

2 CHAPTER **LITERATURE OVERVIEW**

2.1 Introduction

Chapter 1 included an introduction on the motivation, objectives and method of this study. It also included an overview on the stance of education and tertiary educated workers in South Africa, the importance of tertiary education as well as the focus of this study in determining whether the level of education significantly impacts the income of tertiary educated South Africans. Furthermore, the significance of other factors influencing income of tertiary educated individuals will also be determined.

This chapter will include a more focused background on tertiary education and tertiary economics education within South Africa. The primary South African and international literature findings concerning income of tertiary educated individuals and the factors of influence will be considered in general, and specifically on economic education. This chapter will also consider the rate of return to education, where the rate of return can be seen as the income or remuneration received by the investment maker, that is to say the student. The rate of return to education thus plays an import role in this study, since it is a direct link to assessing the significance of education in relation to income. The other factors of influence that will be considered in this chapter include experience, age, gender, population group, occupation, sector or industry, location of employment, marital status, tenure, and union. Literature specifically focusing on the significance of education and economic education on the income of tertiary educated individuals within South Africa is scarce, yet literature regarding the rate of return for each level of education can be found in both South African and International literature. Although this study concentrates on the significance of education and other factors of influence on income of tertiary educated individuals, it is important to note that the rate of return to education consists of two components. The first of these is the cost component which is not considered in the Mincer earnings function (Mincer, 1974). The second component is the income component, which can be seen as the marginal income at a special level of education. Considering literature regarding the rate of return to education, specifically literature making use of the Mincer earnings function, would thus serve to provide a

general overview of the significance of education in income. It is also important to note that the majority of literature considering the private returns to education, use private earnings (income) and private returns interchangeably.

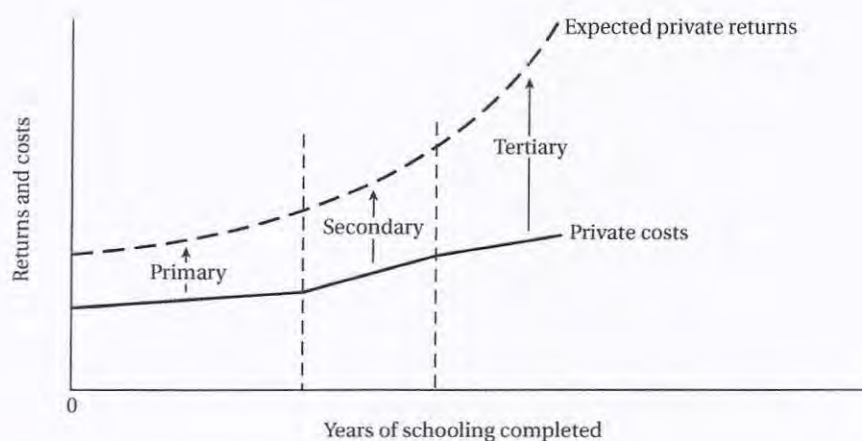
Human capital is often referred to as education, health, and other human capacities which could assist in raising an individual's productivity when these factors are increased (Smith & Todaro, 2009:375). Human capital models have been used in an attempt to explain the differences in the level and skewness of income of individuals who differ based on education, age and region (Mincer, 1974:43). Jacob Mincer (1958) who is considered to be the pioneer in research conducted on the effects of education on income, and, more specifically, the outcome of education on an individual's income path over his or her lifetime (Harberger & Guillermo-Peón, 2012:1). The model developed by Mincer (1958) explored how the differences in private earnings are associated with the differences in the level of education obtained. To comprehend the change in income brought about by the attainment of an additional level of education, the individual's opportunity cost must be taken into account as well as the expenditures associated with the additional level of education. This pattern of additional income following the additional expenditures on education comes to determine an investment profile for each consecutive level of education (Harberger & Guillermo-Peón, 2012:1-2).

As discussed in the previous chapter, a positive correlation exists between formal education and the quality of the labour force within a country, where education renders a significant contribution towards economic growth across countries and over time (Fuller & Heyneman, 1989:14; Pencavel, 1991:333-335). Education's importance can thus not be understated when considering economic development. Therefore enrolment for additional levels of education becomes a significant factor for policy makers. Enrolment for additional levels of education is dependent upon the rate of return or, more so, the additional income obtained with each level of education completed, where enrolment increases as the rate of return or income increases, and vice versa (Smith & Todaro, 2009:375-378).

Economic theory surrounding the private benefits (income) and private costs of education comes to explain that as a student obtains additional levels of education, the expected private returns (which in principle is the expected income received at each specific level of education) increases at a faster rate than that of the private costs

involved (Smith & Todaro, 2009:390-391). Figure 2-1 provides an illustration of this theory, where the expected private returns (also to be known as income) and private costs are plotted against the years of schooling completed. As indicated, the expected income increases with each additional level of education obtained and at a faster rate than the private costs, this divergence between income and costs can be seen as a motivational factor for students to obtain as many additional levels of education as possible. What should be noted is that the social cost of obtaining additional levels of education may, at some point, generally in the case of tertiary education, exceed the social benefits thereof (Smith & Todaro, 2009:390-391).

Figure 2-1: Private benefits and costs of education: An illustration



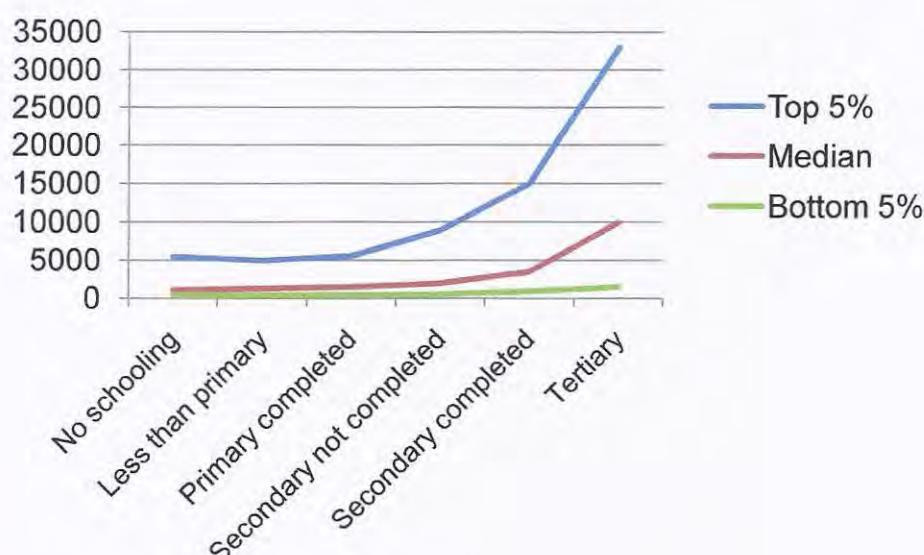
Source: Smith & Todaro (2009:390)

Figure 2-2 indicates the monthly earnings by highest level of education within South Africa for 2010. As indicated, there is a definite increase in the monthly earnings for each additional level of education obtained, and that the top 5% of the population according to income increases at a much faster rate than that of the median and bottom 5% of the population (Kane-berman & Holborn, 2011:438).

When comparing Figure 2-1 and 2-2, it is evident that the monthly income according to the level of education obtained follows a similar path than that of the expected private earnings in the illustration. Students attaining additional levels of education in South Africa would thus be motivated by the increase in monthly income due to increased education. While it is important to consider the difference in income between primary, secondary and tertiary education, the differences in income between the different levels

of education within each of the three categories should also be considered, especially tertiary education since it renders the highest level of income in comparison to primary and secondary education.

Figure 2-2: Monthly earnings by highest level of education in South Africa, 2010



Source: Kane-berman & Holborn (2011:284)

Calculations done by author

The strong positive correlation between the amount of education obtained and the amount of income earned by an individual has frequently been attested (Brunner & Wayland, 1958; Sianesi & Van Reenen, 2003:157) as can be seen from Figure 2-2. Although higher education has often shown to be highly profitable where a divergence between earnings and costs of education exists, few South African researchers have answered the question as to how profitable.

Apart from the private returns or earnings to education, social returns at a macroeconomic level also play a major role in the economic justification for obtaining higher levels of education, especially for least developed countries (LDCs) where returns to education are higher in comparison to the OECD¹ member countries (Tolley &

¹ Australia; Austria; Belgium; Canada; Chile; Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Iceland; Ireland; Israel; Italy; Japan; Korea; Luxembourg; Mexico; Netherlands; New Zealand; Norway; Poland; Portugal; Slovak Republic; Slovenia; Spain; Sweden; Switzerland; Turkey; United Kingdom; United States

Olson, 1971:460; Sianesi & Van Reenen, 2003:158-159). Enrolment in the various levels of education is significantly dependent upon a country's level of development, influencing a country's ability to efficiently allocate its resources (public expenditure and infrastructure), impacting economic growth in the long run. Comparing South African public expenditure as a proportion of total government spending on education (16.9%) to other countries can be seen as somewhat difficult, since data limitations prevail and the South African economy together with its education system is not similar to that of other countries. Yet a comparison needs to be made and therefore a mixture of developed and developing countries will give some idea as to where South African public expenditure as a proportion of total government spending on education lies in relation to Botswana (22%) Brazil (16.1%), Russia (12.9%) and the United States (14.1%) (Kane-berman & Holborn, 2011:438).

The sections that following will firstly consider international and South African literature regarding the significance of education on income for both education in general and specifically for tertiary education, the rate of return to education will serve as an indicator of the significance of education to income. The factors of influence considered include; experience, age, gender, population group, occupation and several others.

2.2 The significance of education in relation to earnings: The rate of return to education

2.2.1 International literature

The international literature that will be considered regards research conducted in Africa, Asia, Latin America and OECD member countries. These studies considered education as a factor of human capital where the amount of education obtained in years of schooling influences an individual's employment status and earnings.

2.2.1.1 Regional returns to education

The rate of return to education based on the human capital theory has been estimated since the 1950s and it has consequently been found that the returns to education decrease by the level of economic development of a country (Psacharopoulos & Patrinos, 2004:112). What this comes to say is that countries with higher economic development will have lower marginal earnings from additional levels of education in comparison to countries with lower economic development. Internationally, the private

rate of return to higher or tertiary education observed from 1994 to 2004 has shown to be increasing and that the average rate of return for obtaining an additional year of education amounted to 10%, the main reason being global technological growth together with increasing demand for university graduates (Psacharopoulos, 1981; Psacharopoulos, 1985; Psacharopoulos & Patrinos, 2004). As can be seen from Table 2-1, the average rate of return to education is highest in the sub-Saharan African (8.8% higher than the world average) and Latin American regions since a large excess demand for university graduates exists in these regions, while the rate of return in Europe, Middle East and North Africa is closest to the international average. While it should be noted that the figures given in Table 2-1 are from the period 1996. The rate of return for the Asian region is lower than the international average, yet the rate of return for OECD member countries is the lowest, 7.4% lower than the global average and can be attributed to smaller gap between the demand for and supply of university graduates in these regions in relation to the international average (Psacharopoulos & Patrinos, 2004:112).

Table 2-1: Rate of return to education by level, latest year, regional averages

Region	Private Rate of Return (%)		
	Primary	Secondary	Tertiary
OECD	13.4	11.3	11.6
Asia	20.2	15.8	18.2
Europe/Middle East/North Africa	13.8	13.6	18.8
Sub-Saharan Africa	37.6	24.6	27.8
Latin America/Caribbean	26.6	17.0	19.5
World	26.6	17.0	19.0

Source: (Psacharopoulos & Patrinos, 2004:114)

The rate of return to education in urban China has been increasing since the mid 1990s where the difference in the return for the period 2009 for males (8.06%) and females (7.67%) are almost insignificant (Ren & Miller, 2012:166). China's rate of return to education has thus increased dramatically since the 1980s, where education's impact on income was either insignificant or ranging from 2.5% and 5.5% (Qian, & Smyth,

2008:484). The main reason for this finding relates back to China's economic development and reform era in the 1990s, where education became more significant in the economic development process. In short, education becomes more significant as the level of economic development increases, yet the rate of return to education may decrease in relation to a country's economic development.

2.2.1.2 Education and income

When researching the rate of return to education, it is important to consider whether an educational mismatch exists on wages. Where an educational mismatch exists, the rate of return related to the job's required level of education is not equal to the individual's existent level of education, resulting in the rate of return for previously attained levels of education not being equal to the rate of return for additional required levels of education (Murillo, Rahona-López & Salinas-Jiménez, 2012:646). A study concerning the effects of an educational mismatch was conducted on the Spanish labour market from the mid 1990s to present. It was found that the rate of return for an additional level of education already obtained was positive but lower than the return for an additional level of required education (Murillo, Rahona-López & Salinas-Jiménez, 2012:646). Such a mismatch indicates that inefficiencies exist in the allocation of educational resources within a country, affecting enrolment for additional levels of education.

The positive correlation between education and income cannot be understated, especially that of tertiary education. According to Salas-Velasco (2006:426), it was found that the total years of tertiary education obtained and years of work experience were the most important determinants in estimating an individual's income. Over the course of the past century, numerous articles have come to show the relationship between education and income, again affirming that education is the single most important determinant in estimating an individual's potential future income (Mincer, 1958; Butter, 1966; Borland, 2002; Qian & Smyth, 2008).

2.2.1.3 Returns to specific majors

Apart from the differences in the level of education obtained, individuals also differ according to their field of study and one would therefore expect differences in the rate of return due to their specific educational backgrounds. The differences in the rates of return according to an individual's academic discipline have been published across countries and over time and has been found that natural science disciplines have higher rates of return than disciplines in the arts (Butter, 1966), engineering majors have a higher return than business and administration majors (Borland, 2002), and that a law degree has a higher return compared to a business degree (Lewis, Daly & Fleming, 2004).

According to Lewis, Daly & Fleming (2004:235), in Australia, the rate of return to a university education is sensitive to changes in the demand for, and supply of university graduates; yet this principle applies to most countries such as in the case of Venezuela where an increase in the supply of skilled labour caused a decrease in the rate of return to education (Gonzalez & Oyelere, 2001:1348-1349). A positive rate of return for a specific major would thus imply an increase in students enrolling for the specific major, and vice versa. During the early 1990s international trends indicated a decline in students majoring in economics degrees. This was a peculiar trend since access to higher education was expanding on a global scale (Lewis & Norris, 1997; Siegfried & Round, 2001; Maxwell, 2003). Two popular reasons for the international decline in economics majors were firstly, potential economics majors changed their focus to business and marketing degrees and, secondly, potential students perceived economics to be an abstract, mathematical and tedious field of study (Lewis, Daly & Fleming, 2004:234). The decline in the supply of economics graduates could thus influence the present rate of return to economics majors, potentially yielding a higher rate of return.

Compared to other majors such as accounting, mathematics, chemistry and general business studies, economics currently yields a relatively higher rate of return in the United States of America (Caplan, 2013). Majors including finance, mechanical engineering, computer sciences and electrical engineering, yield an almost insignificantly higher rate of return compared to economics in the USA (Caplan, 2013). Various other studies have found that economics graduates have a higher rate of return than students majoring in law, business degrees, physics, mathematics, education and

agricultural sciences in Australia and Greece (Lewis, Daly & Fleming, 2004:234; Livanos, & Pouliakas, 2011:421).

Using primary data collected from the 1993 National Survey of College Graduates (NSCG), Black, Sanders & Taylor (2007) considered the wage gaps of other majors relative to an economics major, using a sample of 55 422 workers limited to those with only a bachelor's degree. As indicated in Table 2-2, Black, Sanders & Taylor (2007:368) found that economics majors fared relatively well in the labour market and that the majority of other majors earned significantly less than economics majors, where other social science majors earned 13% less on average. Since these estimates are based on primary data collected in 1990, it is possible to see economics majors' wage gaps before the major decline in economics graduates during the 1990s. Prior to the decline of Economics graduates in the 1990s, graduates earned significantly lower wages compared to engineering majors, while engineering majors yielded an almost insignificantly higher wage after the 1990s decline (Black, Sanders & Taylor, 2007:369-370; Caplan, 2013). From this statement it becomes clear that economics as a major has become more financially beneficial over time.

Table 2-2: Wage Gaps Relative to Economics by Major, in the USA for 1990

Major	Wages Relative to Economics Major (%)	Major	Wages Relative to Economics Major (%)
Social work	-27.81*	Political science	-6.89*
Home economics	-25.71*	Business administration	-10.74*
Psychology	-17.98*	Marketing	-6.89*
Biology	-16.23*	Computer science	8.49*
Communication	-15.66*	Mechanical engineering	10.54*
Geology	-14.99*	Electrical engineering	21.49*
Other business majors	-14.04*	Chemical engineering	21.49*

*Note: * Indicates significance at the 0.01 level.*

Source: (Black, Sanders & Taylor, 2007:368)

Apart from the higher rate of return, economics majors are more likely to find employment compared to other majors. Unemployment rates for Australia in 1997 have shown that economics majors had a higher unemployment rate (7.4%) compared to all other majors (6.8%) but, in 2002, economics majors had a lower unemployment rate (4.2%) compared to other majors (5.5%) (Lewis, Daly & Fleming, 2004:234). An assumption could thus be made that potential students were aware of the higher unemployment rate for economics graduates, thus causing a decrease in the enrolment for economics degrees. The reduction in economics majors' unemployment rate can therefore be attributed to the decline in the supply of economics majors. According to Livanos & Pouliakas (2011:414) when the demand for graduates exceeds the supply thereof, the rate of return will increase. The higher rate of return to economics degrees could thus be the result of the decrease in the supply of economics graduates in the previous decade.

2.2.1.4 Returns according to the level of education obtained

According to Ashenfelter & Mooney (1969:255) the rate of return begins to decline rapidly after the fourth year of tertiary education, regardless of the student's field of study. The decline after the fourth year implies that a master's degree has a higher rate of return than a Ph.D., this is expected since Ph.D. graduates are more likely to find a career within the higher education sector in comparison to those graduates with only a master's degree who are employed in sectors paying higher wages (Ashenfelter & Mooney, 1969:252).

The rapid decline in the rate of return after the completion of a master's degree is followed by a rapid decline in the propensity to pursue higher levels of education. According to Black, Sanders & Taylor (2007:371) an economics graduate's propensity to pursue a master's degree is estimated to be 29.84%, while the propensity to pursue a Ph.D. is estimated to be 5.8%. Although the rapid decline in the rate of return as well as the propensity to pursue degrees higher than a master's degree are correlated, it does not necessarily imply causality.

Table 2-3 indicates the rates of return to the different levels of education within the private sector in Greece, for the period 2002-2003. Table 2-3 confirms the findings of Ashenfelter & Mooney (1969), supporting the theory that a master's degree has a higher rate of return than a Ph.D. According to Livanos & Pouliakas (2011:419) the rate of

return for additional levels of education for both males and females continues to increase until the end of the fourth year of education, where a Ph.D. has a similar rate of return to an undergraduate university degree, higher for males and lower for females. Literature regarding the rate of return according to the level of tertiary education obtained is limited and only considers the difference in return to a college degree and a university degree.

Table 2-3: Rate of Return to Education in Greece, 2002-2003 (Private sector)

Region	Rate of Return (%)	
	Males	Females
Ph.D. degree	27.12	24.28
Master's degree	36.62	51.59
Undergraduate university degree	26.62	25.11

Source: (Livanos & Pouliakas, 2011:419)

2.2.2 South African literature

2.2.2.1 Introduction

Tertiary or university education within South Africa can be seen as one of the most significant factors influencing the success of an individual (Fourie, 2010:15; Hosking, 2003:98). According to the Solidarity Research Institute (2012:3), South Africans with some form of tertiary qualification have lower unemployment rates, as well as higher earnings compared to those who only have secondary or primary education. Furthermore, Statistics South Africa (2012:xvi) also reported that higher levels of education in South Africa are associated with lower levels of unemployment and that countries with high overall unemployment rates should benefit from higher levels of education. As indicated in Table 2-4, Kane-berman, & Holborn (2011:263) found that South Africans with some form of tertiary education represented approximately 67.4% of those who earn an annual income of R750 000 or more, while those with secondary education only represent 28.1% for the specific income population.

Table 2-4: Income Bracket Placement by level of Education, 2011

Income Bracket (Rands)	Level of Education			
	No Schooling	Primary	Secondary	Tertiary
0 - 50 000	12.9%	29.1%	54.9%	3.1%
50 000 - 100 000	8.9%	22.6%	59.3%	9.3%
100 000 - 300 000	4.0%	9.8%	57.8%	28.4%
300 000 - 500 000	1.3%	3.0%	42.7%	53.0%
500 000 - 750 000	2.6%	1.4%	36.4%	59.7%
750 000+	2.1%	2.4%	28.1%	67.4%

Source: (Kane-berman & Holborn, 2011:263)

Due to the lower unemployment rate and higher earnings, it stands to reason that the rate of return to tertiary education in South Africa can be assumed to be higher than the rate of return to primary and secondary education.

2.2.2.2 Education and income

The significance of education's relationship with income is important in determining the rate of return to education, since a weak relationship between the two variables could result in a lower rate of return, and vice versa. According to Bhorat (2000:3) the median wage for tertiary educated skilled workers in South Africa was 44.63% higher than the median wage for those with only a Matric certificate. Furthermore, it was found that tertiary education as a determinant of earnings was more statistically significant than secondary education (Bhorat, 2000:7). Although Bhorat (2000) found that education is a significant determinant of income, the study mainly focused on the magnitude of wage inequality and the wage premia in the South African labour market, using primary data collected in the October Household Survey (OHS) of 1995.

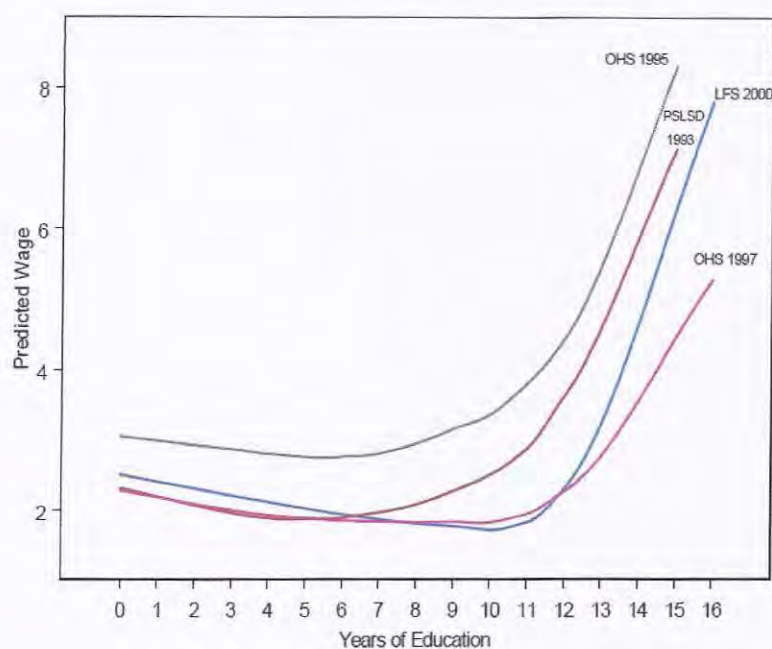
Using primary data collected in the OHS of 1999, Rospabe (2001) considered three forms of the disadvantages women face in the South African labour market. The three forms considered include access to employment, occupational distribution and wages. According to (Rospabe 2001:21-25), it was found that large income inequalities exist between men and women, and that education as a determinant of income was more

statistically significant (at the 1% level) for males (0.176) than for females (0.153). Furthermore, considering the determinants of an individual's income, it was found that tertiary education was more statistically significant than secondary and primary education (Rospabe, 2001:21). Due to tertiary education's greater significance in estimating an individual's earnings, it would thus be expected that tertiary education yields a higher predicted wage than primary and secondary education.

Keswell & Poswell (2004) used primary data drawn from three different sources and for four years. The data were collected from Project for Statistics Living Standards and Development (PSLSD) which was carried out in 1993, the OHS of 1995 and 1997, as well as the Labour Force Survey (LFS), carried out in September of 2000. Keswell & Poswell (2004:849) found that a strong convex relationship exists between education and earnings for all four time periods in South Africa, as indicated in Figure 2-3. As a result of this convex relationship, the rate of return to education increases with each additional level of education obtained, particularly from the twelfth year of education.

Figure 2-3 graphically illustrates the relationship between an individual's predicted wage and his or her years of education. As indicated in Figure 2-3, Keswell & Poswell (2004:843) found that higher education (years 13 to 16) deliver a higher predicted wage than primary and secondary education within South Africa. Although the PSLSD, LFS and OHS of 1997 show similar predicted wages for primary education, the same cannot be said for secondary and especially tertiary education, yet the results still satisfy the assumption that tertiary education yields higher earnings.

Figure 2-3: Predicted Wage in Relation to Years of Education



Source: Keswell & Poswell (2004:843)

2.2.2.3 Rates of return

According to Psacharopoulos & Patrinos (2004:125) South Africa's social rate of return to education for the year 1980, as indicated in Table 2-5, decreases as the level of education increases. This is expected since the social costs per student (e.g. public subsidy) to tertiary education are higher than the costs per student associated with primary and secondary education and, as a result, influence the social rate of return (Smith & Todaro, 2009:368). Due to the scarcity of literature regarding the private and social rate of return to education in South Africa, constructing comparisons for different periods proves to be difficult yet, interestingly, the social rate of return to tertiary education in Sub-Saharan Africa for the year 1994 (11%) is similar to that for South Africa in 1980 (Smith & Todaro, 2009:368). What should be noted is the contrast in the private and social rate of return to education as the level of education increases, the contrast being the increase in the private rate of return as the level of education increases, whilst the social rate of return decreases.

The overall private rate of return to education in South Africa for the year 1990 was one of the lowest for both males and females in the world. Similarly the overall private rate of return to education for South Africa in 1994 was also one of the lowest in the world,

similar to countries such as Vietnam (4.8%) in 1992, Estonia (5.4%), and Cyprus (5.2%) in 1994 (Psacharopolous & Patrinos, 2004:128-129). The reason as to why the overall private rate of return to education in South Africa was low in comparison to the rest of the international community for 1990 and 1994, has yet to emerge.

Table 2-5: Rate of Return to Education in South Africa

Year	Private Rate of Return (%)			Social Rate of Return (%)		
	Male	Female	M&F	Primary	Secondary	Tertiary
1980	-	-	-	22.1	17.7	11.8
1990	2.3	0.8	-	-	-	-
1994	-	-	4.1	-	-	-

Source: (Psacharopolous & Patrinos, 2004:125-133)

Considering the private rate of return in South Africa for 1993, 1995, 1997 and 2000, Keswell & Poswell (2004:835) found that the marginal increase in the rate of return to tertiary education is very high, whilst secondary and especially primary education has a small (approaching zero) marginal increase in the rate of return. The reason for the contrast between the marginal change in the private rate of return for the various levels of education is due to the inclusion of unemployed individuals within the analysis, resulting in lower rates of return for the levels of education where unemployment is the highest (Keswell & Poswell, 2004:850).

No South African literature exists regarding the rate of return to economics majors, since research regarding economics as a field of study mainly focuses on the course outcomes and the determinants of success in economics education (van der Merwe, 2006; Steenkamp, 2006; Fourie, 2010).

2.3 Comparing different models in estimating the effect of education on income

2.3.1 Introduction

A variety of models exist surrounding the estimation of the significance of education to income, the four most popular models are considered below and include Heckman's

two-stage selection Model, the Double-Hurdle Model, the Mincerian Model, and the Multinomial Logistic Regression Model.

2.3.2 Heckman's two-stage selection Model & Double-Hurdle Model (DHM)

The Heckman's two-stage selection Model requires a two-stage procedure where, firstly the probability of employment is determined by using personal variables as regressors, these variables include education, parents' education, age, wealth indexes, and the individual's relationship to the household head. Secondly, a selectivity-correction variable is estimated using the results from the probability regression, this variable is then included in the wage function (Serumaga-Zake & Kotze, 2003:104).

A concern regarding the Heckman's model is that it has a shortcoming considering that it fails to deal with the joint-decision choice which includes two major hurdles. The first hurdle concerns the supply side of the labour market, where an individual decides whether or not to join the labour market. The second hurdle concerns employment, where individuals decide to either work for an offered wage rate or to work for employers who offer them employment from a queue (Serumaga-Zake & Kotze, 2003:104; Maddala, 1994:280).

In theory, the Double-Hurdle Model might be a better suited method to adjust for the joint-decision choice in the determination of the rate of return to education, since the DHM adequately accounts for the two hurdles in its specification (Serumaga-Zake & Kotze, 2003:104). The model entails the estimation of a wage function which includes the two previously mentioned decision functions.

2.3.3 Mincerian Model

Jacob Mincer's earnings model (1974) can be seen as part of the foundation of empirical economics, since it is used as a framework in determining the rate of return to education, the rate of return to the quality of education, and also in estimating the effect of experience on gender wage gaps (Heckman, Lochner & Todd, 2003:1). This earnings model has been the cornerstone for economics education studies from a variety of countries and time periods, and especially in the case of developing countries. More recently, the Mincerian earnings model has been used to examine the extent of the relationship between a country's economic growth and the average years of education (Heckman, Lochner & Todd, 2003:1).

The Mincer-type earnings function is the benchmark model for the estimation of the rate of return to education, where W_i represents the income of an individual, S_i the years of education, Exp_i is the experience obtained, X_i the other variables assumed to influence income, r is the private returns to schooling and ε_i which is the error term (Kenayathulla, 2013:381).

Equation 2-1: Mincer-type earnings function

$$\log W_i = \alpha + rS_i + \lambda_1 Exp_i + \lambda_2 Exp_i^2 + \gamma X_i + \varepsilon_i$$

Source: Kenayathulla (2013:381)

The Mincer function does not account for the direct costs of education, yet it remains a credible method for estimating the rate of return to education and has been used by many researchers in estimating the relationship between education and income (Ren & Miller, 2012:158; Kenayathulla, 2013:381; Sohn, 2013:42). Education obtained as a facet of human capital is thus an important factor when estimating the potential or future earnings of an individual over time. The Mincerian model has been broadly used over the past few decades and is still a credible model. What makes this model worthy is that it captures three crucial empirical regularities which firstly include, the concavity of log wage experience and age profiles. Secondly, capturing steeper profiles for individuals who have higher levels of education and, thirdly, it captures a U-shaped interpersonal variance of wages over an individual's life-cycle (Heckman, Lochner & Todd, 2003:39). Because this study will make use of a categorical dependent variable and metric or categorical independent variables, it is expected that this study will deliver multiple income equations and, as a result, the Mincerian model will not be a suitable model for this study.

2.3.4 Multinomial Logistic Regression Model

A multinomial logistic regression is applied to examine the relationships between a categorical dependent variable and metric or categorical independent variables (Prempeh, 2009:16; Starkweather & Moske, 2011). This model is useful when working with categorical variables where both the dependent and independent variables could have multiple categories, since multiple groups are compared through a combination of binary logistic regressions. The model will compare the first, second, third, etc. category

of the dependent variable to the last category of the dependent variable; this will also be the case for each independent variable, where each of the categories are referenced against the last category for that particular variable (Greene, 1993:720-723; Starkweather & Moske, 2011). It should be noted that the reference category need not be the last category, but any of the categories within the variable; yet should this study make use of this model, it will make use of the last category as the reference category. This means that, for each independent variable, there are multiple comparisons and, as a result, each of the dependent variable categories will deliver a separate equation (Field, 2009:300-312; Prempeh, 2009:16).

Since this study will make use of a single categorical dependent variable and several metric and categorical independent variables, a multinomial logistic regression will be the most suitable statistical model for both the NIDS and Alumni data sets. The objective of a multinomial logistic regression model is to predict the outcome of categorical variables, and, as a result, renders more than two discrete outcomes (Greene, 1993:720-723). This regression model is therefore used to predict the probabilities of the different possible outcomes of a categorical dependent variable with metric and categorical independent variables. Since the multinomial logistic regression model does not assume normality, linearity and homogeneity of variance within the independent variables, it is the preferred model for this study (Greene, 1993:720-723; Field, 2009:300-312). The multinomial logistic regression model is reliable under a number of assumptions. This model assumes that each independent variable has a single value for each case, and assumes that the dependent variable cannot be predicted absolutely from the independent variables. The model also assumes that collinearity is relatively low and that the independent variables need not be statistically independent from each other (Greene, 1993:720-723; Prempeh, 2009; Starkweather & Moske, 2011).

This study will therefore make use of a Multinomial Logistic Regression Model in estimating the significance of education to income for South Africans, as well as for School of Economics alumni of the North-West University's Potchefstroom campus.

2.4 Factors of influence

2.4.1 Introduction

Although education may be the most significant determinant of income (Mincer, 1958; Butter, 1966; Borland, 2002; Qian & Smyth, 2008), it is not the only factor influencing future earnings. Other determinants including experience, age, gender, population group, region, industry or sector, and occupation also influence an individual's future earnings. It is therefore important to consider other factors in determining an individual's future earnings, consequently this study also considers the most significant factors influencing income other than education. Firstly, experience and gender will be considered as determinants of income, followed by gender and population group, and lastly other factors of influence.

2.4.2 Experience and age

2.4.2.1 Experience

Apart from education, the years of work experience has been found to be the second most important determinant of future earnings, according to Salas-Velasco (2006:426). Using the South African OHS of 1995, Bhorat (2000:7) considered experience as a determinant of earnings and found that although experience is positive and significant, it differed between African and white skilled workers, where African workers only earned 3.5% more on wages for each additional year of experience gained while white workers earned 7.5%.

Rospabe (2001) used the OHS of 1999, considering determinants of an individual's income for both males and females between the ages of 16 and 65, using 38 833 observations. The result indicated that experience was more significant for females (2.3%) than for males, but only with a 0.2% difference. Furthermore, it was noted that although experience was positive, it had a decreasing returns on wages. What this means is that an individual could increase his or her income by increasing the years of experience obtained to a certain point, but after this peak an individual's income will be negatively influenced with additional years of experience (Rospabe, 2001:22).

Keswell & Poswell (2004) compared the predicted wage with the years of education obtained. While controlling for experience they found that there is a substantial

difference in the predicted wage for those with 5 years and 12 years experience, but the predicted wage for those individuals with 5 years experience may exceed that for those with 9 years of experience, should the years of education obtained exceed 14 years (Keswell & Poswell, 2004:844-845). The same pattern was found for the PSLD (1993), OHS (1995 & 1997), and LFS (2000) datasets.

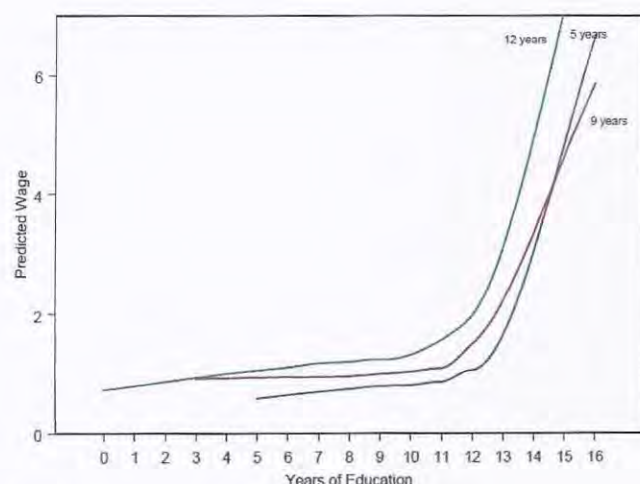
What may be deemed as problematic is the fact that Keswell & Poswell (2004) used the “potential experience” formula (Mincer, 1974), indicated in Equation 2.2. Where 6 is the number of years before enrolment in education. Although this formula may be common in literature on the returns to education, it may render overestimates of the effect of potential experience because of factors such as grade repetition, low educational attainment, and employment insecurity (Keswell & Poswell, 2004:836).

Equation 2-2: Potential Experience Formula

$$\text{Potential Experience} = (\text{age}) - (\text{years of education}) - 6$$

Source: Mincer (1974)

Figure 2-4: Predicted Wage in Relation to Years of Education, Controlling for Experience (OHS '97)



Source: Keswell & Poswell (2004:844)

Qian & Smyth (2008:489) estimated the Mincerian earnings function using data drawn from China's Institute of Labour Studies (ILS), collected in 2005. Using equation 2.2, the results indicated that for each additional year of experience, an individual younger than 35 will receive a 3.76% increase in income, but that individuals older than 35 will receive

a 1.33% decrease in income (Qian & Smyth, 2008:489). The reason as to why this result was obtained, remains unexplained.

Although experience may be a significant determinant of income, it does not render a very high increase in income for additional years of experience obtained and according to the literature given above, an additional year of experience may render an increase in income of between two and eight%.

2.4.2.2 Age

Since experience and age are closely related, especially in calculating potential experience, it may result in multicollinearity leading to spurious results (Asteriou & Hall, 2007:133). If multicollinearity is detected, it would be wise to only include the most significant determinant of the two.

Using the OHS of 1999, Rospabe (2001:7) found that, as a determinant of employment, age was positive and more significant at the 1% level for females (0.103) than for males (0.085). Furthermore, it was found that age is positive but less significant for those who are self-employed, and less so for males than females. According to Rospabe (2001:8) it was determined that males reach diminishing returns at an earlier age than females in South Africa. The significance of age as a determinant of income not only differs among gender but may also differ on the bases of the level of employment. Chang & Huang (2005:2101) used primary data drawn from the Bureau of Labour Insurance of Taiwan using a sample of 5 005 observations. Table 2-6 indicates the determinants of earnings which are ranked according to their significance for the specific job level, as determined by Chang & Huang (2005:2107). What Table 2-6 shows is that age is only a significant determinant of income when an individual is employed as an executive, manager or a professional (high job level). As a result of this finding, it indicates that age as a determinant is more important for higher job levels (individuals with a tertiary qualification) than for lower job levels such as service workers and manual labourers. It was also noted that age was not a significant determinant of competency for either three of the job levels, thus indicating that age did not affect an individual's physical or intellectual calibre (Chang & Huang, 2005:2103).

Table 2-6: Ranking of Earnings determinants within each job-level

Job Level	Determinants
High	Education (0.32), Age (0.30), Gender (-0.21)
Medium	Experience (0.28), Gender (-0.27), Education (0.21)
Low	Gender (-0.35), Education (0.34), Experience (0.25)

Source: (Chang & Huang, 2005:2107)

Kabubo-Mariara (2003) explored the labour market conditions in Kenya using primary data drawn from the 1994 Welfare Monitoring Survey (WMSII). Empirical results indicated that age is associated with higher earnings in all sectors and for both men and women, yet this association is stronger in the private sector than the public sector (Kabubo-Mariara, 2003:15). Similar to the findings of Rospabe (2001), Kabubo-Mariara (2003:15) found that that males reach diminishing returns at an earlier age than females. According to Willis (1985:539-583), agreement seems to have been reached that the changing age structure has a significant impact on the earnings structure of an individual, and that it is important to note that ability is positively associated with age. It was also noted that, at an early age, those who have greater ability earn less than those who are less able, yet at the age where earnings reaches its peak (approximately at age fifty), those who have greater ability earn significantly more than those with lower levels of ability (Willis, 1985:583).

Reed & Miller (1970) measured the factors influencing the variations in earnings for college men using multiple regression with dummy variables. The results indicated that age, college rank and the field of study were the most important determinants of income for both males with a bachelor's degree and males with a master's degree. Yet, it was found that age is more significantly associated with income for those males with a bachelor's degree, than for those with a master's degree (Reed & Miller, 1970:180).

2.4.3 Gender and population group

2.4.3.1 Gender

Using the South African OHS of 1999, Rospabe (2001:4) found that males have a higher labour force participation rate, employment rate and self-employment rate. The

estimates indicated that females (43.2%) have a much higher unemployment rate than males (30%). This could affect the rate of return to education when comparing South African males and females.

Psacharopoulos & Patrinos (2004) reviewed the empirical results of estimates of the returns to investment in education from a wide variety of countries and periods. Table 2-7 indicates the international average for the rate of return to education by gender. The returns to primary and higher education are lower for women than for men, while returns to secondary and overall education are higher for women than for men, it would thus be expected that the earnings of tertiary educated women would be lower compared to those of men with a similar level of human capital, *ceteris paribus* (Psacharopoulos & Patrinos, 2004:113-116). While in the case of South Africa for the year 1990, as indicated in Table 2-5, it is evident that women (0.8) receive a much lower rate of return to overall education in comparison to men (2.3) (Psacharopoulos & Patrinos, 2004:129). From this it is apparent that the South African rate of return to overall education is not only lower than the international rate, but that women earn a lower rate of return whereas this is not the case internationally.

Table 2-7: Returns to Education by Gender (%)

Educational level	Male	Female
Primary	20.1	12.8
Secondary	13.9	18.4
Higher	11.0	10.8
Overall	8.7	9.8

Source: (Psacharopolous & Patrinos, 2004:116)

Using the South African PSLSD of 1993, Mwabu & Schultz (2000) applied the Ordinary Least Squares method in estimating the wage function where the dependent variable is the log of the hourly wage rate, as can be seen in Table 2-8. As indicated, Mwabu & Schultz (2000:314) found that higher education is more significant than lower levels of education for both males and females. Furthermore, it was found that for all population groups apart from the white population group, higher education is more significant for females than for males, while primary education has a negative impact on the Indian

and white population group's earnings for both males and females. It should thus be noted that although the significance of education for white males may be higher than for white females, this is not the case for other population groups within South Africa.

Table 2-8: OLS Estimates of the Wage Function, South Africa, OHS 1993

Education	African		Coloured		Indian		White	
	Male	Female	Male	Female	Male	Female	Male	Female
Primary	0.084	0.062	0.014	0.023	-0.095	-0.082	-0.012	-0.034
Secondary	0.158	0.249	0.187	0.199	0.214	0.126	0.084	0.052
Higher	0.294	0.396	0.186	0.307	0.214	0.304	0.151	0.139

Source: (Mwabu & Schultz, 2000:314)

According to Rospabe (2001:4-7) tertiary education is less significant for employed males (0.446) than for employed females (0.764), while tertiary education is less significant for self-employed individuals than for employed individuals, for both males and females. Considering the earnings gap between males and females in South Africa, it was estimated that the average earnings gap amounted to 29%, the gap being the highest for the white and African population groups (Rospabe, 2001:23). Furthermore, it was found that large gender gaps exist in occupational attainment, where the obtainment of high skilled employment is more significant for females than for males (Rospabe, 2001:14). The reason for the significant difference stems almost entirely from women's higher endowments of productive characteristics, where it appears that women don't benefit from favouritism from employers in the case of high skill occupations (Rospabe, 2001:17). It was also found that gender played a less significant role as the level of employment increased, from unskilled to skilled.

The decrease in the significance of gender as a determinant according to the level of employment is confirmed by Chang & Huang (2005:2107), as indicated in Table 2-6. Across all three employment skill levels, females have a significant negative effect on earnings, yet this significance weakens as the skill level increases. For low-level employment, gender is the most significant determinant; however, gender's rank order

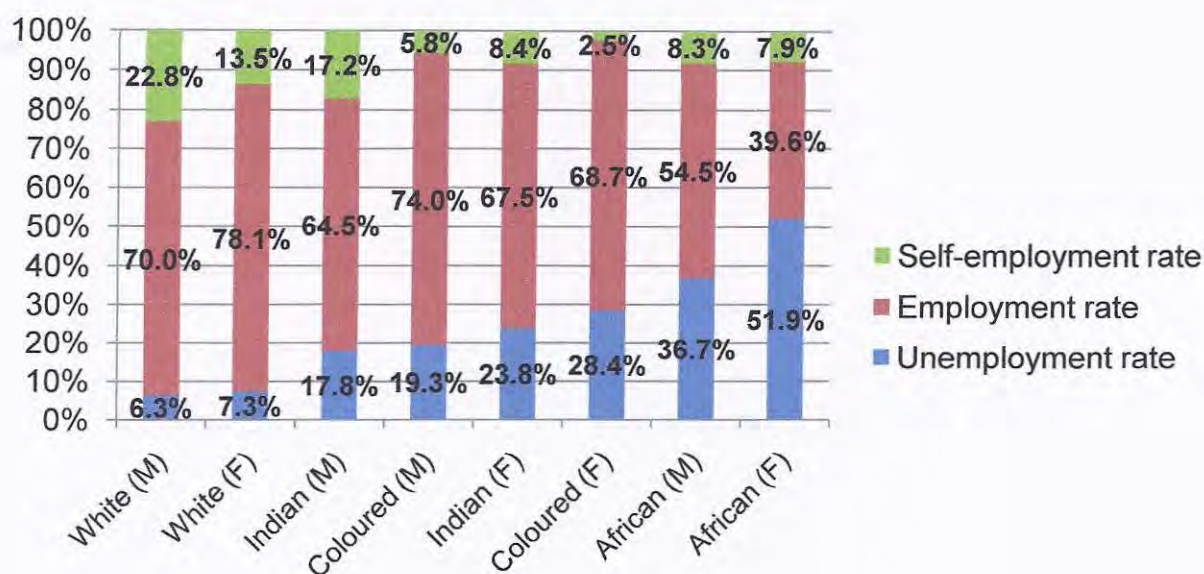
decreases to second for medium-level employment and third for high-level employment (Chang & Huang, 2005:2103).

2.4.3.2 Population group

Due to South Africa's political history and the raised institutional barriers to employment, property rights, civil rights, and regional mobility, it is expected that population group would influence the earnings of individuals within the country (Mwabu & Schultz, 2000:307). The majority of South African surveys use four population classifications (Anderson, Case & Lam, 2001:39); therefore this study will make use of the same population classifications. These are whites, Africans, coloureds and Indians. The following literature will therefore mainly focus on the effect of these four population groups on earnings.

Figure 2-9 represents the self-employment, employment and unemployment rates for South Africa, using the OHS of 1999. As indicated in Figure 2-9, the white and African population groups lie on opposite sides of the unemployment scale, while both Indian and coloured men have lower unemployment rates in comparison to Indian and coloured women (Rospabe, 2001:4). The extent to which unemployment differs between the population groups can be seen as substantial, since white males and females have single figure unemployment rates, while more than one third of African males and up to half of African females were unemployed during this period (Rospabe, 2001:4-5). Since such substantial differences in both the unemployment and self-employment rates exist, it is safe to assume that population group would be a significant determinant of income for South Africans.

Table 2-9: Self-employment, Employment and Unemployment rates, OHS 1999



Source: *Rospabe (2001:4)*

According to Mwabu & Schultz (2000:326) for the year 1993, it was estimated that the wages of white South African workers are approximately five times larger than those of Africans, three times larger than those of coloureds, and twice the size of Indian workers' wages. Nearly 50% of the differences in the wages between the racial groups in South Africa can be explained by the differences in the amount of education obtained, while the difference in the quality of education between the racial groups also accounts for some of the large difference in wages. According to Mwabu & Schultz (2000:326) it was observed that, during the 1960s, the white racial group received five times the amount of public resources spent on a year of secondary education than the African racial group, yet this large difference decreased to 2:1 by 1990. While Case & Yogo (1999:2) reported that the African racial group had bounded residential and school choices as well as larger mean pupil/teacher ratios compared to the white racial group prior to 1994. This is an important indication that inferior inputs in education for the African racial group could result in inferior outputs when considering market wages (Moll, 1996:185).

Table 2-8 shows the significance of the three levels of education to logged hourly wages, for each gender within each of the four racial groups. It is evident from Table 2-8

that for the African racial group, the significance between education and wages is the highest, except for male African secondary education (Mwabu & Schultz, 2000:326). It should be noted that the significance for male African secondary education is almost twice the significance than for whites, this figure could thus be explained by the difference in public expenditure on education. Furthermore, when comparing the difference in significance for tertiary education, it is apparent that although African males have a significance twice as great as that of white males, African females have a significance almost three times higher than white females (Mwabu & Schultz, 2000:326). When comparing the difference in the significance of education to Indian and coloured wages, it becomes evident that Indian males have a higher significance for secondary and higher education, while coloured females have a higher significance for all three levels of education. From this it becomes clear that the differences in significance between genders within a particular population group is an important factor to consider, since it could assist in the greater determination of wages in South Africa.

Using the OHS of 1995, Bhorat (2000:7) found that a difference in significance between the white and African population groups exists for different job skill levels. In the case of skilled workers, tertiary education is more significant for white workers than for African workers, yet when considering semi-skilled workers it is apparent that tertiary education is more significant for African workers than for white workers (Bhorat, 2000:7-10). The significance of population group and education thus depends upon the skill level of employment, yet an assumption can be made that those individuals with a tertiary qualification is more likely to be employed as a skilled worker rather than a semi-skilled worker.

Rospabe (2001:7) considered the determinants of employment income, using the OHS of 1999. The results indicated that white males and females were significantly more able to find employment compared to coloured, Indian, and African males and females, respectively. A similar pattern was found in the estimation of the determinants of income, with the only difference being that Indian males and females have a higher significance estimate than coloured men and women (Rospabe, 2001:21). Furthermore, of the four population groups, the largest wage inequalities between males and females are amongst white and African workers (Rospabe, 2001:25).

Literature surrounding the determinants of income, employment and job skill level have come to show that both gender and population group act as significant determinants in the case of the South African labour force.

2.4.4 Other factors of influence

Although gender, population group, age, experience and education are some of the determinants of income most discussed within literature, they are not the only factors of influence. A variety of other determinants have been estimated both internationally and locally, the most significant determinants will be discussed and include; occupation, sector/industry, location of employment, marital status, tenure and union.

2.4.4.1 Occupation

An individual's income also depends upon his or her occupation, since specific occupations have wages that differ from other occupations. Although this statement seems apparent, it is the extent to which one's occupation influences income that is important.

Black, Sanders & Taylor (2007) considered the main occupations of economists, accountants, electrical engineers, political scientists, history majors and those who studied business administration, for the year 1993 in the United States of America. Black, Sanders & Taylor (2007:367) found that the five main occupations for economists include managers and administrators, supervisors and proprietors, sales representatives (mining, manufacturing and wholesale), accountants and auditors, and other financial officers. These five main occupational categories have different financial outcomes for potential job seekers. Bhorat (2000) investigated the median wages for different occupations within South Africa, using the OHS of 1995. According to Bhorat (2000:5), managers and professionals have the highest median wages and, as confirmed by Black, Sanders & Taylor (2007:367), economists' main occupation is that of a manager or administrator. Rospabe (2001:21) used the OHS of 1999, and found that managers (males, 0.432; females 0.585) and professionals (males, 0.393; females, 0.638) have the highest significance associated with an individual's income of all the occupational categories. The significance of these two occupations is also higher for females than for males, implying that both gender and occupation have a significant effect on an individual's income.

2.4.4.2 Sector or industry

The occupation and sector of industry in which an individual finds employment may influence his or her income, yet these two factors may possibly lead to multicollinearity leading to spurious results. It is therefore important to test for multicollinearity between these two factors and, if such results are found, only the most significant of the two factors will be included in this study.

Bhorat (2000:4) considered the median wages for various sectors, using the OHS of 1995 and found that those employed in the financial and business services sectors have the highest median wage, while those in the wholesale and retail sectors have a substantially (nearly 50%) lower median wage. Those students who have majored in economics are more likely to fall under these sectors than agriculture or mining. We therefore only consider these two sectors. Furthermore, Bhorat (2000:7) found that the finance sector (0.331) had the highest significance as a determinant of earnings for skilled workers, while the wholesale sector was not a significant determinant at all. Interestingly, Rospabe (2001:21) considered the finance sector as a determinant of income using the OHS of 1999, and found that although the finance sector is a positive and significant determinant for females (0.148), this is not the case for males (-0.020). From this, it is evident that although one may consider the sector or industry as a determinant, depending on one's sample population, the significance of the variable may be skewed.

2.4.4.3 Location of employment

The geographic location of employment is an important factor of influence, since large industry tends to be strategically placed within a particular country (Coe, Hess, Yeung, Dicken, & Henderson, 2004). It therefore stands to reason that those workers located near large industry will most probably earn a larger wage than those located in regions where unemployment is high and industry is small.

According to Bhorat (2000:7), the earnings function results indicated that for skilled white workers, the Gauteng province (0.2) was the only significant province, while the Free State province (-0.238) was strong and negatively significant for skilled African workers, and also the only significant province for skilled African workers. It was found that although the Gauteng province is also the only significant province for semi-skilled

white workers, several other provinces were found to be significant for semi-skilled African workers and include; Gauteng (0.205), Northern Province (0.205), North-West (0.144), Mpumalanga (0.139), Kwazulu-Natal (0.128), and Free State (-0.165) (Bhorat, 2000:10). As one would expect, the Gauteng province is the most significant region associated with higher wages within South Africa, since Gauteng is seen as the economic hub of South Africa, providing a wide variety of employment opportunities and significantly higher wages (Rogerson, 1996:168).

In contrast to the findings of Bhorat (2000), Rospabe (2001:9-22) used the OHS of 1999 and found that for both employment and income, living in any other province besides the Western Cape will decrease an individual's chances of being employed or receiving a higher wage. Rospabe (2001:9-22) also found that for both employment and income, the Western Cape was more significantly associated among females than males. Furthermore, both Bhorat (2000:22) and Rospabe (2001:4) found that urban areas are more significantly associated with higher wages than are rural areas, where the rural median wage is approximately 37% of the urban median wage.

Although one could consider urban and rural areas as determinants of income, it would only be a significant indicator for certain racial groups. According to Mwabu & Schultz (2000:312) the South African population is relatively urbanised, yet large differences of rural to urban populations exist between racial groups. It was found that approximately 94% of coloured workers were urbanised and 91% white workers. While all Indian workers were considered to be in urban areas, only 23% of African workers were located in urban areas (Mwabu & Schultz, 2000:312). Furthermore, it was also found that the returns to education were higher in rural areas than in urban areas, for African workers, while rural wages are 26% lower than urban wages, for white workers (Mwabu & Schultz, 2000:316). Therefore, these differences in urban populations between population groups may well influence the results of the earnings functions for the different population groups.

2.4.4.4 Marital status

Whether an individual is married or not may influence his or her wage and employment status, since potential employers might consider this factor as a positive influence on the length of time that the employee will continue to work for the firm (Rospabe, 2001:8). According to Rospabe (2001:7), married males have a greater chance of

finding employment than single males, and more so for employed males than self-employed males. Yet for employed females, marital status is not a significant determinant of employment, while for self-employed females being married is a significant and positive determinant of employment, however less so than in the case of males (Rospabe, 2001:7). Furthermore, as expected, marital status as a determinant of income is significant and positive for both males and females, more so for males (0.166) than females (0.059) (Rospabe, 2001:21).

2.4.4.5 Tenure

Considering tenure as a determinant of occupational attainment, it was found that tenure is a significant but negative factor of influence for finding higher level occupations, while more so for females than males and higher for those who are self-employed (Rospabe, 2001:15). While as a determinant of income, tenure is significantly positive and has decreasing returns on wage, while the significance of this determinant is only slightly higher for males (0.019) than for females (0.018) (Rospabe, 2001:21).

2.4.4.6 Union

Unions play an important role in the wage bargaining process of workers and, as such, can be seen as a positive influence on an individual's income (Rospabe, 2001:22; Livanos & Pouliakas, 2011:420).

According to Bhorat (2000:7) the earnings function results for skilled workers indicated that being a union member was not a significant determinant for African workers, yet it was a significant but negative determinant for white workers. While in the case of semi-skilled workers, it was found that being a union member was a significant and positive determinant of income, yet more so for African workers (0.180) than white workers (0.147) (Bhorat, 2000:10). The union variable thus acts to narrow the wage gap between African and white semi-skilled workers (Bhorat, 2000:11). Rospabe (2001:21) also found that being a union member was a positive and significant determinant of income, yet being a union member was more significant for females (0.271) than for males (0.189).

2.5 Summary and conclusion

Considering the amount and extent of literature on the human capital theory relating to wages or income, it has become apparent that education is the most significant determinant of income and that tertiary education may provide an individual not only with higher wages, but also increases the standard of living of tertiary educated workers (Mincer, 1958; Pencavel, 1991:333-335; Smith & Todaro, 2009:375).

Considered to be the pioneer in researching the effects of education on income, Jacob Mincer (1958) explored the outcome of education on an individual's income path over his or her lifetime and found that more years of education led to higher wage outcomes (Harberger & Guillermo-Peón, 2012:1). As discussed in this chapter, economic theory surrounding the private return and costs to education shows that, as an individual obtains additional levels of education, it is expected that the future private benefits will increase at a faster rate than those of the private costs involved, thereby ensuring a greater rate of return for each additional level of education (Smith & Todaro, 2009:390-391). It was also determined that this study will make use of a multinomial logistic regression model, since this study will make use of a single categorical dependent variable and several metric and categorical independent variables. The model will assist in determining the significance of education and other factors of influence on income, where the dependent variable (income) will have multiple categories as well as the majority of the independent variables.

The international literature discussed in this chapter has indicated that the return to education decreases as the level of economic development of a country increases. In other words, those countries with a lower level of economic development, as is the case for most African countries, one would expect a higher rate of return to education and especially in the case of tertiary education (Psacharopoulos, 1981; Psacharopoulos, 1985; Psacharopoulos & Patrinos, 2004:112). It was found that the average rate of return to education is highest in the sub-Saharan African and Latin American region, while the rates of return for OECD member countries were found to be the lowest. The rate of return in Europe, Middle East and North Africa was estimated to be near the international average at 26.6% for primary education, 17% for secondary education and 19% for tertiary education, as indicated in Table 2-1. While the rate of return to

education for the Asian region was estimated to be lower than the international average (Psacharopoulos & Patrinos, 2004:112).

Apart from the differences in the level of education obtained, individuals also differ according to their field of study and, as such, differences in the rate of return among individuals exist due to their specific educational background. Literature regarding the rate of return to economics education was also considered within this chapter. It was found that, compared to other majors such as accounting, mathematics, chemistry and general business studies, economics currently yields a relatively higher rate of return (Caplan, 2013). While majors such as finance, mechanical engineering, computer sciences and electrical engineering yield an almost insignificantly higher rate of return compared to economics (Caplan, 2013). Several other studies have also found that economics graduates have a higher rate of return compared to most other majors (Lewis, Daly & Fleming, 2004:234; Livanos, & Pouliakas, 2011:421).

The South African literature discussed in this chapter has shown that tertiary education within South Africa can be seen as one of the most significant factors influencing the success of an individual (Fourie, 2010:15). It was also reported that unemployment rates are lower for those with some form of tertiary education, while having higher earnings in comparison to those who only have secondary or primary education (Solidarity Research Institute, 2012:3). Furthermore, Statistics South Africa (2012:xvi) reported that higher levels of education in South Africa are associated with lower levels of unemployment and that countries with high overall unemployment rates should benefit from higher levels of education. The median wage for tertiary educated skilled workers in South Africa was estimated to be 44.63% higher than the median wage for those with only a Matric certificate Bhorat (2000:3). It can therefore be concluded that tertiary or university education is a positive and significant determinant of income and employment.

This chapter also considered other factors influencing an individual's income and employment. It was found that, apart from education, the years of work experience has been observed to be the second most important determinant of future earnings, according to Salas-Velasco (2006:426). According to a wide variety of research, it was found that experience is a positive and significant determinant of income while having a decreasing return on wages. It was also found that experience is more significant for

females than for males but only by a small amount (Bhorat, 2000:7; Keswell & Poswell, 2004:844-845; Qian & Smyth, 2008:489). It was also shown that age is an important factor of influence and that the factor has a positive and significant association with income, more so for females than for males and more so in the private sector than in the public sector (Reed & Miller, 1970:180; Kabubo-Mariara, 2003:15; Chang & Huang, 2005:2101). While, according to Rospabe (2001:8) it was determined that males reach diminishing returns at an earlier age than females in South Africa.

Gender was also considered as a determinant of income within this chapter, and it was found that males have a higher labour force participation rate, employment rate and self-employment rate than females. Estimates also indicated that females have a much higher unemployment rate than males (Rospabe, 2001:4). It was also found that the returns to primary and higher education are lower for women than for men, while returns to secondary and overall education are higher for women than for men. It would thus be expected that the earnings of tertiary educated women would be lower compared to those of men with a similar level of human capital, *ceteris paribus* (Psacharopoulos & Patrinos, 2004:113-116).

South Africa's political history, together with the raised institutional barriers to employment, property rights, civil rights, and regional mobility in the past, leads to the expectation that population group would influence the current and future earnings of individuals within the country (Mwabu & Schultz, 2000:307). South African literature has come to show that white workers earn significantly more than workers from other population groups, while African workers earn significantly less than other racial groups (Mwabu & Schultz, 2000:326; Bhorat, 2000:7-10; Rospabe, 2001:4). It was also found that population group does not only influence income, but also employment opportunities and occupational attainment.

Other factors of influence were also considered including occupation. Black, Sanders & Taylor (2007:367) found that the five main occupations for economists include managers and administrators, supervisors and proprietors, sales representatives (mining, manufacturing and wholesale), accountants and auditors, and other financial officers. According to Bhorat (2000:5) and Rospabe (2001:21) managers and professionals have the highest significant positive influence on an individual's income, and that it is more significant for females than for males. Similarly, in the case of sector

or industry as a determinant of income, it was found that the financial and business sectors have the highest positive significance associated with income (Bhorat, 2000:4).

When considering the location of employment, it was found that the Gauteng province (Bhorat, 2000:7) and the Western Cape (Rospabe, 2001:9-22) is positive and the most significant provinces associated with an individual's income. While in the case of rural employment, it was found that African workers have a higher rate of return to education, while white workers have a lower rate of return to education compared to their urban counterparts (Mwabu & Schultz, 2000:316). Other factors were also considered such as marital status, which is positive and more significant for men than women (Rospabe, 2001:7-21). Tenure, was found to be a negative influence on occupational attainment and a positive influence on income (Rospabe, 2001:15). Union membership was found to be positive and more significant for lower skill levels, while it was found to be more significant for African workers than for white workers, and higher for females than for males (Bhorat, 2000:7-11; Rospabe, 2001:21).

From this chapter, it can be concluded that both international and South African literature has indicated that economics education is one of the most beneficial majors, since it delivers a relatively higher rate of return to education compared to other majors. Estimates on the rate of return to the different levels of education have indicated that, as education increases, an individual's potential for future income will increase, especially in the case of tertiary education. Apart from education, a variety of other determinants of income was considered, and it can therefore be concluded that, although education is the most significant determinant of income and employment, it is not the only determinant. From the literature overview, it has become apparent that a person's human capital can, to some extent, be used in estimating an individual's employment status, occupational attainment as well as the his or her income. The main objective of this study is thus to determine the significance of education to income as well as determining the most significant determinants of tertiary educated workers' income.