



























































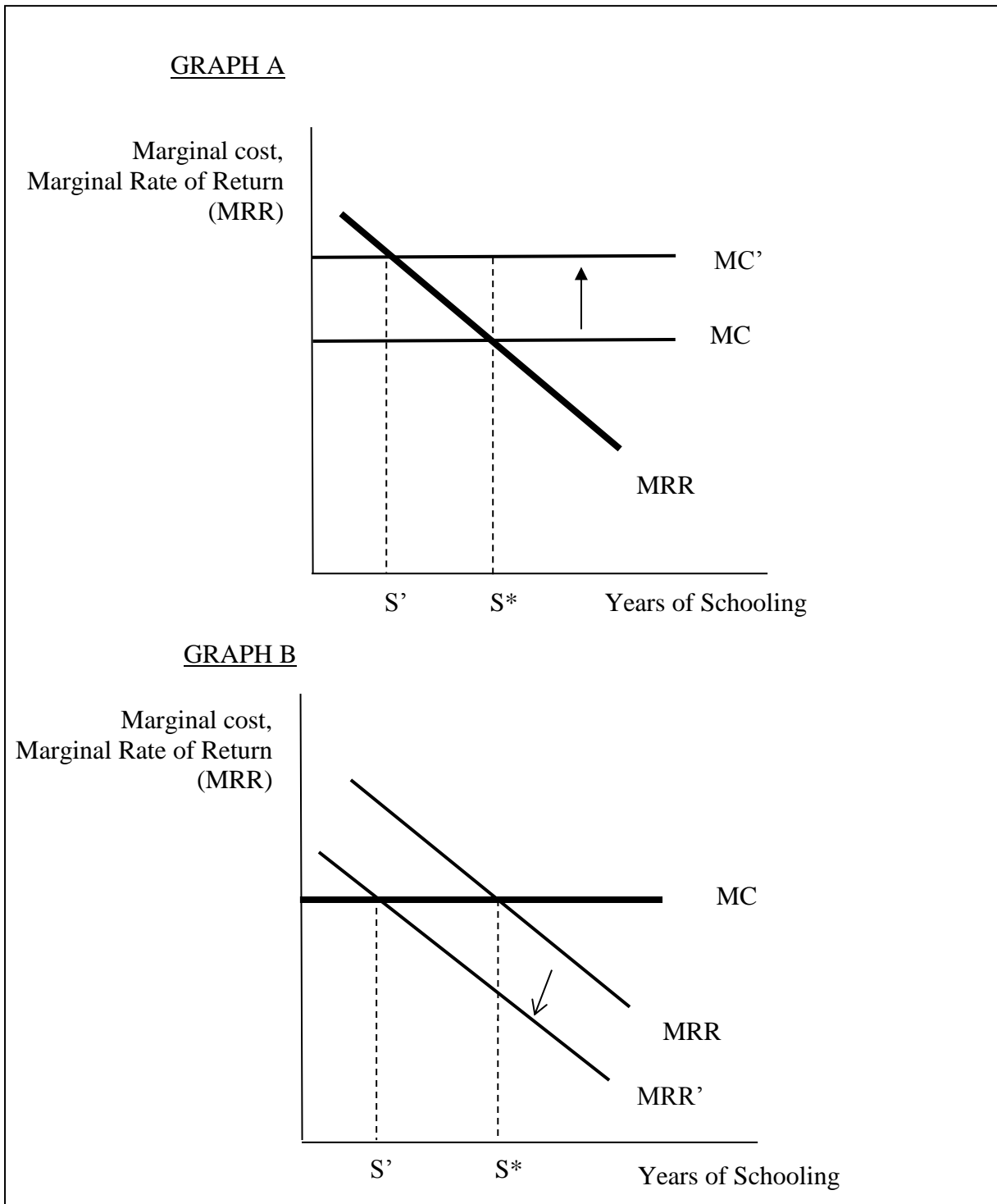








**Figure 2.5: The Optimal Schooling Option**

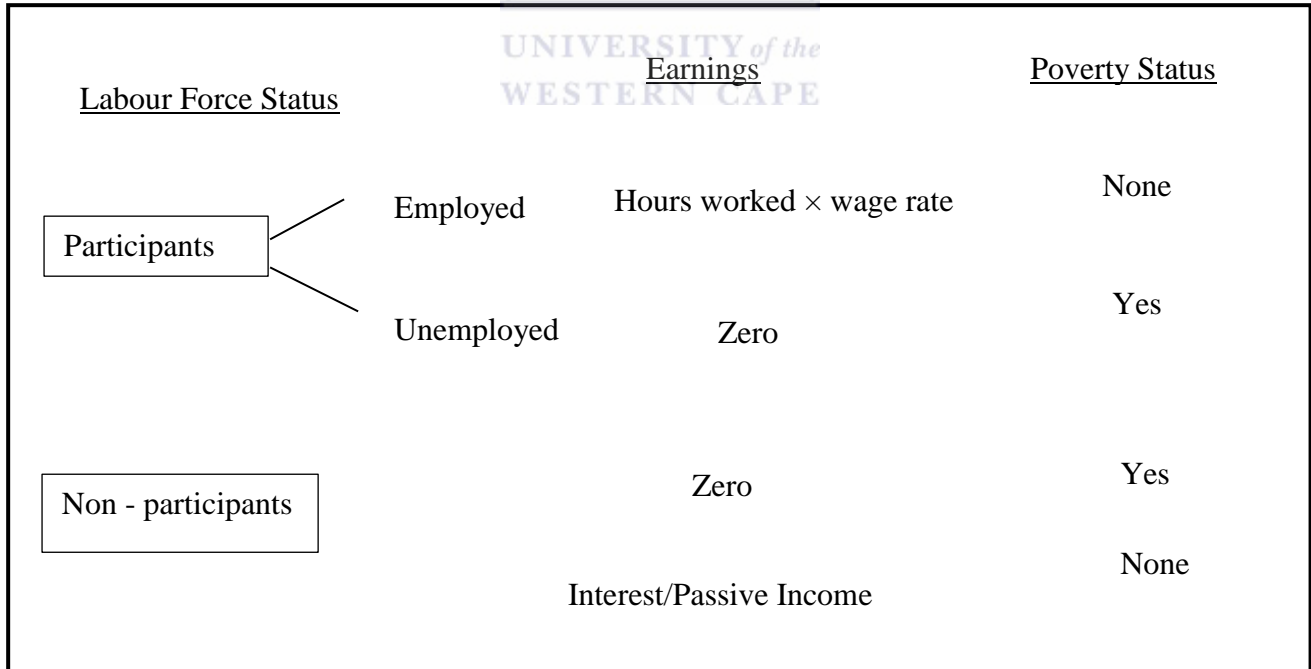


Source: Rosen (1977: 12); Card (1999: 06); Borjas (2009: 243)

Van der Berg (2008: 11) emphasised that, the probability of gaining employment by a well-educated person is much higher than someone without education (and less education). Also, a well-educated person is more economically productive and more likely to earn higher income. As such, households with educated people are less likely to be poor, suggesting a

positive association between education and earnings, and therefore, a negative association between education and poverty. It therefore appears that, education affects poverty predominantly through the labour market (Orazem et al, 2007: 5; Schiller 2008 as cited in Botha, 2010: 124). Figure 2.6 below shows the link between unemployment and poverty. It summarises the link between labour force participation and earnings. If someone loses his/her job or is unable to acquire employment, this usually decreases his/her income and consumption spending. As such, he/she tends to reduce his/her consumption of some essential commodities. Unemployed labour market participants who are unable to find work have a higher likelihood of being poor. This is because it becomes difficult for them to sustain an effective purchasing power when their wages drop to zero. This is mostly the case if they do not have an alternative income source. It should be noted that there are others who might be employed but their earnings is insufficient to place them on or above the poverty line. This is particularly the case for semi-skilled or unskilled workers or due to underemployment (Schultz, 1999: 79; Van der Berg, 2008: 5 - 7; Zaman et al, 2010: 259 – 260; Ganguli et al, 2011: 8).

**Figure 2.6: Labour force status, earnings and poverty status**



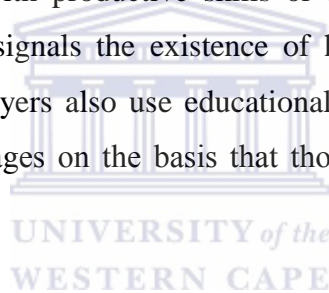
Source: Mbuli (2008: 83)

It is important to note that, returns to education differ with factors such as the; supply of educated workers, level of development and shift in demand for such workers in the

development process (Van der Berg, 2002: 1 & 2008: 11). Also, the emergence of globalisation has led to increased economic competition within and amongst countries, and the world at large. This has increased competitiveness in the labour market, causing lower skilled labour ever more replaceable and hence investing in higher levels of education is important (Bonafant 2007: 6 – 7; Tarabini 2010: 210).

## **I. Signalling theory**

This theory is an alternative explanation for the positive association between education and earnings. Kjelland (2008: 70) explained that, in most cases individuals use their education to signal broad sets of inherent productive characteristics, which employers cannot observe and that educational attainment does not necessarily result in enhancing productivity directly. In addition, Weiss (1995: 135); Flores-Lagunes and Light (2007: 3) argued that, this theory is mostly predominant for those with productive skills or aptitudes not easily identified by employers. As such, education signals the existence of human capital, thereby, resolving information asymmetries. Employers also use educational attainment to make employment decisions and set employees' wages on the basis that those with more education are more productive (Page, 2010: 33).

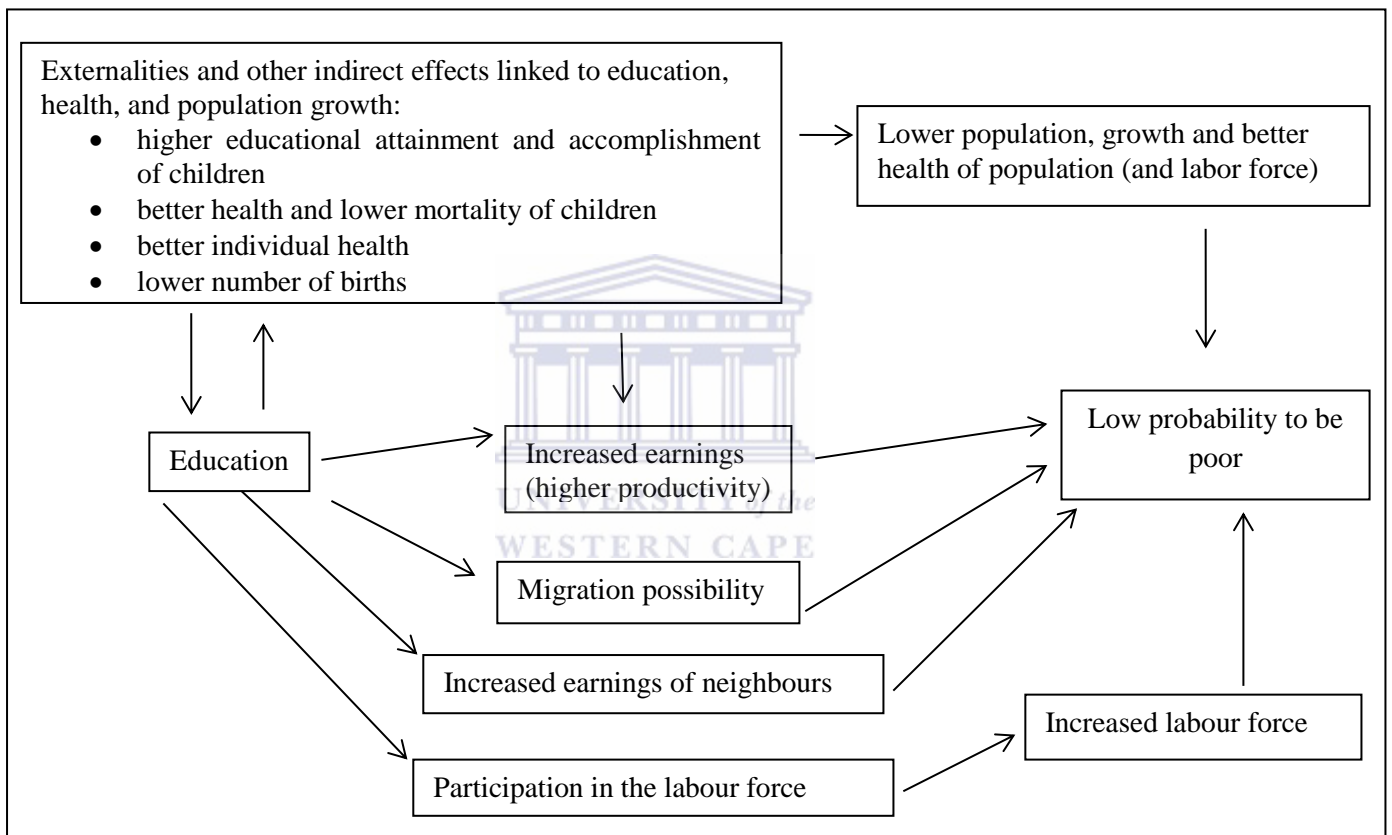


According to Zaman et al (2010: 257), education is also associated with lower levels of poverty through its association with improvement of human development indicators. A highly educated female population is associated with reduced fertility rates, as many women will spend time schooling to equip themselves for the labour market. It is also associated with smaller household size, enabling more parental participation in their children's education (since time is an issue for parents). This in turn, results to better school performance of the child and thus motivates him/her to follow additional years of schooling. In addition, it improves health care and sanitation in a household. Parental involvement in their children's health also reduces the rate of infant and child mortality. These factors are positive externalities resulting from education (Van der Berg, 2008: 8; UNESCO, 2002: 20 - 33).

Ganguli et al, (2011: 8); Van der berg, (2008: 5 – 7); Zaman et al (2010: 259 - 260) found that, an educated workforce of great quality turns to be more productive. Thus, stimulating industrial growth and attracts foreign direct investment. As investment increases in a country,

many jobs tend to be created, that can absorb some of these quality skills. Bloom et al (2005: 18) concluded that, communities with high human capital tend to grow faster. Oxaal (1997: 8) also added that, education reduces the gap between rural and urban areas, as it facilitates migration from rural to urban areas. Those who migrate learn new skills, which could be beneficial to their local communities, such as, increase in developmental projects, which might result to poverty reduction. Figure 2.7 below, summarises the direct and indirect impact of education on poverty.

**Figure 2.7: Direct and indirect effects of education on poverty**



Source: Modified from Michaelowa (2000: 2)

According to Van der Berg (2007: 7), there is an inverse relationship between education and poverty. This implies the lower the educational level the more likely poverty might prevail in a household. In addition, Tilak (2002: 198) argued that, poor education and income poverty are jointly reinforcing. This indicates that, lack of education is the main cause for income poverty and income poverty retards people from overcoming poverty of education. Schiller (2008) in Botha (2010: 125) argued that, students from poor homes are less likely to complete their education up to a certain level not because they are not intelligent, but because of low

rate of enrolment due to insufficient funds to enrol in school. Armstrong et al (2008: 19) further noted that, individuals with low educational levels are likely to be poor than those with higher education. The next section looks at the link between education and poverty, in terms of education being a way out of poverty.

## **2.4 Review of past studies on the relationship between Educational Attainment and Poverty Status**

Reports from both international and South African studies on education and poverty continue to show that, education and poverty are inversely proportional. Oxaal (1997: 1) argued that, the link between education and poverty, can be seen in two ways; firstly, investing in education as a tool to alleviate poverty can improve the skills and productivity among poor households, and secondly, poverty can be a barrier to educational attainment both at micro (less education is received by children from poor homes) and macro (generally, poor countries do have lower enrolment rates) levels. This research focuses on the first option. Below are some past studies that have shown this relationship.

### **2.4.1 International Evidence**

Weber et al (2007: 443) noted that, encouraging students to stay in school and improving the quality of education is one possible approach to reduce poverty and raise local welfare. Using the US Panel Study of Income Dynamics data, they found that, households headed by a well-educated person, have a lower probability of being poor. Education had great effect on the poverty status of households, that is, for each additional year of schooling (further education) by a household head, that household was 39% less likely to be poor, which is lower than households whose heads do not further their education.

According to Njong (2010: 3- 5), using the Cameroon Household Survey (CHS) conducted in 2001, education has an inverse relationship with an individual's poverty status. That is, the more educated an individual becomes, the likelihood of being poor is slim. This is an indication that, education is a critical determinant of the incidence of poverty. Education has a negative impact on poverty, implying that, the chances of an individual escaping poverty increases as his/her level of education increases. Furthermore, a study carried out by Ijaiya

and Nuhu (2011: 88) using questionnaires based on Federal Office of Statistics (FOS), National Integrated Survey of Households (NISH) and World Bank Living Standards Measurement Study (WBLSMS) methods on Ilorin Metropolis in Nigeria found that, an important determinant of poverty is the educational level. For example, their findings revealed that, poverty is less prevalent amongst households in which the head has attained a higher level of education.

Given these theories surrounding education and poverty, and the link between these concepts, the next section looks at this in the context of South Africa and Limpopo Province. Before looking at the relationship between education and poverty status of an individual or household in South Africa, it is vital to first highlight the extent of poverty in the country and Limpopo Province. Many studies have been carried out with respect to poverty in South Africa and Limpopo Province using one of the methods explained in section 2.2.2. The next section looks at past studies on poverty in South Africa and Limpopo Province.

## **2.5 Poverty in South Africa and Limpopo Province**

The end of apartheid in 1994 ushered in a new democratic government that inherited a nation with millions of its inhabitants stricken by poverty (Perret, 2004: 3). According to Statistics South Africa (2012: 5), using the international poverty lines of \$1.25 and \$2.50 a day, about 10.7% and 36.4% respectively, of the population lived below these lines. Using the Living Condition Survey (LCS) of 2008/09, it found that, roughly 26.3%, 38.9% and 52.3% of the populace lived below R305 - the food poverty line, R416 - the lower bound poverty line and R577 - the upper bound poverty line respectively. Using the food poverty line, the poverty gap and poverty severity were approximately 8.5% and 3.8% respectively. The poverty gap was about 15% and the severity of poverty was roughly 7.5% for the lower bound poverty line and approximately 23.6% and 13.3% respectively, for the upper bound poverty line at the time of the survey.

The level of poverty in South Africa is compared with some selected countries in terms of six social indicators; adult literacy, access to improved water and sanitation, life expectancy at birth, total fertility and infant mortality. The other countries are Botswana, Brazil, Chile, Malaysia, Romania and Turkey – middle-income countries, Kenya, Morocco, Nigeria and Sri

Lanka – low-income countries. The social indicators for South Africa compared to those of the low income countries, particularly African countries like Kenya, Morocco and Nigeria is much better. That for Sri Lanka however, shows that some low-income countries have attained better social levels than some upper-middle-income countries like South Africa. Table 2.1 below shows the Gross National Income (GNI) per capita in 2010, the figures for the various social indicators and the Gini coefficient<sup>6</sup> for each country.

With respect to the middle-income countries, the social indicators of South Africa are almost in line with those of the African countries that is, Botswana and Tunisia. The middle-income countries in Asia - Malaysia and Romania, Latin America - Brazil and Chile and Eastern Europe - Turkey, all have considerably better outcomes than South Africa and the other African countries. The difference is more pronounced in health indicators (HIV/AIDS has greatly affected infant mortality and life expectancy rates in Botswana and South Africa), nonetheless, it extends to low fertility levels, educational measures and access to basic services (Armstrong et al, 2008: 5).

The main reason for the relatively poor social indicators of South Africa, a middle-income country, is the skewed nature of income distribution within the country as indicated by the Gini coefficient in the last column of table 2.1 below. The Gini coefficient of South Africa exceeds that of the other selected countries. Growth in per capita income for most middle-income countries, led to widespread enhancement in living standards, and therefore, social indicators. On the contrary, social indicators for South Africa remained relatively low. This indicates that, progress in South Africa lags behind compared to the other countries in the middle-income group. According to World Bank (2012: 104), the poorest 20% only had command over 2.7% of the country's income, while the richest 20% controlled 68.2% of income.

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<sup>6</sup> The Gini coefficient is widely used to summarise measures of income inequality and ranges from 0 – income is perfectly equally distributed to 1 – income is perfectly unequally distributed.

**Table 2.1: Selected countries social indicators**

Countries	GNI per capita <sup>1</sup>	Life Expectancy at Birth <sup>2</sup>	Infant Mortality Rate <sup>3</sup>	Adult Literacy Rate <sup>4</sup>	Total Fertility Rate <sup>5</sup>	Access to Improved Water <sup>6</sup>	Access to Improved Sanitation <sup>7</sup>	GINI coefficient
Kenya	790	56	55	87	4.7	59	32	47.7
Morocco	2850	72	30	56	2.3	83	70	40.9
Nigeria	1180	51	88	61	5.5	58	31	48.8
Sri Lanka	2240	75	14	91	2.3	91	92	40.3
Botswana	6790	53	36	84	2.8	96	62	61.0
South Africa	6090	52	41	89	2.5	91	79	63.1
Tunisia	4160	75	14	78	2.0	94	85	41.4
Brazil	9390	73	17	90	1.8	98	79	54.7
Chile	10,120	79	8	99	1.9	96	96	52.1
Malaysia	7760	74	5	92	2.6	100	96	46.2
Romania	7850	73	11	98	1.4	89	73	30.0
Turkey	9890	74	14	91	2.1	100	90	39.0

Source: World Bank 2012 and 2013

Note: <sup>1</sup> Current US dollars (2010)

<sup>2</sup> Years (2010)

<sup>3</sup> Per 1000 live births

<sup>4</sup> Percentages of ages 15 and older (2005 – 2010)

<sup>5</sup> Births per woman (2010)

<sup>6,7</sup> Percentage of population (2010)

According to Todaro and Smith (2009: 208), the relative income share of households, individuals and percentile groups in a particular population, gives the best information on poverty for policy makers. The most usable generalisations about the poor are, they are; mostly located in rural areas, generally active in agriculture and related activities, and more likely to be women (Todaro & Smith, 2009: 238). There is a strong racial poverty dimension in South Africa, rooted from the history of the country. Apartheid created dissimilarities in poverty level, and the distribution of wealth and income amongst the different population groups. Since democratisation, things have not changed in South Africa and Limpopo Province. Most studies on poverty in South Africa have shown a high incidence of poverty particularly for African (Black) population than other racial groups (Woolard, 2002; Hoogeveen & Özler, 2006; Lekezwa, 2011).

The nine provinces in the country differ significantly in terms of poverty rates, likewise the urban and rural areas of the country. Using a lower bound poverty line of R322 and the 2000 OHS<sup>7</sup> and IES data, Hoogeveen and Özler (2006: 65) found that, the three provinces with the highest poverty rates in 2000 were; Eastern Cape (with poverty rate of approximately 76%), Limpopo (76%) and KwaZulu – Natal (68%). Provinces with the lowest poverty rates were Gauteng (37%) and Western Cape (31%). Armstrong et al (2008: 9) also found similar results and noted that, these provinces with the highest poverty rates are the most populated and rural provinces, and housed 47.4% of the South African population at the time of IES 2005. Hence, those residing in the Eastern Cape and Limpopo Provinces are most likely to be poor. Given that poverty is highly concentrated in rural provinces, is an indication that the incidence of poverty is most likely to be highest in the rural than urban settlements of the country (Armstrong et al, 2008: 10).

According to Posel and Rogan (2012: 97 & 104), of the world's poor, 70% are women, due to HIV/AIDS epidemic, persistent gender gap in real income and increased unemployment rates among women, just to name a few. Using the OHS of 1995 and 1999, GHS<sup>8</sup> of 2004 and 2006, income measures and a poverty line of R322 per capita in 2000 prices, they noted that, over these years the estimated poverty rates was consistently lower for men than women.

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<sup>7</sup> OHS = October Household Survey

<sup>8</sup> GHS = General Household Survey

For instance, in 1999 and 2006 they noted that, 65.8% and 59.6% of females and 61.3% and 52.3% of males respectively lived in poor households. Most studies on poverty in South Africa have also found similar results in terms of gender disparities (Govender et al, 2007; Armstrong et al, 2008; Lekezwa, 2011).

The rate of poverty is expected to be relatively high in young age, decrease in middle age, and then increase in old age<sup>9</sup>. According to Armstrong et al (2008: 14); Lekezwa (2011), children below the age of 15<sup>10</sup> and adults at the age of 65 and above, had the highest incidence of poverty of 58.7% and 43.3% respectively, at the time of IES 2005. Those in the working age group – in South Africa it refers to those between the ages 15 - 65 for males and 15 - 60 for females, experienced lower poverty rates.

### **2.5.1 Poverty in Limpopo Province**

The uneven distribution of poverty in terms of race, gender and area type in Limpopo Province is similar to the national level, but the extent of poverty is quite different (Walters 2008: 189). The challenges of post-apartheid reconstruction and development in the country are greatly felt particularly in the province. The province is very rural, and the provincial economy is not predominantly diversified. The major economic activities in the province are agriculture, mining and tourism. Poverty rate is lower in the urban than rural areas. Nevertheless, poverty in the urban areas is likewise significant (Tshitangoni et al, 2010: 2376).

According to Kongolo (2009: 248), the poorest regions in Limpopo Province are; Bushbuckridge, Central, Lowveld and Southern administrative areas. Many households in the province are headed by women and the elderly, and there are high dependency ratios (number

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<sup>9</sup> Perlman (1976) asserted that, though there are differences between those aged below 15 and those aged above 65, these groups have similar poverty-inducing characteristic which is, they are in the non-working age.

<sup>10</sup> Households headed by this age group made up approximately 0.3% of all households as such this result may not be reliable. Also, they usually lack; tertiary education, cognitive skills and work experience to secure lucrative jobs.

of people relying on those working, and is divided into child and aged dependency ratios). The dependency ratio for Limpopo Province is very high compared to the national level. In 2007, the dependency ratio for Limpopo Province stood at approximately 81.6% and that of South Africa was roughly 59.1%. This implies an average South African in the working age carries fewer burdens to support the economically inactive than in Limpopo Province (Limpopo Provincial Treasury, 2012: 34). Approximately, 47.6% of households in the province have access to social grants, which is the highest percentage when compared to other provinces in the country (SANRD, 2008: 12).

The Human Development Index (HDI) for Limpopo Province is approximately 0.47, the lowest compared to the national average of about 0.68. Infant mortality rate is about 50 per thousand live births, greater than an average rate of 42 per thousand live births nationally. Indicators such as those related to; health, literacy, employment, water and energy consumption, life expectancy for Black households fall far below the overall national average (Kongolo, 2009: 249). In 2007, about 12.4% of households in the province lacked access to proper sanitation amenities as opposed to 8% nationally. About 83.6% of households in the province have access to piped water. Approximately 18% and 40% of households in Limpopo Province, had access to pipe water inside and outside their yards respectively, as opposed to 47% and 18% respectively in South Africa. The life expectancy at birth for the province was about 55.6 years in 2010 longer than that of South Africa which is about 50.4 years (Limpopo Provincial Treasury, 2012: 35 – 36).

The fertility rate for South Africa in 2010 measured in terms of average births per woman was roughly 2.4 and that for Limpopo Province was 2.7 the highest in the country. These evidences on poverty in South Africa and Limpopo Province show lapses in terms of development. From previous knowledge, economic growth leads to poverty reduction in a region. Hence, there is the need for developmental policies such as education to help lift households from poverty (Limpopo Provincial Treasury, 2012: 65 & 70). As seen in the theories, education has a negative relationship with the poverty status of an individual and its impact on poverty is greatly felt in the labour market. Section 2.5 below looks at this in the context of South Africa.

## **2.6 The relationship between education and poverty status in South Africa**

The problem of educational quantity and quality in post – apartheid South Africa dates back from the apartheid period (1948 – 1994). During this period, equal access to quality services and educational resources were limited, and at the worst denied to most South Africans especially Blacks, Coloured and Indians - all as part of a deliberate attempt to reduce and/or deprive them from attaining quality education. The introduction of the Bantu Education Act of 1954 was to prescribe educational access based on race. This greatly affected educational attainment of the South Africans. As such, it contributed greatly to the high poverty rate prevalent particularly amongst the aforementioned racial groups (Schuster, 2011: 41).

Louw et al. (2006: 15) using the census data of 1970 to 2001 found that, differences in quantitative educational attainment reduced during the apartheid era. Blacks born in 1920, 1950, 1960, 1970 and 1980 on average attained 7.2, 6.0, 4.9, 3.6 and 2.3 years of education respectively less than that of Whites. Despite this reduction, mean attainment by race and urban versus rural areas still had large differentials, but gender disparities were quite small. The provision of education on the basis of equality and quality to all South Africans was seen as a priority by the new government (Waghid & Schreuder, 2000: 85). They further stated that, the issue of eliminating deep poverty levels prevalent particularly in rural communities of the country (particularly; KwaZulu – Natal, Eastern Cape and Limpopo provinces) was also a main focus of the democratic government. Von Kotze (2007: 23) noted that, in 1994, education was the fundamental developmental tool by the new government to fight illiteracy and provide essential skills that can help alleviate poverty. It is important to note that, the quantity of education attained by an individual is insignificant if it is not of quality because it negatively affects an individual's prospects of being employed. This is discussed in more details in the next two subsections below.

### **2.6.1 Quantity of education and labour market prospects**

According to Van der Berg (2007: 851), the legacy of the apartheid schooling system, with under-resourced and racially segregated schools for Blacks, is still seen in large educational inequalities between Whites and Blacks. This is noticeable particularly on educational quality. When there is high level of inequality in educational attainment, this leads to a great

increase in wage differentials. As such, it is important for this inequality to decline both within and between these population groups. Leibbrandt et al (2012: 11) found that, the lack of progress in closing the disparity in racial earnings is due to lack of improvement in completing post – secondary school among Africans (Blacks). Using the 1998 and 1999 October Household Surveys (OHSs) and 2000 to 2007 Labour Force Surveys (LFSs) on men and women of age 25 to 59, Leibbrandt et al (2012: 10) affirmed that, from 1997 to 2007 the cumulative distribution of education using different estimates for Africans and Whites had large racial differentials. Years of schooling for White men and women were greater than that of Africans. In both groups, men and women have very similar school distribution. This explains why Whites have greater chances of gaining lucrative employment and better wages than Blacks.

More so, right to the age of 15, there is virtually universal school enrolment. But it is noticed that, there is high failure rates at matric level and high school dropout at upper secondary level. This is attributed to a weak educational quality in South Africa (Van der Berg, 2007: 852). Human capital theory assumes that, there is a positive relationship between an individual's future earnings streams and years of schooling. Also, it assumes that people can predict their future earnings streams (Borjas 2009: 252). Nevertheless, Lam et al (2008: 13) ascertain that, youths cannot accurately predict their future earnings. As such, educational value is not known to most of them. This led to early school drop out for many youths. Furthermore, according to Smith (2011: 8), many South African youths do not have matric due to high school drop-out rate. In addition, Gustafsson (2011: 17-25) noted some reasons for this which includes:

- ❖ They cannot cope with the study regimes;
- ❖ Poor facilities such as no proper classrooms and no desks, some schools are overcrowded;
- ❖ High rates of teenage pregnancies: Approximately 42% of females who drop out from school result from pregnancy. This has been a serious problem as it increases the likelihood of early drop-out. According to Kyei (2012: 135), though the highest fertility level in the country is in the Limpopo Province, which stands at five children per woman, teenage fertility rate is the third highest in the country after Mpumalanga (22.7%) and KwaZulu-Natal (19.2%), with Limpopo (18.4%);

- ❖ Financial constraints since many do not have money to pay school fees, buy books and uniforms and other school necessities.

These factors also account for the less participation of these individuals in the labour market as their level of schooling is low.

Smith (2011: 9) accentuated that, about 30% of those aged 18 and above, do not attend any educational institution. Moreover, approximately above 11% of children in high school, drop - out each year to join the labour force. These high rates of school drop-out reduce the education quantity for most people in the labour market. As a result, increase their chance of being unemployed. This shows that education enhances an individual's chances of being employable. Lam et al (2008: 15) using 2001 census and Cape Area Panel Study, noted that, matric holders are 16 percentage points more likely, to be employed after school compared to those not having matric. Leibbrandt et al (2012: 12) using 1998 and 1999 OHS and LFS of 2000 to 2007, also found that, African men with a diploma or degree are about 20 percentage points more likely to be employed compared to those with grade 7.

Moreover, Mbuli (2008: 91) using Stats SA data of 1995 and 2002 found that, 33.12% and 32.30% of those without schooling in 1995 and 2002 respectively were unemployed. While the rate was lowest that is, 6.44% and 15.37% amongst those with tertiary education in the given years respectively. One can therefore assume that, those without schooling (and less schooling) are more likely to be poor, since they are most likely to be unemployed. Woolard (2002: 30) found that, in 1998, 58%, 53%, 34%, 15% and 5% of adults with; no education, primary education, incomplete secondary education, complete secondary and tertiary education in South Africa respectively were poor. In addition, Armstrong et al (2008: 19) using the IES 2005/2006 data and a poverty line of R322 per capita per month in 2000 prices, ascertained that, as an individual's level of education increases, the rate of falling into poverty is likely to decrease. Those with degrees had the lowest poverty rate of 1.2%, while those with no schooling had 66.3%. Just having a degree or any form of education is not enough if it is not of quality. The next section looks at the importance of quality education on an individual's labour market prospects.

## 2.6.2 Educational quality and labour market prospects

Nowadays, Black pupils do attend formerly White schools though great variations in terms of quality among formerly Black schools still exist. Generally, the performance of South African schools is lower compared to most of their African counterparts, even though it has more educated parents and resources, and less acute poverty. Based on international tests, intervention in the educational system of the country is required at the early stage than matric. Since it is relatively easy to gain promotion to higher grades, educational quantity may overstate progress in intellectual levels mastered (Van der Berg, 2007: 852). Some evidence on the quality of education was summarized by Taylor et al. (2003: 41) as: Researches done about South Africa for the period 1998 to 2002 proposed that, the scores of learners are extremely below expectation at all schooling system levels, compared to some countries and the expectations of South African's curriculum. Many studies carried out in South Africa have supported this view:

- In international tests such as TIMSS (Trends in International Mathematics and Science Study), PIRLS (Progress in International Reading and Literacy Study) and SACMEQ (Southern African Consortium Education Quality) South Africa performs poorly. For the mean scores of science and mathematics (TIMSS, 2003) for grade 8 pupils by country, of the participating countries, South Africa was ranked at the bottom as shown on figure A. 1 and 2 in the appendix below. Taylor et al (2009: 4) explained that, these scores were respectively above two standard deviations, from international average. Furthermore, for PIRLS (2006), South Africa was at the bottom see figure A. 3 in the appendix. The performance of South Africa in SACMEQ II for grade 6 pupils was also poor. The country was ranked 8th in reading and 9th in mathematics of the 14 participating countries shown in table A. 1 in the appendix. In comparison with other countries, South Africa's quality of education is very low relative to international countries; nevertheless, higher than some countries in Africa (Van der Berg, 2007: 855).

According to Van der Berg (2008: 149), the difference in schools (based on the; quality of teaching materials, pupil-teacher ratio and under-expenditure by government in historically Black schools) to some extent, explain the labour market inequalities in South Africa. Moreover, although South Africa is fast becoming an urbanised country, most learners still attend schools located in rural areas. Highly urbanised provinces like Gauteng and Western

Cape Provinces spend lots of money on school resources, than predominantly rural provinces for instance, Limpopo and Eastern Cape Provinces (Macfarlene, 2005: 4). In addition, Veriava (2013: 2) noted that, in 2012, there was serious crisis in Limpopo Province because the Department of Education in the province had not ordered for textbooks. This greatly affects the quality of education in the province. Moreover, Moses (2011: 26) explained that, in order to determine wages in the labour market, it is important that for education quality to be reflected by cognitive skills. Nevertheless, some schools in South Africa lack resources to provide these necessary cognitive skills. This leads to inequalities in the South African quality of education and the labour market.

Armstrong (2009: 22) explained that, historically Black schools mostly in the homelands have fewer teachers such that, the student-teacher ratio in these schools is significantly high. She further explained that, this has a negative effect on graduates from these schools. In addition, based on some selected middle-income countries - Brazil, Chile, Malaysia, Tunisia, Romania and Thailand and some low-income countries – Kenya, Nigeria and Morocco, South Africa, a middle income country compared to the others has the highest pupil – teacher ratio of 31, but lower than that of some selected low-income countries (Nigeria and Kenya) except Morocco. This also accounts for the low quality of education in South Africa, given that teachers do not give proper attention to individual students due to high pupil – teacher ratio (World Bank, 2012: 123). Also, when the method of teaching is considered, problem arises. Reason being that, many students at home and elsewhere speak different languages while being taught in English at school. As such, students tend not to have a good mastery of subjects (Armstrong, 2009: 22).

According to Louw et al (2006: 2), the quality of education of a school in South Africa is determined by its history. This implies the quality of graduates from historically White schools is considered higher than those from historically Black schools. For instance, Pauw et al (2006: 19) noted that, approximately 60% of those gaining access to universities, are functionally illiterates with most coming from historically Black schools. These schools lack teachers, proper infrastructures and learning facilities (Lam et al., 2008: 20). The poor infrastructures are reflected by; lack of boards, classrooms and desks, as such classes are over-crowded (Moses 2011:12). Additionally, according to findings by Clotfelter et al (2007: 38), teachers do have a significantly positive effect on the performance of students. Klasen

(1997: 65) accentuated that, employment has a positively significant effect on earnings. This implies those who are employed stand higher chances of earning better wages, thus the probability of being poor tends to be slim.

Using the Southern African Labour and Development Research Unit (SALDRU) survey data of 1993, Klasen (1997: 66) found that, about 80% of poor households are headed by someone with no level of education. This is because those with no schooling have less chances of being employed and earn better wages. Poverty prevails less in households with well - educated heads. With respect to reverse causality, inadequate access to quality education is also recognized as a significant consequence of poverty, which helps to replicate inter-generational poverty. In addition, Pauw et al (2006: 8) asserted that, unemployment is highest among holders of certificates or diplomas in comparison to those with degrees. In their findings, approximately 82% of those with certificates and diplomas in 2005 were unemployed compared to about 18% for degree holders. Nonetheless, the quality of post-matric certificates or diplomas from particularly Black historic schools is unknown. Consequently, employers are reluctant to employ them and these unemployed individuals are more likely to be poor, since they may not have a reliable source of income. The next section summarises the findings of this chapter.

## **2.7 Conclusion**

Poverty is a multidimensional phenomenon therefore the definition may vary from one individual to the other. Its measure is based on the definition adopted. This implies there is no fixed definition or measurement of poverty. Education is seen as one important tool that can be used to alleviate poverty in a household or society. This impact is greatly felt in the labour market, whereby education provides an individual with cognitive skills and signals to employers the skills which they cannot see. Also, well-educated persons are more likely to gain lucrative jobs and earn better wages, which then reduces their chances of being poor. This shows that education has an inverse relationship with the poverty status of an individual. This implies, as an individual's level of education increases the possibility of being poor decreases. Although poverty can lead to less educational attainment, this research did not focus on this aspect. The following chapter covers the methodology used to obtain results for this research.

## CHAPTER THREE: RESEARCH METHODOLOGY

### 3.1 Introduction

This study looks at the impact educational attainment has on household poverty in South Africa, using Limpopo Province as a case study. This chapter looks at the model that will be used to derive the results. Many models have been used by researchers to assess the impact of education on household poverty. In this research, poverty is a dependent and a binary variable. When the regressand has a binary/dichotomous (0, 1) outcome, a binary response model is often used to estimate the variable. The objective is to find the probability of something happening. As such, a qualitative response regression model that is where the dependent variable is binary is often known as a probability model (Gujarati, 2003: 581). A dichotomous response model is a model where by, the regressand takes on only two values (Bosch, 2008: 123). The regressand which is poverty in this case has only two options; either the respondent is poor or non-poor. The category poor, is assigned a value of 1 and 0 if non-poor. This study is out to measure the impact of the regressors on the probability of having a value of 1 on the regressand.

The Linear Probability Model (LPM) can be used when modelling for poverty to estimate the coefficients. Nevertheless, problems with this model include: the disturbance term ( $\mu$ ) is not normally distributed; predictions are not bound between 0 and 1; errors are highly Heteroscedastic and difficult to correct (Gujarati, 2003: 584 – 586; Bosch, 2008: 125). The most commonly used probability models on poverty analysis include; Probit, Logit and Tobit just to name but a few. These models ensure that the probabilities estimated will indeed fall between 0 and 1, the logical limits (Gujarati, 2003: 584). Previous studies on the impact of education on poverty conducted by Botha (2010); Ijaiya and Nuhu (2011) just to name but a few, used one of these probability models. This study makes use of a probit model to analyse the impact of educational attainment on the poverty status of households.

The chapter is sub-divided as follows: section 3.2 discusses the data sources; section 3.3 looks at model for poverty analysis, section 3.4 focuses on the model for regression analysis and section 3.5 is the conclusion.

### 3.2 Data Sources

The variables considered for this study are; the poverty status of each household head (poor and non-poor), educational attainment proxied by the category of education attained by individual household heads and the vector of household characteristics such as; gender, area type and race of the head of house, and household size. In evaluating the impact of education on household poverty, a cross-sectional data obtained from Statistics South Africa was used. The data used for this study is the Income and Expenditure Survey (IES), conducted after every five years by Statistics South Africa for the periods 1995, 2000, 2005 and 2010. IES 1995 took place September 1995, IES2000 took place October 2000, IES2005/2006 known as IES2005, took place between September 2005 and August 2006 and IES2010/2011 known as IES2010, took place between September 2010 and August 2011. Across these years the sample size for South Africa was approximately 29582 in IES1995, 26263 in IES 2000, 21144 in IES 2005 and 25328 in 2010. The sample size was 2668, 3104, 1951 and 3306 for the various years for Limpopo Province respectively.

Yu (2010: 6) asserted that, these surveys are widely used to gather necessary information required to analyse poverty. The IES provides important information on expenditure patterns on services and items by households as well as various sources of income. The purpose of the IES is to collect information on services and items households acquired, together with various sources of income and expenditure. This helps in updating the baskets of goods and services, vital to compile the Consumer Price Index. In order to accomplish this, all acquisitions of and expenditures on goods/services by the participating households for their own consumption within these reference periods were collected.

The collection of these data was different across surveys. With respect to IES 1995 and 2000, a recall method was used. This method required participants to record their expenditures for a period of 11 or 12 months using a questionnaire which encompassed annualised figures of expenditure. The IES 2005 and 2010 used two methods; diary and the recall methods. The diary method required respondents (which changed every month) to record their expenditures on personal care and food items for four weeks. This method was used monthly, mainly to record expenditure values for non-durable goods such as food. The outcome is later

annualised. The diary and record methods were used to obtain annual figures for semi-durable and durable goods (Stats SA, 2008: 11).

### 3.3 Model for Poverty Analysis

Poverty analysis in this dissertation is based on the absolute money-metric measure of poverty (discussed in chapter 2, section 2.2.2.1). The two absolute income poverty lines (as defined earlier, these lines indicate the threshold on which poor and non-poor individual's will be distinguished) adopted by Woolard and Leibbrandt (2006) and used in most recent poverty studies in South Africa are used in this research that is; the "lower-bound" which amounts to R322 per capita per month, when decomposed gives R211 used for consumption of essential food and R111 for non-food intakes or  $R322 \times 12 = R3864$  per capita per annum in 2000 prices and the "upper- bound" decomposed gives R211 for food and R382 for other non-food items, amounts to R593 per month or  $R593 \times 12 = R7116$  per capita per annum in 2000 prices. The per annum poverty lines are used to estimate those consuming below or above this threshold.

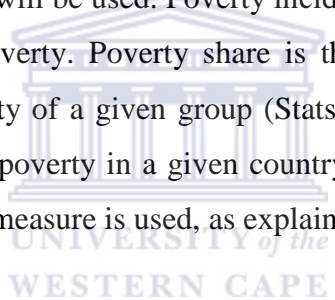
#### i. Derivation of the poverty lines

The approach commonly used by most researchers in South Africa to construct poverty lines, is the Cost of Basic Need method. The poverty lines used in this research were derived by Statistics South Africa. According to Stats SA (2007b: 7 - 8), in South Africa, the nutritive value for each bundle of food item proposed by the Medical Research Council (MRC), provides approximately 1927 kilocalories per capita/day to an individual. This cost R180 in real 2000 prices. Using the Recommended Daily Allowances (RDA) of 2261 kilocalories per person per day for South Africa suggested by South African Medical Research Council (MRC), the essential amount needed to buy sufficient food to obtain the basic daily food energy requirement is calculated as  $R180 \times \left(\frac{2261}{1927}\right) = R211$ . This value is known as the food poverty line.

In estimating the poverty lines of non-food items, it is assumed that, the non-food items usually purchased by households spending roughly R211 per capita per month on food items

can be seen as important. This is because these households forgo expenditure on food in order to purchase these items. The cost of these important non-food items amounted to R111 per capita each month. Therefore, R211 + R111 = R322. This gives the lower bound poverty line. Stats SA (2007b: 10) estimated again that, the average per capita expenditure level of households spending is about R211 per capita each month on food was R593 in 2000 prices. This means that, these households spent R382 per capita every month on non-food items. When the R382 is decomposed, R111 is used to acquire essential non-food items and R271 to obtain non-essential non-food items.

Furthermore, Ravallion (1994: 34) encouraged that, at least two or most preferably many poverty lines should be considered when measuring poverty. This is because, given a small change in poverty setting, this helps to test the responsiveness of poverty measures. In measuring the incidence and share of poverty, these poverty lines, particularly the lower bound (R3864) except otherwise will be used. Poverty incidence refers to the level at which a specific group is affected by poverty. Poverty share is the fraction of poverty a specific group, takes in the overall poverty of a given group (Stats SA 2007: 7 – 8). These poverty lines do not reveal the extent of poverty in a given country or society. As such, the Foster-Greer-Thorbecke (FGT) poverty measure is used, as explained in section 3.2.1 below.



### 3.3.1 The Foster-Greer-Thorbecke (FGT) class of decomposable poverty measure

Several methods can be used for poverty measurement, for instance, HDI, HPI, FGT just to name but a few. The HDI and HPI cannot be used in this case because they are non-income poverty measures. This research uses the FGT measure proposed by Foster, Greer and Thorbecke (1984) and is the most commonly used measure of poverty. This measure is used because it examines three poverty measures; headcount index ( $P_0$ ), poverty gap index ( $P_1$ ) and squared poverty gap index ( $P_2$ ). If households are classified according to their income measure and we define household  $i = 1 \dots q$ , as poor and  $i = (q + n) \dots n$ , as non-poor, the FGT poverty measure is expressed as:

$$P_\alpha = \frac{1}{n} \sum_{i=1}^q \left( \frac{z - y_i}{z} \right)^\alpha, \quad \alpha \geq 0 \dots \dots \dots (1)$$

Where:  $z =$  poverty line,

$Y_i =$  measure of income of the  $i$ th household,

$n =$  sample size

$q =$  number of poor individuals and

$\alpha =$  poverty aversion parameter (Foster et al, 1984: 762).

The interpretation of  $P_\alpha$  varies for every given value of  $\alpha$ . It should be noted that for all poor households ( $i = 1 \dots q$ ),  $(z - y_i)$  is positive because they earn less than the poverty cut-off point.

According to Govender et al (2007: 125); Woolard and Leibbrandt (1999: 20), Sen 1976 put forward four axioms that good poverty measures need to satisfy. They are;

1. Monotonicity: In case a poor individual's income rises (falls), the index needs to fall (rise).
2. Transfer: When a poor individual transfers his income to another person poorer than him, the index should not rise.
3. Population – Symmetry: The index should not change, when at least two populaces are pooled.
4. Proportion – of – Poor: If it grows/ decreases, the index must increase/fall.

These axioms will be used in this study to assess the measures of FGT.

#### **i. Head-Count index ( $P_0$ )**

It indicates the proportion of people living below a given poverty line in a country or society. It is stated as:

$$\text{When } \alpha = 0, P_\alpha = P_0 = \frac{q}{n} \dots \dots \dots (2)$$

The advantage of  $P_0$  is that, it is easy to compute and understand (Coudouel et al, 2002: 33; Mbuli, 2008: 30; Woolard et al, 2009: 2). As such, it is used in many researches in analysing poverty in a region (for example, see Hoogeveen & Özler, 2004; Armstrong et al, 2008). The weakness of this ratio is that, it does not give the depth (gap) and the severity of poverty

(Ijaiya & Nuhu, 2011: 7). As such, violates Sen's first two axioms of Sen 1976 (Johnson, 1996: 114). Due to these drawbacks,  $P_0$  should be used concurrently with the poverty gap ratio which will be the case in this research.

**ii. Poverty gap index ( $P_1$ )**

It is the difference between the poverty line and income per capita, of a given household (Woolard and Leibbrandt, 1999:56). It is expressed as:

$$\text{When } \alpha = 1, P_\alpha = P_1 = \frac{1}{n} \sum_{i=1}^q \left( \frac{Z - Y_i}{Z} \right) \dots \dots \dots (3)$$

The advantages of this are: it reveals the average shortfalls of poor individuals, thus providing a clear picture of poverty depth; also, when multiplied by the given poverty line,  $P_1$  indicates the amount that has to be transferred to the poor in an economy to move their expenditures above the poverty line (May et al, 2000: 30; Kaplan & Makoka, 2005: 20). Hence, from  $P_1$  it is easy to obtain the least cost of eradicating poverty with transfers. That is, the cost of eradicating poverty by targeting the rightful poor group, with no distortion or targeting costs. The main shortfall of  $P_1$  index is that, it does not take into account the variances in the severity of poverty between poor persons and ignores inequality amid poor individuals themselves.

**iii. Squared poverty gap index ( $P_2$ )**

$P_2$  shows how poverty is distributed below a given poverty line. It is often calculated as severity of poverty measure and can be seen as the sum of an amount, resulting from the poverty gap and inequality amongst poor people (Ravallion, 1992: 39).

$P_2$  is expressed as:

$$P_2 = \frac{(P_1)^2}{P_0} + \frac{(P_0 - P_1)^2}{P_0} C_q^2 \dots \dots \dots (4)$$

↑
←  
 (Contribution of the poverty gap)      (Contribution of inequality amongst the poor)

Where,  $C_q^2$  = squared coefficient of variation of income among poor individuals or group.

The advantages of  $P_2$  are: apart from capturing the gap between poor people from the poverty line that is, the poverty gap, it also identifies inequality amongst poor individuals; the value helps us to make comparisons over space or time or between different policy options (Woolard & Leibbrandt: 2001: 55).  $P_2$  is needed as  $P_1$  might not indicate the distributional changes of the population's poor fragment adequately. For instance, if there is a policy in place, that has an effect on cash transfer from someone slightly beneath the poverty line to the poorest individual;  $P_1$  would not be able to reflect this change, but  $P_2$  would. At all times,  $IP_2I$  when taken into account on its own tells us very little about poverty.

It is not easily interpreted as  $P_0$  and  $P_1$  even though it weights the poorest of the poor more heavily in its calculation, thus, not widely used (Woolard and Leibbrandt, 1999: 58; Kaplan & Makoka, 2005: 20; Woolard et al, 2009: 2). The  $P_\alpha$  index satiates Sen's transfer axiom, which states that, when income is transferred from a poor household to a rich one, measured poverty rises. Another advantage of the  $P_\alpha$  measure is that, it is decomposable by population subcategories. Hence, the overall poverty measure can be expressed as the sum of group measures, weighted by the population share of respective group (Kaplan & Makoka, 2005: 21).

### **3.4 Model for Regression Analysis**

In carrying out empirical analysis on the relationship between education and poverty, most previous studies used the probit regression model for instance, Botha (2010). This model is suitable in this case because the dependent variable which is poverty is binary in nature and takes on two values; poor or non-poor, which will be denoted as 1 and 0, respectively (Gujarati, 2003: 608). A household is considered poor if its head's consumption expenditure falls below R3 864 or R7116 per annum and non-poor if annual income is above R3 864 or R7116 per annum. Also, the model allows the reporting of changes in the response probability that is marginal effects (Gujarati, 2003: 609).

The precise form of the model is given as:

$$\text{POVERTY } (Y) = \beta_0 + \beta X + \mu \dots \dots \dots (5)$$

In equation (5),  $\beta_0$  is the constant;  $\beta$  is the vector coefficients, associated with the explanatory variables ( $X$ );  $\mu$  is the error term, subject to the standard normal distribution. In a probit model, it is assumed that though the values, 0 and 1 are observed for  $Y$ , there is  $Y^*$  - a latent unobserved continuous variable, which determines the value of  $Y$  (Gujarati, 2003: 606). Assuming there are latent variables  $Y^*$  such that;

$$Y^* = \beta X + \mu, \quad \mu \sim N(0, \sigma^2) \leftarrow \text{Normal} = \text{probit} \dots \dots \dots (6)$$

In a linear regression model,  $Y^*$  is observed directly, but in probits,

$$Y = \begin{cases} 0 & \text{if } Y^* \leq 0 \\ 1 & \text{if } Y^* > 0 \end{cases} \dots \dots \dots (7)$$

Since we are concerned with  $Y = 1$ , the error term  $\mu$  is translated to a possible value of;

$$\begin{aligned} Y^* > 0 &\rightarrow \beta X + \mu > 0 \rightarrow \mu > -\beta X, \\ \rho[Y^* > 0|X] &= \rho(Y = 1|X) = \rho(\mu > \\ &-\beta X) \\ &= \rho\left(\frac{\mu}{\sigma} > \frac{-\beta X}{\sigma}\right) \\ &= \Phi\left(\frac{-\beta X}{\sigma}\right) \dots \dots \dots (8) \end{aligned}$$

Since  $\beta$  and  $\sigma$  entered equation (8) as ratio, they cannot be estimated. Therefore, setting  $\sigma = 1$ , makes  $\mu$  a standard normal distribution. In a binary response model, the main concern is with the response probability given as;

$$\rho(Y = 1 | X) = \rho(Y = 1|x_1, x_2 \dots x_k) \dots \dots \dots (9)$$

Where;  $Y$  = dependent variable. It is dichotomous and takes the value of 1, if the individual is poor and 0 if otherwise.  $X$  = explanatory variables (these explanatory variables are some socioeconomic elements affecting poverty dynamics),  $\rho(Y = 1 | X)$  is the probability that, a household is poor given the values of the independent variables ( $X$ ). To remove the limitations of the Linear Probability Model (LPM), we make the following assumptions:

$$\rho(Y = 1 | X) = F[\beta_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_kx_k] \dots \dots \dots (10)$$

$F(.)$  is a function such that,  $F: x \rightarrow [0, 1], \forall x \in R$ . The Probit model assumes that  $F(.)$  follows a normal (cumulative) distribution,

$$F(x) = \Phi(x) = \int_{-\infty}^x \phi(z) dx \dots \dots \dots (11)$$

Where;  $\Phi$  = standard normal cumulative distribution function and  $\phi(z)$  = normal density function, and is written as;

$$\phi(z) = \frac{\exp\left(-\frac{z^2}{2}\right)}{\sqrt{2\pi}} \dots \dots \dots (12)$$



Hence, fitting the probit regression model to data, the binary discrete selection model that affects poverty of individual households can be denoted as following;

$$\begin{aligned} \rho(POOR = 1 | X = x) &= \rho(\text{income} < 3864 | x) = \rho[\mu > -(\beta_0 + \beta)x] \\ &= 1 - \Phi[-(\beta_0 + \beta)x] = \Phi(\beta_0 + \beta)x \dots \dots \dots (13) \end{aligned}$$

The same substitution applies for R7116. Given that,

$$X = f(\text{LE}, \text{HHc}) \dots \dots \dots (14)$$

Where; LE stands for level of education and HHc are the vector of households' characteristics.

HHc in this analysis is given as;

$$HHc = f(\text{FEMALE, BLACK, RURAL, and HHSIZE}) \dots \dots \dots (15)$$

Hence, equation (13) is re-written as;

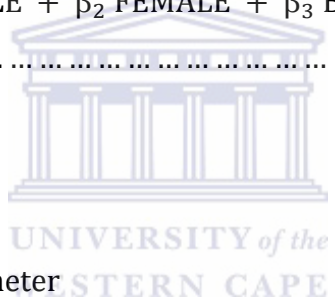
$$\rho(\text{POOR} = 1 | X) = \rho(\text{POOR} = 1 | \text{LE, HHc}) \dots \dots \dots (16)$$

Therefore,

$$\rho(\text{POOR} = 1 | X) = \rho(\text{POOR} = 1 | \text{LE, FEMALE, BLACK, RURAL, and HHSIZE}) \dots \dots \dots (17)$$

As such,

$$\rho(\text{POOR} = 1 | X) = F(\beta_0 + \beta_1 \text{LE} + \beta_2 \text{FEMALE} + \beta_3 \text{BLACK} + \beta_4 \text{RURAL} + \beta_5 \text{HHSIZE}) \dots \dots \dots (18)$$



Where;

$\beta_0$  = the intercept

$\beta_1$  to  $\beta_5$  = estimation parameter

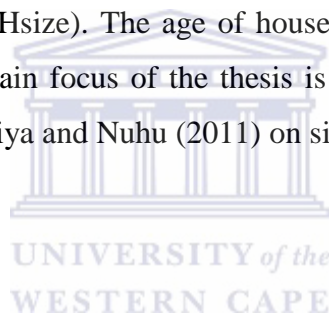
During the model specification, emphasis is on whether educational attainment has any significant impact on household poverty in South Africa, looking at Limpopo Province in particular. The validity of the model was tested using a-priori expectation, which is based on the signs and magnitude of the coefficient ( $\beta$ ) of the variables under investigation.  $\beta$  measures the marginal effect of the regressors on the regressand. The marginal effect is assessed using the mean values of the regressors used. It indicates how much the dependent variable (poverty) changes when the independent variable changes (Gujarati, 2003: 613). In a probit model with many independent variables, the model for the marginal effect is given as;

$$\frac{d\rho}{dx}(\text{Poor} = 1 | X) = F[\beta_0 + \sum(\beta_1 \text{LE} + \beta_2 \text{FEMALE} + \beta_3 \text{BLACK} + \beta_4 \text{RURAL} + \beta_5 \text{HHSIZE})] \dots \dots \dots (19)$$

To know if this model fits significantly better than that with just primary, secondary, matric, post-matric and HHsize as the predictor variables, the likelihood test ratio (LR) will be used. If the calculated LR is greater than the critical value or p – value, then our model with all predictor variables fits better. The likelihood ratio test equation is:

$$X^2 = 2[(\log\text{-likelihood for bigger model}) - (\log\text{-likelihood for smaller model})] \dots (20)$$

The specific details of each explanatory variable are provided in table 3.1 below. The characteristics describing the individual households include; educational attainment level [none (reference group), primary, secondary, matric and post-matric (matric + certificate/diploma and degree combined, due to the small sample size of degree holders)], racial classification [Black (reference group), Coloured, Indian and White], gender type [male (reference group) and female] of the household head, area type [urban (reference group) and rural] and the household size (HHsize). The age of household heads was not included as a predictor variable because the main focus of the thesis is not on poverty distribution. Also studies done by Botha (2010); Ijaiya and Nuhu (2011) on similar work did not include it.



**Table 3.1: List of explanatory variables for the probit regression model**

Explanatory Variables	Description of Variables
LE	<i>Educational level attained by household head:</i>
	None dummy: 0 = No, 1 = Yes:
	Primary education dummy: 0 = No, 1 = Yes
	Secondary education dummy: 0 = No, 1 = Yes
	Matric education dummy: 0 = No, 1 = Yes
	Post-Matric education dummy: 0 = No, 1 = Yes
FEMALE	<i>Gender of household head:</i>
	Male dummy: 0 = No, 1 = Yes
	Female dummy: 0 = No, 1 = Yes
BLACK	<i>Population group of household head:</i>
	Black dummy: 0 = No, 1 = Yes
	Coloured dummy: 0 = No, 1 = Yes
	Indian dummy: 0 = No, 1 = Yes
	White dummy: 0 = No, 1 = Yes
RURAL	<i>Area type of household head:</i>
	Urban dummy: 0 = No, 1 = Yes
	Rural dummy: 0 = No, 1 = Yes
HHSIZE	<i>Size of the household</i>

The following subsection summaries the findings of this chapter.

### 3.5 Conclusion

This chapter looked at the method and the data that was used to obtain the results for this mini-thesis. Data used is from the Income and Expenditure Survey (IES) carried out by Statistics South Africa for the period 1995, 2000, 2005/2006 and 2010/11. The Foster-Greer-Thorbecke poverty measure will be used alongside with two absolute poverty lines (R3864 – lower bound and R7116 – upper bound per capita income per annum in 2000 prices) to distinguish between the poor and non-poor individuals in Limpopo Province and nationally. Since the dependent variable (poverty) is binary in nature, a probit regression model will be run to determine the relationship between education and poverty in Limpopo Province. The next chapter discusses the research findings.

## **CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION OF RESULTS**

### **4.1 Introduction**

As discussed earlier, the main aim of this research is on educational attainment and its impact on household poverty in South Africa with Limpopo Province as a case study. The purpose of this chapter is to analyse and interpret the results obtained from the data sets used; Income Expenditure Survey (IES) 1995, 2000, 2005/06 and 2010/11 for South Africa and Limpopo Province. The general trend is analysed and for more statistical clarification IES 1995 and 2010/11 were mostly analysed, for simplicity and proper understanding of the results. It should be noted that the sample size for Coloureds, Indians and Whites in Limpopo Province are quite small as opposed to Blacks. The chapter is structured as; section 4.1 presents descriptive statistics of the results obtained; section 4.2 analyses the result of the probit regression and section 4.3 Conclusion.

### **4.2 Descriptive statistics**

This section gives the statistics of poverty and education in Limpopo Province, which is then compared to the national level. Subsection 4.1.1 focuses on the extent of poverty in Limpopo Province and amongst the different schooling categories and subsection 4.1.2 looks at the rate of education in different dimensions.

#### **4.2.1 The extent of poverty in Limpopo Province**

As indicated in Table 4.1 below, using the lower bound poverty line of R3864 over these years there was an increase in the head-count index from 1995 to 2000 that is, by 0.188 and 0.11 respectively, which then dropped from 2000 to 2010 by 0.163 and 0.166 for Limpopo Province and South Africa respectively. The poverty gap and squared poverty gap increased by 0.154 and 0.12 respectively from 1995 to 2000 for Limpopo Province and by 0.096 and 0.081 respectively nationally, which then dropped by 0.146 and 0.13 respectively from 2000 to 2005 and slightly increased by 0.002 and 0.017 respectively from 2005 to 2010 for Limpopo Province. For South Africa it decreased by 0.125 and 0.97 respectively from 2000

to 2010. Using the upper bound poverty line of R7116, over these years there was an increase in the head-count index by 0.144 and 0.081, poverty gap by 0.160 and 0.097 and squared poverty gap by 0.15 and 0.093 from 1995 to 2000 for both Limpopo Province and South Africa respectively, which then dropped by; the Headcount – 0.101 and 0.14, the poverty gap – 0.134 and 0.138 and the squared poverty gap – 0.132 and 0.123 from 2000 to 2010 for both Limpopo Province and South Africa respectively.

Considering IES 2010, Limpopo Province and these poverty lines, the head-count ratio of 0.596 and 0.777 respectively represent 59.6% and 77.7% of households in Limpopo Province whose level of consumption is below the aforementioned poverty lines. These figures indicate that, 59.6% and 77.7% of households in the province are poor since their head's consumption-expenditure level falls below the set poverty lines at the time of this survey. This is higher than the national rate of 40.6% and 58.3% respectively. The poverty gap ratio of 29.0% and 48.1% respectively, represent those whose average consumption-expenditure is below these poverty lines. This gap indicates the degree of poverty of poor households, thus representing the percentage of expenditure required to bring each poor household below these poverty lines up to these poverty lines. Compared to the national rate of 19.3% and 33.6% respectively, this is much higher. The squared poverty gap index of 0.177 and 0.338 represent 17.7% and 33.8% respectively of the poorest of the poor households in Limpopo Province that required special attention by policy makers in the distribution of social amenities. For instance; education, clean water, and sanitation and health care facilities, income generating activities and food that will help improve their living standards. This is higher than the national level of 11.7% and 23.0% respectively. The same explanation applies for the previous years.

Comparing IES 1995 and 2010 for Limpopo Province, and using these poverty lines, the headcount ratio increased by 2.5% and 4.3% respectively in 2010, indicating additional 2.5% and 4.3% of households in the province became poor since their head's consumption-expenditure level fell below the set poverty lines at the time of IES 2010. The poverty gap ratio increased by 1% and 0.7% respectively. This shows that, an additional 1% and 0.7% expenditure was required to bring each poor household below these poverty lines up to the poverty lines in 2010. The squared poverty gap ratio increased by 0.026 and 0.018 respectively, at the time of IES 2010. This signifies more 2.6% and 1.8% of the poorest of

poor households that required special attention by policy makers in the distribution of social amenities at the time of IES 2010. The distribution and share of poverty in the province in terms of area type, race and gender is shown in Table A. 2 in the appendix, based on the head-count ratio and the lower bound poverty line. In summary at the time of all surveys, the rate and share of poverty was highest for Blacks, rural areas and females.

**Table 4.1: Trend in head-count, poverty gap and squared poverty gap in percentages for Limpopo Province and South Africa**

	1995		2000		2005		2010	
	L	SA	L	SA	L	SA	L	SA
<b>Poverty Line: R3864</b>								
Head-Count ( $P_0$ )	57.1	46.2	75.9	57.2	63.9	47.3	59.6	40.6
Poverty Gap ( $P_1$ )	28.0	22.2	43.4	31.8	28.8	21.7	29.0	19.3
Squared Poverty Gap ( $P_2$ )	17.0	13.3	29.0	21.4	16.0	12.6	17.7	11.7
<b>Poverty Line: R7116</b>								
Head-Count ( $P_0$ )	73.4	64.2	87.8	72.3	81.7	65.2	77.7	58.3
Poverty Gap ( $P_1$ )	45.5	37.7	61.5	47.4	49.8	38.2	48.1	33.6
Squared Poverty Gap ( $P_2$ )	32.0	26.0	47.0	35.3	34.0	26.0	33.8	23.0

Source: Researcher's own calculations using IES 1995, 2000, 2005 and 2010 data

Note: L = Limpopo and SA = South Africa

In Table 4.2 below, the FGT measures are disaggregated by the highest educational level of the household head for Limpopo Province. The head-count ratio is higher for households in which the head has primary or no education comparative to households where the head has matric or post-matric education. Moreover, the depth and severity of household poverty is much lower if the household head has matric or post-matric education. Looking at IES 2010, 73.6% and 91.8% of households whose head had no schooling were poor as their head consumption level falls below these poverty lines R3864 and R7116 respectively, at the time of the survey. While only 18.7% and 26.2% of households whose head had post-matric were poor respectively, since their head consumption expenditure falls below these poverty lines respectively.

**Table 4.2: Trend in poverty rate by highest educational attainment in percentages in Limpopo Province**

	1995		2000		2005		2010	
	R3864	R7116	R3864	R7116	R3864	R7116	R3864	R7116
<b>None</b>								
P <sub>0</sub>	74.4	88.7	86.5	96.2	75.1	93.0	73.6	91.8
P <sub>1</sub>	38.1	58.4	49.8	69.1	33.6	58.4	33.5	57.3
P <sub>2</sub>	23.7	42.7	32.8	53.3	18.4	40.0	19.0	39.6
<b>Primary</b>								
P <sub>0</sub>	63.8	82.7	84.7	94.5	73.7	92.5	63.5	87.3
P <sub>1</sub>	31.5	51.3	50.7	69.1	34.2	57.0	30.6	52.4
P <sub>2</sub>	19.2	36.3	34.7	54.0	19.4	39.6	18.2	36.1
<b>Secondary</b>								
P <sub>0</sub>	52.2	72.4	72.4	87.7	61.4	80.4	61.9	78.7
P <sub>1</sub>	23.4	42.1	40.0	59.1	27.8	48.1	32.1	50.3
P <sub>2</sub>	13.0	28.4	26.5	44.2	15.9	33.0	20.7	36.5
<b>Matric</b>								
P <sub>0</sub>	20.2	36.8	47.5	64.1	41.4	59.4	39.4	54.9
P <sub>1</sub>	7.6	17.8	23.5	38.0	16.0	32.1	18.5	31.9
P <sub>2</sub>	4.2	10.6	14.5	26.8	7.5	20.2	11.2	22.0
<b>Post- Matric</b>								
P <sub>0</sub>	4.4	12.8	12.8	26.8	14.9	21.7	18.7	26.2
P <sub>1</sub>	1.0	3.7	5.3	11.9	6.7	12.3	9.0	15.2
P <sub>2</sub>	0.3	1.7	3.1	7.1	3.6	8.1	5.4	10.5

Source: Researcher's own calculations using IES 1995, 2000, 2005 and 2010 data

The next section looks at the level of schooling from different dimensions that is, area type, race and gender.

#### **4.2.2 Educational attainment in Limpopo Province in different dimensions.**

Households headed by someone located in urban areas on average have a higher level of education than those located in rural areas. Table 4.3 below shows the educational attainment level by household heads in the urban and rural areas of Limpopo Province. The results show that for the period 1995, 2000, 2005 and 2010, about 5.5%, 7.7%, 4% and 12.1% respectively of household heads in the urban areas have degree, while the rural areas recorded 1.8%, 1.3%, 1.5% and 2.1% respectively. In terms of no schooling by household heads the highest was the rural area with about 42.6%, 38.9%, 33.5% and 25.2% in 1995, 2000, 2005 and 2010

respectively and urban areas recorded the lowest result of 18.8%, 10.9%, 17.9% and 5.9% respectively. In addition, over these years, the percentage of those with no education for both urban and rural areas decreased, except from 2000 to 2005 where the urban area experienced a 7% increase of those with no education. Overall, the percentage of those with matric and post-matric (matric plus certificate/diploma and degree) is very low for both regions. This explains the disturbingly low percentage of quality skills from this province and particularly the rural areas. This could be seen as one reason why poverty is less prevalent in urban than rural areas in the province as shown in Table A. 2 in the appendix.

In addition, the statistics for South Africa is shown in Table A. 3 in the appendix. Comparing the two and using IES 2010, 5.9% of household heads have no education in Limpopo Province as opposed to 6.6% nationally and 12.1% as opposed to 7.5% nationally household heads have degree in the urban area. Thus lower than the national average. In the rural areas household heads with no education in Limpopo Province is 25.2% as opposed to 24.2% nationally and 2.1% as opposed to 1.6% nationally have degree at the time of this survey.

**Table 4.3: Trend in educational attainment by area type in percentages in Limpopo Province**

Household Heads Educational Attainment Category	1995		2000		2005		2010	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
None	18.8	42.6	10.9	38.9	17.9	33.5	5.9	25.2
Primary	14.1	16.5	16.0	25.5	7.9	24.5	13.7	26.2
Secondary	28.3	24.9	39.1	27.5	36.5	30.2	35.1	34.5
Matric	16.0	5.4	14.8	3.7	20.4	6.6	19.5	6.9
Matric + Certificate/diploma	9.5	5.6	10.1	2.1	13.2	3.3	12.7	3.5
Degree	5.5	1.8	7.7	1.3	4.0	1.5	12.1	2.1
Total	100	100	100	100	100	100	100	100

Source: Researcher's own calculations using IES 1995, 2000, 2005 and 2010 data

Note: Figures might not add up due to round up and down.

Furthermore, the educational attainment of individual household heads is highest for Whites and lowest for Blacks. This is shown in Table 4.4 below, where over the period 1995, 2000, 2005 and 2010, approximately 41.5%, 35.7%, 32.6% and 23.3% respectively of Black

household heads have no schooling, while White household heads 0.4% in 1995 and 0% in both 2000 and 2005, and 0.4% in 2010 respectively have no schooling. In addition, the percentages of degree holders for Black household heads are 1.8%, 1.9%, 1.7% and 3.1%, and for Whites 14.6%, 14.3%, 6.8% in 1995, 2000, 2005 and 14.6% in 2010 respectively hold a degree. Overall, the percentage of household heads with post-matric was highest for Whites and lowest for those with primary or no education than their Black counterparts across these periods. Similar trends could be seen nationally. This is shown in Table A. 4 in the appendix. This could be one reason why poverty is dominant amongst Blacks than the other race group as shown in Table A. 2 in the appendix, as they might not have acquired the required skills gained through education to secure lucrative jobs.



**Table 4.4: Trend in educational attainment by race in percentages in Limpopo Province**

Household Heads	1995				2000				2005				2010			
Educational Attainment Category	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
None	41.5	5.1	0.0	0.4	35.7	50.6	9.5	0.0	32.6	11.7	0.0	0.0	23.3	17.9	0.0	0.4
Primary	16.6	8.7	8.9	5.9	24.6	37.4	40.2	0.0	23.4	0.0	0.0	0.0	25.2	0.0	0.0	0.0
Secondary	25.1	23.1	32.4	29.5	29.1	12.0	12.0	31.7	31.1	62.2	17.5	50.5	34.6	62.9	47.9	26.3
Matric	5.9	17.0	44.1	23.9	4.8	0.0	5.2	32.4	7.4	26.1	45.2	49.5	8.1	12.5	19.5	30.6
Matric + Certificate/diploma	5.5	5.1	0.0	22.4	2.9	0.0	0.0	21.7	3.7	0.0	31.3	34.9	4.3	0.0	15.1	28.2
Degree	1.8	0.0	14.7	14.6	1.9	0.0	33.1	14.3	1.7	0.0	6.1	6.8	3.1	0.0	14.1	14.6
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: Researcher's own calculations using IES 1995, 2000, 2005 and 2010 data

Note: B = Black, C = Coloured, I = Indian and W = White

Finally female household heads have lower educational attainment than male. As shown in Table 4.5 below, at the time of IES 1995, 2000, 2005 and 2010 approximately 34.8%, 23.4%, 18.6% and 15.1% respectively of male heads, had no schooling and while 49.6%, 45.3%, 42.5% and 29.7% in 1995, 2000, 2005 and 2010 respectively of female heads had no schooling. In addition, the percentages of female heads with degrees were; 0.6%, 0.9%, 0.6%, and 1.8%, and 3.1%, 3.6%, 3.8% and 5.1% for male heads in 1995, 2000 2005 and 2010 respectively at the time of these surveys. Generally, the percentage of household heads with post-matric is highest for male heads than female across these periods. A similar trend is observed at national level as shown in Table A. 5 in the appendix. One can assume that, one of the reasons for females to be less educated than males is because of pregnancy which might have caused some of them to drop out of school. This could be one reason why poverty is more prevalent amongst female than males as shown in Table A. 2 in the appendix, as they do not have the required skills gained through education to secure lucrative jobs.

**Table 4.5: Trend in educational attainment in Limpopo Province by gender in percentages**

Household Heads	1995		2000		2005		2010	
	Male	Female	Male	Female	Male	Female	Male	Female
None	34.8	49.6	23.4	45.3	18.6	42.5	15.1	29.7
Primary	16.7	15.6	28.5	20.5	27.1	19.2	26.9	22.7
Secondary	26.4	23.2	32.7	25.9	33.8	28.6	36.6	32.8
Matric	7.4	4.7	5.0	3.7	10.3	6.6	9.1	8.0
Matric + Certificate/diploma	7.9	2.6	3.8	2.6	6.9	2.5	6.0	3.5
Degree	3.1	0.6	3.6	0.9	3.8	0.6	5.1	1.8
Total	100	100	100	100	100	100	100	100

Source: Researcher's own calculations using IES 1995, 2000, 2005 and 2010 data

The next section looks at the impact of the explanatory variables particularly educational attainment on the probability of an individual household being poor in each poverty line, using a probit regression model.

### 4.3 Regression Analysis

To determine the effect of the explanatory variables on the probability of an individual household being poor in each poverty line, probit regressions were run for the different data sets. The marginal effects are shown in Table 4.6 and 4.7 below for the various IES data sets and poverty lines used. Before analysing the regression, the researcher first of all checked whether the model proposed in Chapter 3 fits significantly better. The likelihood test ratio statistic (distributed chi-squared) is used to determine this. This involves running two models; one with five predictor variables as shown in Table 4.6 below that is the restricted model – model 1 and the other with all the predictor variables as shown in Table 4.7 below – model 2, then the likelihood test ratio statistic (distributed chi-squared) was calculated and the values obtained are shown in Table 4.8 below.

The likelihood ratio test statistic is 171.66 with four degrees of freedom, 261.60 with five degrees of freedom, 88.23 with two degrees of freedom and 177.00 with five degrees of freedom for 1995, 2000, 2005 and 2010 respectively for the lower bound poverty line of R3864. For the upper bound poverty line of R7116 it is 239.73 with four degrees of freedom, 310.53 with five degrees of freedom, 116.52 with four degrees of freedom and 245.15 with five degrees of freedom for 1995, 2000, 2005 and 2010 respectively. We can use a table or find the associated p-value that corresponds to these likelihood test ratios, which is  $p < 0.001$ . This probability is very small as such, indicating that the model with all the predictors fits significantly better than the model with only five predictors. Hence, the analysis that follows is based on Table 4.7 and the robust standard errors are shown in parenthesis. For better analysis and due to the small sample size of those with degrees, it was combined with matric + certificate/diploma as post-matric. All the perfectly predicted outcomes were omitted from the result as seen in Table 4.7 below. This implies, for the given poverty lines and IES 1995 no Indian household head was poor at the time of this survey. The same conclusion applies for Coloured, Indian and White that were omitted from the IES 2005 results for the lower bound poverty line and White for the upper bound poverty line.

Holding the other variables constant, based on a priori grounds, the coefficient estimate of educational attainment for 1995 have the expected sign and likewise, for 2000 and 2010 when using the poverty line of R7116 per annum. The a-priori expectation result indicates

that, the more people with lower education in Limpopo Province, the more the poverty incidence. This is in accord with Todaro (1977), who noted that, in developing countries, the high poverty level makes it tough for most people to either attend, complete or even advance with their schooling due to the direct cost involved which includes; school fees and cost of books and clothing, and the decreasing income and wages of the individuals hence affecting their aspiration of schooling. Except for the coefficient of Coloureds, the other variables were statistically significant at 1% level of significance, considering the R3864 per annum poverty line in 1995. From the poverty line of R7116 per annum for the period 1995 to 2010 most of the estimated coefficients were statistically significant at the 1% significance level, except the coefficient estimate for primary and secondary (from 2000 to 2010), matric (2005), Coloureds and Indians, which are insignificant.

The number of units of change and direction in the dependent variable resulting from one unit change in each explanatory variable is shown by the  $\beta$  values for education and poor while holding the other explanatory variables constant. The result shows that a more educated individual is less likely to be poor. Considering IES 1995 and 2010, and 1% significant level, at R3864 poverty line and controlling for the effects of race, gender, area type and household size, the result indicates that a household with the head having matric is 32.79% and 9.29% respectively, less likely to be poor than a household with the head having no education, whereas a similar household is 42.30% and 16.86% respectively less likely to be poor when using the R7116 poverty line. In addition, where the head has post-matric education, the likelihood of the household to be poor is 45.89% and 30.88% respectively, at R3864 poverty line and 64.35% and 49.35% respectively at R7116 poverty line, less than a household in which the head has no education. The same interpretation applies for 2000 and 2005.

With respect to the additional explanatory variables, poverty is higher among female-headed and rural households and households with larger size. Moreover, households with a Black head are most likely to be poor compared to their Coloured, Indian and White counterparts as shown in Table 4.7 below. Keeping all other explanatory variables constant and considering IES 2010 and 1% significant level, at R3864 and R7116 poverty lines, a household headed by a White is 30.51% and 42.73% respectively less likely to be poor than that headed by a Black. Considering IES 2010 and the poverty lines of R3864 and R7116, and controlling for the effects of gender, area type, education and household size, the result shows that a

household headed by a female is 13.96% and 14.46% respectively, more likely to be poor than those headed by a male. Keeping all other explanatory variables constant, a household whose head resides in the rural area is 21.70% and 24.86% respective more likely to be poor than that headed by someone residing in the urban area. Finally, controlling for the effects of the other explanatory variables, the result shows that an increase in the size of a household the more likely for the household to be poor.



**Table 4.6: Probit results, reporting marginal effects for highest educational level of the household using five predictor variables**

	1995		2000		2005		2010	
	3864	7116	3864	7116	3864	7116	3864	7116
Primary	-0.1134***	-0.0660**	-0.0665***	-0.0728***	0.0197	-0.0252	-0.0206	-0.0434
Secondary	-0.2093***	-0.2267***	-0.1504***	-0.1316***	-0.0205	-0.1192***	-0.0079	-0.1027***
Matric	-0.3841***	-0.5175***	-0.3840***	-0.4145***	-0.1701***	-0.2668***	-0.1878***	-0.3028***
Post-Matric	-0.4937***	-0.6834***	-0.6117***	-0.7300***	-0.4544***	-0.6889***	-0.3866***	-0.5940***
Household size	0.0632***	0.0443***	0.0806***	0.0380***	0.0890***	0.0697***	0.0781***	0.0732***
Sample size	2668	2668	3104	3104	1951	1951	3306	3306
Likelihood ratio (5)	752.78	802.02	958.34	806.33	490.65	543.16	662.76	838.77
Prob. > Chi <sup>2</sup>	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Log Likelihood	-1460.4344	-1352.7299	-1605.9025	-1248.8006	-1106.9138	-902.50842	-1947.6035	-1719.1474

Source: Researcher's own calculations using IES 1995, 2000, 2005 and 2010 data.

\*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%

**Table 4.7: Probit results, reporting marginal effects for highest educational level of the household head using all predictor variables**

	1995		2000		2005		2010	
	3864	7116	3864	7116	3864	7116	3864	7116
Primary	-0.0907*** (0.0276)	-0.0524* (0.0331)	0.0071 (0.0284)	-0.0141 (0.0237)	0.0712** (0.0358)	0.0117 (0.0321)	0.01870 (0.0279)	-0.0004* (0.0287)
Secondary	-0.1641*** (0.0233)	-0.1679*** (0.0271)	-0.0461* (0.0266)	-0.0352* (0.0220)	0.0398 (0.0316)	-0.0579** (0.0294)	0.0653** (0.0252)	-0.0148* (0.0257)
Matric	-0.3279*** (0.0240)	-0.4230*** (0.0345)	-0.2173*** (0.0403)	-0.2004*** (0.0391)	-0.0713* (0.0488)	-0.1222*** (0.0463)	-0.0929*** (0.0336)	-0.1686*** (0.0365)
Post-Matric	-0.4589*** (0.0136)	-0.6435*** (0.0189)	-0.5288*** (0.0324)	-0.6104*** (0.0387)	-0.4024*** (0.0358)	-0.6247*** (0.0408)	-0.3088*** (0.0284)	-0.4935*** (0.0325)
Coloured	-0.0890 (0.1204)	-0.1413 (0.1434)	0.0757 (0.2517)	-0.1106 (0.2241)	omitted	-0.2552* (0.1663)	-0.1575 (0.1422)	-0.1406 (0.1485)
Indian	omitted	Omitted	-0.1906 (0.2352)	-0.1544 (0.1811)	omitted	-0.4195 (0.2921)	0.0944 (0.1403)	-0.0938 (0.1408)
White	-0.2598*** (0.0461)	-0.5025*** (0.0484)	-0.4219*** (0.0921)	-0.5636*** (0.0845)	omitted	omitted	-0.3051*** (0.0771)	-0.4273*** (0.0890)
Female	0.1737*** (0.0221)	0.1258*** (0.0219)	0.1963*** (0.0198)	0.1419*** (0.0150)	0.2027*** (0.0251)	0.1570*** (0.0218)	0.1396*** (0.0189)	0.1446*** (0.0184)
Rural	0.2040*** (0.0234)	0.2401*** (0.0263)	0.2515*** (0.0237)	0.1984*** (0.0201)	0.1555*** (0.0345)	0.2172*** (0.0330)	0.2170*** (0.0227)	0.2486*** (0.0239)
Household size	0.0613*** (0.0046)	0.0380*** (0.0047)	0.0773*** (0.0049)	0.0332*** (0.0034)	0.0871*** (0.0064)	0.0650*** (0.0052)	0.0734*** (0.0046)	0.0675*** (0.0048)
Sample size	2668	2668	3104	3104	1951	1951	3306	3306
Likelihood ratio	916.38 <sup>(9)</sup>	1031.86 <sup>(9)</sup>	1219.94 <sup>(10)</sup>	1116.86 <sup>(10)</sup>	501.59 <sup>(7)</sup>	545.45 <sup>(9)</sup>	839.76 <sup>(10)</sup>	1083.92 <sup>(10)</sup>
Prob. > Chi <sup>2</sup>	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Log Likelihood	-1374.6077	-1232.8631	-1475.1046	-1093.5345	-1062.7982	-844.25069	-1859.1051	-1596.5731

Source: Researcher's own calculations using IES 1995, 2000, 2005 and 2010 data.

\*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%. Note: The powers in brackets on the likelihood ratio values signify the degree of freedom

**Table 4.8: The Likelihood ratio test statistic**

Year	Poverty lines	
	3864	7116
1995	171.66 (4)	239.73 (4)
2000	261.60 (5)	310.53 (5)
2005	88.23 (2)	116.52 (4)
2010	177.00 (5)	245.15 (5)

Source: Researcher's own calculations using IES 1995, 2000, 2005 and 2010 data.

Note: The values in bracket signify the degree of freedom

The findings of this chapter is summarised in the next section.

#### **4.4 Conclusion**

Comparing the level of poverty in Limpopo Province and the national level it was found that, the poverty rate in Limpopo Province was much higher than the national level. But in terms of poverty distribution it is still; racially biased with Blacks being poorer than the other racial groups, highest in the rural areas and amongst females, which is similar to the national level as seen in the literature. Over a period of 15 years, using the lower and upper bound poverty lines of R3864 and R7116 per annum respectively, there was an increase of 2.5% and 4.3% respectively of households that are poor because their head consumption-expenditure levels fell below the given poverty lines in Limpopo Province. The results showed that majority of household heads with no schooling in Limpopo Province; lived in the rural areas and were females and Blacks. While majority with degrees are; located in the urban area and were males and non-Blacks. From the regression result, it is seen that the higher the level of education of an individual, the less likely he or she will be poor. Hence, one can conclude that there is an inverse relationship between education and an individual's poverty status. The subsequent chapter outlines the conclusion of the thesis.

# CHAPTER FIVE: CONCLUSION

## 5.1 Introduction

This research explored the impact of educational attainment on household poverty in South Africa, with Limpopo Province as the case study. The Income Expenditure Survey (IES) data of 1995, 2000, 2005/2006 and 2010, conducted by Statistics South Africa to analyse the trend in the poverty rate of households, poverty status of households given their heads level of education and the educational level of household heads was consulted. This chapter first reviews the findings of the research before the conclusion follows.

## 5.2 Review of findings

Chapter 2 looked at the different definitions and measures of poverty that is absolute, relative and subjective measures; the impact education has on household poverty and past research on the relationship between education and poverty. It was seen that; there is no one definition or method of measuring poverty and the impact of education is greatly felt in the labour market. These past researches revealed that there is a negative relationship between education and poverty, meaning the higher the level of education the lower the probability of being poor.

Chapter 3 discussed the methodology used in the research. The method used to measure poverty was the Foster-Greer-Thorbecke (FGT) class of decomposable poverty measure and the selected poverty lines; lower bound poverty line of R3864 per capita per annum and upper bound of R7116 per capita per annum, were used to identify poor and non-poor households. The poverty lines and poverty measures helped in measuring to a certain extent what was deemed an acceptable standard of living for South Africa and Limpopo Province. To establish that education has an impact on the poverty status of an individual or household, a probit regression was used due to the binary nature of the dependent variable.

Chapter 4 analysed the statistics on poverty rate, poverty status based on educational attainment of household heads and the rate of educational attainment of household heads. It was found that, poverty is less common among households headed by someone in an urban area and who were males and Whites and also attained more schooling than those in the rural

area and who were females and Blacks, Coloureds and Indian. These results are similar to the findings of Pauw et al (2005); Armstrong et al (2008); Botha (2010); Lekezwa (2011). Using a probit regression model, the results showed that, in Limpopo Province, poverty is more prevailing and severe for households in which the heads have low or no level of educational attainment, lives in rural area and who are females and Blacks.

### **5.3 Conclusion**

This dissertation has limitations; first, since poverty was measured at household level, specific poverty dynamics within households cannot be observed. Secondly, there is the possibility of endogeneity in the regression model. Endogeneity is an issue because though lack of education may lead to poverty, inadequate financial resources might also elucidate the incapability of obtaining satisfactory educational level in the first case. This issue was not controlled due to the absence of a suitable instrumental variable. The direction of causality between education and poverty is therefore not clear, and the estimated parameter(s) cannot be accepted as entirely conclusive. However, the results are strongly indicative of the evidence that higher education is associated with lower levels of poverty and this is in accordance with past research, for instance, Botha (2010); Ijaiya and Nuhu (2011); Njong (2011) and theory.

The immense shortage of skills in Limpopo Province may be a manifestation of the generally low educational attainment level in the province. By shifting the focus to better educational quality and the development of more skills, this will greatly improve an individual's skills thus giving him/her higher chances in the labour market. Although, substantial amount of money is allocated by the South African government towards education, nevertheless, this is less likely to have improved the quality of the educational system in South Africa in general and the Limpopo Province in particular (Van der Berg, 2002). This gives room for future research on the relationship between the allocation of resources towards education and the quality of education.

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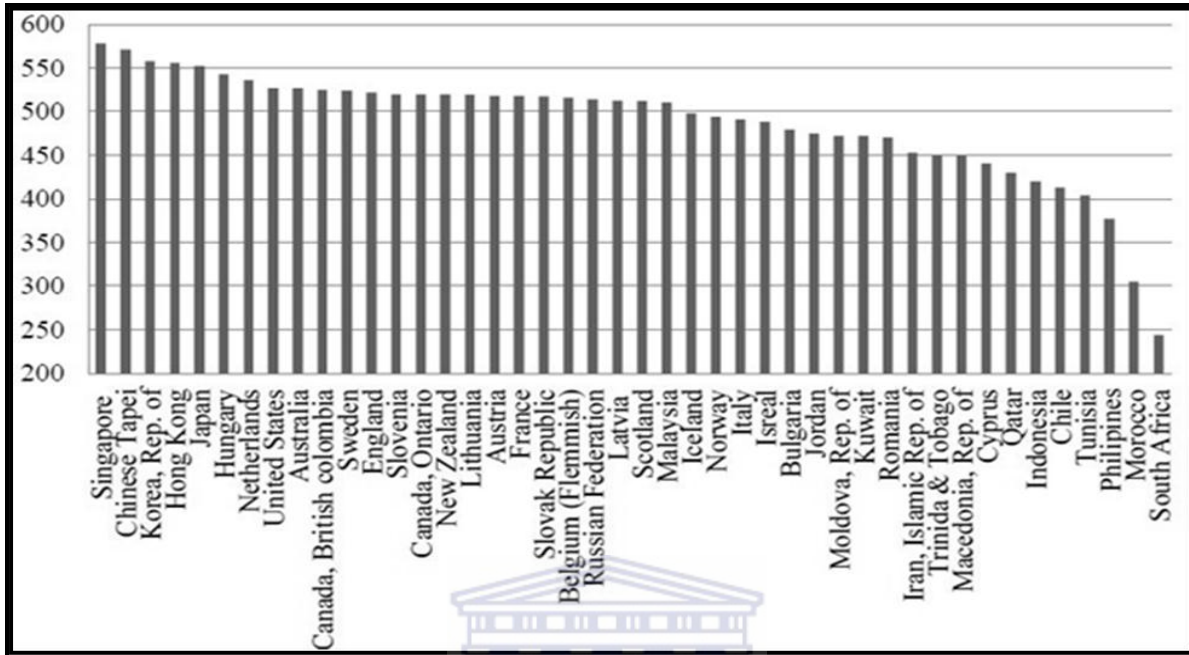
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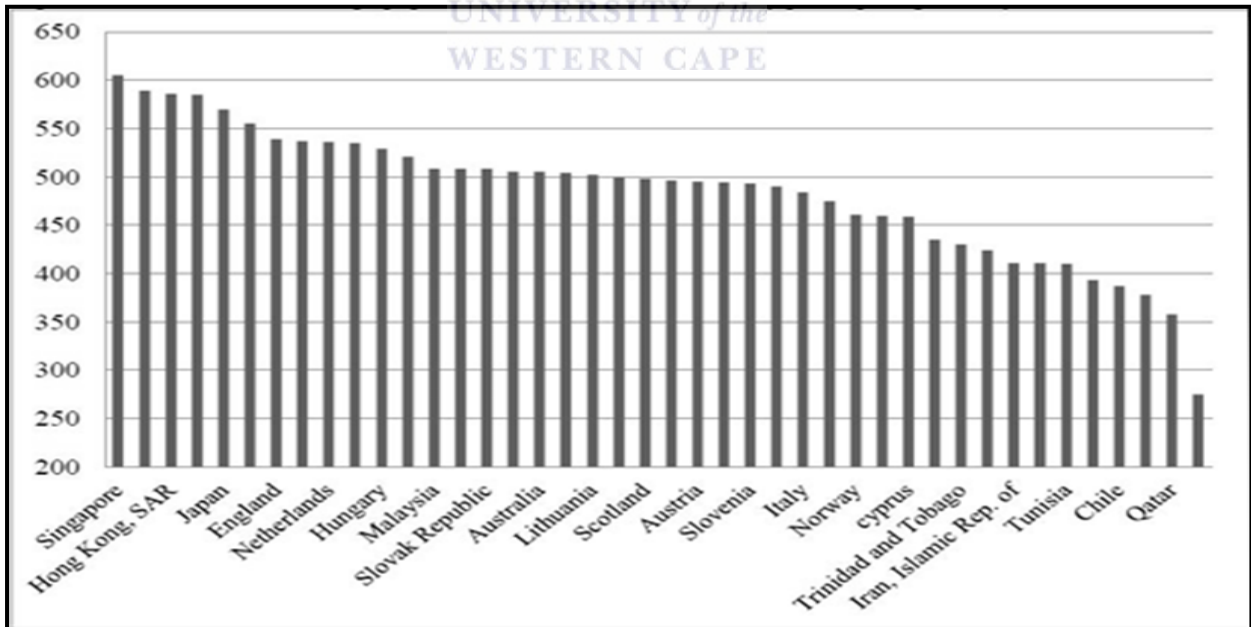
# APPENDICES

Figure A. 1: TIMSS 2003 average pupil Grade 8 Science score by participating country



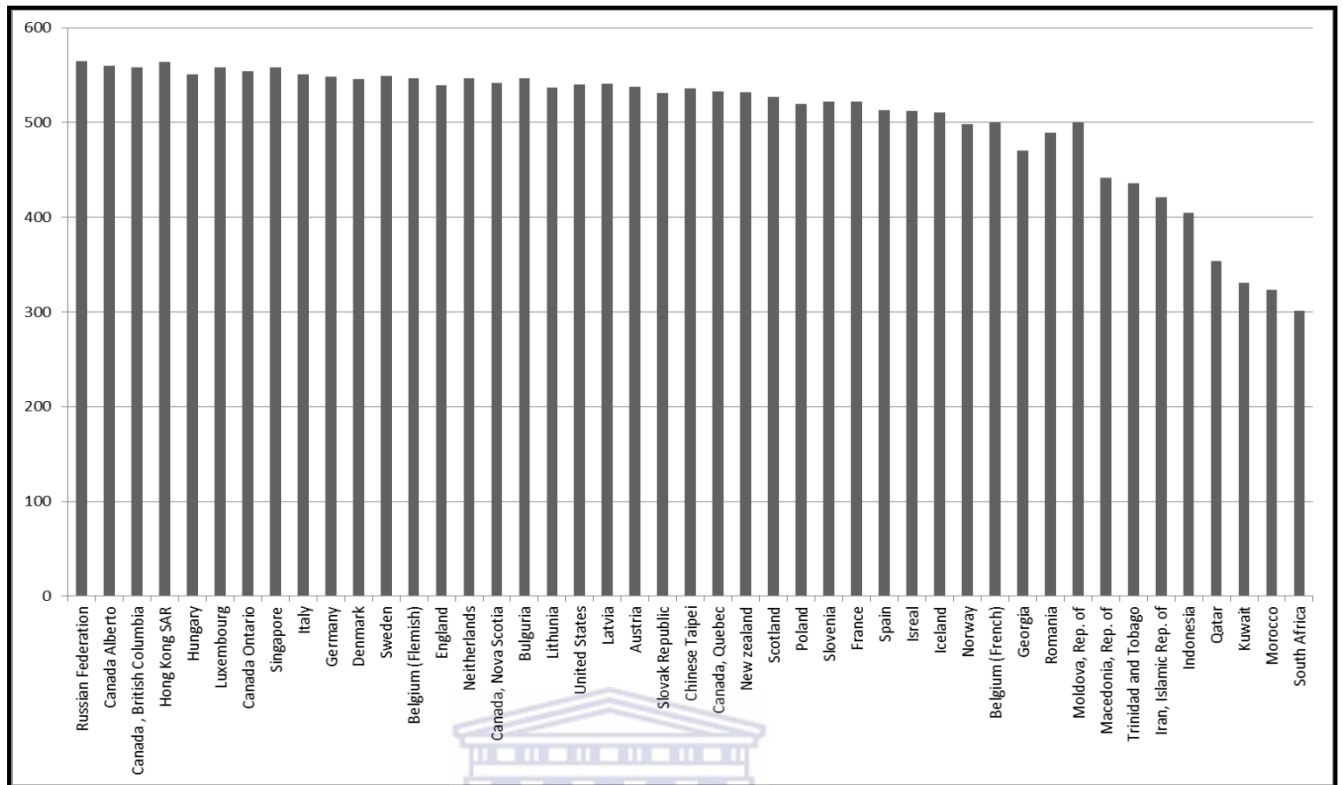
Source: Mullis, Martin, Gonzalez, Chrostowski (2004: 44-46)

Figure A. 2: TIMSS 2003 average pupil Grade 8 Mathematics score by participating country



Source: Mullis, Martin, Gonzalez, Chrostowski (2004: 42-44)

Figure A. 3: PIRLS 2006 average pupil Grade 4 reading score by participating country



Source: Mullis, Martin, Kennedy, Foy (2007: 44 - 49)

Table A. 1: Mean Scores of Pupils on SACMEQ II Grade 6 Reading and Mathematics Tests by Country

Reading		Mathematics	
Seychelles	582.0	Mauritius	584.6
Kenya	546.5	Kenya	563.3
Tanzania	545.9	Seychelles	554.3
Mauritius	536.4	Mozambique	530.0
Swaziland	529.6	Tanzania	522.4
Botswana	521.1	Swaziland	516.5
Mozambique	516.7	Botswana	512.9
<b>South Africa</b>	<b>493.3</b>	Uganda	506.3
Uganda	482.4	<b>South Africa</b>	<b>486.3</b>
Zanzibar	478.2	Zanzibar	478.1
Lesotho	451.2	Lesotho	447.2
Namibia	448.8	Zambia	435.2
Zambia	440.1	Malawi	432.9
Malawi	428.9	Namibia	430.9
SACMEQ Average	500	SACMEQ Average	500

Source: Servaas Van der Berg (2007: 855)

**Table A. 2: Trend in poverty rate and share by area type, race and gender in Limpopo Province in percentages**

	1995		2000		2005		2010	
	Rate	Share	Rate	Share	Rate	Share	Rate	Share
Urban	28.8	4.8	41.8	7.5	34.4	6.4	26	5.4
Rural	60.1	95.2	81.3	92.5	67.8	93.6	64.3	94.6
Black	58.6	99.5	77.3	99.8	65.6	100	60.7	99.9
Coloured	51.4	0.2	54.3	0	0	0	52.4	0.3
Indian	0	0	32.3	0	0	0	21.6	0.1
White	6.3	0.3	1.4	0	0	0	1.6	0.0
Male	50	55	65.8	40.3	50.8	36	49.5	38.9
Female	69	45	84.8	59.6	75	64	68.5	61.1
Total								

Source: Researcher's own calculations using IES 1995, 2000 and 2005/06

**Table A. 3: Trend in educational attainment by area type in percentages in South Africa**

Household Heads Educational Attainment Category	1995		2000		2005		2010	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
None	10.4	32.7	10.3	34.9	9.6	32.1	6.6	24.2
Primary	14.7	26.7	18.2	30.4	16.8	29.9	15.7	30.4
Secondary	39.8	27.0	40.8	26.8	42.7	29.1	42.7	33.3
Matric	17.1	4.4	15.2	4.0	18.2	5.7	18.0	6.7
Matric + Certificate/diploma	6.9	2.6	6.4	1.7	7.3	2.1	8.8	3.1
Degree	4.9	0.9	6.7	1.0	5.1	0.9	7.5	1.6
Total	100	100	100	100	100	100	100	100

Source: Researcher's own calculations using IES 1995, 2000, 2005 and 2010

**Table A. 4: Trend in educational attainment by race in percentages in South Africa**

Household Heads	1995				2000				2005				2010			
Educational Attainment Category	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
None	29.1	13.6	2.8	0.3	25.3	11.0	3.3	0.0	22.5	8.4	5.9	0.4	16.1	6.1	1.8	0.1
Primary	24.1	25.9	8.2	0.9	26.8	23.6	10.2	1.0	25.5	21.7	10.3	0.1	24.8	16.1	7.4	0.5
Secondary	31.8	48.5	48.0	28.2	34.5	46.3	45.3	24.7	36.8	51.5	41.5	24.6	39.5	51.4	36.8	24.3
Matric	6.2	6.7	24.2	36.7	7.4	9.7	24.1	30.6	10.1	12.3	24.1	35.7	11.2	15.4	30.1	28.6
Matric + Certificate/diploma	3.2	2.7	6.9	14.5	2.7	4.2	10.1	16.0	3.4	4.1	9.0	20.4	4.9	7.0	8.9	20.3
Degree	1.1	1.0	7.4	13.5	1.6	2.3	5.7	25.7	1.6	1.8	8.7	18.4	2.8	3.1	14.2	25.8
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: Researcher's own calculations using IES 1995, 2000, 2005 and 2010

**Table A. 5: Trend in educational attainment in South Africa by gender in percentages**

Household Heads	1995		2000		2005		2010	
Educational Attainment Category	Male	Female	Male	Female	Male	Female	Male	Female
No Schooling	20.1	30.4	16.3	27.6	13.6	25.5	9.3	18.7
Incomplete Primary	19.8	23.3	21.6	26.2	20.5	24.4	18.7	24.8
Incomplete Secondary	33.5	32.5	36.2	32.8	37.9	36.7	39.2	38.8
Matric	12.9	5.4	13.2	6.3	16.4	8.8	16.8	9.5
Matric + Certificate/diploma	5.4	3.1	5.2	3.2	6.4	3.4	8.1	4.7
Degree	3.8	0.8	5.8	2.1	4.6	1.7	7.1	2.7
Total	100	100	100	100	100	100	100	100

Source: Researcher's own calculations using IES 1995, 2000, 2005 and 2010

