)	-0.035 (-0.207)

TABLE 7(b) (CONTINUED)

variable	Estimate - males	Estimate - females
Indust2	0.349* (1.656)	0.532 (0.883)
Indust3	0.329* (1.675)	0.109 (0.254)
Indust4	0.307 (1.591)	0.133 (0.391)
Indust5	0.514** (2.240)	0.182 (0.532)
Indust6	0.057 (0.126)	-0.423 (-1.069)
Occup2	-0.070 (-0.361)	-0.214 (-0.871)
Occup3	-0.506*** (-2.702)	0.236 (0.782)
Occup4	-0.445** (-2.404)	0.575 (1.575)
Occup5	-2.837*** (-4.101)	-0.296 (-1.211)
union	0.351*** (3.435)	0.215 (1.445)
Lambda1	0.426** (2.025)	-0.052 (-0.637)
No.	192	143
R^2	0.69	0.74
Adj. R^2	0.63	0.68

(Source: Calculated from own sample)

Table 8(a): Participation and employment probit results (own sample) – with education splines

Variable	Estimate – participation (males)	Estimate – participation (females)	Estimate – employment (males)	Estimate – employment (females)
intercept	4.733** (6.632)	1.061 (0.587)	3.868*** (14.251)	5.361*** (21.571)
age	-0.290*** (10.103)	-0.121* (3.138)	-0.182*** (13.062)	-0.195*** (11.623)
sqage	0.003*** (10.893)	0.002* (3.682)	0.002*** (11.624)	0.002*** (6.757)
S_{prim}	-0.148** (4.514)	-0.080 (1.899)	-0.079** (4.261)	-0.124** (5.854)

TABLE 8(a) (CONTINUED)

variable	Estimate – participation (males)	Estimate – participation (females)	Estimate – employment (males)	Estimate – employment (females)
S_{sec}	-0.103 (0.561)	-0.282** (5.590)	-0.063 (0.948)	-0.144** (5.718)
S_{ter}	-6.232 (2.775E-8)	-3.445 (3.402E-8)	-0.353 (0.280)	-13.329 (3.402E-7)
Marital2	-0.018 (0.002)	-0.109 (0.037)	-0.507** (5.869)	-0.097 (0.076)
Marital3	1.176 (2.531)	0.129 (0.070)	0.037 (0.003)	-0.210 (0.302)
semiubn	-0.356 (1.212)	0.481* (2.724)	-0.168 (0.727)	0.117 (0.298)
rural	-1.150** (5.969)	-0.052 (0.027)	0.155 (0.440)	0.451* (2.916)
Central			0.050 (0.045)	-0.425 (2.473)
Klerksdorp			-0.113 (0.187)	-0.007 (0.001)
Rustenburg			0.262 (0.591)	-0.128 (0.112)
Eastern			-0.010 (0.001)	-0.179 (0.281)
Relat2	0.975 (2.177)	0.940 (2.575)	1.024* (3.704)	0.086 (0.054)
Relat3	-6.125 (5.881E-8)	0.307 (0.433)	1.139*** (10.728)	-0.139 (0.186)
Relat4	0.229 (0.268)	0.395 (0.580)	0.739** (5.391)	0.366 (1.023)
Relat5		-4.808 (2.802E-8)		6.476 (1.502E-7)
Nlbincm	0.000** (5.896)	-0.000 (0.738)		
No. 0 =	17	42	132	207
1 =	353	349	237	176
Total =	370	391	369	383
Prob>Chisq	0.290	0.000	0.251	0.000

(Source: Calculated from own sample)

Table 8(b): Regression results (own sample) – log of hourly wage rate(adjusted for participation and employment selectivity bias with education splines)

Variable	Estimate - male	Estimate - females
intercept	0.464 (1.308)	0.426 (0.787)
Exp	0.085*** (4.398)	0.100*** (3.072)
Sqexp	-0.001 (-1.606)	-0.001 (-1.205)
Educexp	-0.008*** (-4.140)	-0.005 (-1.599)
Marital2	-0.083 (-0.499)	0.341** (2.255)
Marital3	-0.001 (-0.004)	-0.515** (-2.100)
Central	0.190 (1.324)	0.443** (2.018)
Klerksdorp	-0.105 (-0.730)	0.011 (0.052)
Rustenburg	0.175 (0.894)	0.271 (1.054)
Eastern	-0.026 (-0.150)	0.151 (0.619)
S_{prim}	0.097*** (3.149)	0.052 (0.954)
S_{sec}	0.104*** (2.617)	0.102 (1.407)
S_{ter}	-0.240 (-0.657)	-1.609 (-0.909)
Employer2	-0.129 (-0.581)	0.049 (0.138)
Employer3	-0.256* (-1.770)	-0.630** (-2.370)
Employer4	-0.027 (-0.045)	0.070 (0.124)
Employer5	-0.684 (-1.133)	-0.534 (-1.263)
Pwork2	0.156 (1.095)	0.219 (1.019)
Pwork3	0.333** (2.417)	-0.031 (-0.184)

TABLE 8(b) (CONTINUED)

Variable	Estimate - males	Estimate - females
Indust2	0.312 (1.542)	0.706 (1.166)
Indust3	0.382** (2.016)	0.184 (0.429)
Indust4	0.239 (1.281)	0.094 (0.278)
Indust5	0.507** (2.291)	0.114 (0.333)
Indust6	0.113 (0.262)	-0.482 (-1.225)
Occup2	-0.132 (-0.703)	-0.260 (-1.059)
Occup3	-0.530*** (-2.952)	0.302 (1.003)
Occup4	-0.474*** (-2.639)	0.496 (1.361)
Occup5	-0.961*** (-4.771)	-0.253 (-1.038)
union	0.413*** (4.129)	0.129 (0.848)
Lambda1	0.385* (1.870)	0.092 (0.817)
Lambda2	0.063 (1.281)	0.244* (1.759)
No.	187	138
R^2	0.72	0.75
Adj. R^2	0.66	0.68

(Source: Calculated from own sample)

Table 9(a): Employment probit results (CSS) – with education splines

Variable	Estimate (African males)	Estimate (African females)	Estimate (Coloured males)	Estimate (white males)	Estimate (white females)
intercept	-0.177 (0.171)	1.065*** (7.562)	-1.858 (0.571)	-40.644 (2.159E-8)	-8.661 (3.069E-7)
age	-0.072*** (12.811)	-0.053*** (8.854)	0.101 (0.667)	1.727 (1.690)	0.011 (0.039)
sqage	0.001*** (19.353)	0.001** (6.217)	-0.001 (0.501)	-0.040 (1.518)	0.000 -3.769E-6
S_{prim}	-0.021 (1.030)	-0.014 (0.760)	0.074 (0.273)	1.066 (0.848)	-0.021 (1.030)
S_{sec}	-0.040 (1.030)	-0.169*** (33.877)	-0.190 (0.781)	-0.101 (0.062)	-0.040 (1.030)
S_{ter}	0.180 (0.696)	-0.017 (0.012)	-6.474 (5.13E-8)	1.111 (8.039E-9)	0.068 (0.013)
Marital2	-0.368*** (6.714)	0.677*** (20.957)	-1.101 (1.413)	0.650 (6.69E-12)	-3.430 (4.43E-9)
Marital3	-0.691*** (7.368)	0.026 (0.025)	-7.849 (2.213E-8)	8.391 (8.55E-11)	5.786 (1.37E-7)
Semiubn	0.225 (0.318)	0.855* (2.897)		0.528 (1.3E-11)	
rural	0.581*** (7.427)	-0.013 (0.003)	-0.382 (0.123)	7.557 (4.072E-9)	-6.599 (1.996E-8)
Ownship2	0.093 (0.092)	-0.305 (0.262)	-6.211 (0.999)	3.939 (6.46E-10)	5.318 (6.137E-9)
Ownship3	-0.817** (3.866)	-0.867** (5.527)	-1.036 (0.157)	7.472 (3.95E-9)	-6.829 (1.827E-7)
Ownship4	-0.210 (1.672)	0.084 (0.150)	-0.322 (0.088)	0.411 (1.71E-10)	6.313 (1.826E-8)
Relat2	1.378*** (20.686)	-0.034 (0.067)	8.363 (0.999)	22.645 (2.23E-10)	10.087 (3.508E-8)
Relat3	1.634*** (123.351)	0.567*** (15.827)	1.264 (2.468)	7.749 (9.54E-10)	6.381 (1.666E-7)
Relat4	1.457*** (70.409)	0.484*** (9.728)	1.965** (4.498)	13.576 (8.02E-11)	15.240 (3.237E-7)
Relat5	1.549** (4.076)	0.599 (0.650)	-6.326 (6.819E-9)	15.917 (3.31E-10)	-0.234 (2.26E-11)
No. 0 =	460	987	30	17	168
1 =	885	546	60	219	96
Total =	1345	1533	90	236	264
Prob>Chisq	0.000	0.063	0.362	0.880	0.037

(Source: Calculated from the CSS sample)

Table 9(b): Regression results (CSS) – log of hourly wage rate (adjusted for selectivity bias with education splines

Variable	Estimate (Africans males)	Estimate (African females)	Estimate (coloured males)	Estimate (white males)	Estimate (white females)
Intercept	-0.205 (-0.904)	-0.506 (-1.449)	-1.160 (-0.715)	0.318 (0.657)	-0.230 (-0.343)
Exp	0.005 (0.400)	0.003 (0.175)	0.004 (0.039)	0.040 (1.531)	0.070 (1.482)
Sqexp	-0.000 (-0.162)	-0.000 (-0.340)	0.000 (0.236)	-0.000 (-1.110)	-0.001 (-1.620)
S_{prim}	0.054*** (4.355)	0.040 (1.514)	0.181 (1.491)		
S_{sec}	0.103*** (3.859)	0.033 (0.665)	-0.190 (-0.884)	0.094** (2.234)	0.019 (0.235)
S_{ter}	-0.287 (-0.937)	-0.151 (-1.138)	-0.422 (-0.317)	0.015 (0.057)	0.351 (0.440)
Region2	0.358*** (3.676)	0.621*** (3.138)	0.739 (1.036)	0.314 (1.201)	-0.339 (-0.964)
Region3	0.317*** (2.826)	0.485*** (2.853)			
Region4	0.337*** (3.540)	0.449*** (2.901)	2.011 (1.955)	-0.047 (-0.163)	-0.272 (-0.595)
Region5	0.164 (1.249)	0.187 (0.956)			
Region6	0.444*** (3.849)	0.477* (1.874)	1.012 (1.649)	0.123 (0.490)	-0.197 (-0.643)
Region7	0.001 (0.012)	0.319* (1.887)	0.921 (1.553)	0.129 (0.541)	0.008 (0.024)
semiubn	0.142 (1.183)	-0.252 (-0.338)		-0.087 (-0.306)	
rural	0.005 (0.075)	0.139 (0.798)	-0.436 (-0.964)	0.101 (0.973)	-0.218 (-0.733)
Marital2	0.146* (1.897)	0.202 (1.637)	0.047 (0.064)	0.044 (0.227)	0.326 (0.914)
Marital3	0.144 (1.082)	0.405** (2.440)	-2.288 (-1.378)	-0.358 (-0.654)	0.297 (0.805)
Indust2	1.384*** (14.076)	1.339*** (4.379)	0.628 (0.690)	0.554* (1.791)	1.772** (2.122)
Indust3	1.216*** (12.430)	1.045*** (4.907)	0.839 (1.339)	0.223 (0.691)	0.903 (1.451)
Indust4	0.837*** (7.671)	0.706*** (3.972)	-0.040 (-0.063)	0.450 (1.493)	0.707* (1.701)
Indust5	1.313*** (10.581)	1.048*** (3.320)	-0.081 (-0.096)	-0.016 (-0.048)	0.909* (1.801)

TABLE 9(b) (CONTINUED)

variable	Estimate (African males)	Estimate (African females)	Estimate (coloured males)	Estimate (white males)	Estimate (white females)
Indust6	1.089***	1.062***	0.185	0.639*	0.774*
	(7.237)	(3.464)	(0.184)	(1.781)	(1.695)
Indust7	1.282***	1.180***	0.329	0.378	0.867**
	(12.353)	(6.689)	(0.496)	(1.175)	(2.186)
Indust8	-0.030	0.706			
	(-0.109)	(1.370)			
Occup1	0.930***	1.402***	1.581	1.338***	1.284***
	(4.738)	(6.303)	(1.607)	(3.769)	(3.236)
Occup2	0.584***	1.043***	1.879**	1.338***	1.319***
	(3.964)	(6.480)	(2.279)	(4.027)	(3.230)
Occup3	0.429***	0.636***	0.974	0.913**	0.999***
	(4.089)	(4.283)	(1.118)	(2.000)	(2.736)
Occup4	0.222**	0.387***	0.876	0.947***	0.628
	(1.965)	(2.672)	(1.167)	(3.130)	(1.536)
Occup5	0.111	0.774***	0.689	1.165***	1.361*
	(1.321)	(4.002)	(1.205)	(3.828)	(1.738)
Occup6	0.040	0.508**	0.203	1.057***	
	(0.569)	(2.007)	(0.296)	(3.159)	
union	0.244***	0.155	-0.043	0.229*	0.339
	(3.858)	(1.542)	(-0.098)	(1.908)	(1.353)
Lambda1	-0.028	-0.032	0.178		
	(-0.385)	(-0.121)	(1.118)		
No.	546	271	41	129	72
R^2	0.78	0.61	0.83	0.52	0.64
Adj. R^2	0.76	0.56	0.52	0.41	0.47

(Source: Calculated from the CSS sample)

Table 10: Number of observations used in the study for each level of a variable

Own sample (Africans):

Variable	level	Number of observations (males) (%)	Number of observations (females) (%)
Type of area of residence	urban	216 (36)	256 (36)
	Semi-urban	168 (28)	189 (26)
	rural	215 (36)	271 (38)
region	Huhudi/Bophirima	116 (19)	147 (20.5)
	Central	178 (30)	192 (27)
	Klerksdorp	170 (28)	204 (28.5)
	Rustenburg	56 (9)	69 (10)
	Eastern	79 (13)	104 (14.5)
gender		593 (45.5)	710 (54.5)
age	15 – 24 years	111 (19)	126 (18)
	25 – 34 years	179 (30)	212 (30)
	35 – 65 years	309 (52)	378 (53)
Marital status	single	260 (45)	320 (47)
	Married/living together	299 (52)	294 (43)
	Divorced/widowed	15 (3)	70 (10)
education	No education	77 (10)	84 (9)
	Sub A – std 4	155 (19)	157 (16)
	Std 5 – std 7	220 (27)	267 (27)
	Std 8 – std 9	131 (16)	187 (19)
	Std 10	171 (21)	205 (21)
	Over std 10	48 (6)	76 (8)
Economic status	Employed (full-time)	272 (52)	206 (35)
	Employed (part-time)	42 (8)	45 (8)
	unemployed	162 (31)	268 (46)
	Sub-total (economically active)	476 (90)	519 (89)
	Non-economically active	46 (9)	62 (11)

TABLE 10 (CONTINUED)

variable	level	Males (%)	Females (%)
Work hours	Less than 40 per week	359 (60)	562 (79)
	40 per week	142 (24)	109 (15)
	More than 40 per week	98 (16)	45 (6)
industry	Agriculture, forestry and fisheries	21 (8)	12 (6)
	mining	56 (21)	4 (2)
	manufacturing	15 (6)	6 (3)
	Electricity and water	9 (3)	1 (0.5)
	construction	19 (7)	1 (0.5)
	Whole sale and retail	26 (10)	18 (8)
	Restaurant and hotel/entertainment/sport	6 (2)	13 (6)
	Transport and communication	32 (12)	6 (3)
	finance	4 (1:5)	5 (2)
	Educational services	46 (17)	67 (31)
	Medical services	10 (4)	28 (13)
	Legal services	4 (1.5)	0 (0)
	Domestic services	6 (2)	45 (21)
	Armed forces	11 (4)	4 (2)
	Other services	4 (1.5)	5 (2)
occupation	Manager, administrator and supervisor	10 (4)	2 (1)
	professional	21 (8)	66 (31)
	technician	17 (6)	10 (5)
	clerk	13 (5)	19 (9)
	Service, shop market and sales	40 (15)	23 (11)
	Skilled agriculture, forestry and fisheries	9 (3)	3 (1)
	Craft related and trade	72 (27)	12 (6)
	Plant and machine operator	22 (8)	0 (0)
	elementary	53 (20)	76 (36)
	Army personnel	8 (3)	2 (1)
Employer	Central, provincial and local government	56 (25)	89 (49)
	Public corporation	10 (4)	7 (4)
	Private sector	151 (67)	51 (28)

TABLE 10 (CONTINUED)

variable	level	Males (%)	Females (%)
	Self employed	5 (2)	3 (2)
	Household	1 (1)	28 (15)
	Non-profit making institution	1 (0)	5 (3)
Union membership	Member	117 (50)	95 (49)
	Non-member	115 (50)	98 (51)

SALDRU and CSS samples (all population groups)

variable	level	Number of observations (SALDRU) (%)	Number of observations (CSS) (%)
Type of area of residence	urban	1942 (89)	626 (10)
	Semi-urban	76 (1)	
	rural	246 (11)	5785 (89)
Population group	Africans	1306 (90)	5327 (82)
	coloureds	2 (0)	347 (5)
	Asians	1 (10)	132 (2)
	whites	148 (10)	685 (11)
gender	males	1127 (48.5)	3033 (47)
	females	1061 (51.5)	3458 (53)
Marital status	single		3216 (49.5)
	Married/living together		2865 (44)
	Divorced/widowed		410 (6)
education	No education	215 (15.5)	700 (11)
	Sub A – std 4	255 (18)	1294 (20)
	Std 5 – std 7	441 (32)	1975 (30)
	Std 8 – std 9	240 (17)	1175 (21)
	Std 10 and over	233 (17)	1347 (21)
age	15 – 24 years	751 (34)	2130 (33)
	25 – 34 years	607 (28)	1558 (24)
	35 – 65 years	830 (38)	2803 (43)
Economic status	Employed (full-time)	795 (55.5)	2145 (33)
	Employed (part-time)		171 (3)
	unemployed	175 (12)	836 (13)

TABLE 10 (CONTINUED)

Variable	level		SALDRU (%)	CSS (%)
	Sub-total (economically active)		970 (67.5)	3152 (49)
	Non-economically active		463 (32)	3339 (51)
Work hours	Less than 40 per week		853 (39)	4604 (71)
	40 per week		625 (29)	713 (11)
	More than 40 per week		710 (32)	1174 (18)
province	Cape:	Africans	33 (100)	
		coloureds	0 (0)	
		Asians	0 (0)	
		whites	0 (0)	
	Transvaal :	Africans	495 (74)	
		coloureds	2 (0)	
		Asians	1 (0)	
		whites	168 (25)	
	Bophuthatswana:	Africans	1453 (100)	
		coloureds	0 (0)	
		Asians	0 (0)	
		whites	2 (0)	
region	Region1:	Africans		645 (85)
		coloureds		30 (4)
		Asians		25 (3)
		whites		59 (8)
	Region2:	Africans		415 (73)
		coloureds		32 (6)
		Asians		1 (0)
		whites		120 (21)
	Region3:	Africans		919 (97)
		coloureds		25 (3)
		Asians		4 (0)
		whites		4 (0)
	Region4:	Africans		1191 (91)
		coloureds		33 (3)
		Asians		19 (1)
		whites		65 (5)

TABLE 10 (CONTINUED)

variable	Level		SALDRU (%)	CSS (%)
	Region5:	Africans		671 (99)
		coloureds		4 (1)
		Asians		4 (1)
		Whites		1 (0)
	Region6:	Africans		174 (46)
		coloureds		34 (9)
		Asians		22 (6)
		whites		146 (39)
	Region7:	Africans		1052 (66)
		coloureds		189 (12)
		Asians		57 (4)
		whites		290 (18)
industry	agriculture			370 (19)
	mining			233 (12)
	manufacturing			178 (9)
	Electricity, water and gas			17 (1)
	construction			79 (4)
	Trade and repair			377 (20)
	Transport storage and communication			94 (5)
	Finance, community, social and personal service			473 (25)
	other			21 (1)
	agriculture		225 (15)	
	mining		289 (20)	
	manufacturing		147 (10)	
	Electricity and water		10 (1)	
	construction		40 (3)	
	Wholesale and retail		207 (14)	
	Restaurant and hotel, entertainment and sport		54 (4)	
	Transport and communication		52 (4)	
	finance		22 (1.5)	
	Community, social and personal service		365 (25)	
	other		46 (3)	

TABLE 10 (CONTINUED)

variable	Level	SALDRU (%)	CSS (%)
occupation	manager		54 (3)
	professional		54 (3)
	technician		187 (10)
	clerk		239 (13)
	Service, shop market and sales		215 (12)
	Skilled agriculture and fisheries		13 (1)
	Craft related and trade		276 (15)
	Plant and machine operator		232 (13)
	elementary		563 (30.5)
	other		13 (1)
	Manager and administrator	21 (1)	
	Professional and technician	124 (8.5)	
	Clerical and sales	232 (16)	
	Transport, delivery and communication	101 (7)	
	service	312 (21.5)	
	farming	143 (10)	
	Artisan and apprentice	74 (5)	
	Production, mining and quarrying	78 (5)	
	labourer	102 (7)	
	other	265 (18)	
employer	government	273 (18.5)	
	Public corporation	64 (4)	
	Private sector	1024 (69)	
	Non-profit making institution	3 (0)	
	Self-employment	8 (0.5)	
	householder	104 (7)	
Union membership	member	388 (26)	599 (9)
	Non-member	1083 (74)	1329 (20.5)
	unspecified		4563 (70)

(source: calculated from the own sample, SALDRU sample and CSS sample)

APPENDIX B

page

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Date: June/July 1997

UNIVERSITY OF POTCHEFSTROOM / UNIVERSITY OF NORTH WEST

Survey on Earnings Determinants of people in North West Province

Dear Respondent

This is a survey about the Earnings Determinants of people in North West Province by the Department of economics, Potchefstroom University and Faculty of Agriculture, North West University. The survey focuses on all people. The information gathered here is intended to inform the socio-economic programmes and policies which the North West government should put in place in order to uplift the living standards of the people of the province. Your information will be strictly confidential.

The survey report may then in future be used by the policy-makers to plan for the province. Your participation is vital in ensuring that we obtain as accurate and comprehensive a picture as possible.

Your participation in this survey is greatly appreciated.

Yours sincerely

P. S. Zake
Project Leader: Survey on 'earnings determinants' in North West province

Questionnaire

Confidential information to be used for research purposes only

AN ECONOMETRIC ANALYSIS OF SOCIO-ECONOMIC DETERMINANTS OF HOUSEHOLD EARNINGS IN THE NORTH WEST PROVINCE

DEPARTMENT OF ECONOMICS, POTCHEFSTROOM UNIVERSITY

Questionnaire number ...

To assist us to correctly interpret your response to this questionnaire, it would be appreciated if you would circle your response to each question. e.g.

Are you living in a district other than your home district?

1 Yes

2 No

Household code ...

Description of settlement ...

Number of households at visiting point ...

Type of area (i.e.suburb/village/town/city/farm/ etc.) ...

Name of the magisterial district ...

Interviewer ...

Date of interview ...

Return checked by supervisor

.....

SECTION A: HOUSING AND OTHER HOUSEHOLD ASPECTS

1.1 Ownership of the dwelling:

1 Own dwelling a. Fully paid off b. Partly paid off **(Go to question 1.3)**
2 Rented dwelling
3 Free dwelling (company/job benefit)

1.2 If you are a tenant, what kind of rent arrangement did you make with the landlord?

1 Cash payment
2 Share cropping
3 Payment in kind
4 Other (Specify) ...

1.3 If you were to sell this dwelling, how much would you get now?
Rands ...

1.4 If you were to rent out your house(s), how much would you get?
Rands ...

1.5 Family type

1 Traditional, multi-unit extended family
2 Nuclear family
3 Single-unit family

SECTION B: LAND ACCESS AND USE

2.1a Does any person in this household have the right to use (have access to) any land for farming?

1 yes
2 no

2.1b IF YES: is this land

1 communal
2 private (own farm)
3 private (rented)
4 other (specify)

2.2 How much of the land does the household use for growing crops and how much does the household use for grazing of animals?

1 all for crops
2 most for crops
3 half for crops and half for grazing
4 most for grazing
5 all for grazing

2.3 What is the total size of all land that is available to household members for farming?
Record in hectares for those who can give the information otherwise estimate by using the football ground.

..... hectares

2.4 If you were to sell all the land, how much could you get for it now?

Rands ....

2.5 Did the household have to pay rent for any of the land used for farming in the past 12 months?

1 yes
2 no

2.6 IF YES: how much was paid in rent?

Rands ...

2.7 Was any of the land rented out to other people in the past 12 months?

1 yes
2 no

2.8 IF YES: how much was paid to the household as rental for land?

Rands ...

NON-FARMING LAND AND OTHER PROPERTY (IMMOVABLE PROPERTY)

2.9 Does any member of this household own other property or a share of other property (such as a second or holiday home, a business or commercial property). **(not counting the property on which the household lives presently)?**

1 yes **Go to question 2.10**
2 no **Go to section c**

2.10 Please indicate the type of property in the table below.

List of properties	How much do you think it is worth (Rands)	Is any rent being received yes	no	Amount received as rental for this property in the past month (Rands)

SECTION C: PERSONAL INFORMATION

3.1 First Name

	1	2	3	4	5	6	7	8	9	10

3.2 Sex

	1	2	3	4	5	6	7	8	9	10
1 male										
2 female										

3.3 Race

	1	2	3	4	5	6	7	8	9	10
1 African										
2 coloured										
3 Asian										
4 white										

3.4 Relationship to the head/acting head of household.

	1	2	3	4	5	6	7	8	9	10
1 Head/acting head										
2 Spouse (i.e. Husband/wife/partner)										
3 Son/daughter/stepchild/adopted child										
4 Brother/sister										
5 Father/mother										
6 Grandparent										
7 Grandchild										
8 Other relative (e.g. In-laws)										
9 Non-related person										

3.5 Which year were you born? ...

1	2	3	4	5	6	7	8	9	10

3.6 How old are you? ... in completed years

1	2	3	4	5	6	7	8	9	10

3.7 What is the highest standard (class) you finished in school or are in now?

	1	2	3	4	5	6	7	8	9	10
0 No Schooling										
1 Sub A/Sub B/grade 1/grade 2/Std 1										
2 Std 2										
3 Std 3										
4 Std 4										
5 Std 5										
6 Std 6										
7 Std 7										
8 Std 8										
9 Std 9										
10 Std 10										
11 Diploma/certificate with std 9 or lower										
12 Diploma/Certificate with Std 10										
13 Degree										
14 Other (specify in column)										

3.8 Do you presently attend school , college, technikon or university? (This includes studies by correspondence).

	1	2	3	4	5	6	7	8	9	10
1 Yes, full time										
2 Yes, part-time										
3 No										

3.9 What is your permanent residential area? (specify province) ...

1	2	3	4	5	6	7	8	9	10

3.10 Where did you grow up (i.e. around the age of 12 years)? .....

1	2	3	4	5	6	7	8	9	10

3.11 Was there a local school near your home (i.e. walking distance) where you grew up?

	1	2	3	4	5	6	7	8	9	10
1 Yes										
2 No										

3.12 Are you living in a district other than your home district?

	1	2	3	4	5	6	7	8	9	10
1 Yes										
2 No										

3.13 Nationality (State)

1	2	3	4	5	6	7	8	9	10

3.15 What is your current marital status?

	1	2	3	4	5	6	7	8	9	10
1 Single/never married										
2 Married: Civil/religious										
3 Married:Traditional/customary										
4 Living together (with partner)										
5 Widower /widow										
6 Divorced/separated										

3.16 Can you read and write a letter?

	1	2	3	4	5	6	7	8	9	10
1 Yes										
2 No										

3.17 What is or was (in case he is late) your father's occupation? (Specify) ...

1	2	3	4	5	6	7	8	9	10

3.18 What is or was (in case he is late) your father's highest educational level? ... (State according to list in Q.1.7)

1	2	3	4	5	6	7	8	9	10

3.19 What is or was (in case she is late) your mother's occupation? (Specify) ...

1	2	3	4	5	6	7	8	9	10

3.20 What is or was (in case she is late) your mother's highest educational level? ... (State according to list in Q.1.7)

1	2	3	4	5	6	7	8	9	10

SECTION D1: REGULAR EMPLOYMENT AND EARNINGS INFORMATION

4.1 Economic status

1 Employed/ Working full-time										
2 Employed/Working part-time/temporary/ seasonal/rotational **(Go to Section D2)**										
3 Student (full time) (**end interview, go to next person)**										
4 Private business										
5 Unemployed (**Go to 4.28)**										
6 Retired										
7 Not economically active (i.e. permanently unable to work) **(end interview ...)**										
8 Other (Specify) ...										

4.2 How many (i) days a week , and (ii) how many hours a day (excluding travelling time) do you actually work?

	1	2	3	4	5	6	7	8	9	10
1 days										
2 hours										

4.2 Who were you working for in the most recent job? **(See the Code List)**

1 Employer										
2 Code										

4.4 For how long have you been doing this particular job? (Specify in years)

1	2	3	4	5	6	7	8	9	10

4.5 Nature of place of work

	1	2	3	4	5	6	7	8	9	10
1 Country side (village) or farm										
2 Small rural town or trading centre										
3 Small urban town										
4 Big rural town or trading centre but not city										
5 Big urban town but not city										
6 City										

4.6 In which economic sector were you employed in the most recent job? **(See Code List)**

Name of sector										

4.7 What type of work is done by the business / organisation for which you work (main economic activity)?

Describe										

	1	2	3	4	5	6	7	8	9	10
1 per day										
2 per week										
3 per month										
4 per year										

4.13 If the earnings stated is net pay (or take-home' pay), what is the amount that was deducted (i.e. including tax)?

(in Rands ... specify)										

4.14 What was the estimated value did you receive in kind for (i.e.during pay period):

1 transport										
2 clothing										
3 food										
4 other (e.g. housing)										
Specify per day/week/month										
1 day										
2 week										
3 month										
4 year										

4.15 How much, if anything, was paid to you as a bonus in the last year?

	1	2	3	4	5	6	7	8	9	10
Rands										

4.16 And, how much, if anything, was paid to you as a share of profits in the last year?

	1	2	3	4	5	6	7	8	9	10
Rands										

Are you a paid-up member of a trade union?

	1	2	3	4	5	6	7	8	9	10
1 Yes (Specify which)										
2 No										

4.8 How big is the enterprise? (in terms of number of workers)

1 1										
2 2 - 5										
3 6 - 10										
4 11 - 20										
5 more than 20										

4.9 In order to determine whether your job/business is informal or formal (registered), you are requested to indicate whether the business was registered at either Registrar of companies, Commissioner of unemployment insurance, or Commissioner of workmen's compensation's offices. Is your business registered at any of the above-mentioned?.

	1	2	3	4	5	6	7	8	9	10
1 Yes										
2 No										

4.10 Do you have credit facilities for the business?

	1	2	3	4	5	6	7	8	9	10
1 Yes (Specify the source(s))										
2 No										

4.11 What type of income do you earn? (e.g. wage/salary, interest, profit, commission)

	1	2	3	4	5	6	7	8	9	10
Describe										

4.12 Income from main job:

What was your actual take-home pay (i.e. salary/pay including bonus, overtime and commission after deductions for tax, contributions, etc.) in your pay packet?

(in Rands)										

Continuation of Q. 4.13, please, indicate

4.18 If self-employed: what is the total value of all equipment that you use to do your job?

	1	2	3	4	5	6	7	8	9	10
Rands										

4.19 (a) Do you get materials easily?

	1	2	3	4	5	6	7	8	9	10
1 Yes **(Go to Q. 4.20)**										
2 No										

(b) If No, why?

	1	2	3	4	5	6	7	8	9	10
1 No money										
2 Not materials not readily available										
3 Other (specify)										

SECTION D2: WAGE WORK: CASUAL OR TEMPORARY

4.20 What do you do? **(See Code List)**

	1	2	3	4	5	6	7	8	9	10
Describe										
Code										

4.21 Who do you work for? **(See Code List)**

	1	2	3	4	5	6	7	8	9	10
Type of Employer										
Code										

4.22 In which economic sector are you employed? **(See Code List)**

Sector name										
Code										

4.23 About how many hours, not counting travel time, do you work on an average day?

	1	2	3	4	5	6	7	8	9	10
Hours										

4.24 How many hours of paid overtime, if any, did you work in the past week?

	1	2	3	4	5	6	7	8	9	10
Overtime hours										

4.25 In the past week, what were you paid in cash for the work that you did?

	1	2	3	4	5	6	7	8	9	10
Rands										

4.26 What is the estimated value did you receive in kind for:

	1	2	3	4	5	6	7	8	9	10
1 transport										
2 clothing										
3 food										
4 other (e.g. housing)										

4.27 If self-employed: what is the total value of all the equipment that you use to do your job?

	1	2	3	4	5	6	7	8	9	10
Rands										

GOTO Q.4.37

4.28 Why are you not working? (e.g. at school, sick, can't find job, etc.)

	1	2	3	4	5	6	7	8	9	10
Describe										

4.29 How do you make a living? **(See Code List)**

	1	2	3	4	5	6	7	8	9	10
Describe										

4.30 Are you looking for work?

	1	2	3	4	5	6	7	8	9	10
1 Yes										
2 No										
If No why?										

4.31 If you are looking for a job, what kind of work do you want? (e.g. construction work, unskilled factory work, domestic work, driver etc.)

	1	2	3	4	5	6	7	8	9	10
1 Any										
2 Any but prefer										
3 Only										

4.32 Which job-search technique do/did you normally use?

	1	2	3	4	5	6	7	8	9	10
1 Queuing										
2 Family and friends										
3 Advertising										
4 Other (specify)										

4.33 How long have you been looking for a job? (Specify months) 1 2 3 4 5 6 7 8 9 10

1	2	3	4	5	6	7	8	9	10

4.34 Are you trained or skilled to do a particular job?

	1	2	3	4	5	6	7	8	9	10
1 yes										
2 no										
If "yes", describe skill or qualification										

4.35 What is the minimum salary or wage are you prepared to work for?

	1	2	3	4	5	6	7	8	9	10
Rands										

Specify per day/week/month/year

	1	2	3	4	5	6	7	8	9	10
1 day										
2 week										
3 month										
4 year										

4.36 If you have ever worked for pay but not presently working, state one single most important reason why you quite working. **(See Code List)**

	1	2	3	4	5	6	7	8	9	10
Reason										

4.37 If you plan to go back to work again, which of the following reasons is the most important in your decision to go back to work again? **(See Code List)**

	1	2	3	4	5	6	7	8	9	10
Reason										

4.38 If you have ever worked before, what kind of work do/did you normally do or what is/was your occupation? (e.g. teacher, nurse, etc.)

	1	2	3	4	5	6	7	8	9	10
1 ... (specify)										
2 not applicable										

4.39 What is/was your main duty or activity in this occupation, (How do/did you earn the money)? (e.g. Selling fruit and vegetables, breeding cattle, teaching primary school children).

	1	2	3	4	5	6	7	8	9	10
1 Describe in detail										
2 Not applicable										

4.40 Are you a migrant work? (Someone who is a way from home for more than a month each year to work or to seek work).

	1	2	3	4	5	6	7	8	9	10
1 Yes										
2 No										

4.41 If you have ever worked before, (are, were) you mostly paid in cash or mostly in kind, or (are, were) you not paid at all?

	1	2	3	4	5	6	7	8	9	10
1 in cash										
2 in kind										
3 both in cash and in Kind										
4 unpaid										

4.42 If you have ever worked, are/were you employed by some members of your family, by some one else or organization, or are/were you self-employed?

	1	2	3	4	5	6	7	8	9	10
1 Family member										
2 Some one else/ organization										
3 Self-employed and employs other people										
4 Self-employed without employing other people										
5 Never worked in my life										

OTHER FORMS OF SELF-EMPLOYMENT

4.43 Apart from the work that we have already talked about, did any one in this household do any other kind of work for an income in the past month? I am going to read from a list of possibilities. As I read each one, please indicate whether or not it was a source of income for the household in the past month.

	1	2	3	4	5	6	7	8	9	10
1 yes										
2 no **(Go to Section E)**										
Activity name										
Code										

4.44 Who are the household members who spend time in the production or sale of or help in .....?

Member 1 (personal code) ...
Member 2 (personal code) ...
Member 3 (personal code) ...

4.45 About how much time was devoted last month by all household members to .....?

Hours ... or
Days ...

4.46 How much in total did the household bring in last month as a result of .....?

(Gross Sales) Rands ...

4.47 How much was spent in total last month by the household for .....?

(Total expenses) Rands ...

4.48 What is the total value of equipment or stock that you need to do .....?

(Value) Rands ...

4.49 How many people excluding household members are employed in this activity?

Number ...

SECTION E: FARMING ASSETS

5.1a Does this household own any tractor or other farming vehicles?

1 yes
2 no **Go to Question 5.2**

5.1b IF YES: approximately how much could you sell them now?

Rands ...

5.2a Does this household own mechanised farm equipment/pumps?

1 yes
2 no **Go to Question 5.3**

5.2b IF YES: approximately how much could you sell them now?

Rands ...

5.3a Does this household own other non-mechanical farm tools (spades, hoes, etc.)?

1 yes
2 no

5.3b IF YES: approximately how much could you sell them for?

Rands ...

OTHER FARMING COSTS

5.4 Please, give the costs of the following items:

	Code	Rands
Wages for workers who helped with farming		
Farming material like seeds, fertilizer, pesticides		
Petrol, diesel & oil for machines		
Food for the poultry or farm animals		
Farm land that was rented from someone else		
Other payments made in the last 12 months to gain access to land		
Land taxes		
Various services, for example, tractors, oxen which were used for Ploughing		
Interest on loans		
Any other costs (describe)		

SECTION F: OTHER HOUSEHOLD INCOME

6.1 Is there any additional money that this household generates, and that has not been included in the previous questions (e.g. the sale of home grown produce or sale of bear or the rental of property)? If so, please indicate this total amount, if anything, during the past year. (1 January, 1996 - 31 December 1996). If none, enter "0".

R .... for the year

6.2 If this household receives any remittances or payments (e.g. money sent back home by someone working or living elsewhere or alimony). Please indicate the total received during the past year. (1 January 1996 - 31 December 1996).

R ... for the year

6.3 Is the household producing any goods for home consumption or are part of the goods produced by the household, if any, consumed at home? If 'Yes', what is their total monthly value?

1 Yes Rands .....
2 No

6.4 Here, we are going to talk about any other money or any other form of assistance that members of the household may have received from sources which do not involve employment of some kind. There are many ways in which the household can receive money without being employed. For example, pension payments, charity, unemployment insurance fund, etc. You are kindly requested to indicate in the list below whether any member of the household did, infact, receive such assistance or not.

Source	yes	no	How much total was received by the household last month? (Rands)
1 Old age pension/social pension)			
2 Private pension /private provident fund			
3 Government civil servants pension			
4 Government disability grant			
5 Government poor relief			
6 Government workmen's Compensation			
7 Interest earnings including dividends from savings, loans			
8 Unemployment insurance fund			
9 NGO food or meals			
10 Other NGO transfers			
11 Government supplementary food scheme			
12 Other (describe)			

SECTION G: HOUSEHOLD EXPENDITURE

In this section, I am going to talk about all the expenses (including those already covered in the previous sections) which were incurred by the household during the past month.

7.1 How much money (approximately) did the household spend, during the past month?

			Rands
1	Car(s)	(a) instalment(s)	
		(b) fuel & repairs	
		(c) insurance(s)	
2	House	(a) Rent	
		(b) Bond repayment	
		(c) Other (including repairs)	
3	Groceries (including toiletries and household essentials)		
4	Municipal taxes (i.e. rates & water)		
5	Fuel & power (for heat & light energy, i.e. electricity, paraffin & gas)		
6	Clothing & footwear (including payments accounts)		
7	Cosmetics		
8	Imputed value for consumption of Household produced food and drink		
9	Restaurants and cafes		
10	Regular non-food		
11	Entertainment & visitors		
12	Glassware		
13	Health (including life insurance, medical aid & hospital bills)		
14	Telephone		
15	Misc. services & semi-durables		
16	Other durables (including furniture and hire purchases)		
17	Weddings and funerals etc.		
18	Savings (including retirement annuities and stokvel contributions)		
19	Other (Specify)		

7.2 What did the household spend on education fees for scholars? (Please, refer to Education spending list. Values for Bursaries, Scholarships and School Meals, and for any other kind of school subsidy should be deducted).

	School fees	Transport	Other (e.g. books, school uniform & boarding,)
1. during the past month or " " " year			
2. during the past month or " " " year			
3. during the past month or " " " year			
4. during the past month or " " " year			
5. during the past month or " " " year			
6. during the past month or " " " year			

CODE LIST

1 Employer

1 = Central Government
2 = Provincial Administration
3 = Local Authority or Regional Authority
4 = Public Corporation
5 = Private Sector Employer
6 = Non-Profit Institution
7 = Self-employment
8 = Household
9 = Other (Specify)

2 Sector/Industry

01 = Agriculture/Fishing/Forestry
02 = Mining
03 = Manufacturing
04 = Electricity & Water
05 = Construction
06 = Wholesale & Retail
07 = Restaurant & Hotels/Entertainment/Sport
08 = Transport & Communication
09 = Finance
10 = Educational Services
11 = Medical Services
12 = Legal Services
13 = Domestic Services
14 = Armed Forces
15 = Other Services

3 How making a living

1 = Do odd jobs
2 = Supported by persons in the household
3 = Supported by relatives not in the household
4 = Supported by friends not in household
5 = Supported by charity, church, welfare, etc.
6 = Unemployment benefit
7 = Savings or money previously earned
8 = Old age or disability pension
9 = Other (Specify, e.g. bursary, loan)

4 Reasons why quite working

1 = I was laid off / dismissed or fired
2 = Retrenchment / Closure of business
3 = I got married
4 = I had a child
5 = had to go back to school
6 = was temporarily ill / health
7 = Resigned voluntarily
8 = Retired
9 Other (Specify)

5 Reasons for going back to work again

1 = Better qualifications, now or soon
2 = Need for money to supplement family income
3 = Children are older now
4 = Money to go back to school
5 = Need money to take care of may parents and relatives
6 = Just want to get out of the house to do something
7 = Don't know
8 = Other (Specify)

6 Education Expenditure items

School fees for Pre-primary education
School fees for primary education
School fees for secondary education
Tuition fees for tertiary education

Other expenses

School uniform
Transport to school
Meals at school
Stationery for school
School books
Boarding fees
Contributions to school buildings
Extra costs for teachers
Extramural activities
Other (Specify)

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