DEPARTMENT OF ECONOMICS

UNIVERSITY OF STELLENBOSCH

EDUCATIONAL PERFORMANCE IN MOZAMBIQUE: AN ECONOMIC PERSPECTIVE

by

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DECLARATION

I, the undersigned, hereby declare that the work contained in this thesis is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

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ABSTRACT

The aim of this study was to analyse educational performance in Mozambique by 1) comparing the determinants of education in developing countries with the situation in country, 2) understanding the supply factors that influence enrolments and education attainment, 3) evaluating the efficiency of the current education system, 4) analysing the importance to education of each of the demand determinants and of school quality on education attainment, and 5) contributing information to assist policy makers with decisions regarding education.

Mozambique is one of the poorest countries in the world. More than half of the population lives below the poverty line and the general adult literacy is only 54%. The education system is mainly characterized by weak performance as a whole, high grade repetition, high dropout rates, low survival rates, high pupil-teacher ratios and a low percentage of qualified teachers. In addition to this, there is a great deal of inequality in education achievement by province, place of residence, income group and gender. After this preliminary analysis, chapter II (literature review) highlighted critical inputs and served as a guideline for the following chapters of this study. The dimensions analysed in the followed chapters were: 1) Supply Factors, 2) Demand determinants and 3) School Quality.

Chapter III therefore consisted of a descriptive analysis of the most important supply conditions in education in Mozambique based on reports of the Ministry of Education and other important documentation. The results found in this analysis were that supply constraints, such as low availability of schools in rural areas and some provinces, low qualification of teachers, costs of education and poor education funding, play an important role in education achievement in Mozambique.

Further analysis on demand determinants of education was conducted in Chapter IV, using the household survey 2002/03. It was found that individual characteristics, such as age and gender, are important in explaining variations in education achievement. Boys

are more likely to perform better than girls. It was also found that household characteristics (such as: parents' education, headship and income) are important for school achievement. A female headed household has a positive impact on the education of boys and girls. Children in high income households are more like to perform well at school. The other important demand factors that affect education achievement are the place of residence and province. Pupils in Maputo City or other urban areas have more probability of school success.

After analysis of the important demand and supply factors that affect education, Chapter V identified the influence of school quality on education attainment. Empirical work on SACMEQ 2000 was used to achieve the above mentioned goal. The findings indicated that pupils' achievement is mainly driven by differences between schools. It was also found that the teaching activities, such as homework, are positive factors for pupils' achievement. A higher class size has a small but negative impact on school outcomes. Moreover, the phenomenon of extra tuition is great in Mozambique and should be investigated in future research projects.

In the concluding chapter, the study recommended that the Ministry of Education should continue to improve the enrolment rates and educational attainment of the population, providing quality education and proper incentives for attainment. The Ministry of Education should also continue to improve the qualification of teachers in the system, performing better recruitment and providing the necessary training programs. Quality of schools should also improve in the dimensions of materials inputs (e.g. learning materials, infrastructure, equipment and amenities), school environment and classroom activities. The improvement of school quality will ensure better pupil achievement in the education system. It was also recommended that access to school should be expanded to rural areas, not compromising quality of education. Provision of secondary education in all provinces and rural areas is also important. Gender inequality should also be addressed by the Ministry of Education. For that, further research is necessary on this topic. All these policies will require additional budget allocations, and government should develop a research project on education funding to find out the best alternatives to

finance the activities of the sector. In this project the government should also take into consideration future challenges to education such as HIV/AIDS and the recent abolition of school fees in primary schools. Finally, the study also detected problems concerning availability of data. Therefore, it was also recommended that further and reliable data, on education should be collected, to allow better analysis on educational performance in Mozambique.
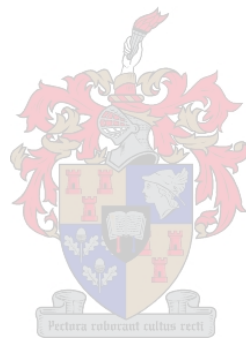
OPSOMMING

Die primêre doel van hierdie studie is om die opvoedkundige vertoning in Mosambiek te ontleed deur 1) die determinante van onderwys in ontwikkelende lande met die situasie in Mosambiek te vergelyk, 2) die verband tussen indiensneming en onderwys te verstaan, 3) die doeltreffendheid van die huidige onderwysstelsel te bereken, 4) die belangrikheid van verskillende vraagfaktore sowel as skoolgehalte vir onderwys te bepaal, en 5) om inligting te bied om beleidmakers met onderwysbesluite te help.

Mosambiek is een van die armste lande ter wêreld. Meer as die helfte van die bevolking leef in armoede en skaars 54% van volwassenes is geletterd. Die onderwysstelsel word hoofsaaklik gekenmerk aan swak prestasie in geheel, met groot getalle herhalers, hoë uitvalkoerse, lae retensievlakke, hoë onderwyser-leerling-verhoudings en min gekwalifiseerde onderwysers. Daar is verder groot ongelykheid in onderwysprestasie volgens provinsie, woonplek, inkomstegroep en geslag. Na hierdie inleidende analise, belig hoofstuk II (literatuuroorsig) kritiese insette in onderwys en dien as rigtingwyser vir die volgende hoofstukke. Daaropvolgende hoofstukke bespreek 1) Aanbodfaktore, 2) Vraagfaktore en 3) Skoolgehalte.
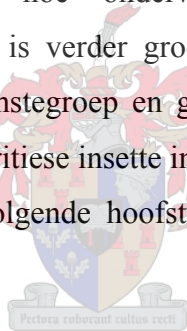
Hoofstuk III bied 'n beskrywende analise van die belangrikste aanbodfaktore in Mosambiek se onderwys, gebaseer op verslae, dokumente en inligting van die Ministerie van Onderwys. Die gevolgtrekkings daaruit is dat aanbodbeperkings, soos beperkte beskikbaarheid van skole in landelike gebiede en sekere provinsies, swak gekwalifiseerde onderwysers, onderwyskostes en swak befondsing van onderwys 'n belangrike rol in swak onderwysprestasie in Mosambiek speel.

Verdere analise van vraagdeterminante in onderwys word in Hoofstuk IV gedoen, deur van die 2002/03 huishoudingsopname gebruik te maak. Hieruit is bevind dat individuele eienskappe, soos ouderdom en geslag, belangrik is om verskille in onderwysvlakke en skooldeelname te verklaar. Seuns vorder gewoonlik verder as dogters. Huishoudingseien-skappe soos ouers se opvoeding, wie die gesinshoof is, en inkomste is belangrik vir

onderwysprestasie. Vrouens as hoof van huishoudings het 'n positiewe impak op beide seuns en dogters se opvoeding. Kinders uit huishoudings met hoër inkomste staan 'n beter kans om op skool te presteer. Ander belangrike vraagfaktore wat kinders se onderwys beïnvloed is woonplek (landelik of stedelik) en provinsie. Skoliere in Maputo(stad) of ander stedelike gebiede staan 'n groter kans op sukses op skool.

Na ontleding van die vraag- en aanbodfaktore wat onderwys beïnvloed, ondersoek Hoofstuk V die invloed van skoolgehalte op prestasie van leerlinge op skool. Empiriese werk op die SACMEQ 2000 data is hiervoor gebruikk. Daar is bevind dat verskille in leerlinge se prestasie hoofsaaklik deur verskille tussen skole verklaar word. Verder is ook bevind dat onderwysersgedrag, bv. huiswerk, positiewe gevolge vir leerlinge se vordering kan inhou. Groter klasse het 'n klein negatiewe impak op skoolresultate. Daarbenewens is betaling van bykomende skoolfooie algemeen in Mosambiek; dis iets wat verder nagevors moet word.

In die slothoofstuk word die Ministerie van Onderwys aanbeveel om vol te hou om inskrywingsyfers en vlakke van onderwys van die bevolking te verbeter, deur gehalte onderwys en goeie insentiewe vir vordering. Die Ministerie van Onderwys moet ook onderwyserskwalifikasies, werwing en onderwyseropleidingsprogramme verder verbeter. Skoolgehalte moet ook verbeter word in terme van materiële insette (leermateriaal, infrastruktuur, toerusting en geriewe), die skoolomgewing en klaskameraktiwiteite. Beter skoolgehalte sal beter leerlingprestasie bevorder. Daar word ook voorgestel dat toegang tot skole in landelike gebiede verbeter moet word. Geslagsongelykheid moet ook deur die Minsterie aangespreek word. Daarvoor is verdere navorsing nodig. Al hierdie beleidsintervensies sal geld verg, en die regering moet onderwysfinansiering ondersoek om onderwysaktiwiteite te finansier. Hierdie ondersoek moet ook toekomstige uitdagings vir die onderwys, soos HIV/VIGS en die onlangse afskaffing van skoolfooie op laerskole, in ag neem. Daarom word ook aanbeveel dat meer betroubare data oor onderwys ingesamel word, om 'n beter analise van die vertoning van Mosambiek se onderwysstelsel moontlik te maak.

As long as I have a want, I have a reason for living.

Satisfaction is death.
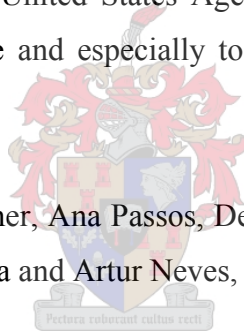
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(George Bernard Shaw)

ACKNOWLEDGEMENTS

The whole worth of a kind deed lies in the love that inspires it.

(The Talmud)

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List of Abbreviations

AIDS	Acquired Immuno-deficiency Syndrome
CFPP's	Training Centres for Primary Teachers - *Centros de Formação de Professores Primários*
DDE	District Department of Education – *Direcção Distrital de Educação*
DPE	Provincial Department of Education – *Direcção Provincial de Educação*
EP1	First Level of Primary School
EP2	Second Level of Primary School
ESG1	First Level of Secondary School
ESG2	Second Level of Secondary School
GER	Primary Gross Enrolment Rate
HIV	Human Immuno-deficiency Virus
IAF	Mozambican Household Survey – *Inquerito aos Agregados Familiares*
IMAP	Primary Teacher Training College - *Instituto de Magistério Primário*
INE	National Institute of Statistics – *Instituto Nacional de Estatistica*
MDG's	Millennium Development Goals
MINED	Ministry of Education – *Ministério da Educação*
NER	Net Enrolment Rate
PARPA	Poverty Reduction Strategy Paper – *Plano de Acção para a Redução da Pobreza Absoluta*
SACMEQ	Southern African Consortium for Monitoring Educational Quality
SES	Socio-economic Status
SMO	Compulsory Military Service – *Serviço Militar Obrigatório*
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
USA	United States of America
USD	United States Dollars

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CHAPTER ONE - INTRODUCTION AND BACKGROUND

1.1. Introduction

Mozambique has continued to register high economic growth in the few past years. In 2005, the Mozambican economy recorded a growth rate of 7.7% compared to 7.2% of the previous year (World Bank, 2006). Despite this, social problems, low levels of education for example, are still a constraint for the country's development. According to the Mozambique Household Survey of 2002/2003, the adult literacy rate (population over 15 years) was 56% and the prevalence of poverty was 54%. The literature in economics of education emphasises a strong relationship between low income and low levels of schooling. Therefore, one of the possible central reasons for low levels of education could be the high levels of poverty within the country or the other way around.

The objective of this thesis is to analyse the educational performance in Mozambique, using the relevant literature and datasets on education. This study is relevant because economics of education is a new subject in Mozambique and few studies have been undertaken on this subject. The most relevant studies that have been carried out to date were: 1) *Human Capital, Household Welfare, and Children's Schooling in Mozambique* (Handa, Simler and Harrower, 2004); and 2) *Mozambique. Poverty and Social Impact Analysis: Primary School Enrolment and Retention – the Impact of School Fees* (World Bank, 2005). According to Handa *et al*. (2004) demand factors such as household characteristics and location (urban/rural) played an important role in education attainment in Mozambique. In a more recent report on poverty and social impact, the World Bank (2005) found that school supply factors, such as infrastructure, teachers, materials, and education quality were also important determinants of school enrolments in the country.

These two arguments about the relevance of supply and demand factors to education have resulted in an interest in investigating this subject in Mozambique. In this context, the author investigates: *educational performance in Mozambique: an economic perspective.*

1.2. Mozambique: Country Overview

Mozambique, a country situated in Southern Africa, is one of the poorest nations in the world - the Gross Domestic Product (GDP) per capita was $ 428,2 in 2005 (World Bank, 2006). The population is mainly rural (64%) and 54% lives below the poverty line. Other social indicators show the low standards of living of the Mozambican population caused by the poverty that plagues Mozambique. The life expectancy was only 41 years; below the 46 years of the Sub-Saharan African countries. The illiteracy rate for the population over 15 years was 60% (World Bank, 2004). The Net Enrolment Rate (NER) for Mozambique was about 76% and it was higher than the average of Sub-Saharan countries of 64% and lower than that of Latin America and the Caribbean countries of 95% (United Nations, 2006: 6). There were also some differences in terms of gender enrolment, where boys were more likely to enrol in- and attain education than girls.

The average growth of Gross Domestic Product (GDP) was low (3.6%) in the period between 1983 and 1993 (World Bank, 2004). The main explanation for this poor performance was the ongoing civil war of more than 14 years, which constituted the main constraint on the economic growth of the country. The war destroyed important national infrastructure, such as hospitals, schools, roads and important links between rural and urban areas. After the Peace Agreement of 1992, the economy started to show good signs of economic growth. The average growth of GDP, for the years 1993 to 2003, was 8.1%. The contribution to GDP was 26% for agriculture, 31% for industry and 43% for services (World Bank, 2004). This demonstrates the dependence of the economy on the primary sector, which is related to the fact that a high percentage of the population lives in rural areas.

Regarding the administration; the country is divided into 11 provinces: Niassa, Cabo Delgado, Nampula, Zambezia, Tete, Manica, Sofala, Inhambane, Gaza, Maputo Province and Maputo City. The population is estimated at 20 million, and the most populated provinces are Nampula (20% of total population) and Zambezia (19%) (Ref. figure 1-1). Maputo City has the greatest population density, with an average of 3223 people per

square kilometre. In terms of gender distribution within the country, 52% of population is female and 48% male.

| □ Niassa | ■ Cabo Delgado | □ Nampula | □ Zambézia | ■ Tete | ■ Manica | ■ Sofala | □ Inhambane | ■ Gaza | ■ Maputo | □ Maputo Cidade |
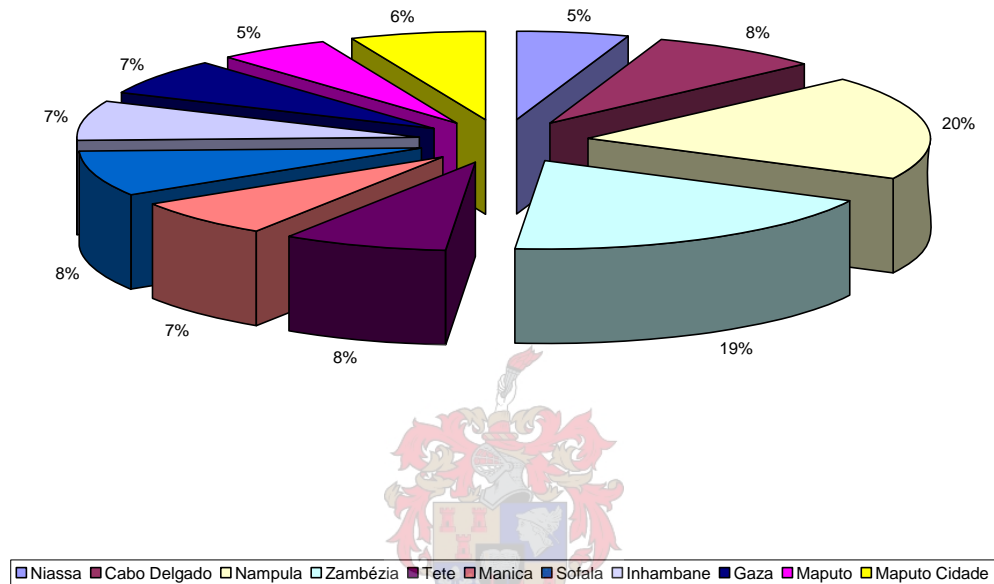
Figure 1-1 – Distribution of the population by provinces
Source: INE (2006)

1.3. The education sector in Mozambique

1.3.1. Background

The decade of the 80s in Mozambique was characterized by political instability and the civil war. As a consequence, a large proportion of the rural population moved to the major urban areas and it had a negative impact on the education system. The stagnation of the education system during 80s and early 90s was mainly explained by negative factors such as infrastructure destruction, social disintegration and the economic crisis.

As consequence of the war, the number of pupils decreased to fewer than 1,2 million (UNDP, 1990: 41).

It is important to mention that the negative effects of the war had not been felt in a uniform way all over the country. The UNDP Report (1990: 41-42) demonstrated that Tete and Zambézia were the provinces which had seen most part of their education infrastructure destroyed or closed. In addition to the political crisis, the development of the education system was in this period also influenced by the implementation of the Structural Readjustment Program (PRE) from 1987. It resulted in a deep deterioration of the conditions of the education system because the program (PRE) did not give priority to education in its budget.

1.3.2. The Education System

The education system in Mozambique consists of four levels: seven years of primary education (*ensino primario 1º grau e 2º grau*) – Grade 1 to Grade 7, three years of secondary education of first level (*ensino secundário geral 1º grau*) – Grade 8 to Grade 10, two years of secondary education of second level (*ensino secundário geral 2º grau*) – Grade 11 and Grade 12 and four years of higher education. In addition, there is a level of pre-schooling for children younger than six years (*pré-primaria)*. The education department of Mozambique also provides technical and vocational education, training of teachers and education for adults.

The technical education is divided into the following levels: I) technical elementary education; II) technical basic education and III) technical intermediate education. The areas of education, for basic and elementary, are agriculture, industry and commerce. The colleges (technical schools) perform the training of teachers, which consists of the following: I) basic level i.e. training of primary school teachers and II) intermediate level. The adult education in primary school targets people over 15 years old and in secondary school targets people over 18 years. The education system operates in both day and evening shifts.

The national education system comprises of four levels: National education department, Provincial education departments (DPE), District education departments (DDE) and schools and other institutions of education. The definition of national strategies and plans of education, and the national budget are responsibilities of the central boards of the Ministry of Education (MINED). The provincial education departments have the task of distributing resources at a Provincial level. The DPE is also responsible for the administration of investment projects and a small percentage of funds provided by the donors. The district education departments are responsible for the administration and distribution of funds allocated by the provincial department. The district education department is also responsible for the supervision of schools of EP1. The other schools levels (EP2, ESG1 and ESG2) of the education system have budget autonomy. Besides the government funds, these schools collect funds from fees and other revenue defined at that level.

1.3.3. Education Indicators: An overview

The objective of this subsection is a description of the important education indicators in Mozambique such as enrolments, number of schools, number of teachers and their qualifications, the pupil-teacher ratio and the efficiency of the system, based on annual reports of the Ministry of Education. These indicators will be detailed in chapters 3 and 4 of this study.

1.3.3.1. Enrolments and Number of pupils

In general, school enrolments are increasing in the Mozambican education system. The number of children enrolled in Grade 1 doubled in the period between 1992 and 2003. There was a substantial gap between the number of enrolments in Grade 1 and Grade 2. There is evidence that many of the children that enrolled in Grade 1 leave school without completing Grade 1 (according to the graph). The figure 1-2 shows the through flow from Grade one to ten, in the period 1992-2003:
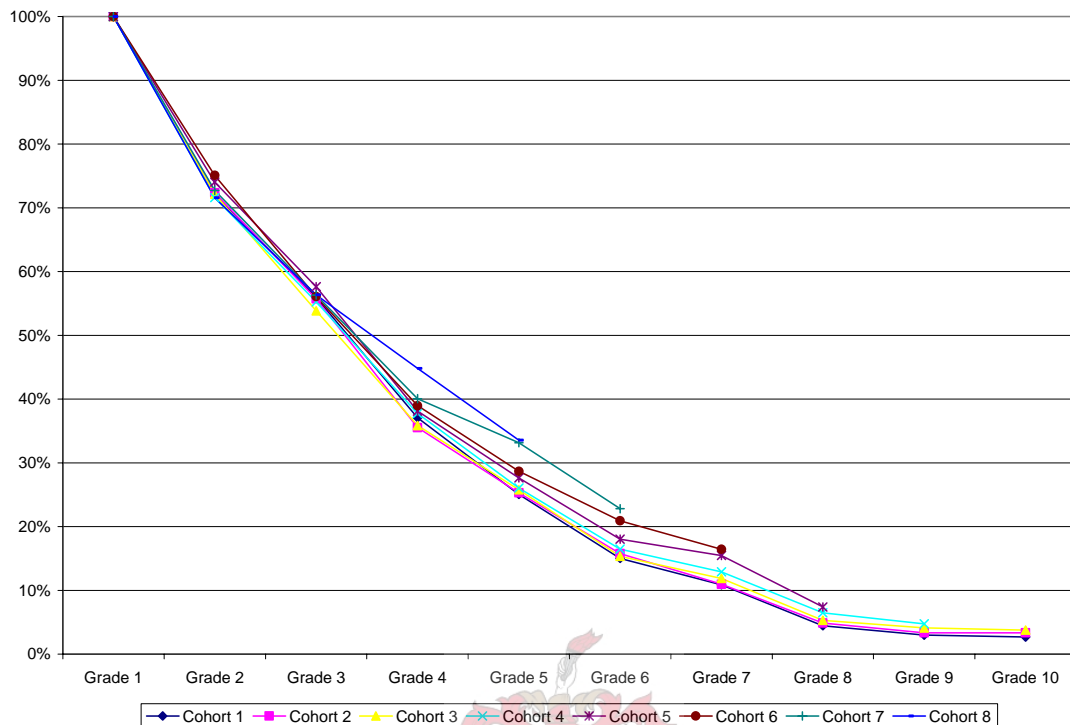
Figure 1-2 – Through Flow, grades 1-10 from 1992 to 2003

Source: Ministry of Education

Of the pupils in Cohort 1 (enrolled in Grade 1 in 1992), only 3% survived to Grade 10 in 2003. High dropout and repetition rates might be the causes for this poor achievement. Cohorts 2 and 3 presented similar patterns with a small improvement in terms of Grade enrolments. The other cohorts follow the same trend line.

3 320 721 pupils were enrolled in 2003 compared to 1 307 954 in 1992 (ref. Table 1-1). In other words, the number of pupils more than doubled in the national education system in 11 years. If one analyses the evolution of numbers of pupils by levels of education, i.e. primary and secondary, one can conclude that the number of pupils at the secondary level of education in 2003 represent only 4% of the total number of pupils in the system. Furthermore, analysis is important if this rapid growth of demand for education was followed by an increase in supply conditions of education, such as schools, teachers and quality of education. This is dealt with in the following subsections.

Table 1-1 – Evolution of number of pupils from 1992 to 2003

YEAR	Primary	Secondary	Total
1992	1 280 856	27 098	1 307 954
1993	1 333 377	30 029	1 363 406
1994	1 413 090	30 406	1 443 496
1995	1 539 405	34 464	1 573 869
1996	1 714 278	39 816	1 754 094
1997	1 897 965	45 211	1 943 176
1998	2 053 689	53 693	2 107 382
1999	2 261 132	64 194	2 325 326
2000	2 497 385	79 069	2 576 454
2001	2 770 258	95 707	2 865 965
2002	2 947 269	115 935	3 063 204
2003	3 177 937	142 784	3 320 721

Source: Ministry of Education
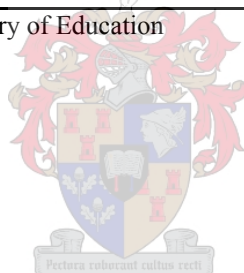
1.3.3.2. Schools

The literature on economics of education suggests that one of the causes of low literacy within a country is the shortage of schools. Thus, table 1-2 below presents some information on the availability of schools in Mozambique (in 2003):

Table 1-2 – Evolution of number of schools by location and ownership

| | Rural | | | Urban | | | Total | | |
Year	Private	Public	Sub-Total	Private	Public	Sub-Total	Private	Public	Total
1992	0	2484	**2484**	4	391	**395**	4	2875	**2879**
1993	12	3579	**3591**	156	1052	**1208**	168	4631	**4799**
1994	23	3350	**3373**	181	587	**768**	204	3937	**4141**
1995	43	3821	**3864**	187	590	**777**	230	4411	**4641**
1996	116	4707	**4823**	225	662	**887**	341	5369	**5710**
1997	116	5100	**5216**	272	676	**948**	388	5776	**6164**
1998	137	5563	**5700**	227	688	**915**	364	6251	**6615**
1999	100	6448	**6548**	312	801	**1113**	412	7249	**7661**
2000	199	6926	**7125**	339	851	**1190**	538	7777	**8315**
2001	205	7329	**7534**	343	977	**1320**	548	8306	**8854**
2002	243	8169	**8412**	387	1043	**1430**	630	9212	**9842**
2003	259	8422	**8681**	390	1082	**1472**	649	9504	**10153**

Source: Ministry of Education (2003)

The above table shows that the proportion of schools in rural areas (approx. 86%) is greater than the proportion in urban areas (14%) in Mozambique. This figure can be explained by the fact that the major proportion of the Mozambican population lives in rural areas (64%) and the major percentage of schools are EP1 (89%). In 1992 the number of schools in rural areas was 2 484 and in 2003 increased to 8 681 schools. In urban areas the number of schools tripled from 1992 to 2003. In 2003, public schools comprised 94% of the total schools, which shows that the larger part of the education system is currently run by the government. In summary, the availability of schools in rural and urban areas is increasing in the country.

1.3.3.3. Teachers

An important part of the supply-side of education relates to the number of qualified teachers and their qualifications. Table 1-3 illustrates the percentage of qualified teachers by location (in 2003):

Table 1-3 – Teachers by qualification and place of residence

Type of Training	Rural		Urban	
		%		%
Without qualification	19498	47%	4638	25%
Basic training	19203	47%	9192	50%
Intermediate level	1261	3%	1854	10%
Higher education	467	1%	1975	11%
Other	855	2%	808	4%
Total	**41284**	**100%**	**18467**	**100%**

Source: Author's calculation from Ministry of Education (2003)

From table 1-3 it is evident that the Mozambican education system lacks qualified teachers. In rural areas, 47% of the teachers had no formal qualification, 47% had basic training, and only 1% had higher education. In urban areas, 25% of teachers had no formal qualification, 50% had basic education, and only 11% had higher education. Thus, the concentration of qualified teachers was in the urban areas and many factors contributed to this tendency. One is the fact that in urban areas there are more opportunities, i.e. higher salaries, and there is also a possibility of complementary employment (part-time jobs).

It is important also to analyse the gender dimension of teachers in the system. Figure 1-3 shows that in rural areas, 81% of teachers were male and 19% were female. The figures were more equal in urban areas, where 57% of teachers were male and 43% were female. The gender of the teachers is described here because it has been an important explanatory variable in the recent literature about school outcomes.
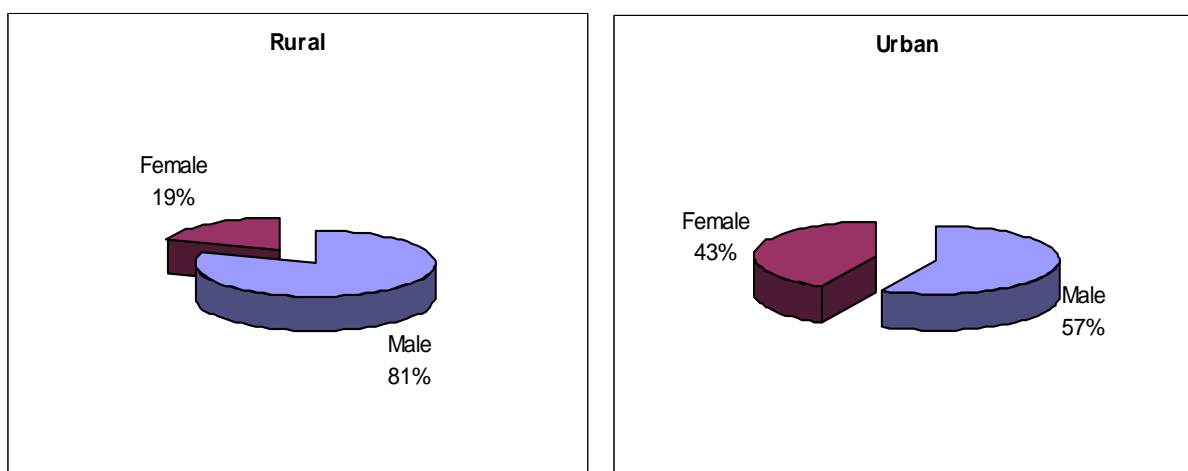
Figure 1-3 – Qualified teachers by place of residence and gender

Source: Ministry of Education (2003)

1.3.3.4. Pupil-Teachers Ratio

Table 1-4 indicates the evolution of the pupil-teacher ratio in Mozambique:

Table 1-4 – Pupil-Teacher Ratios in Primary and Secondary Education in Mozambique

YEAR	Primary Education			Secondary Education			Total		
	Teachers	Pupil	Ratio	Teachers	Pupil	Ratio	Teachers	Pupil	Ratio
1992	25760	1280856	**50**	1558	27098	**17**	27318	1307954	**48**
1993	26474	1333377	**50**	1665	30029	**18**	28139	1363406	**48**
1994	26821	1413090	**53**	1572	30406	**19**	28393	1443496	**51**
1995	28825	1539405	**53**	1857	34464	**19**	30682	1573869	**51**
1996	31213	1714278	**55**	1963	39816	**20**	33176	1754094	**53**
1997	34674	1897965	**55**	1308	45211	**35**	35982	1943176	**54**
1998	37138	2053689	**55**	1742	53693	**31**	38880	2107382	**54**
1999	40353	2261132	**56**	2150	64194	**30**	42503	2325326	**55**
2000	42833	2497385	**58**	2650	79069	**30**	45483	2576454	**57**
2001	46214	2770258	**60**	2779	95707	**34**	48993	2865965	**58**
2002	48271	2947269	**61**	3014	115935	**38**	51285	3063204	**60**
2003	53989	3177937	**59**	3014	142784	**47**	57003	3320721	**58**

Source: Ministry of Education (2003)

Starting with primary education, the country pupil-teacher ratio in 1992 was 50 pupils per teacher. A high ratio if one wants to produce quality results. In 2002, the pupil-ratio increased to 61 pupils per teacher. This can be explained by the increasing enrolment number/rates in the past years without similar growth in the number of teachers. The other factor was the low number of classrooms available in each school, which meant many children in each classroom. However, in secondary education, the ratio was low from 1992 to 1996. From 1997 to 2003, the ratio increased substantially. In 2003, the ratio was 47 pupils for one teacher. One can conclude that there was no adequate response, in terms of human resources, for the rapid increase in enrolment rates. The small effect of pupil teacher ratio reduction on school outcomes was demonstrated in some cross countries studies (Kariuki & Guantai, 2005: 20). However, this variable should be investigated further in the case of Mozambique.

1.3.3.5. Efficiency of Education System

Some of the indicators of the efficiency of the national education system are presented in figure 1-4:
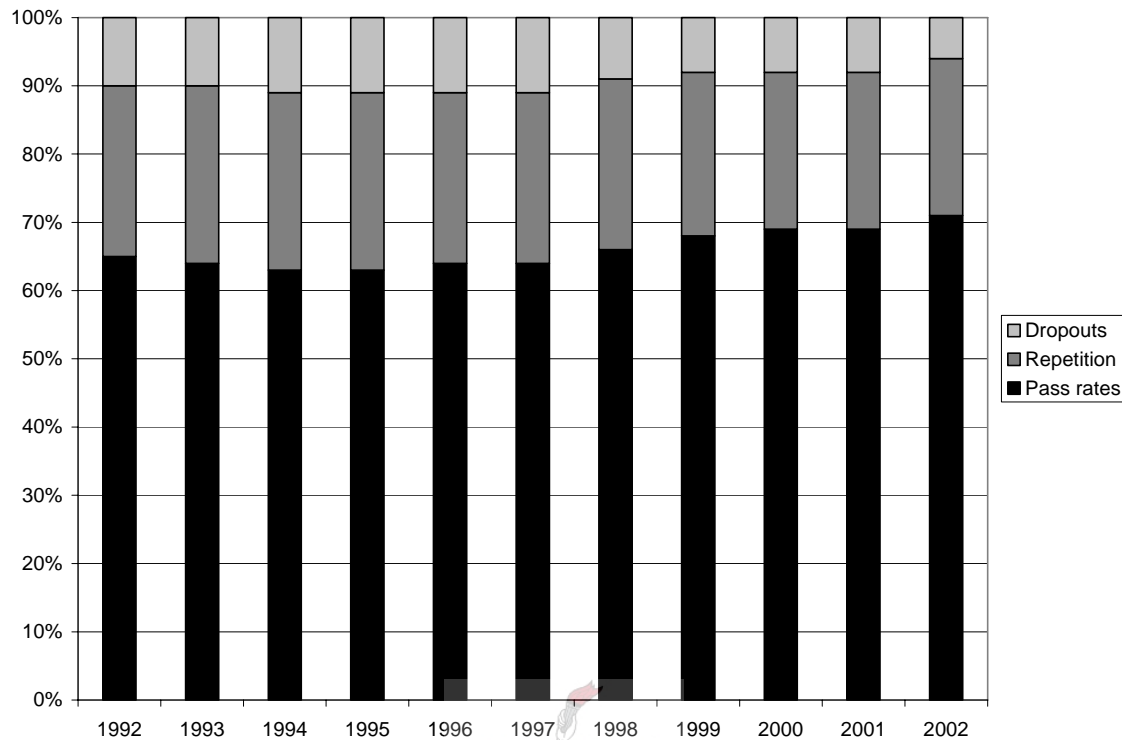
Figure 1-4 - Indicators of Efficiency of the Mozambican Education System
Source: Ministry of Education (2003)

In the period between 1992 and 2002, the pass rates varied between 62% and 71%. This therefore shows that the education authorities need to be challenged to improve the pass rates in the education system. It is necessary to study the factors that lead to low achievement in Mozambican schools in detail. The high levels of dropouts are also a concern for the efficiency of the system. From 1992 to 1995 the dropout rate was between 10% and 16%, but in the past years it had decreased to between 7% and 9%.

It is evident that there is an increase in the number of dropouts in the education system. The report of the Ministry of Education did not specify the factors that contributed to this dropout rate. In addition, the database of the Ministry of Education did not lend itself to analysing efficiency in more detail by grade, region, gender and other variables, and this makes the analysis of the present data difficult. However, from the figures presented in Figure 1-4, one can conclude that the low pass rates and high drop-outs are still a cause of great concern in the national education system.

Give this description of the Mozambican education system, the next subsection turns to the objectives of this study.

1.4. Objectives of the research

The following objectives were set for this research:

1.4.1. Main Objective

The main objective is to analyse the educational performance in Mozambique. To achieve this objective, the following specific objectives were formulated:

1.4.2. Specific Objectives

Objective 1: Compare the determinants of education in developing countries, as contained in the literature review, with the situation in Mozambique

Objective 2: Understand the supply factors that influence enrolments and education attainment in Mozambique

Objective 3: Evaluate the efficiency of the current education system in Mozambique

Objective 4: Analyse the importance of each of the demand determinants to education in Mozambique

Objective 5: Analyse the implication of school quality on education attainment in Mozambique

Objective 6: Contribute information to assist policy makers with decisions regarding education in Mozambique.

1.5. Background and Problem Identification

The problem posed by the author follows one from his previous study; *The effect of household income on education attainment in Mozambique: household survey evidence* (Bilale, 2005). The education system in Mozambique experiences many problems, as was mentioned in section 1.2, such as low enrolments, high levels of dropouts, low pass rates, inequality of schools' distribution (location and provinces), shortage of teachers, low qualification of teachers and a high pupil-teacher ratios.

Following empirical research completed by the author during a previous study, he concluded that household income, gender of the children and headship of the household were important variables in explaining the demand for education in Mozambique. However, these variables do not explain all variations in terms of education attainment. For that reason, the author concluded his first study by suggesting that an investigation into supply factors of education be carried out, with the objective of finding more and better explanations for the low levels of education attainment in Mozambique (Bilale, 2005: 38).

In addition to this, important conclusions about demand determinants and supply factors that affect school enrolments and attainment were derived from the literature review. On the one hand, household wealth, pupil characteristics (gender and age), location (rural or urban), headship of household, household size and parents' education level, were revealed to be the most important demand determinants of school enrolment and education. On the other hand, supply factors such as the quality of education were key factors to increase school enrolment and attainment. School conditions - class size, materials, teaching quality and the building conditions - constituted an important incentive or disincentive to school attainment. However, the physical presence/absence of schools was not the main constraint for the expansion of education enrolment and attainment. Empirical research demonstrated a weak relationship between the presence of schools and enrolments.

1.6. Conceptual Framework

Based on the background and problem identification, the author elaborated the conceptual framework that will guide this study. For the sake of simplicity and clarity, this framework is now presented in the following diagram:
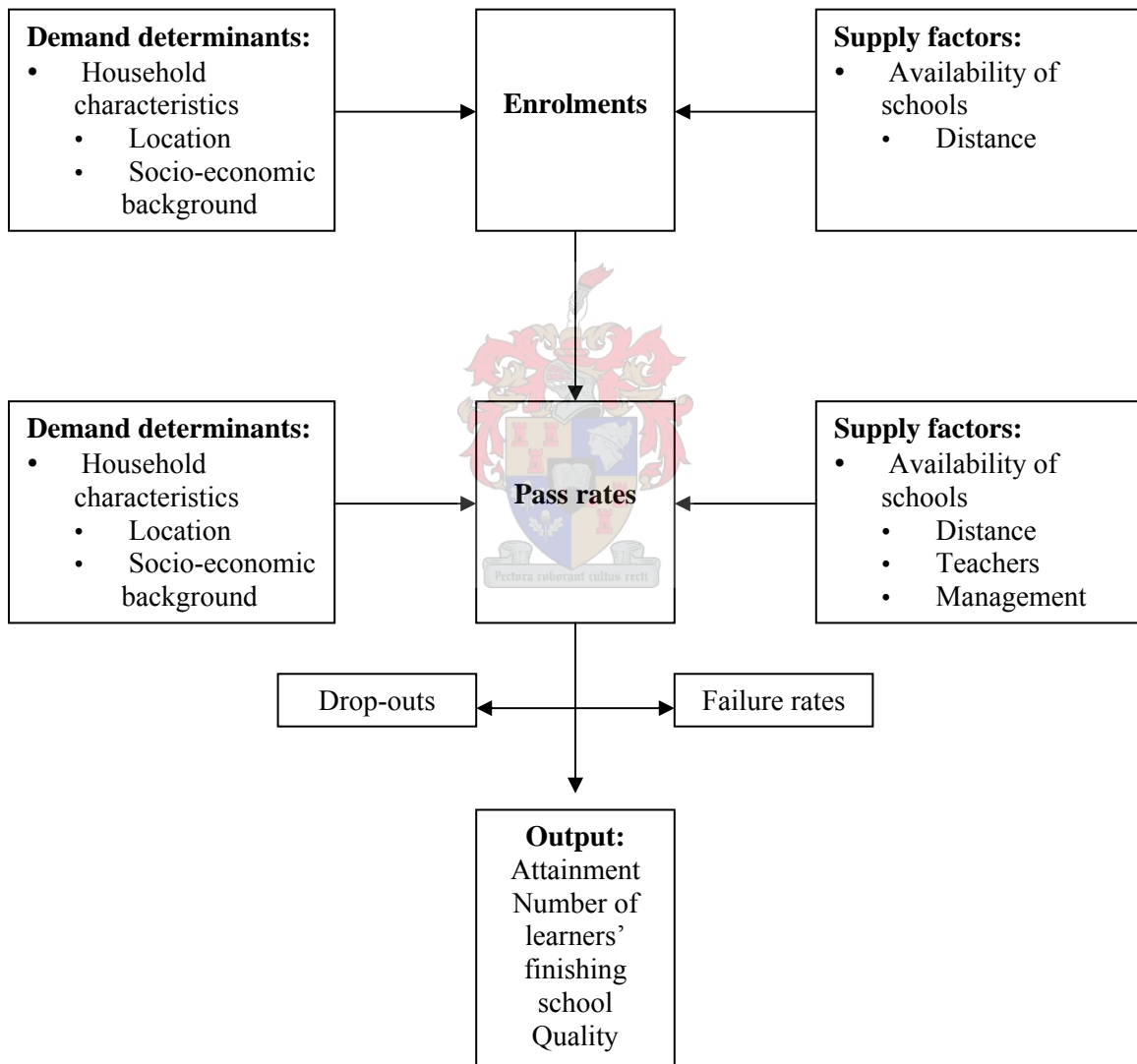
Figure 1-5 – Conceptual framework of the research

In broad terms, the two main important sets of explanatory variables in the research can be classified as the demand determinants and supply factors. The dependent variables include enrolments, attainment and output.

1.7. Description of terms

For better clarification of the scope and the meaning of the important concepts of the study, definitions of the following terms are supplied:

- **Enrolments -** For the purpose of this study, enrolment includes the decision to enrol in a given grade.
- **Attainment** - should be understood as the highest level of education completed or highest grade completed by the pupil.
- **Demand determinants** - Demand determinants in education are the conditions that influence individuals' decision to enrol and attain certain level of education. The main determinants include individual (age, sex) and household characteristics (income, gender of head); location (provinces, urban and rural) and socio-economic background.
- **Supply Factors -** These refer to conditions provided for pupils by the education system. Number of schools, number of teachers, qualification of teachers, distribution of schools around the country, constitute some examples of supply conditions.
- **Dropouts** - When an individual drops out of school. This study will only focus on dropouts from grade 1 to grade 12 (last year of school in Mozambique).
- **Failure -** When a pupil fails to satisfy the criteria for a certain grade.
- **Output -** Output in education means the positive outcome for schooling. The proxies of the output will be the number of pupils finishing certain levels of education, the highest grade completed by a pupil and the quality of education.

1.8. Methodology

The methodology of this study is determined with the aim of achieving the objectives defined in section 1.4. For Chapters 1 to 2 the author will use the following methods: I) compile a literature review and II) develop a historical narrative and conceptual analysis. Chapter 3 will consist of a descriptive analysis of the most important supply conditions in education in Mozambique. Data from reports of Ministry of Education will be used in this chapter. In Chapter 4, an empirical analysis will be used. The author will use econometric techniques to build models for the analysis. The dataset will be a Mozambican household survey of 2002/03 (IAF – *Inquerito aos Agregados Familiares* 2002/03), obtained from the National Institute of Statistics (INE).

The data is the second household survey in Mozambique, which contains indicators about households, income and consumption, and socio-economic and demographic characteristics of the Mozambican population. The great advantage of the IAF 2002/3 survey compared with the household survey of 1997/98 is the availability of education data, contained in the latter. Chapter 5 will use a descriptive and empirical work based on results of the SACMEQ (Southern and Eastern Africa Consortium for Monitoring Educational Quality). The details of the methodology of chapter 4 and 5 will be presented in the respective chapters. The methodology can be summarized as following:

Table 1-5 – Methodology of the research

Objective	Data	Method	Expected outcomes
Objective 1: Compare the determinants of education in developing countries, as contained in the literature review, with the situation in Mozambique	Literature review and reports of Ministry of Education	Literature review	Identification of important variables of analysis
Objective 2: Understand the supply factors that influence enrolments and education attainment in Mozambique	Reports of Ministry of Education and Household Survey Data	Descriptive report and interviews with specialists	Description of the important supply conditions and factors that are relevant to this study
Objective 3: Evaluate the efficiency of the current education system in Mozambique	Reports of Ministry of Education and Household Survey Data	Descriptive report	Indicators of education efficiency in Mozambique
Objective 4: Analyse the importance of each of the demand determinants to education in Mozambique	Household Survey Data 2002/03	Empirical research	Identification of the demand determinants and their relevance for education attainment in Mozambique
Objective 5: Analyse the implication of school quality on education attainment in Mozambique	SACMEQ 2000	Descriptive and empirical work	Indicators of school quality Importance of school quality for educational attainment
Objective 6: Contribute information to assist policy makers with decisions regarding education in Mozambique.	Literature Review	Report	Relevant information for decision makers

1.9. Structure of the Thesis

The structure of this study is as follows:

Chapter 1: Introduction and Background. This chapter contains a brief introduction to the topic, the statement of the problem, and a description of the history of the education system in Mozambique. This chapter also includes the research objectives, conceptual framework and structure of the report.

Chapter 2: Literature Review: Educational Production Function and Theoretical Background on Determinants of Schooling. This chapter includes a comprehensive review of the literature on factors influencing education attainment in developing countries.

Chapter 3: Supply Factors. This chapter describes education indicators in Mozambique, such as the number of schools, number of teachers and their qualifications, and the pupil-teacher ratio. This chapter will also give other important supply indicators.

Chapter 4: Demand Determinants. This chapter deals with the demand determinants of education. An empirical approach will be used here. The chapter will be divided into the following sections: 1) introduction, 2) methodology and data, 3) results and 4) conclusion.

Chapter 5: Analysis of School Quality. School quality will be analysed in this chapter. In addition to descriptive work, empirical research will be used. The chapter will be divided into the following sections: 1) introduction, 2) methodology and data, 3) results and 4) conclusion.

Chapter 6: Conclusion and Recommendations. This chapter summarises all investigations and gives the author's conclusions. Finally, the author will make recommendations for improvements in the Mozambican education system.

CHAPTER TWO - LITERATURE REVIEW: EDUCATIONAL PRODUCTION FUNCTION AND THEORETICAL BACKGROUND ON DETERMINANTS OF SCHOOLING
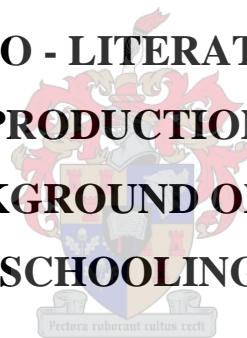
2.1. Introduction

The actual world economic context is dominated by large differences in income between countries, 15% of population in the world has 75% of world income and 85% of population in the world has 25% of world income (Easterly & Levine, 2002: 48). These differences increased interest in the subject of economic growth. Therefore, researchers attempted to explain income differences applying models of economic growth and variables such as education, institutions, geography and social factors. Researchers found a significant relationship between education and economic growth, derived by the fact that education had a role in productivity (Hicks; 1987, Blaug; 1970, Barro & Lee; 1993).

As a consequence of these findings, the interest in studying economics of education has increased in the last three decades. The economics of education uses techniques of economic analysis to study the education sector. There are various dimensions of economics of education analysis, namely: finance of education, efficiency in education, education and the labour market, education and economic growth and education policies. In this chapter, aspects of efficiency in education and education policies will be touched upon. The efficiency of using the educational production process approach in education will be considered.
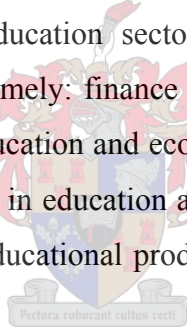
In addition, the relative importance of supply and demand conditions to school enrolment and educational attainment will be discussed using theories of economics of education and evidence from other studies. This description is important because education policies are concerned with the way policymakers should make decisions about the sector. These decisions can build more schools, provide more teachers, improve the system, provide incentives for teachers and management, or provide incentives for pupils to enrol and attain in the system. One can divide these policies into two major components: 1) policies to expand and improve schools by providing more resources and other conditions in the school (supply); 2) policies to influence pupils' decision to enrol and attain certain levels of education (demand). For better decisions on education policies, policymakers should know the relative importance of demand and supply factors to education.

This chapter is structured as follows. Section 2.2 deals with the application of the concept of the production function to the education process. Sections 2.3 and 2.4 describe the factors that influence demand and supply of education. In section 2.5, there is a summary and the main conclusions of the chapter.

2.2. Educational Production Functions

In standard theories of economics, production functions are defined as the maximum output that can be obtained by using a combination of inputs. These have been applied to many industries. Researchers also applied this approach to education and production functions are an important tool for analysing the efficiency of the education process. Educational production functions can be understood as the relationship between quantity and quality of inputs used in educational process and the output of the process (Hanushek, 1987: 35). However, the production function of education has some particular characteristics:

Firstly, the production function is not widely known to policymakers. Secondly, it is difficult to measure outcomes in education. Education outputs are both quantitative and qualitative. On the one hand, the quantitative part of education is related to output in terms of number of learners who finish a given level of education. On the other hand, the qualitative part is related to the provision of good quality education, pupil attitudes, attendance and college continuation and dropout numbers (Hanushek, 1987: 36). The combination of these facts can explain the complexity of the educational production process. Figure 2-1 illustrates this process:
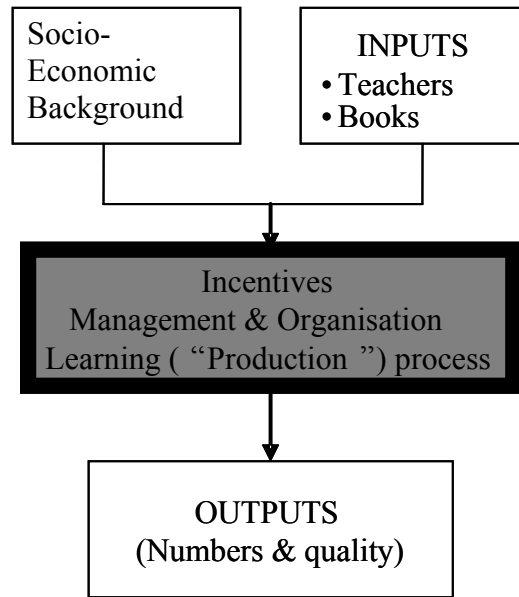
Figure 2-1 – Educational Production Process

Source: Van der Berg (2005: 7)

Each component of the Educational Production Function will be discussed in the following subsections.

2.2.1. Inputs

One can consider as inputs the infrastructure, materials, time spent by teachers and other staff and also the time spent by the pupil. Cohn and Geske (1990) divide inputs into two categories: school inputs and non-school inputs. School inputs include human and physical resources. On the one hand, the physical inputs are constituted by equipment and materials to support the learning process; on the other hand human resources are constituted by quantity and quality of the teachers, managers and personnel. Cohn and Geske think that policymakers should concentrate on teachers due to the fact that a great part of the budget is spent on this human input. It is important to mention that aspects like qualification and teaching vocation should be considered as inputs to the process.

Teacher inputs are difficult to quantify and as a result it is difficult to measure their impact on outcomes of education. Researchers in the field of economics of education try to solve this using average teacher salary and experience as proxy of teacher input. These variables are not complete because there are factors that determine the productivity of the teacher other than salaries and experience (Cohn and Geske, 1990). An empirical study using data from Chicago public high school pupils and their teachers found that teachers play an important role in pupil achievement. In this study, Aaronson and Barrow (2003: 18) tried to determine what one can consider as a good teacher, i.e., how to measure the quality of teachers and they found that it was a difficult task. The conclusion of the study was that low achievement in Chicago schools is due to the inadequate use of human resources (teachers) and not due to the shortage or quality of teachers.

The non-school inputs are related to the socio-economic background of the pupils, and include factors like parental socio-economic levels, demography variables (race, sex) and community environment. Van der Berg and Burger (2003: 496-522) studied the relationship between education and socio-economic differentials in the Western Cape, a province of South Africa. They used school fees as proxy for socio-economic background, pupil-teacher ratios as proxy for teacher quantity and teacher salary as proxy for teacher quality. These input variables proved to be important to explain differentials in education performance in schools in Western Cape.

Furthermore, differentials in performance are due to race differentials in the province. The findings of this study support the importance of school and non-school inputs in educational achievement. An empirical study of secondary education in East Asia (Nabeshima, 2003: 15) found that past achievements and educational resources available at home are determinants of school performance. The same study also found that the importance of teacher variables depends on the subject. Moreover, they found that resources influence pupil performance in certain schools and do not make a difference in others.

2.2.2. School

The production process in education takes place in schools. Better allocation of resources does not necessarily imply better pupil performance. It is necessary also that the production process, which takes place in school, should be efficient. Improvement in efficiency can be interpreted as increasing outputs without additional resources (Hanushek, 1987). According to Cohn & Geske (1990) the process will be influenced by the "black box" of the school: incentives, management and organisation and the learning process. The "black box" of the process has an importance for the success of production. Therefore the improvements in education should take into consideration factors like planning, organizing and motivating people, and control of the production process. Attention to the process of production will ensure better performance in education.

Hanushek and Luque (2002, 20-21) studied the efficiency and equity in a sample of the schools of the world. They found that school performance is related to inefficient use of resources. Policies such as teacher training and reducing pupil-teacher ratios are not always effective means to improve performance. It is necessary to improve organizational aspects of the schools and also incentives to the participants of the process. There are other studies which found similar results.

One of the main concerns in education is the principal-agent problem. The principal-agent problem occurs when the principal (the contractor party) and the agent (the contracted party) differ in terms of interests, goals and incentives. In the education sector the principal is normally the government, department or school and the agent is the institution responsible to achieve certain objectives. De Villiers (1999: 381-402) studied the principal-agent problem in the South African education system, focusing on inefficiency of the system. The author considered that the South African education system is inefficient, if one considers the low pass rates as criterion. For better analysis, De Villiers (1999: 384) divided the analysis according to population groups. White schools were found to be relatively efficient because 69,7% of pupils who enrolled in the system completed Matric (last year of school in South Africa – Grade 12) in 12 years and

Indian schools achieved a percentage of 61,8% of pupil achievement in normal years of school. On the other hand, traditionally coloured and black schools performed in a very inefficient way, as only 18,8% of coloureds and 8,2% of blacks, finished Matric in the normal 12 years of school. Coloured and blacks schools are characterized by high dropouts and failure rates in earlier years of schooling. The author attributed these problems of inefficiency to the Principal-Agent problem and defended the statement by the following remarks:

1. There is no clear identity of the principal in the education system – If the principal is not clearly identified, there is no way that managers of schools, administrative personnel and teachers can know which goals they should achieve;
2. There is no perfect information – the department of education has not got all the information about the activities developed by headmasters of schools and their personnel, they are also not well informed about headmasters' expectations as agents of the process of educating people at school. Without this information, they cannot delivery adequate policies to improve education performance;
3. There are measurement problems – in education it is difficult to measure quality of education and teachers' inputs. Therefore, it is difficult to remunerate teachers according to performance, as happens in other industries.

To solve the Principal-Agent problem De Villiers (1999: 384) suggested some solutions. Firstly, the recruitment process should be better, trying to find the right qualifications for the right positions. Secondly, the process of decision making in the South African education system should be more decentralized with a better sharing of information between the various departments of education and schools. Parents' associations and communities should also be involved in this process. Thirdly, the education system should collect more, reliable data on pupils, teachers and school characteristics to allow better analysis on education performance. Fourthly, the remuneration scheme should be improved and the right criteria to evaluate teachers' performance should be found. Finally, the education system should provide more in-job training for teachers on a regular basis in order to improve their teaching skills.

In Bishop and Wößmann's (2001: 1-30) study of institutional effects on pupil performance, they conclude that the principal-agent problem occurs in the education production process and as a result agents will use resources inefficiently and compromise the education process. Therefore, the problem of pupil performance is not the allocation of resources but a problem of X-inefficiency (see: Leibenstein, 1966: 392-415).

Policymakers should concentrate on incentives for the groups that participate in the production process and they should improve the activities of supervision and control with the objective of ensuring quality in the education system. Therefore, Bishop and Wößmann (2001: 15-23) suggested that examination should be centralized by the departments of education. In addition, it is also important to encourage competition between schools. These suggestions can improve the performance of the agents (Administration, Teachers) giving incentives to efficiency. The final conclusion of the study is that increased resources should be allocated to improve the institutional aspects of schools and that these improvements will result in the better performance of education.

Boozer and Cacciola (2001: 1-68) had a different approach to the problem of performance in education. They tried to analyze how a pupil is affected by group characteristics, in other words, what is the impact of the class environment on school performance? They found that the attention given by teachers in first years of school is an important factor in performance.

The problems of inefficiency in the production process resulted in investigations aimed at improving organizational aspects and the learning process. A suggestion was made by Kingdon and Teal (2002: 1-25); their study tried to establish the impact of performance related pay for teachers on pupil performance. They found evidence that pupils in private schools perform better than those in public schools. The reason given for this tendency is that teacher's effort is greater when they are paid on a performance basis.

2.2.3. Outputs

Outputs in education are difficult to measure. They can be measured in different ways (Vaizey, 1971): 1) the number of pupils that finished school; 2) what every pupil learned in that period; 3) pupils who pass their examinations in the year; 4) improvements in social aspects of the pupils (the last is difficult to measure). However, one can agree that output in education is a result of the inputs allocated to the production process and the way that these inputs are transformed into outcomes.

Cohn and Geske (1990) divide outcomes of schools into five categories: 1) Basic skills; 2) Vocational skills; 3) Creativity; 4) Attitudes; and 5) Other outputs. A pupil obtains basic skills when he or she knows the essentials of mathematics and language. Vocational skills are job-oriented. The capacity to use education to individual and social benefit is known as creativity. The influence that school has on pupils, in terms of behaviour in society, is known as: attitudes. Finally, among other outputs are that some schools work as welfare stations, providing aid to poor people or child care facilities to working parents.

In summary, the inputs of the education process are constituted by school inputs, and non-school inputs. These inputs have an important influence on the success of the education production process. However, it was also found that the rationalisation of inputs is more important than the former in order to achieve better outcomes. In this sense the production process within schools is an important factor in improving pupil outcomes. Furthermore, it was shown that the outputs of schools are difficult to measure and as a result it is difficult to evaluate the outcomes of educational production processes.

2.3. Empirical evidence on determinants of schooling

Filmer and Printchet (1998: 1-38) investigated how educational attainment differs by household wealth within 35 countries in the world. Using Demographic and Health Surveys (DHS), they divided the households from the poorest (40%) to the richest

quintile (20%), using an Asset Index constructed as a proxy of household wealth. This index included the ownership of certain goods, for example: television, refrigerator, car, and important characteristics of the house, such as rooms, construction, materials of the house and toilet facilities. The weakness of the data, in providing information about the income of the households, forced the creation of the Asset Index. The methodology allowed the researchers to identify different patterns of enrolment and dropouts in various regions of the world:

- Western and Central Africa are dominated by low enrolment and high drop-out;
- In South Asia the education system is characterized by low enrolment and low drop-out;
- In Latin America the scenario is quite different, with high enrolment and early high drop-out;
- East Africa exhibits a pattern of high even enrolment and late dropout;
- East and Central Asia, North Africa and Europe are characterized by high enrolment and very late dropout.

The second important finding is about the fact that in some countries, only the poorest quintile did not complete primary school and in other countries, the poor and middle-income households did not complete school. Filmer and Printchet (1998: 22-25) also found that in a small percentage of countries the rich do not have universal basic educational attainment. The key issue to achieve universal primary educational attainment is raising enrolment of the poorest quintile. In addition, the study derived important conclusions about other factors that influence enrolments other than household wealth.

On the one hand, the quality of education is a key factor to increase school enrolment and educational attainment. In this case, the school conditions class size, materials, teaching quality and the building conditions– constitute an important incentive or disincentive to school attendance and thereby educational attainment. On the other hand, the physical presence/absence of schools is not a major constraint for the expansion of enrolment and

educational attainment. The regressions demonstrate a weak relationship between the presence of schools and enrolments.

2.3.1. Demand factors

There is a vast literature about educational attainment in developing countries. An important cross-section study was done by Abuja and Filmer (1995: 1-27), in which they estimated the educational attainment of 71 developing countries across the world. The study found that all world regions registered progress in terms of improvement of schooling, with the Middle East and North Africa regions registering the most significant progress. By contrast, the South Asian and Sub-Saharan African regions were found to constitute the group of countries that did not do well during the period of analysis. The other important finding was that enrolments in developing countries vary according to gender. Male enrolments are usually higher than female enrolments. Thus, the gender gap is an important issue to be addressed by policymakers.

Al-Samarrai and Peasgood (1998: 395-417) studied the effect of household characteristics on school attainment in Tanzania, using the rural household survey of 1992. The first result was that age is positively correlated with enrolments, in that children enrol late at school. Another interesting result was that some household characteristics, such as activity of the head of the household, affect enrolment. Girls whose head of household was involved in services were more likely to enrol when compared with ones whose parent's farm. This may be explained by the fact that girls can help parents in their farm activities or other domestic activities.

In addition to this, there was a significant impact of religion on enrolments. The evidence demonstrated that Christian individuals were more likely to enrol than traditional religious families. Al-Samarrai and Peasgood (1998: 404-406) did not find a plausible explanation for this phenomenon, because the other religious groups were not significantly represented in the sample. Furthermore, the education level of the household head had a positive impact on enrolment. A special remark should be made on the

different impact of head of household's education on differences in gender enrolments. Parents with basic education did not have a differential impact on the boys' and the girls' enrolments, but parents with primary education influenced boys' enrolments more than girls' enrolments. On top of that, female headed households had more impact on increasing girls' enrolments than boys' enrolments. This study also reported other important household factors that affected school enrolments. Firstly, household size was correlated with school enrolment, in the sense that children from large families were more likely to enrol because there were lower opportunity costs associated with sending one more child to school. Secondly, the birth pattern had more impact on girls than boys' enrolments.

In the case of Guinea-Conakry, Glick and Sahn (2000: 63-87), using a household survey, investigated the gender differences in schooling, using the following outcomes: enrolment, attainment and dropouts. They found that more years of schooling of both fathers and mothers, increases the possibility of girls reaching a higher level of education or grade attainment. Fathers' education has a greater impact on boys schooling but mothers' education does not have a significant impact on boys' schooling. Glick and Sahn (2000: 76) also found that household income is an important variable for girls' schooling but does not have any impact on boys' schooling, which means that low income households are less likely to invest in girls' education.

Girls in poor Guinea households play an important role regarding domestic activities inside the household. Moreover, the girls' education is also related to the structure of the household, where households with children younger than 5 years old, have a strong negative impact on girls' schooling because girls will devote their time to childcare and other family activities. Summing up, parental education, income and structure of the household are important variables in educational attainment in Guinea. They impact differently on boys and girls.

Maitra (2003: 129-153) did research in a rural area of Bangladesh, a poor Asian country with an illiteracy rate of 47%, in order to identify the individual and household

characteristics that have an impact on educational attainment. The enrolment amongst Muslims is greater than among Non-Muslim and this can be explained by the fact that Muslims in the sample have greater income compared with other ethnic groups. Other individual characteristics, such as age, also play an important role in school enrolment in Bangladesh. The probability of school enrolment is directly proportional to the age of the child.

The composition of household is also an important factor of analysis, where boys have lower enrolment if they have siblings in the age group of 6 – 24. For girls, the sibling competition effects are not significant. Following other studies, parental education increases the probability of enrolment and there is no great difference between the contribution of fathers' education and mothers' education, to the enrolment of their children. Other than in some African countries, the household size is not an important variable to explain enrolment and there is not much difference, using the above mentioned explanatory variables, between boys' and girls' enrolment.

Regarding the highest level of attainment, Maitra (2003: 146) found that the probability of girls attending post secondary school is higher than boys, which differs from the results of other studies. This fact is explained by the projects that have been in place in the country, since the 1990s, with the primary objective of improving education levels of poor people and which focus on the education of females. The increase of age of the child has a negative impact on attainment and the fact that the child is Muslim increases the probability of a higher grade attainment.

Holmes (2003: 249-264) examined the determinants of school completion in Pakistan. As in most studies on determinants of school attainment, age, parental education and income of the household were found to have a positive impact on education. In the case of the influence of parental education, fathers' education has a positive impact on boys' education and mothers' education has a positive impact on girls' education. Similar to the results found in Bangladesh (Maitra, 2003: 129-153), being a Muslim increases the probability of successful schooling when compared to children of other religious groups.

The location is also an important variable, where being a girl in a rural area of Pakistan decreases the probability of educational attainment. Boys' education does not statistically differ according to the location.

In Papua New Guinea, Gibson (2005: 1 – 19) studied the barriers to education, and he found that the enrolment depends on the age, the household income, the parental education and the distance from schools. Other variables that are determinants for children's education, although with less weight, were the size of the household, demographic characteristics and headship of the household. Regarding the gender of the child, Gibson (2005: 9) found three differences between the education of boys and girls:

1. Household size and demographic composition influences boys more than girls;
2. Parents' education has a positive impact on the enrolment of both boys and girls, however mothers' education only has a positive impact on the enrolment of girls;
3. Regional characteristics affect boys' enrolments but it does not affect girls' enrolments

Household income also represents an important variable, where increasing the income of the household will lead to an increase of 2.5 percentage points in enrolments (Gibson, 2005: 12).

Tansel (2002: 455-470) investigated the determinants of schooling in Turkey, using individual, household and community characteristics as explanatory variables. Income of the household is a significant variable for schooling and it has more impact on girls' education than on boys' education. Increasing the education of parents will lead to an increase in the probability of children's reaching higher levels of education and this impact is greater for girls when compared to boys. In addition to this, the employment status of the parents is also an important determinant of schooling. If the parents are self employed, this reduces the probability of their children reaching middle and higher education.

This fact can be explained by the opportunity cost of parents sending children to school instead of letting them help in the business, in order to improve the income of the household. Another factor that is important to the education of children in Turkey is the location of the household. Urban households have more opportunities for education than rural households (Tansel, 2002: 466). Children in rural areas have to walk long distances to reach schools and this is especially true for middle and higher levels of education as there are fewer such schools.

Dancer and Rammohan (2004: 1-18) worked on determinants of schooling in Egypt, mainly on gender and location (urban/rural) issues. The results show that the child's gender and location, rural or urban, are important factors that affect their schooling. To be female in rural areas has a negative impact on school attainment, whilst to be male, in both rural and urban areas, has a positive effect on enrolment and attainment. They also found that the school enrolment and attainment among female-headed households are very low in both rural and urban areas. This result is in contrast with other findings by Al-Samarrai and Peasgood (1998: 404-406) in Tanzania, where they found that girls have higher enrolment rates in female headed households. However, they found the same results for other variables. For example, urban residence has a positive impact on school enrolments.

In Kenya, Lloyd et al (1998: 1-46) estimated the effects of primary school quality on educational attainment of girls and boys. Again, they found that girls are less likely to enrol than boys. Moreover, girls who delay enrolment are less likely to obtain high educational qualifications. They found that demand determinants (parents' education) have a greater effect on educational attainment than supply factors (school quality).

Handa (1996: 103-128) also estimated the determinants of teenage schooling in Jamaica by income and gender, and they found that socio-economic background, the availability of a school, the gender of the children and the household income all play a determinant role in school enrolment. Household income has a great effect on the enrolment of the children.

These results suggest the need for similar research in Mozambique.

2.3.2. Supply factors

The present subsection analyses the relative importance of supply factors to educational performance, using evidence from some empirical works in this subject. The dimensions analysed are: 1) relationship between resources and educational performance, and 2) impact of school quality in education attainment.

Wößmann (2001: 1-31) did a study on the relationship between education expenditure and the results of TIMSS (Trends in International Mathematics and Science Studies). He found that differences in education expenditure do not explain differences in education performance. Moreover, resources and school performance are independent of each other. In his regression, considering average middle school tests, he found that resources (financial-, human- and organizational-) only explain 16% of variations in pupil performance.

Sander (1999: 223-231) did a survey on the relationship between endogenous expenditures and pupil achievement in Illinois, USA. Firstly, he found that an increase in expenditure per pupil has a low impact on pupil performance. Secondly, an increase in teacher's salary also has a low impact on pupil achievement. Metzger (2003: 1-18), using data from school districts of Oklahoma, USA, used school and non-school inputs (socio-economic status , district structure and expenditure per pupil) and he also found that an increase in human and monetary resources do not have an impact on school performance. It appears that the relationship between resources and pupil performance remains unexplained in the United States.

One of the responses of the United States government to the apparent inefficiency in the education system was the introduction of school accountability. This policy consisted of tests to evaluate the schools according to pupil performance. In a study conducted by

Hanushek and Raymond (2004: 1-24), it was stated that school accountability reduced the inefficiency, but there are other factors that also affect pupil performance.

Hanushek (1995: 227-246) summarized ninety-six studies on the relationship between educational inputs and pupil outcomes in developing countries. The first finding of the study was that class size did not have a great impact on school performance. Moreover, the effect of teacher's experience was not important for educational outcomes, but the education of the teachers made a positive contribution to improving pupil performance. Other important factors were school facilities (infrastructure) and learning materials, which had a positive and significant impact on schooling outputs.

In a more recent paper, Filmer (2004: 1-25) analysed the relationship between enrolments and school availability in 21 poor countries. The study reports that improvements in the availability of schools will lead to an increase of enrolments, but in a small proportion. Moreover, the author did simulation effects where he increased the availability of schools trying to see the impact of that on enrolment. The conclusion showed that increasing the availability of schools does not have a great impact on enrolments and it does not reduce the education gaps in terms of wealth and gender. His suggestions indicated that other policies, rather than expansion of schools, should be the main concern of government in low-income countries. These policies can include the improvement of quality of education and the creation of other incentives related to the demand-side of education sector.

Wößmann and Gundlach (2001: 401-417) studied the relationship between resources and pupil performance over time (15 to 25 years), in selected East Asian countries. They took the variations in performance and variations in expenditure in education over time into consideration. The findings were that an increase in education expenditure does not have a significant impact on schooling performance. Therefore, Wößmann and Gundlach (2001: 410-411) conclude that schools are not economically efficient in transforming inputs (additional resources) into educational outcomes.

Colclough and Al-Samarrai (2000: 1927-1944) analysed the public expenditure in education, using Sub-Saharan and South Asia countries. The study shows that an increase in school enrolments is direct related to public expenditure on education. However, Colclough and Al-Samarrai (2000: 1939-1940) stated that it is important to achieve quality in an education system rather than quantity. Consequently, concentration on efficiency of resource usage is crucial to achieve better performance.

In the United Kingdom, a different approach was constituted when a study was undertaken on the impact of inputs on pupil performance in private schools. (Grady and Stevens, 2003: 1-35) The author chose private schools for three reasons:

(1) Resource variety in private schools is greater than in public ones;
(2) There is a lower pupil-teacher ratio in private schools compared to public schools; and
(3) There are differences in the organization of resources.

The study shows a negative relationship between pupil-teacher ratio and examination results. In addition, Grady & Stevens found that parents send their children to private schools to take advantage of low pupil-teacher ratio. Once again, there is no strong empirical evidence of the relationship between resources and school performance.

On the other hand, research was done on the relationship between resources and performance in China, where Lai (2004: 1-62) used random assignment of Chinese educational reform. The study shows a positive, and statistically significant, relationship between increase of resources and education outcomes. From this evidence and others reported in the study, one can conclude that school resources matter in the Chinese education system, in the sense that resources are important to improve the quality of schools.

In Uganda, Deininger (2003: 291-305) studied the impact of schooling costs on enrolment by the poor. The following conclusions emerged from his study: The programme that took place in Uganda to eliminate school fees – UPE (Universal Primary Education) led to an increase of primary attainment by the poor and other disadvantaged population groups, such as female children.

The UPE reduced the large gaps of education attainment between the rich and poor households in Uganda (Deininger, 2003: 295). However, the increase of number of pupils in the system had two consequences. First, it increased the costs of secondary and tertiary education because these two levels of education financed the elimination of school fees in primary education. Second, it increased the pupil teacher ratio. The increase in enrolments was not followed by a growth in the number of qualified teachers. This phenomenon led to quality problems. In conclusion, the programme to eliminate schools fees in primary school was effective in increasing the number of pupils in the education system but it should be followed by policies to ensure quality in education and also other supply incentives to children to enrol in higher secondary and tertiary levels of education.

Lloyd et al (1998: 1-42) examined the impact of school quality on enrolment and attainment in Kenya, where they found that school attainment varied by location, age and gender. As age increased, school attainment dropped substantially (Lloyd et al, 1998: 21). In some regions, older girls were more likely to attend school than older boys. Furthermore, in the empirical study, the authors found that school quality was not statistically significant for girls because other demand factors, such as household characteristics, were more important to girls' school achievement. On the other hand household characteristics are less important for boys and school quality issues played an important role in educational outcomes.

In addition to this Lloyd et al (1998: 39) found that school fees and trained teachers were variables that were significant to dropouts and the school progress of girls. Increasing the material resources reduced the probability of Girls dropping out. Moreover, school environments' were variables which discourage school attendance by Girls.

Lavy (1996: 291-314) studied the school supply constraints and children's educational outcomes in rural Ghana. The first finding showed that limited access to secondary school had a negative impact on educational attainment. Pupils in rural areas who finish primary school did not enrol in secondary schools because the schools were far away from their homes. If children wanted to continue with schooling they would have had to travel long distances or pay for transportation, which represented a great constraint on the household. The performance of children who travelled long distance to go to school was low. In summary, the distance from school represented an important variable for schooling outcomes. Another important finding was that quality of education played an important role in educational outcomes. In this case, the provision of facilities from infrastructure to teaching materials was important to increase educational attainment in rural Ghana (Lavy, 1996: 312).

Case and Deaton (1999: 1047-1084) analysed the relationship between school inputs and outcomes in South Africa, before the end of the apartheid regime. They found that differences in school performance between whites and blacks were the consequence of three facets of the apartheid regime: Firstly, black people were restricted to certain residential areas. This fact contributed to difficult access of black children to better schools. Secondly, the decisions on education policies and spending were made by white-controlled entities. This meant that blacks did not have opportunity to express their opinion on the way that their children should be educated. Thirdly, the resource allocations made by the apartheid government created enormous disparities in the education system.

Consequently the pupil-teacher ratio in some schools was 80 children per teacher (Case and Deaton, 1999: 1053-1064). The South African education system was affected by inequity in resource allocation between races, which contributed to differences of performance. Therefore, lack of resources in Black schools contributed to poor school

performance. This result differed from the conclusions of above reported studies, which found that resources did not have an impact on school performance. It is important to emphasize that some of these findings were based on lower R-squared and t-statistics, i.e., the explanatory variables tested did not "explain" a large part of variation in pupil performance.

Another study of the South African education system conducted by Crouch and Mabogoane (1998: 1-14), covered the period after apartheid. They found that only 25% of pupil achievement was explained by resource availability. They also found that socio-economic background explained 25% of pupil achievement. Moreover, some poor resources schools had better pupil performance than schools with more resources. Some rich resources schools had a low pupil performance. These findings can be interpreted as a question of inefficiency within schools and not a problem of resource allocation.

A later study by Van der Berg and Burger (2003: 496-522) also addressed the questions of resources allocation and the efficiency problem in the South African education system. According to their results, resources mattered but an efficient use of the resources was necessary to achieve the expected outcomes.
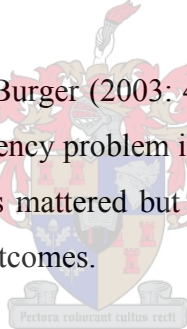
2.6. Conclusion

The discussion in this chapter has highlighted critical inputs for the present research. The chapter started by discussing the educational production function and its importance. The production function approach to education considers the relationship between inputs (quantity and quality) used in the education process to generate outcomes. The inputs are constituted by infrastructure, materials, time spent by teachers, administrative staff and pupils. The school are the places where the production process in education takes place. Therefore, schools should be efficient in transforming resources in desirable outcomes. However, there is a negative factor that affects efficiency within schools - the principal-agent problem. The principal-agent problem is mainly characterized by no clear identity of the principal in education system, also by imperfect information and by measurement

problems. The principal-agent problem can be solved by better organization of schools, improvement in the recruitment process, better training of teachers and other personnel, more incentives for teachers and by better supervision and control. The outputs in education are basically constituted by attainment, number of learners' finishing school and quality of learners.

After an overview on the educational production function, the analysis turns to demand and supply factors that affect educational performance in developing countries. The results of the analysis showed that both demand and supply conditions were important for pupil's performance. In developing countries, individual characteristics (age, gender, race), household characteristics (wealth, size, headship, activity of the head, parents' education), cultural characteristics (religion) and location (rural and urban) were important determinants of schooling. For example, in most of the countries that were examined in this research, boys were more likely than girls to enrol and attain high levels of education, pupils whose parents had high levels of education were also more likely to attain high school grades. Moreover children in urban areas performed better than children in rural areas. In addition to this, in most of the studies, a low household income and female headed households have a negative impact on schooling.
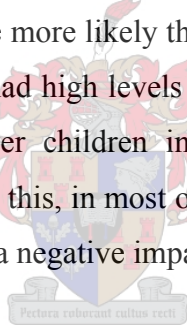
On the side of supply conditions, it was found that the quality of education is a key factor to increase education attainment. In this case, the school conditions – class size, materials, teachers' quality and the infrastructure conditions – constitute an important incentive or disincentive to school attainment. Evidence from developing countries in Asia, Africa and Latin America, exception of China (Lai, 2004: 1-62), showed that there was no clear relationship between increase of resources and better school outcomes. This evidence can be related to problems of inefficiency in schools, where the resources were not well optimised. In addition to this, there were other important variables that determined quality of education, such as material resources available for the teaching process, time to learn and school and classroom dynamics. Finally, low availability of schools in certain locations constituted a negative factor for school attendance. For

example, in many regions of Africa, children did not have access to school or have had to travel long distances to attend class.

However, other evidence demonstrated that the physical presence/absence of schools is not always the main constraint to the growth of enrolment and attainment. In some cases, they found a weak relationship between the presence of schools and enrolments. Therefore, it is possible to conclude that the relationship between increase of resources and variations in pupil performance is still unexplained. Therefore, it is important to study in detail the institutional effects of the school on education outcomes.

In conclusion, it is clear that demand determinants, supply factors and the dimensions of school quality are important to explain variations in educational performance in developing countries. Therefore, these factors will be analysed for the case of Mozambique, in the following chapters.

CHAPTER THREE - SUPPLY FACTORS

3.1. Introduction

The Mozambican government elected education, health, agriculture and rural development, good governance, financial and economic development and infrastructure as key areas of development and poverty reduction. Therefore, the investments in these areas are increasing substantially. Investments in the education sector are the second after road construction and maintenance, and represent in average 2.4% of the GDP (Gross National Product) and 12.3% of the total public expenditure (World Bank, 2003). This is a great effort for a country where 70% of the investment is financed by external funds,

In this context, the resources that the country is putting into improvement of education should be transformed into desirable outcomes. However, low enrolment, high grade repetition and high dropout rates are a concern and a reality of the Mozambican education system. In developed countries, the attention is on quality of education rather than only availability of schools and teachers. In a poor country, like Mozambique, availability of resources is still a concern in the education system. For that reason, the objective of this chapter is to analyse the supply conditions of the education system in Mozambique and the main implications for pupil performance.

This chapter is structured as follows. In the following section some important education indicators will be reviewed. A review of past studies can be found in section 3.3. Sections 3.4 and 3.5 describe the supply conditions and the process of financing the education system. An overview of policies of education will be presented in section 3.6 and a summary and conclusion in section 3.7.

3.2. Education Indicators: Enrolments

In 2004, the Net Enrolment Rate (NER) was 76% (Figure 3-1). The NER estimates the percentage of pupils of primary school age who are attending primary school. This enrolment rate is higher than that of the average of Sub-Saharan countries of 64% and lower than that of Latin America and the Caribbean of 95% (United Nations, 2006: 6). It

means that there is still a lot of work to do in Mozambique in order to achieve one of the Millennium Development Goals (MDG's) namely, universal primary education for all children by 2015. There are disparities in terms of NER between provinces in Mozambique. Maputo City (99.9%) and Maputo Province (99.3%) are provinces with a high percentage of school-aged children attending primary school. This means that nearly all children of the eligible ages in these Provinces are enrolled. On other hand, provinces like Nampula (59.1%), Sofala (71.2%), Cabo Delgado (73.3%) and Manica (75.1%) are below the country average.

The poor NER's in these provinces can be explained by the fact that most of the children enrolled at school late. The Primary Gross Enrolment Rate (GER) is the ratio between all children enrolled in school (not taking age into account) and children of primary school age. The indicator is difficult to use for progress purposes because factors such as repetition and late entry are part of the indicator. The primary GER for Mozambique is 121.2% and, like other enrolment indicators, it varies a lot between provinces.
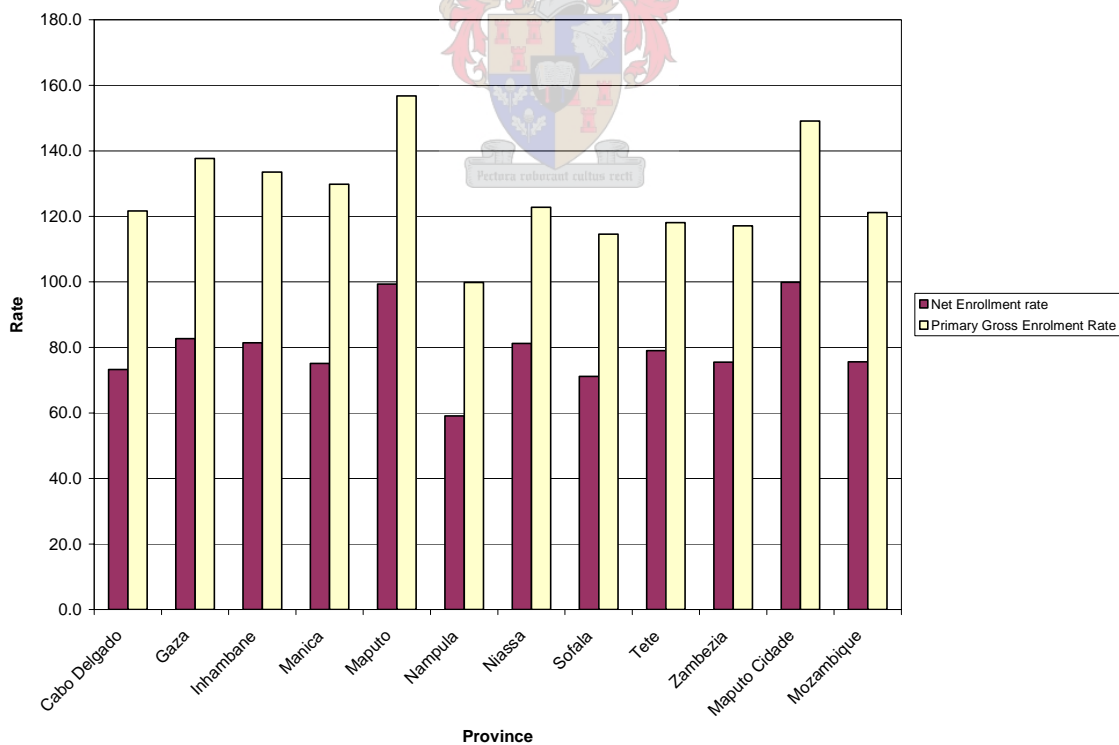
Figure 3-1 – Net enrolment rate and Gross enrolment rate, EP1 – Public and Private Schools, 2004
Source: Ministry of Education (2004)

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In 2004, 3 071 564 pupils were enrolled at primary school of which 54% were girls. The provinces with more pupils in EP1 are Zambezia (19.7%) and Nampula (15.4%). This was expected due the fact that these two provinces are the most populous in the country. The gender distribution of pupils does not vary a lot between provinces in Mozambique and also has the same tendency – more girls enrolled in primary school. In terms of progress through school, 21% of all pupils in primary school repeated at least one grade and the pattern is the same irrespective of the gender. The provinces with high percentages of repeaters are Inhambane (25.5%), Gaza (25.2%), Zambezia (24.7%) and Maputo City (23.8%).

Table 3-1 – Number of pupils, total and repeaters by gender, EP1 – Public Schools, 2004

Province	Total		Repeaters	
	Male	**Total**	**Male**	**Total**
Cabo Delgado	107,386	242,105	17,012	38,631
Gaza	115,270	233,633	27,558	58,760
Inhambane	118,937	241,818	29,341	61,574
Manica	101,142	223,738	20,396	45,812
Maputo	95,302	192,614	19,292	41,435
Nampula	217,482	487,989	41,439	91,485
Niassa	72,337	160,228	12,822	28,249
Sofala	106,367	242,808	17,940	40,683
Tete	115,205	251,621	16,558	36,788
Zambezia	278,147	630,622	69,856	155,626
Maputo Cidade	82,046	164,388	18,317	39,035
Total	**1,409,621**	**3,071,564**	**290,531**	**638,078**

Source: Ministry of Education (2004)

3.3. Past studies

There were few studies that investigated the main supply determinants of educational attainment in Mozambique. Handa (2000: 1 – 38) studied the trade-offs between quality and quantity in the allocation of resources in the Mozambican education system. He found that, for enrolment purposes, quantitative indicators, such the number of schools and distance to school, were more important than quality indicators (pupil-teacher ratio) (Handa, 2000: 15). Regarding school attainment and efficiency, quality of education was important for retaining children at school. In other words, the high pupil-teacher ratio

was one of the negative factors that affected schooling continuation in Mozambique. Handa (2000: 19) developed simulations to try to find the appropriate policies that should be conducted in order to improve school enrolment, educational attainment and efficiency. Firstly, to improve school educational attainment and efficiency it is important to improve the quality of education. Secondly, for growth in enrolments it is important to build more schools, mainly in regions where a shortage of schools exists. However, there are budget constraints that one should take into consideration when one wants to improve school enrolment and educational attainment. The author found that improving school quantity was more cost-effective than improving school quality (Handa, 2000: 22).

The World Bank (2003: 1-64) did a study on *Cost and Financing of Education in Mozambique*. First, they found that the geographic distribution was a great concern for educational attainment in Mozambique because 32% of the rural areas did not have any schools and on average pupils had to walk 45 kilometres to reach a school. Second, there was a great inequality in terms of enrolment patterns by region, gender and grade attained. For example, the pattern of enrolment in grade 1 is about the same for all regions and gender but in grade 5 there is a great difference between provinces and girls' enrolment rates are lower than boys' (World Bank, 2003: 51). Third, they also found that despite the increasing investment in education, the system is far from efficient due to the high dropout and repetition rates.

It was also demonstrated in the report that the investment, mostly financed by external sources, was used in school construction. In addition to this, the study showed the inconsistency of teacher distribution across the country (provincially), where provinces with different number of pupils had a similar number of teachers. Finally, there was evidence of poor education quality in the system, where school outcomes varied considerably among schools.

Another report, *The Impact of school fees reduction on Primary School Enrolment and Retention* (World Bank, 2005: 1-157), revealed that access and distance to school was not a major constraint for primary school enrolment because most of the villages had a

primary school. However, access to secondary schools was difficult as there were very few such schools in the rural areas. For the major urban areas, the access and distance to school should not constitute a constraint due the fact that schools for the ESG1 and ESG2 were available in these regions.

Evidence from the study demonstrated that school fees were not the major constraint for primary school enrolment and attainment as such, and policies to reduce or eliminate fees would have little impact on the improvement of school enrolments and attainment. Costs of school uniforms, school supplies (books, pens, pencils, etc), alimentation and transport are other direct costs that are relevant to the decision to send children to school. In urban areas, school uniforms are the most significant expense and in the rural areas nutrition plays an important role in school attainment.

The quality of the infrastructure of schools is also considered a challenge to pupils' attainment. Most of the schools in the education system network do not provide for the basic needs (example: water and electricity) in answer to the demand for education. There are not enough rooms and pupils are either crowded into the same classrooms or have to attend classes in an open-air environment (World Bank, 2003: 46). Schools in rural areas have worse infrastructure conditions and most of them are built of local materials rather than the conventional construction materials. Regarding quality of education, the World Bank report (2003: 47) demonstrated that most schools do not have the necessary teaching materials such as textbooks, libraries, blackboards and other teaching facilities.

The low quality of education in Mozambique is also associated with lack of available, qualified teachers, and this is greater in rural areas than in urban ones. Moreover, the high failure and dropout rates among girls was mostly caused by the high percentage of unqualified female teachers because there was enough evidence from other countries that there is a positive relationship between the performance of girls and female teaching activities. In addition to this, there are the different perceptions, by location, of the relevance of education for parents and community leaders. In rural areas, parents are

more aware of the importance of education for their children's future income and for poverty reduction due the high direct and indirect costs of sending children to school.

Also when drawing up the school calendar, the agricultural production cycle should be taken into consideration as agriculture is important to sustain the household, and parents can be expected to need their children's help during certain seasons. Provision should be made for this. In urban areas, the perception of relevance of school is more positive, and parents think that education is important for both boys and girls.

Finally, there are three major sources of income for school education: Government budget, school fees and direct support for schools program. Schools do not have the same access to these three sources of funds, where schools from upper primary onwards and in the major urban areas take priority in access to funds. Schools in rural areas are poorly financed because the late allocation of funds by central government and the absence of control mechanism for school fees collection (World Bank, 2003: 50).

3.4. Supply Conditions

3.4.1. Schools

In section 3.2, some education indicators were considered, such as number of students and distribution by provinces. In this section, the distribution of schools by levels of education and regions will be discussed. Table 3-2 shows that the distribution of schools by level of education (day shift) is 86.7% for EP1, 11.6% for EP2, 1.4% for ESG1 and 0.3% for ESG2; demonstrating that the availability of schools for the first phase of schooling is high but it decreases substantially for higher levels of education.

The distribution of public schools is proportional to the population and the number of students enrolled in the system. Therefore, the provinces with a high number of schools are Zambezia (20.8%) and Nampula (16.4%). The pattern of high provision of schools in

the earlier grades is the same across provinces. There are provinces where availability of schools can be considered a great concern, like Niassa with only 4 schools in ESG1 and only one school in ESG2. Niassa with population of 1 027 037 is one of the low population density- and low income areas of Mozambique.

These two factors are part of the explanation for the low availability of schools. On the other hand, Maputo City, capital of Mozambique, with a population of 1 244 227 has the highest population density and the highest per capita income within the country. As a result, one would expect that availability of schools for higher levels of education (4 schools in ESG2) would be the greatest in the country. In addition to this, it is important to mention that the schools in ESG2 are concentrated in the major urban areas of Mozambique, such as Maputo City, Matola, Beira, Nampula City, Quelimane, Xai-Xai, Inhambane City and Tete City, all capitals of provinces. An interesting aspect in the Mozambican education system is the evening shift. The availability of schools for this type of education is quite high and represents an option for students who enrolled in school late and also for adult education.

Table 3-2 – Number of public schools by province and level of education, 2004

Province	Day shift				Evening shift		
	EP1	EP2	ESG1	ESG2	EP2	ESG1	ESG2
Cabo Delgado	750	108	9	2	3	5	2
Gaza	647	130	11	3	17	9	3
Inhambane	623	106	13	3	16	11	2
Manica	499	97	14	2	33	12	2
Maputo	406	93	14	2	35	11	2
Nampula	1431	136	14	5	31	12	5
Niassa	708	57	4	1	10	6	1
Sofala	581	95	12	2	27	10	2
Tete	798	83	12	3	26	13	4
Zambezia	1833	154	19	3	28	16	3
Maputo Cidade	97	57	18	4	28	20	4
Total	**8373**	**1116**	**140**	**30**	**254**	**125**	**30**

Source: Ministry of Education (2004)

Although table 3-2 shows the availability of schools in provinces, it is also important to see the breakdown in terms of classrooms and grades (Table 3-3). Taking the EP1 as example, the distribution of classrooms across the country follows the same tendency as the schools do. This can be understood as there are a similar number of classrooms in each school in Mozambique. The number of classrooms in grade 1 represents 29.26% and in grade 5 represents only 12.6% of total availability. If one compares these figures with the through flow figures presented in chapter 1, it is difficult to state whether the low enrolments in higher levels of education (grade 1 to grade 5) are due to the availability of classrooms or if the availability of classrooms is a result of the demand for education at these levels.

Table 3-3 – Number of classrooms by grade and province – EP1, 2004

Province	Schools	Classrooms					
		Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Total
Cabo Delgado	750	1,455	1,024	799	661	592	4,531
Gaza	647	1,354	1,117	1,056	828	710	5,065
Inhambane	623	1,364	1,186	1,070	908	792	5,320
Manica	499	1,419	1,214	1,044	820	676	5,173
Maputo	406	949	900	926	790	690	4,255
Nampula	1,431	2,769	2,143	1,800	1,452	1,108	9,272
Niassa	708	1,022	715	584	478	411	3,210
Sofala	581	1,363	1,065	971	754	624	4,777
Tete	798	1,611	1,223	956	747	605	5,142
Zambezia	1,833	4,284	3,045	2,380	1,671	1,116	12,496
Maputo Cidade	97	556	582	617	525	492	2,772
Total	**8,373**	**18,146**	**14,214**	**12,203**	**9,634**	**7,816**	**62,013**

Source: Ministry of Education (2004)

It is also important to analyse the availability of schools for technical education in the Mozambican education system because this represents one of the priorities of the Ministry of Education, in order to provide a technically qualified labour force to the market. All provinces have at least one college, which operates in day and evening shifts and covers areas such as agriculture, industry and commerce. All provinces have colleges in the field of agriculture with the exception of Maputo City, Sofala and Manica. The interest in agriculture is related to the fact that the majority of the Mozambican

population lives in rural areas and agriculture is the major economic activity in Mozambique. In the case of Maputo City, the absence of such courses can be justified by the fact that it is an exclusively urban area. Industrial and commercial subjects at basic level are offered in all the colleges. In terms of medium level (highest level in terms of technical education) only 7 provinces provide education and only 3 in an evening shift. It is once more important to mention high concentration of higher levels of education in urban areas.

Table 3-4 – Technical education – numbers of existing schools and schools according to province and level of education, 2004

| Province | Basic level | | | | | Evening Shift | Elementary Level | Medium Level | |
	Total	Ind Comm	Day Shift Agric.	Comm.	Indust			Day shift	Even Shift
Cabo Delgado	3	1	1		1	1	1		
Gaza	2	1	1			1	1		
Inhambane	3	1	1		1	1	2		
Manica	1	1				1	1	1	
Maputo	3	1	1		1	1	1	1	
Nampula	3	1	1		1	1	2	1	1
Niassa	2	1	1			1			
Sofala	1	1				1		1	1
Tete	3	1	1		1	1	2	1	
Zambezia	3	1	1		1	1	1		
Maputo City	4			3	1	2		2	2
Total	**28**	**10**	**8**	**3**	**7**	**12**	**11**	**7**	**4**

Source: Ministry of Education (2004)

3.4.2. Teachers

The number, the qualifications and the experience also represent important inputs in the production process. In 2004, only 56% of the teachers had teacher training. Provinces with high level of trained teachers are Maputo City (94.1%), Sofala (70.7%), Maputo Province (66.5%) and Zambezia (60.9%). On the other hand, there are provinces with very low percentage of trained teachers (below the national level), such as Manica (35.3%), Niassa (46.0%) and Inhambane (48.2%). Summing up, there are great

disparities in terms of teacher education within Mozambique. Regarding gender, 70% of teachers are female. However, 62% of all male teachers have teacher training against 53% of female teachers. This is valid for all provinces, with the exception of Niassa (with 45.7% of male trained teachers and 46.1% of female teachers). Tete and Inhambane have the greatest disparities in terms of gender qualifications of teachers.

Table 3-5 – Teachers with and without teaching training by province and gender – Public Schools, EP1, 2004

| Province | Gender | Total | Teacher Training | |
			With	Without
Cabo Delgado	Male	465	255	210
	Total	3392	1812	1580
Gaza	Male	2050	968	1082
	Total	4169	1788	2381
Inhambane	Male	1693	916	777
	Total	4076	1963	2113
Manica	Male	746	299	447
	Total	3682	1298	2384
Maputo	Male	1778	1264	514
	Total	3459	2299	1160
Nampula	Male	1361	764	597
	Total	7310	4082	3228
Niassa	Male	840	384	456
	Total	3641	1676	1965
Sofala	Male	865	635	230
	Total	3258	2304	954
Tete	Male	1212	800	412
	Total	4201	2211	1990
Zambezia	Male	1312	829	483
	Total	6700	4081	2619
Maputo City	Male	1676	1592	84
	Total	2720	2559	161
Total	Male	13998	8706	5292
	Total	46608	26073	20535

Source: Ministry of Education (2004)

To reduce the high percentage of teachers without teacher training, the Ministry of Education introduced training centres which provide education for teachers. There are two types of specialized Centres: 1) basic level i.e. training of teachers of primary school

(Centres of education); ii) intermediate level (IMAP).   The higher level teachers' training is performed by the Teaching University (*Universidade Pedagógica*).

The Training Centres for Primary Teachers (CFPP – *Centros de Formação de Professores Primários*) train teachers with secondary education to teach in primary schools at the first level (EP1). The training takes 3 years and candidates should have at least EP2 (Republic of Mozambique, 1990: 1). In 2004, there were 11 CFPP's distributed across all provinces of Mozambique.

Table 3-6 – Teacher training Centre – Number of students at the beginning of the school year, classes and residential students; number of teachers, classrooms by Centre, 2004

Centre	Type of Training	Total	% of Males	No of Classes	Repeaters	Residential Students	Lectures	Classrooms
Montepuez	Total	642	52.2	12	69	217	32	5
	Initial	627	53.4					
Inhamizua	Total	357	70.9	8		188	32	10
	Initial	347	71.5					
Homoine	Total	517	71.8	8	81	255	21	8
	Initial	436	69.5					
Chicuque	Total	422	72	9	25	224	23	8
	Initial	410	72.9					
Chimoio	Total	384	61.5	8			22	9
	Initial							
Namaacha	Total	489	65	11	25	267	16	8
	Initial	488	65.2					
Marrere	Total	475	60	12	39	210	25	11
	Initial							
Lichinga	Total	855	56.1	14	105	243	24	14
	Initial	831	57					
Cheringoma	Total	548	52.7	12	13	410	14	12
	Initial	548	52.7					
Chitima	Total	380	66.3	8	45	297	11	4
	Initial	332	66.3					
Nicoadala	Total	574	61.1	11	65	410	23	10
	Initial	571	61.1					
	Total	**5643**	**61.6**	**113**	**467**	**2721**	**243**	**99**
	Initial	**4590**	**61.8**					

Source: Ministry of Education (2004)

The Primary Teacher Training College (IMAP - *Instituto de Magisterio Primario*) trains primary school teachers. The training lasts two years (2 years). The requirements for attending the training are at least grade 10 or equivalent (Republic of Mozambique, 1997: 107). The expected outcomes of this training are (Republic of Mozambique, 1997: 108):

1. Better interaction between teachers and pupils;
2. Knowledge in terms of planning, organization, management and implementation of teaching programmes;
3. Better understanding of school management and dynamics;
4. Better communication between school/teachers and community.

Table 3-7 shows the number of IMAP's and respective students.

Table 3-7 – IMAP's – Number of students at the beginning of the school year, classes and residential students; number of teachers, classrooms by Institute, day shift, 2004

Centre	Type of Training	Total	Classes	Repeaters	Residential Students	Lectures	Classrooms
Matola	Total	512	17	7	160	56	11
	Initial	482					
Chibututuine	Total	695	25	4	430	40	14
	Initial	635					
Nampula	Total	609	17	7	408	49	12
	Initial	561					
Sofala	Total	631	11	1	320	43	11
	Initial	350					
Tete	Total	408	10			20	12
	Initial	328					
Quelimane	Total	566	18	1	373	39	11
	Initial	474					
Maputo City	Total	619	15	15		53	24
	Initial	370					
	Total	**4040**	**113**	**35**	**1691**	**300**	**95**
	Initial	**3200**					

Source: Ministry of Education (2004)

3.5. Educational Budget

3.5.1. Decision making process

The decision making process in the National Education System is centralized. Some activities are developed at provincial, district and school levels. The education planning is done by using a bottom up approach, where the schools identify the financial and material resources to conduct the administrative and teaching activities. In the decision making process, schools take into consideration guidelines supplied by central bodies, such as the Ministry of Education, Ministry of Planning and Development and Ministry of Finance. The local needs are expressed according to the global guidelines and the planning is submitted for approval by the central bodies.

The Ministry of Education has two advisory bodies, which help it in the decision-making process. The first body is the Advisory Committee (*Conselho Consultivo)*, which is constituted by the Minister of Education, internal bodies of the Ministry of Education and other subordinate institutions, with the task to analyse and discuss core question of the Ministry's activity. A Coordinator Committee (*Conselho Coordenador)* headed by the Minister of Education and constituted by members of Advisory Committee and Provincial Directors has the task of coordination, planning and control of all activities run by local and central bodies of the Ministry of Education. It is important to mention that this decision making process is not applicable to the Public Higher Education Institutions.

These institutions have autonomy in terms of administrative and teaching activities. The scope of this study does not include an analysis of these institutions. The human resources management is the task of the Central Department of Human Resources in the Ministry of Education, which has a database with individual information of all personnel (qualifications, location, experience, etc). Private schools do not receive any funds from the Ministry of Education.

3.5.2. Budgeting process: planning and implementation

The process of budget planning takes place simultaneously to the planning of new institutions, the hiring of teachers and other important decisions in the education system. In the preparation of the education budget, local institutions and schools receive from the Ministry of Education, Ministry of Planning and Development and Ministry of Finance, budget guidelines (in accordance with projections of the subsequent year's national budget) and methodology of budgeting elaboration. The Ministry of Education defines the annual goals in terms of school enrolments and attainment based on projections made in the Strategic Planning of Education (*Plano Estratégico da Educação)*, National Policy of Education (*Política Nacional da Educação)* and the Five years Government Program (*Programa Quinquenal do Governo)* and sends them to provincial departments of education.

In their turn, Provincial Departments elaborate the objectives and goals to be achieved by districts, taking into consideration demographic and geographic conditions. The process repeats itself at a district level, where schools are provided with information on objectives to be achieved in a certain school year. After the objectives and goals are discussed at administrative and political levels, the plan is converted into a budget proposal, which starts from school level and progresses from district and provincial levels to the central bodies.

After approval of the educational budget, the Ministry of Finance communicates the budget limits and rules of usage to the Ministry of Education. The expenses of salaries and other remunerations are requested on a monthly basis. There are delays in the process of payment of salaries and most of the salaries are paid in cash because of the poor coverage of financial institutions in rural areas of the country. In addition to the salary, there is a bonus for medium and higher qualified human resources of the Ministry. The bonus is stipulated according to geographic criteria. The educational budget is submitted to parliament for approval.

Expenditures in goods and services are implemented according to the criteria of resources allocation, which takes into consideration the type of institution, dimension and school effectiveness. The requests are made on an annual basis and funds are provided at the beginning of each school year. Most schools receive funds late and have to find alternative sources.

3.5.3. Analysis of the Education Budget

In global terms, the Mozambican National Budget is financed mostly by external sources (aid programs, donors and international financial institutios), prioritizing social areas in general and education in particular. A high percentage of the external funds are used for capital expenditures (construction and equipment). The following table presents the general and educational budget.

Table 3-8 – General and Education Budget, 2005 and 2006

	2005		2006 Millions of MZM	
	Value	%	Value	%
General Budget				
Revenue	22,225,913		27,016,733	
Expenses	46,783,367		52,529,527	
Deficit	-24,557,454		-25,512,794	
Expenses	27,782,299	100%	30,741,700	100%
Recurrent	22,464,834	81%	26,622,611	87%
Capital	5,317,465	19%	4,119,089	13%
Investment	19,001,068	100%	21,787,826	100%
Internal	5,762,525	30%	6,566,458	30%
External	13,238,543	70%	15,221,368	70%
Education Budget				
Total	1,735,680	100%	2,891,945	100%
Expenses	433,800	25%	410,087	14%
Investment	1,301,880	75%	2,481,858	86%
Internal	152,289	9%	111,620	4%
External	1,149,592	66%	2,370,238	82%

Source: Republic of Mozambique (2005 and 2006) and author's calculation

The education budget is divided into two main categories of expenses: investment- and recurrent-. In 2005, capital expenses represented 75% of the total expenses and they were composed of investments in school construction and equipment. Salaries, goods and services are part of the recurrent expenses and represent 25% of total expenses. In 2006, this structure changed to 86% (capital) and 14% (recurrent). The education budget is financed by external sources and in 2006 they represented 66% of the total expenses of education. The percentage increased to 82% in 2006.

It is also important to know the allocation of the public expenditure by level and type of education. Table 3-9 illustrates the total recurrent budget for education, for 2005 and 2006 and the distribution by levels and types of education.

Table 3-9 – Distribution of Recurrent Education Budget by level and type of education, 2005 and 2006

Levels	2005	2006
Administrative	**18.8%**	**18.8%**
Ministry of Education - Central body	11.1%	9.8%
Provincial Department of Education (DPE)	5.1%	5.9%
District Department of Education (DDE's)	2.6%	3.1%
General Education	**66.5%**	**68.4%**
Primary School of First Level (EP1)	45.1%	48.0%
Primary School of Second Level (EP2)	10.1%	9.5%
Secondary School of First Level (ESG1)	8.2%	7.2%
Secondary School of Second Level (ESG2)	3.2%	3.7%
Technical and vocational education	**6.0%**	**6.0%**
Elementary	0.3%	0.3%
Basic	3.7%	3.9%
Medium	2.0%	1.9%
Teacher training	**2.7%**	**2.7%**
Training Centres for Primary Teachers (CFPP's)	1.3%	1.2%
Primary Teacher Training College (IMAP'S)	1.4%	1.4%
Others	**6.1%**	**4.1%**
Total Provincial	**88.9%**	**90.2%**
Total National	**100.0%**	**100.0%**

Source: Ministry of Education (2005 and 2006)

When analyzing the budget allocation by levels of education, it can be seen that the primary schools (EP1 and EP2) received 55% of the recurrent budget, against 19% for expenses at administrative level. The remaining 26% was allocated to the other levels of education.

3.6. Policies in Education

The Mozambican government introduced the Strategic Plan for Poverty Reduction (PARPA – *Plano de Acção para Redução da Pobreza Absoluta*) with the objective of reducing poverty from 54% (estimates of IAF 2002/3) to 45% in 2009 (Republic of Mozambique, 2006: 1). The key areas, for the purpose of development and poverty reduction, are human capital, health, agriculture and rural development, good governance, financial and economic development and infrastructure. Therefore these areas received special attention in the elaboration of PARPA. The relationship between education and poverty reduction was recognized in the plan.

The charter of Human Capital development established the growth of enrolments and attendance in all levels of education (mainly amongst girls) and the improvement of education quality, in order to serve the labour market better (Republic of Mozambique, 2006: 87). The reduction of inequalities in terms of educational attainment and availability of schools between provinces and locations (rural and urban), is also a priority of PARPA. In this context, the policies of the education sector were defined based on the global strategy of development and poverty reduction. In this section the national policy of education defined in the context of PARPA and the Government Plan (*Plano Quinquenal do Governo*) is discussed. In addition, other policies to increase enrolments, attainment and quality of education are also discussed.

3.6.1. Strategic Plan of Education

The Strategic Plan of Education 2006/2010 (*Plano Estratégico de Educação e Cultura*) was defined based on the current situation of the education system in Mozambique. Low attainment and non-completion of primary school, limited access to secondary school,

and lack of expansion of schools were detected as the main problems of the education sector (Ministry of Education, 2006:8). Besides PARPA, the strategic plan of education took into consideration the Millennium Development Goals (MDG's) defined by United Nations.

The Millennium Development Goals for education established an elimination of gender inequality in primary and secondary education, the completion of primary school for all boys and girls by 2015, and the reduction by a half of the illiteracy rate in 2015. The main objectives of the plan are: 1) improvement of quality and access to education and 2) improvement in capacity building and efficiency in management process in central bodies and at schools level.

For primary school, the Government believes that quality will be the key issue for a better education system (Ministry of Education, 2006:8). The first strategy is the expansion of schools in a sustainable way and taking into consideration the inequalities by gender, regions and location. This will imply an additional investment in the present infrastructure and the construction of new schools in regions that are undersupplied at the moment. The second one is the improvement of teaching quality and the retention of pupils at schools.

For that, the recruitment of new and qualified teachers will be one of the major issues to address. In addition, accountability at schools and the improvement of management process should also receive attention. The decentralization of the decision making process for province, district and school levels is the last main strategy defined in the plan. The government believes that this is the way to improve quality and to solve access problems (Ministry of Education, 2006:26).

Concerning secondary education, the main problem is access to these schools. As demonstrated before, access is limited in urban areas and nonexistent in rural areas. Therefore, it is the intention of the government to construct schools at community level, to ensure school continuation of pupils. The other challenge, also related to access to

school, is the supply of qualified teachers to ensure quality of education. Strategies concerning technical education and the training of teacher also follow the same principle of expansion with quality. Training of teachers is the foundation of all other strategies like improvement of access and quality of education. For that reason, besides the conventional training in centres of education, teachers will receive in-job training and constant evaluation (Ministry of Education, 2006:46).

From the analysis of the strategic plan, it seems that the government selected improvement of efficiency, quality and access to education as the vital areas of education expansion in Mozambique. It is also clear that they defined a strategy to address these problems. The strategy used is aligned to solutions proposed by De Villiers (1999: 384) for the South African Education System. De Villiers touched on the following points: 1) better recruitment; 2) decentralise the process of decision making in education system; and 3) provision of in-job training in order to improve teachers' teaching skills.

3.6.2. School fees: The Official Policy

Ministerial decree 6/86 of the 22nd of January (*Diploma Ministerial número 6/86*) determines the official policy of school fees (Republic of Mozambique, 1986: 6). The policy established all fees and taxes (exams, registration and others) that pupils must pay in public education system. Payment of these fees was compulsory and pupils could not attend class without payment. However, there were some exceptions, where pupils could benefit from reduction or abolition of school fees. Good academic achievement in a previous year (score equivalent or more than 16 out of 20) and a household with four or more children enrolled in the system were examples of important conditions for reduction or abolition (Republic of Mozambique, 1986: 10). The policy also established penalties for repetition, where pupils who repeated a grade, should pay 50% more to repeat the grade.

Ministerial decree 153/87 of the 9th of December (Republic of Mozambique: 1987: 409) introduced some alterations in school fees policy, concerning the updating of fees and taxes and also the abolition of fees for people who do Compulsory Military Service (SMO – *Serviço Militar Obrigatório*). During the implementation of PARPA, the government decided to abolish school fees in primary school (EP1 and EP2) from the 2005 school year onwards (Republic of Mozambique, 2004: 528). With this ministerial decree 228/2004, the government created an important incentive for school enrolments and attainment, especially for low income households. Although, it is too soon to analyse the impact of the abolition of school fees in primary school, there is no doubt that it will have a positive impact on school enrolments, even taking into consideration that it can be a small impact, if one takes into account the results of the report on the impact of school fee reduction on primary school enrolment and retention (World Bank, 2005: 1-157).

In a recent workshop on school fee abolition in sub-Saharan countries (World Bank & UNICEF, 2006: 3) school fees were acknowledge as a major barrier to school enrolment and attainment. The report noted some problems related to the implementation of the school fee abolition policy in Mozambique, such as a shortage of teachers and resources to respond to the increasing demand for education, and problems related to funding education activities in schools. In addition, government will have to provide, every year, an additional budget of USD 2.5 million for EP1 and USD 1 million for EP2 to compensate for the cost of school fee abolition (World Bank, 2005: 118). This will be a great challenge in a country where most of the budget is financed by external sources.

3.7. Conclusion

This chapter analysed the supply conditions of the education system in Mozambique and its implication for pupils' attainment and achievement. The low enrolment rates still prove a problem in Mozambique. The indicators presented in section 2.3 also demonstrated an inequality in terms of education across provinces in Mozambique. The central question of this chapter is if these poor indicators of enrolment and attainment are due to school access (supply factors). The overview of studies about education in

Mozambique highlighted important factors: such as availability of schools (mainly in rural areas), resources (human, financial and material), quality of education and the cost of education (direct and indirect) as the main constraints for schooling.

In addition to this information, the supply conditions were analysed using a dataset provided by the Ministry of Education. Firstly, there is a high provision of schools in the earlier grades (EP1) but the provision decreases substantially for higher levels of education (EP2, ESG1 and ESG2). Moreover, there is a concentration of higher level schools in urban areas and the availability of all schools is not equitable between provinces. Secondly, in 2004, only 56% of teachers had teaching training. To improve the qualifications and increase the availability of teachers, government introduced training centres (CFPP's and IMAP's).

The chapter also analysed the education budget and its process. The decision making process is the task of the central bodies in collaboration of local authorities (provinces, districts and schools). The process of budget allocation is long and some schools have to find alternative funds. The education budget is mostly financed by external sources (donors) and school construction and equipment represent the major expense. In terms of distribution by level, primary schools (EP1 and EP2) account for 55% of the education budget.

Government is committed to develop policies to stimulate enrolments, attainment and quality in the education system. The strategic plan of education defined as priorities expansion of schools (mainly to rural areas), improvement in quality of education and teachers; and efficiency on the administrative level. The abolition of school fees for primary school (EP1 and EP2) was a significant decision and one can expect a positive result of this policy. However, budget constraints and difficulties which schools experience to generate alternative income are the major challenges of implementing this policy. Government should provide an additional budget of 3.5 millions of USD to compensate for the abolition of school fees. On top of that, a question remains: is the system ready to absorb the growth in enrolments?

To answer this question, one should consider the availability of qualified teachers and other resources inside the education system, presented in this chapter. It is important to mention that HIV/AIDS will have a negative impact on the availability of teachers. According to UNESCO (2006: 2), 17% of teachers will die by 2015 because of AIDS. The escalation of this pandemic will mean that the government will have to increase the education budget by 5% (7 millions of USD) after 2006 to make up for the deaths and absence of teachers. The additional budget will be used in training programs in HIV/AIDS (for managers and teachers), programs of prevention and replacement of teachers.

In summary, supply constraints (schools, teachers, quality, costs and budget) play an important role in education in Mozambique.

CHAPTER FOUR - DEMAND DETERMINANTS
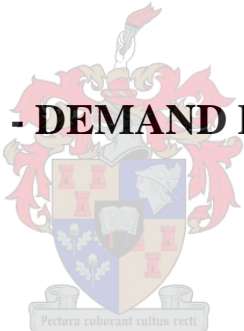
4.1. Introduction

The literature review, presented in Chapter II, on determinants of education in developing countries highlighted important aspects for the present research. One of the aspects was the demand factors that affect pupil enrolment and attainment, such as individual, household and community characteristics. The relative importance of demand determinants vary by region and country, where each country has specific factors influencing children's achievement at schools. For that reason, it is also important to investigate the demand determinants affect school attainment in Mozambique.

This chapter has the objective of analysing the effect of demand determinants on educational attainment in Mozambique, using the Household Survey of 2002/2003. Chapter IV will investigate the average educational enrolment and attainment of children in Mozambique and how that differs by province, location, household income, gender and age. Moreover, the study will analyse the influence of further demand-side factors of education, such as household characteristics (head of household's education and headship of the household).

The analysis is organised as follows. Section 2 gives a background on determinants of schooling in Mozambique, using some studies done in the country. Section 3 describes some indicators of the educational attainment in Mozambique. The following section (4) explains the methodology of the study, and the description of the dataset is found in section 5. The results of the empirical work are reported in section 6 and the last section provides the summary and main conclusions of the chapter.

4.2. Background

Handa et al (2004), using the first Mozambican household survey of 1996-97, investigated the relationship between human capital, household welfare and children's schooling in Mozambique. The first finding was that education played an important role in economic and social well-being. Moreover, the education of the head of the household

had an impact on primary school enrolments, for all locations – urban and rural. On top of that, they found that other factors affecting enrolments in Mozambique varied according to the location. In urban areas, the variables that played a major role were the household income and the age of the child, but in rural areas the most important factor was the gender of the child, where boys had higher enrolment rates than girls. This is similar to results found in other developing countries. In addition to this, Handa estimated the schooling efficiency in Mozambique. He argued that high levels of parents' education contributed to reduced dropouts and higher attainment. Also, factors such as quality, availability and efficiency of primary schools had a positive impact on rural enrolments. In other words, the expansion of schools to rural areas will lead to an increase in enrolments, mainly for female and poorer households. This may be the case because the monetary cost and opportunity cost of sending children to school can be high if schools are at a far distance from the villages. Low-income households cannot afford the costs of transport. Important is the question of sending or not sending children to school. If children are at home they may help in domestic and farming activities. It is important to remember that most of the Mozambican labour force is in the primary sector.

In a recent report on poverty and its social impact, the World Bank (2005) estimated the impact of direct costs and opportunity costs on primary school enrolment and attainment in Mozambique. The report began by investigating the importance of fees in the school budget, and the findings were that the school fees constituted an important source of income for Mozambican schools. This was due to the shortage of funds allocated by the Ministry of Education to schools. Therefore, policies of eliminating school fees for poor children to improve school enrolments were difficult to implement. Moreover, the report also found that school supply factors, such as infrastructure, teachers, materials, and education quality were important determinants of school enrolments in the country. In addition to that, cultural factors such as early marriage had a negative influence on school enrolments in some regions of Mozambique. On the one hand, the empirical part of the study found that reduction or abolition of school fees had no greater significant impact on enrolment and school attainment. On the other hand, the variables such as distance to school in rural areas, the income of household (rural and urban areas) and personal

characteristics of the child (age and gender) had a significant impact on enrolments. For example, in primary education, girls were less likely to enrol than boys. In conclusion, the study stated that demand-side factors had a greater impact in education attainment. It is important to underline that this study was done before the abolition of school fees.

4.3. Educational enrolment and attainment

This section describes some indicators of the educational attainment in Mozambique, based on the Household Survey of 2002-2003. It begins by describing the literacy rates of provinces and locations, followed by other indicators of education and income of the households.

4.3.1. Adult Literacy Rates

The adult literacy rate for Mozambique was approximately 54%, and the average literacy rate of males was 71% and for females was 41%. Figure 4-1 illustrates the difference in education attainment between provinces. The provinces with low literacy rates (below the country's average rate of (54%)) were Niassa (49%), Cabo Delgado (28%), Nampula (32%), Zambezia (40%), Tete (45%), Sofala (47%), Inhambane (52%) and Gaza (53%). In these provinces, there was also a pattern of gender education inequality. However, the most problematic cases were of Sofala, Manica and Zambezia provinces.

For example, in Sofala, 72% of males were literate and only 28% of females. Manica province (60%) had a literacy rate closer to the country's average. Maputo province and Maputo city were the provinces with the highest literacy rates within the country, 67.2% and 77.4% respectively. Maputo City is the capital of Mozambique and Maputo Province is the major industrial district of the country, which means that the greater concentration of resources is in these two provinces. Summing up, there is a gap in terms of literacy rates between provinces and by gender.
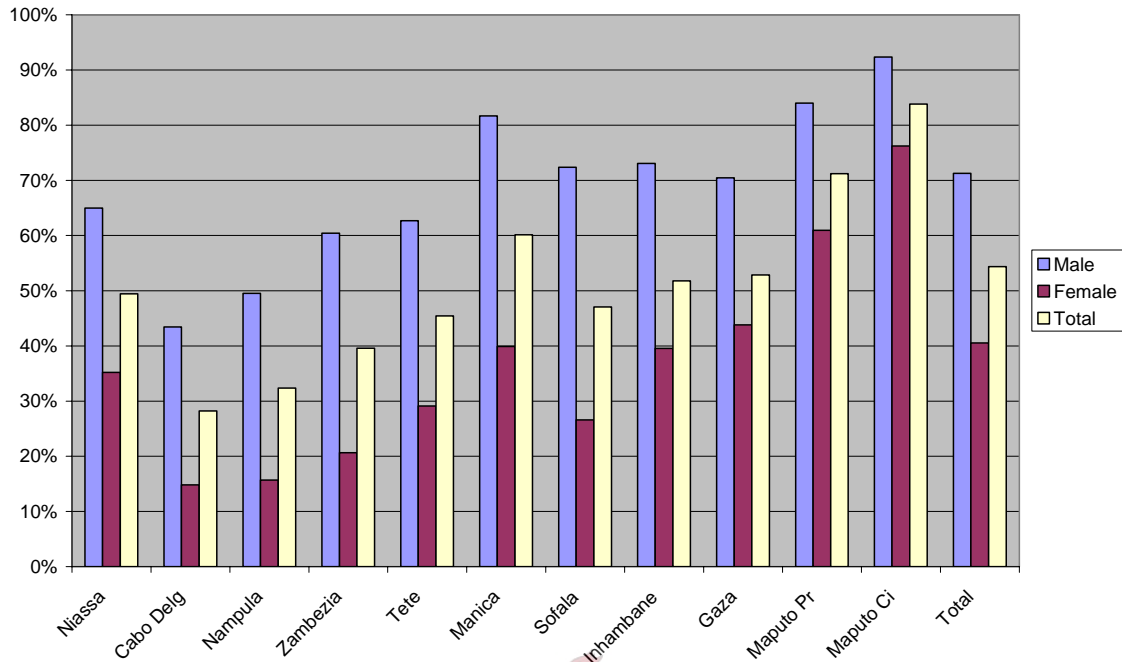
Figure 4-1 – Adult Literacy Rates by Province and Gender
Source: Mozambican Household Survey 2002/03

Figure 4-2 shows the literacy rates in terms of area of residence (rural and urban) and gender. There is evidence of large differences in literacy rates between rural households and urban households, where in urban households, 73% of the population was literate and in rural areas, only 34% were literate. In rural areas, there was a gap between literacy of males (53%) and females (20%). In urban areas, the inequality was less than in rural areas, as literate males were 87% and literate females were 62%.

However, the inequality in urban areas should also be taken into consideration. This means that factors affecting female educational attainment should be investigated more deeply. The literature of educational attainment in developing countries found that low female educational attainment is related to social and cultural factors. Some of these were that girls were more likely to help in domestic activities and drop out because of early marriage.
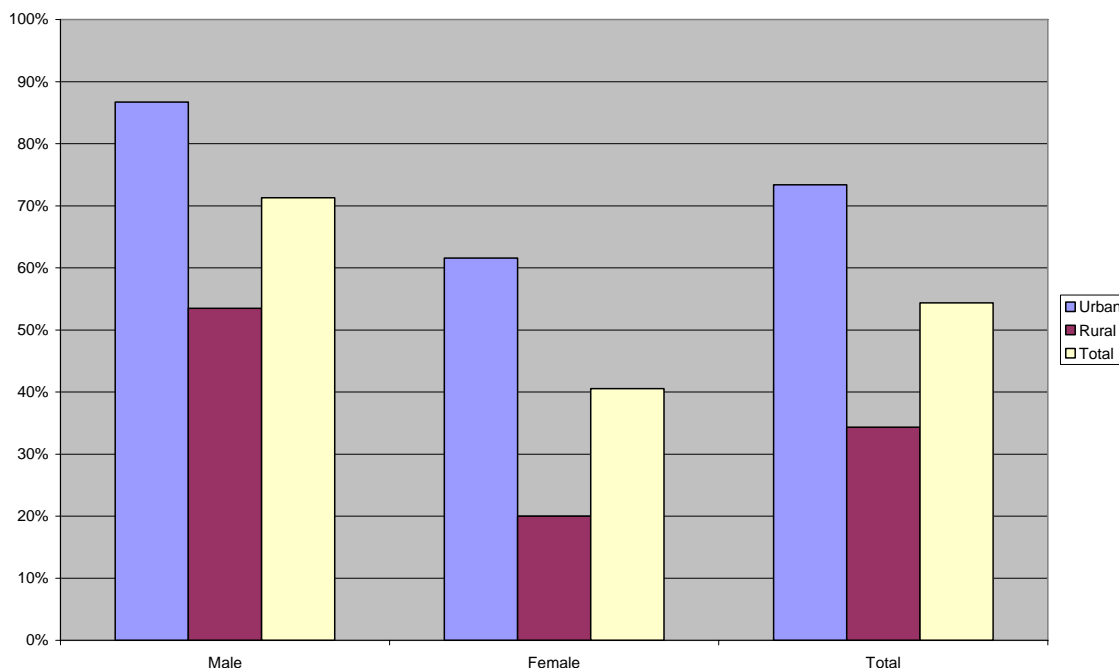
Figure 4-2 – Adult Literacy Rates by Area of Residence and Gender
Source: Mozambican Household Survey 2002/03

4.3.2. Enrolment and Educational Attainment

For children between 6 and 18 years old in the Household Survey, 81% were enrolled at school, and the males that enrolled were estimated at 84% and females at 78%. The provinces with high enrolment numbers were Maputo Province and Maputo City, with 94% and 93% respectively. The provinces with lower enrolment numbers were the provinces of Cabo Delgado with (72%), Tete (70%), Niassa (74%), Nampula (69%), Sofala (71%) and Zambezia (77%). These results are in line with the analysis in Chapter III (Supply Factors).
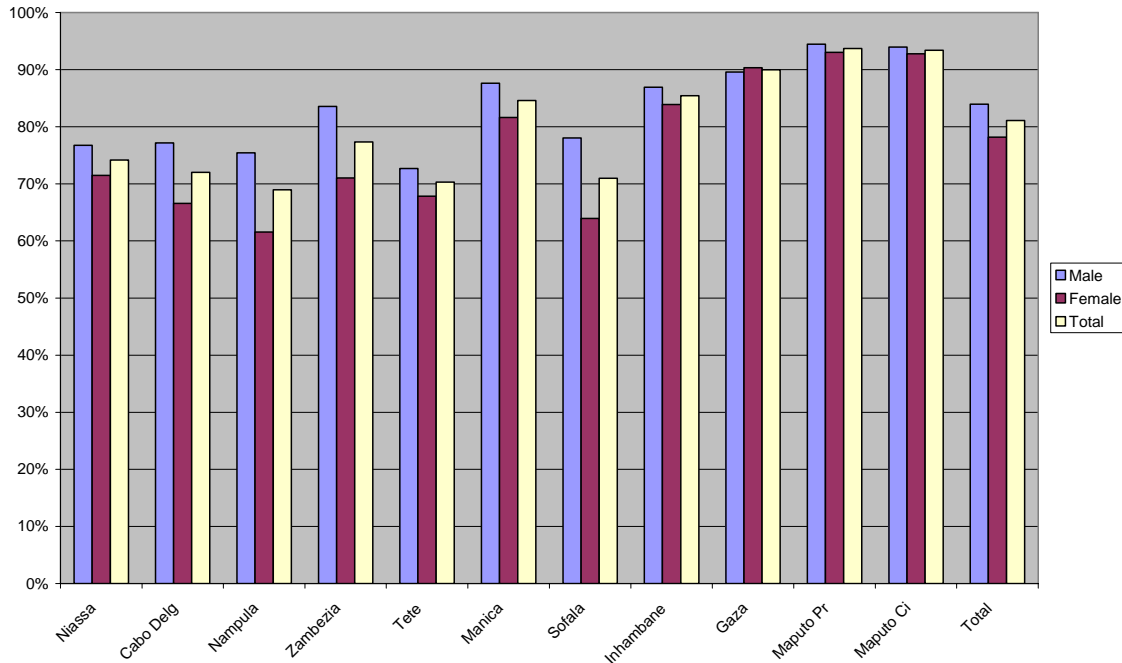
Figure 4-3 – Enrolments by Province and Gender
Source: Mozambican Household Survey 2002/03

The analysis of enrolment was also decomposed by location (rural and urban) and income groups (Figure 4-4). The percentage enrolment in urban areas was 86% and in rural areas only 63%. This result does not constitute a surprise due the differences in income between urban and rural areas in Mozambique. In urban areas, there was a difference in terms of enrolment by income groups, where higher income groups had a higher percentage enrolments than low income groups. It can be interpreted that in urban areas income was a determinant of enrolments. By contrast, in rural areas enrolments did not vary a lot by income groups, partly because income did not vary significantly between the groups. Therefore, income could not be interpreted as an important determinant of enrolments in rural areas.
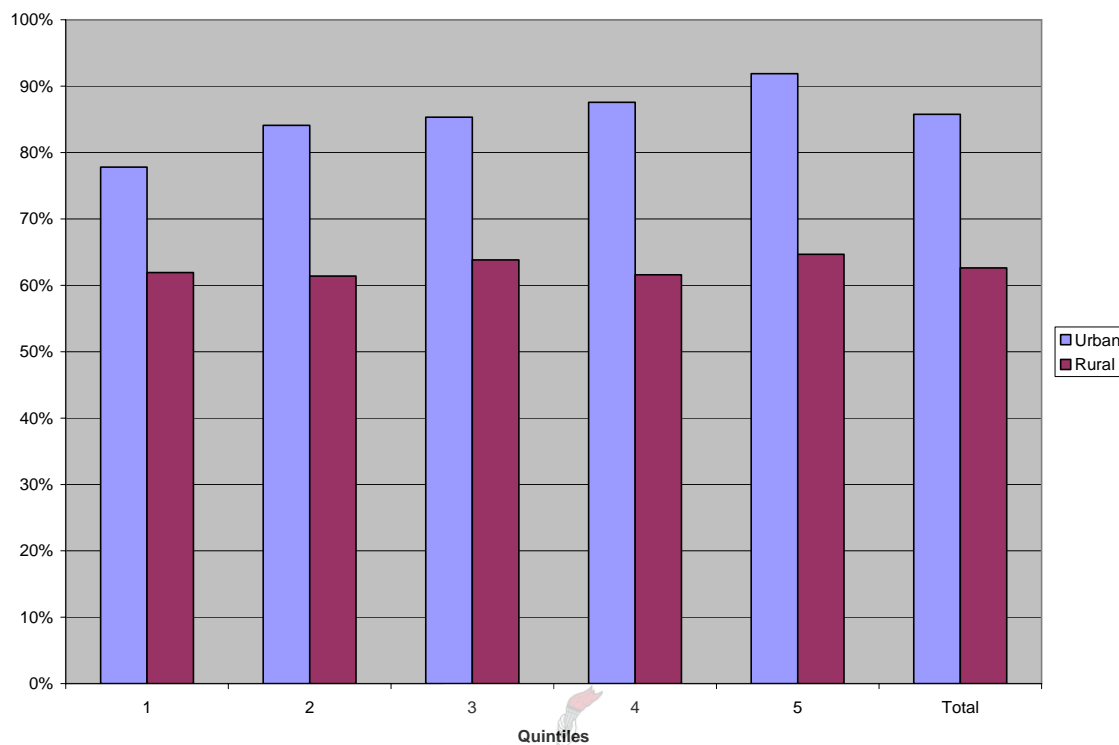
Figure 4-4 – Enrolments by location and quintiles of income
Source: Mozambican Household Survey 2002/03

Table 4-1 illustrates that 62% of Mozambican adults did not complete at least EP1. Only 22% of the sample completed the first level of primary school (EP1). As the level of education increases, the number of people who completed the advanced grades decreases. The percentages of pupils that completed the primary school of second level (EP2) and secondary school of first and second level (ESG1 and ESG) were 11%, 3% and 2% respectively. The most worrying figure was in higher education, where only 0.26% of the population had a university degree or an equivalent level of education.

There was a visible difference in terms of educational attainment by location. In rural areas, on average 80.73% of adults did not have any formal education. The levels of primary and secondary education were very low compared with urban areas. There were almost no adults with a university degree or equivalent in rural areas. If one recalls the analysis in chapter III about the distribution of schools between urban and rural areas, where evidence showed that there was a concentration of secondary schools in urban

areas, one of the possible reasons for low attainment in rural areas may be the shortage of schools in these regions. Another reason can be the fact that qualified people migrate to urban areas, looking for better employment opportunities and other benefits. Turning to urban areas, educational attainment was better than in rural ones, despite the fact that approximately half of the adult population still had no education. In addition, the levels of education were still low in this region, where for example only 27% of the population completed EP1 and only 0.43% obtained a university degree.

Table 4-1 – Maximum adult education level in the Household by location

	None	EP1	EP2	ESG1	ESG1	Higher	Total
Urban	48.13%	26.60%	16.14%	5.16%	3.53%	0.43%	100%
Rural	80.73%	14.84%	3.52%	0.68%	0.23%	0.00%	100%
Total	61.54%	21.76%	10.95%	3.32%	2.18%	0.26%	100%

Source: Mozambican Household Survey 2002/03

In terms of educational attainment by province (Figure 4-5), Nampula (82%), Zambezia (79%), Cabo Delgado (76%) and Tete (70%) were the provinces with high percentages of the population with any degree. Maputo City and Maputo Province had low percentages of non-educated adults of 40% and 51%, respectively. Maputo City and Maputo Province were also the provinces with the highest proportion of population in higher levels of education, namely secondary school and university. Niassa, Nampula, Zambezia, Tete and Inhambane were provinces with very few university degree. The province with worst educational attainment was Zambezia, where 79% of the population had no formal education, only 19% had primary education, 3% had secondary education and few had a tertiary degree.
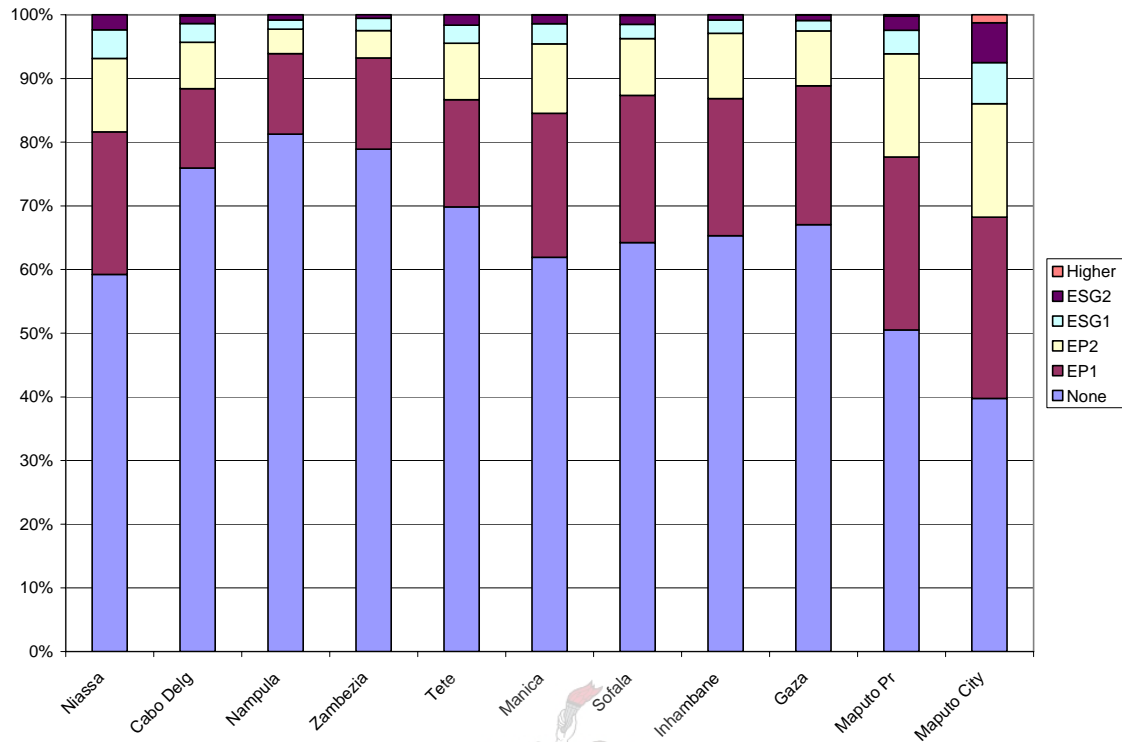
Figure 4-5 – Educational attainment by Province
Source: Mozambican Household Survey 2002/03

Figure 4-6 shows the educational attainment by gender. The percentage of adult female that had no education was 66%, above the country average of 62%. For all female in the sample, 21% completed EP1, 9% completed EP2, 2% ESG1, 1% ESG2 and only 0.19% completed university degree. One can conclude that there is significant gender inequality in education attainment in Mozambique.

Female

21%

9%

2%

1%

0%

67%

□ None ■ EP1 □ EP2 □ ESG1 ■ ESG2 ■ Higher

Male

12%

4%

3%

0%

23%

58%

□ None ■ EP1 □ EP2 □ ESG1 ■ ESG2 ■ Higher
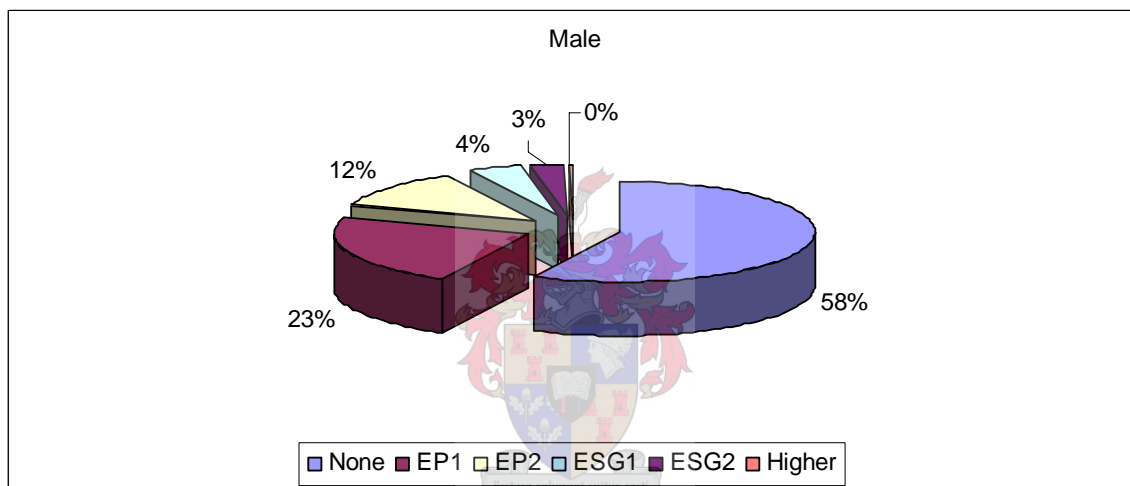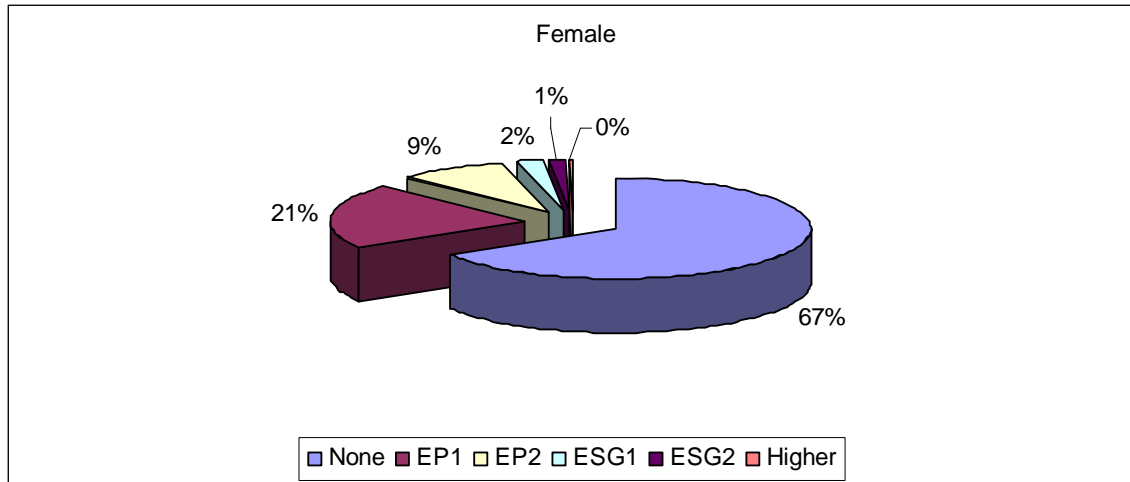
Figure 4-6 – Educational attainment by gender
Source: Mozambican Household Survey 2002/03

4.3.3. Income and education attainment

The Mozambican household survey did not provide information on income and for that reason this study uses daily consumption per capita as a proxy for income. Figure 4-7 presents the education profile by income groups.
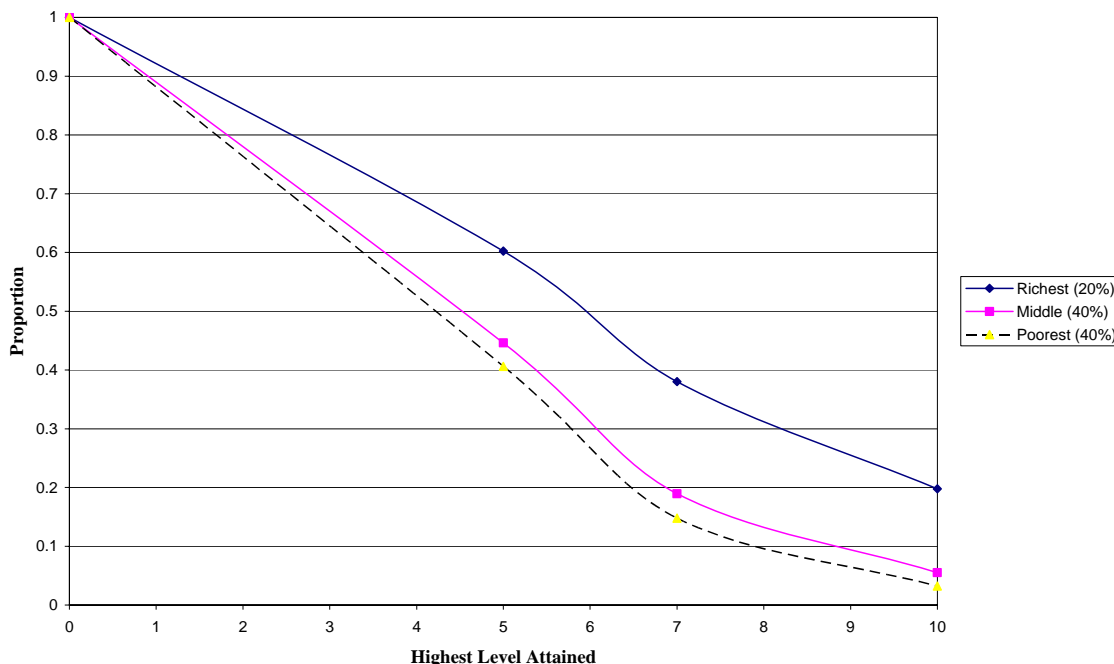
Figure 4-7 – Attainment profiles by quintiles
Source: Mozambican Household Survey 2002/03

The differences in attainment profiles are visible from figure 4-7. Only 41% of those aged 20 to 25 years from the poorest 40% of households in Mozambique had completed EP1 or higher. From the same income group only 15% had completed EP2 or higher, and only 3% had completed ESG1 or higher. Among the richest quintile 20%, 60% had completed EP1 or higher. However, only 38% had completed EP2 or higher, which means a high level of drop-outs. The same pattern is observed for higher levels of education, where only 20% of the richest group had completed ESG1.

However, there is no evidence on the direction of the causality. In other words, it is difficult to interpret whether the higher levels of education were the factors that determined their positions in this quintile or whether it was due to the fact that they were in the high-income class which gave them the opportunity to attain higher levels of education, or whether both situations occurred simultaneous. Section 4.6 of this chapter, the empirical part, will try to answer this question. Hence, it is important to mention that there is a difference in educational profiles between the three income groups.

4.3.4. Reasons for children not attending school

The household survey also provided some information on reasons for the lower school attainment. Figure 4-8 illustrates the reasons given by adult individuals in the sample for their children not attending school. For the main group of school-aged, the main reason for not attending school was not specified. In the survey, 25% of the sample perceived that education was not important for their children and therefore it was not important to enrol/attend school. Furthermore, 21% say that their children were not currently in school because school was expensive and 12% of the population said that distance to school was also a constraint for school enrolment and attainment.

Finally, reasons such as absence of next level[1] of school, limited vacancy at schools, work, marriage and pregnancy were not reported to be important constraints of current enrolment status. The reasons for not enrolling amongst girls followed the same pattern. However, it is important to mention that girls reported earlier marriage (5%) and pregnancy (2%) as constraints for attending school. It seems that earlier marriage had a more adverse impact on girls more than on boys.

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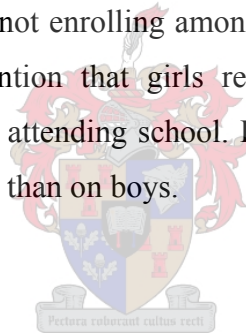
[1] The reason "Next level" refers to nonexistence of a next grade or level of school (EP2, ESG1 or ESG2) that a pupil is supposed to attend in some regions
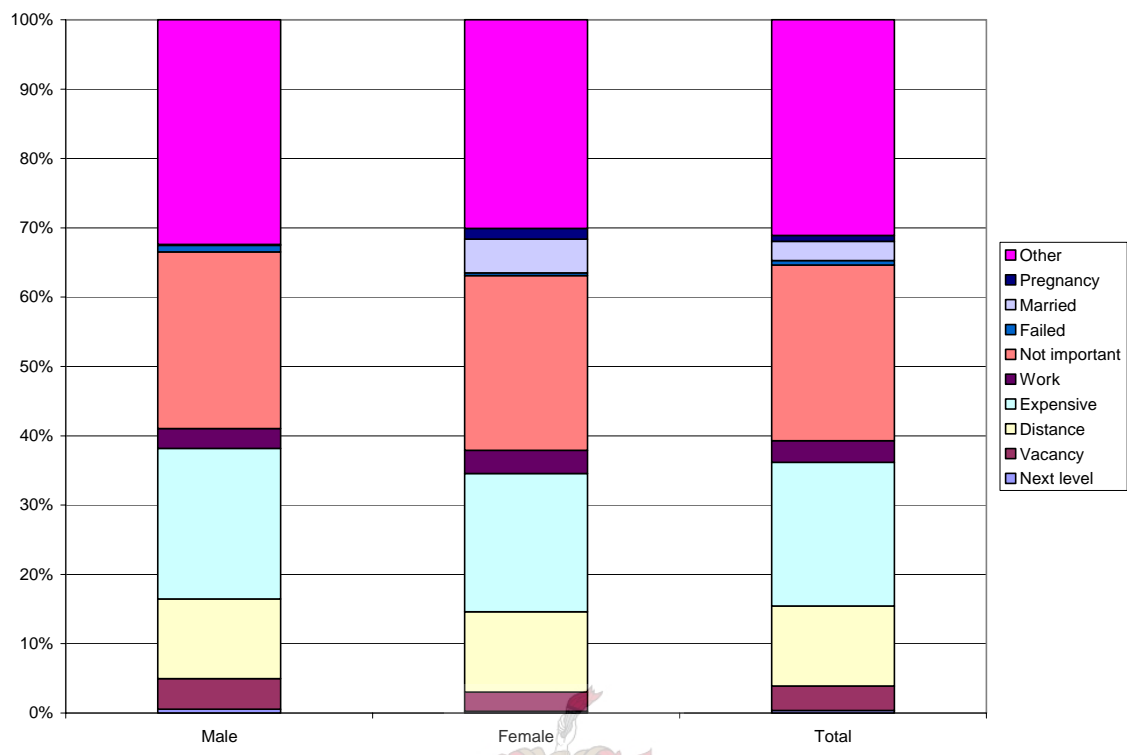
Figure 4-8 – Reasons for children not attending schools – boys and girls
Source: Mozambican Household Survey 2002/03

The reasons for not attending school varied, by region (Figure 4-9). For children in rural areas, distance to schools transpired to be an important factor in school enrolment. Earlier marriage and perception of importance of school were also more important in rural areas than in urban areas. For children in urban areas, the most important constraints were the cost of school, repetition, limited number of vacancies, earlier work and pregnancy. The cost of school can be explained by the fact that schools in urban areas had higher school fees and other costs, such as uniforms and important school materials. It was important to underline that this survey was done before the abolition of schools fees[2]. According to the old school fees' policy, pupils who failed a given grade had to pay 50% more to attend the same grade.

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[2] For more details section 3.6.2 (in Chapter III – Supply Factors) deals with this subject
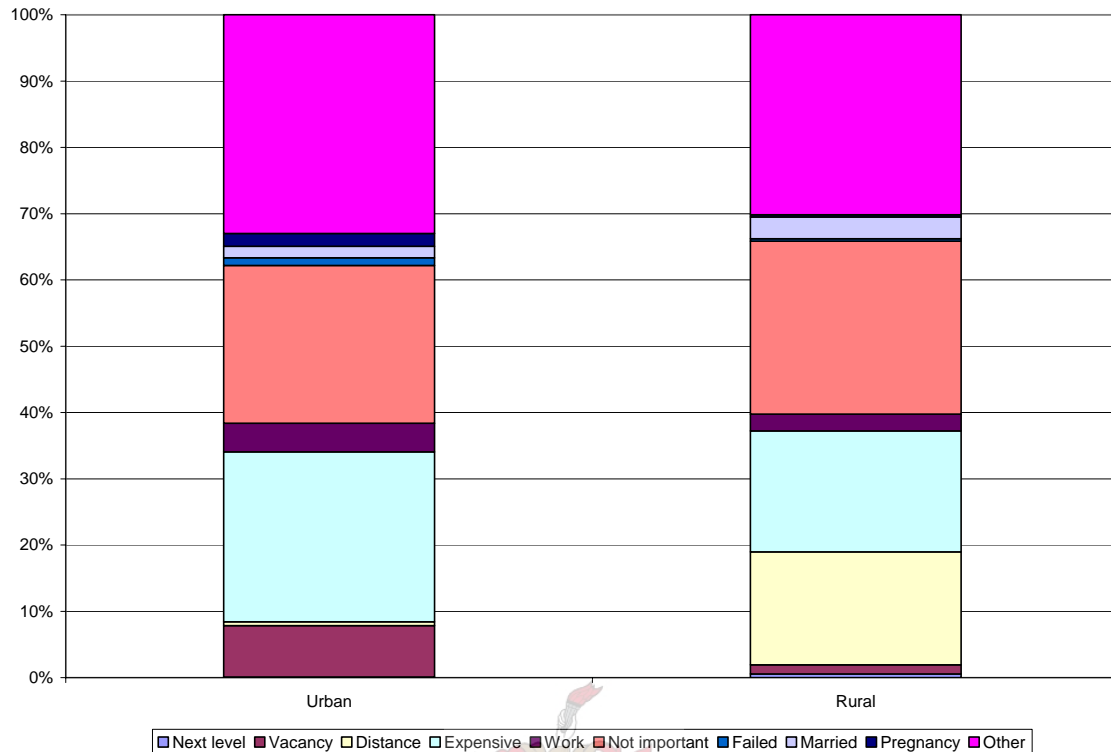
Figure 4-9 – Reasons for children not attending schools by location
Source: Mozambican Household Survey 2002/03

Table 4-2 describes the reasons for children not attending school by Province. Vacancy at schools was a problem in Maputo City and Maputo Province. It is important to mention that Maputo City is the major urban area and Matola City (capital of Maputo Province) is the second major city of Mozambique. Distance to school was a concern in Zambezia, Sofala and Nampula. The possible reason for this result was the fact that these regions had shortage of schools in rural areas, where most of the population resides.

Table 4-2 – Reasons for children not attending school by Province

	Niassa	C Delg	Namp	Zamb	Tete	Manica	Sofala	Inhamb	Gaza	Map Pr	Map C
Next level	0.00%	0.00%	0.23%	1.97%	0.24%	0.28%	0.20%	1.39%	0.00%	0.00%	0.00%
Vacancy	1.46%	0.00%	0.93%	0.00%	1.44%	4.70%	1.22%	7.41%	6.19%	7.57%	17.86%
Distance	14.39%	5.08%	15.35%	27.81%	10.79%	5.25%	18.09%	6.94%	4.12%	0.54%	0.45%
Expensive	24.39%	4.24%	44.19%	25.84%	9.83%	11.33%	15.85%	11.11%	22.34%	31.35%	22.77%
Work	4.15%	0.42%	0.93%	1.40%	3.36%	3.59%	4.27%	2.78%	4.81%	4.86%	4.02%
Not important	33.17%	33.90%	11.63%	11.80%	47.72%	26.80%	19.92%	35.19%	24.05%	15.14%	18.30%
Failed	1.22%	1.69%	0.47%	0.56%	0.72%	0.28%	0.81%	0.00%	0.34%	0.00%	0.45%
Married	2.20%	2.97%	1.63%	1.69%	0.48%	4.42%	2.64%	7.87%	5.84%	2.70%	0.45%
Pregnancy	1.22%	0.42%	0.70%	0.28%	0.00%	0.83%	0.61%	0.46%	0.34%	2.16%	4.02%
Other	17.80%	51.27%	23.95%	28.65%	25.42%	42.54%	36.38%	26.85%	31.96%	35.68%	31.70%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: Mozambican Household Survey 2002/03

Finally, the analysis of reasons for children not attending school also touched on income variables. The table 4-3 illustrates the reasons by income group. As expected, for low income groups (quintiles 1 and 2) the cost of schooling turns out to be an important negative factor for enrolment. There was a low perception of returns of school among the lower quintiles of income. Work and earlier marriage were perceived as being significant factors for enrolment in higher quintiles of income. The reason for this should be investigated in more detail in the following sections of this chapter. The other factors did not vary substantially by income groups and they all followed the general tendency of the answers of the survey about the reasons of low attainment.

Table 4-3 – Reasons for children not attending school by Income Group

	Quintiles				
	1	**2**	**3**	**4**	**5**
Next level	0.34%	0.12%	0.40%	0.62%	0.60%
Vacancy	3.94%	3.03%	3.03%	3.56%	4.19%
Distance	6.97%	10.56%	13.97%	13.31%	15.37%
Expensive	26.66%	22.45%	19.37%	17.65%	13.37%
Work	1.12%	2.79%	3.43%	3.25%	6.59%
Not important	27.45%	25.61%	22.40%	25.85%	24.95%
Failed	0.56%	0.73%	0.26%	1.08%	0.60%
Married	1.12%	2.67%	2.77%	3.72%	4.59%
Pregnancy	0.34%	0.85%	1.45%	0.93%	0.80%
Other	31.50%	31.19%	32.94%	30.03%	28.94%
Total	100%	100%	100%	100%	100%

Source: Mozambican Household Survey 2002/03

4.4. Methodology

The present section describes the methodology used in this Chapter. The first part specifies the econometric model used. The second part explains the reasons for the inclusion of dependent and explanatory variables in the empirical work.

4.4.1. Model Specification

The model used in the present study was based on the educational production function, which shows the relationship between quantity and quality of inputs used in the educational process and the output of the process (Hanushek, 1987). The inputs of the education process are constituted by the school inputs and non-school inputs. School inputs include human and physical resources. On the one hand, equipment and materials to support the learning process constitute the physical inputs; on the other hand, human resources are constituted by quantity and quality of the teachers, managers and personnel. The non-school inputs are related to socio-economic background of the pupils, which are factors such as parental socio-economic levels, demography variables (race, gender) and community environment. Our model was based only on demand-side factors of education. The general model is presented below:

$$Y = \alpha + \beta_1 C + \beta_2 H + \beta_3 L + \beta_4 R + \mu i$$

Where:

Y – School outcomes (no education, EP1, EP2, ESG1, ESG2, Tertiary education)

C – Individual characteristics (Age, Gender)

H – Household characteristics (Income, Parental Education, Headship of the household)

L – Location (urban and rural)

R – Region (provinces)

The estimation of regressions used two methods: 1) Interval regressions and 2) Probit Model. The dependent variable, education years, was discrete: a) No school; b) EP1; c) EP2; d) ESG1; e) ESG2; and f) Tertiary education. Thus, the analysis used Interval Regression Model to estimate the determinants of educational attainment. Interval regressions are a variant of Ordered Probit Model with fixed cut points and the coefficients and standard errors are estimated with maximum likelihood (Wooldridge, 2002: 509). A problem with this model is that the R-Squared is not computable. However, the author also used OLS (Ordinary Least Squares) to obtain an indication about the power of variables in explaining variations in educational attainment. These estimates are not reported in this paper.

The use of probit model had the objective of analyzing the qualitative behaviour of the individual: whether he/she had completed a given education level or not (Wooldridge, 2002: 458). The probit is used when the dependent variable is a dummy (or binary categorical). In this case, the dependent variable (primary education completion and enrolment status) assumed two values: 0 if the children did not complete the primary education and 1 if the children completed this level. The model focused on a positive outcome, the probability of completion of primary education. The model was also used to analyse the probability of completion of primary school by region and location. In addition, the determinants of primary completion by gender (girls and boys) were also explored.

In order to make the results of the regressions representative of the population in the survey, the estimates were done by using weights (household weight) (Deaton, 1997: 71).

In addition to this, estimates report robust standard errors to minimize the impact of hetero-skedasticity in the regressions. Hetero-skedasticity is a common problem in Household Surveys and the consequence is that the estimates become inefficient and the standard errors are calculated in an incorrect way (Deaton, 1997: 79).

4.4.2. The Choice of Variables

The choice of variables was done by the analysis of the dataset of household survey, reports of the Ministry of Education and inputs from the literature review. These variables are described below:

Dependent variables

The dependent variables used were the highest level of education attained, the completion of primary education and current enrolment status. These estimates were for population above age 6 years and less than 25 years. Models for secondary education were also estimated but results were found to be weak and for that reason they are not reported here.

Individual Characteristics

The relevant individual characteristics were gender and age. Section 4.3 showed evidence of gender gaps in terms of enrolments and educational attainment. Other studies in developing countries also demonstrated evidence of differences by gender in schooling. Dancer and Rammohamn (2004) for Egypt and Lloyd et al (1998) for Kenya were examples of studies that demonstrated the importance of these variables. The age of the individual is an important variable according to the educational production function.

Household Characteristics

One of the objectives of this study is to estimate the effect of household income in educational attainment. Therefore, an important variable of analysis is the income of the

household. The database of the Mozambican Household Survey did not provide information about income and for that reason consumption per capita was used as proxy of income. Other variables include parental education and gender of the head of the household. Al-Samarrai and Peasgood (1998), studying the relationship between educational attainment and household characteristics, found a positive impact of a female headed household on educational achievement. The empirical research and literature in economics of education also demonstrated the importance of parents' education on educational attainment of the children.

Regions and Location

The earlier analysis showed (see section 4.3) that there were inequalities, in terms of educational attainment, between provinces in Mozambique. Moreover, there was also inequality between rural and urban areas. For that reason the region and location variables received attention in this research.

4.5. Description of dataset and descriptive statistics

4.5.1. Data Description

The database used in this chapter was the household survey 2002/2003 (Inqueritos aos Agregados Familiares – IAF) of Mozambique, taken from National Institute of Statistics (INE). The data was the second household survey in Mozambique, which contains indicators about the income and consumption, socio-economic and demographic characteristics of the Mozambican population.

The sample of the IAF 2002/2003 was drawn from the last Mozambican Census (1997) and it was a random and a multi-stage stratified sample which was constructed. The first stage was stratification by Primary Sampling Units (PSU). The following stage was the construction of Enumerator Areas (Eva's) inside the PSU. The third stage was the selection of households inside the Eva's. The survey chose fifteen households in each urban EA and twelve in each rural EA. Thus, the sample size of the questionnaire is 8

727 households, of which 4 020 were in urban areas and 4 707 in rural areas. The sample was representative at the national, the provincial, and the local residences (urban and rural) and regional (south, centre and north) dimensions. Of the initial sample of 8 727 households, 8700 were interviewed, which represented a coverage rate of 99.7%. The following table (4-4) shows the results of sampling implementation:

Table 4-4 – Coverage rate by Province

Province	Households		Coverage Rate (%)
	Selected	Interviewed	
Countrywide	**8,727**	**8,700**	**99.7**
Niassa	816	816	100.0
Cabo Delgado	738	738	100.0
Nampula	756	756	100.0
Zambezia	735	733	99.7
Tete	756	756	100.0
Manica	816	816	100.0
Sofala	795	795	100.0
Inhambane	756	753	99.6
Gaza	786	786	100.0
Maputo Province	837	828	98.9
Maputo City	936	923	98.6

Source: National Institute of Statistics (INE) – 2003

Table 4-5 presents some descriptive statistics of the variables used in the regressions. The majority of the population resided in rural areas (68%). Within provinces, with exception of Maputo City and Maputo Province, the population was mainly rural. In terms of gender, 52% were female and 48% were male. Nampula and Niassa were exceptions in terms of gender proportion in the sample, where males were more than females. As expected, male headed households were more common than female headed households. The proportion of children at school was about 70% and there were considerable disparities across provinces (Example: Maputo City (91.37%) and Niassa (56%)). The descriptive statistics also demonstrated low levels of education and inequality across provinces. Finally, the sample illustrates a young population with average age of 21 years.

Table 4-5 – Descriptive Statistics for Mozambican Household Survey 2002/2003

Sample Size	All 44083	Niassa 4126	Cabo Delgado 2848	Nampula 3341	Zambezia 3449	Tete 3546	Manica 4767	Sofala 4449	Inhambane 3507	Gaza 4257	Maputo Province 4182	Maputo City 5611
Male (%)	47.96	50.19	48.60	50.84	47.83	49.02	48.71	48.17	43.70	41.53	46.28	48.28
Rural (%)	67.92	80.81	77.47	59.69	89.15	84.89	63.91	60.07	77.91	74.33	38.43	0.00
Female-headed household (%)	20.51	16.33	18.59	15.44	17.14	14.30	13.86	13.70	33.20	40.45	34.66	26.53
Literate (%)	39.84	28.52	30.14	28.26	30.55	34.40	48.23	41.34	51.21	44.69	64.99	77.66
Proportion of children at school (%)	70.28	55.74	60.82	68.67	73.79	57.12	71.37	66.05	66.62	77.03	85.45	91.37
Mean of Age (years)	21.19	19.85	22.33	21.07	20.32	20.23	20.19	20.44	23.39	22.04	22.43	22.54
	(18.18)	(17.64)	(18.19)	(18.27)	(17.75)	(17.73)	(17.19)	(17.73)	(20.30)	(19.82)	(17.88)	(16.93)
Mean of years of educational attainment	1.83	1.74	1.74	1.31	1.04	1.41	2.03	2.06	2.06	1.69	2.98	4.23
	(3.05)	(2.98)	(3.12)	(2.70)	(2.33)	(2.75)	(3.07)	(3.10)	(2.90)	(2.77)	(3.39)	(3.92)
Mean of head of household's years of education	2.72	3.30	2.64	2.22	1.95	2.58	3.30	2.70	2.44	2.16	4.20	5.35
	(3.53)	(3.66)	(3.79)	(3.34)	(2.95)	(3.47)	(3.71)	(3.34)	(3.21)	(3.20)	(3.61)	(4.17)
Mean of per capita consumption (Daily consumption in old metical's)	10,987	11,058	10,955	10,113	11,620	9,101	12,126	15,573	6,625	10,625	8,672	14,503
	(15,430)	(10,852)	(27,018)	(8,271)	(9,306)	(8,820)	(11,540)	(23,372)	(8,373)	(15,820)	(9,853)	(28,798)
Mean of log of per capita consumption (Daily consumption in old metical's)	9.01	9.09	8.95	9.01	9.15	8.83	9.12	9.34	8.46	9.00	8.76	9.12
	(0.71)	(0.60)	(0.63)	(0.62)	(0.62)	(0.77)	(0.75)	(0.70)	(0.76)	(0.64)	(0.73)	(0.84)

Notes: Standard deviation in brackets

All variables are binary except age, education attainment and consumption

4.6. Econometric Results

The present section describes the results of the empirical approach. It starts by discussing the main determinants of educational attainment in Mozambique, including models for gender comparisons and location. Section 4.6.2 explains the determinants of primary school completion for the whole country and by location of households (rural and urban). The present empirical work also attempted to investigate the factors that affect secondary education attainment but due the poor statistical results, it was excluded from the analysis. Finally, section 4.6.3 analyses the determinants of enrolment status.

4.6.1. Determinants of educational attainment

The dependent variable, education years, of the regressions presented in table 4-6 was discrete: a) No school; b) EP1 (5 years); c) EP2 (7 years); d) ESG1 (10 years); e) ESG2 (12 years); and f) Tertiary education (16 years). Thus, an Interval Regression Model was used to estimate the determinants of educational attainment. Interval regressions estimate the standard errors with maximum likelihood but the R-Squared is not computable. The child characteristics (age dummies and gender), household characteristics (income, education of household, headship of the household), regions (provinces) and location (rural or urban) were included in the model. Income was positively correlated with educational attainment. If daily consumption per capita (used here as proxy for income), in a household, increase by 1% it would increase education attainment by about 0.193 years. This suggests that, controlling for age dummies, education of head of household, headship of household, region and location, households with greater income were more likely to invest in education of their children. Being a boy also increases attainment grade by 0.131 years. This is not a surprising result due the gender disparities that were demonstrated in descriptive work. The age dummies also demonstrated a positive relationship with educational attainment. As age increases additional years of education also increase. However, ages 7, 8 and 9 do not follow this tendency and the dummies were not statistically significant. It seems that these dummies were not statistically different from the reference category (Age 6). In other words, controlling for other

variables the educational attainment of the school age children of 6, 7, 8 and 9 were not different. This may result from the categorical dependent variable. Moreover, the coefficients in age dummies revealed a pattern of both late enrolment and high failure rate. An additional year of head of household's education increase children's education by 0.064 years. There is an incentive for educated parents to send their children to school. This incentive comes from the perception that investment in children's education would have positive returns and future benefits, in terms of income. Moreover, education of the head of household maybe correlated with income.

An interesting result came from the fact that female-headed household was positively related with attainment and increased the education of children by 0.125 additional years. In Egypt (Dancer and Rammohan (2004)), school enrolment and attainment among female-headed households were very low in both rural and urban areas. The authors explained this situation by the fact that a female headed household was more likely to be poor than a male headed household in that country. However, in the case of Egypt, Dancer and Rammohan (2004) did not control for income. In addition to this, a study done in Kenya (Lloyd et al (1998)) found that female headed household only had a positive impact on girls' enrolments. Despite this, for the case of Tanzania, Al-Samarrai and Peasgood (1998) found that female headed household had a positive impact on schooling for both boys and girls. In the case of Mozambique, it seems that female-headed households were more likely to invest in education of their children believing in future positive return of their investment. Moreover, it was also tried to include in the model an interaction variable (male*female headed household) in order to find the impact of boys' education achievement in a female headed household. The coefficient found in this experiment was negative but insignificant. As a result, no conclusions could be drawn for that experiment or whether there was a gender bias in education in female headed households.

Rural residence decreases attainment of children by almost 0.455 years. It can be explained by the fact that rural households were poorer and costs (both direct and opportunity costs) of sending children to school were high. Furthermore, in the case of

Mozambique, it can also be explained by supply-side factors such as the qualification of teachers and availability of schools for higher levels of education (ESG1 and ESG2) in rural areas (see chapter III for more details). In terms of regions, the inequality of education between Maputo City (capital and omitted region) and other provinces was clear. After controlling for other factors (age, income, gender, education of head of the household, headship of household and location), provinces like Nampula, Niassa, Zambezia and Sofala had on average 0.722, 0.588, 0.581 and 0.488 fewer years of education, respectively. These results were in line with the ones found in descriptive work, i.e., they remain true after controlling for other factors, and provide further proof of the disparities of education within the country.

The general model of education attainment was also applied separately for males and females for gender comparison purposes. The headship of the household for female model was positive and significant and in the Male model it was positive and not significant. It underlines the importance of female headed household for girls' education and indicates that girls may gain more from female headship. The behaviour of the age dummies was also different in the models. The impact of the above variables was similar as in others developing countries.
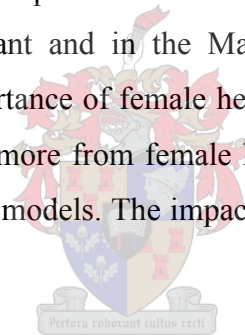
The model presented in table 4-6 shows a further analysis of determinants of education attainment, this time by location. The income of the household had a positive and significant effect for both rural and urban households. It seemed to have a more significant impact in urban areas than in rural ones, where in the first an increase in daily income by 1% will increase education by 0.294 years. Parents' education was also more important in urban areas.

Table 4-6 – Interval Regressions estimates of determinants of education years (Age < 19) – General, Gender and Location models

	Dependent Variable: Educational Attainment				
	General	**Male**	**Female**	**Rural**	**Urban**
Log of per capita consumption	0.193	0.217	0.173	0.079	0.294
	(4.19)***	(3.12)***	(3.01)***	(2.28)**	(3.13)***
Female Headed Household	0.125	0.048	0.198	0.06	0.134
	(1.98)**	(-0.54)	(2.46)**	(-1.58)	(-0.77)
Education of Head of Household	0.064	0.066	0.06	0.024	0.081
	(6.63)***	(4.86)***	(4.38)***	(2.91)***	(3.68)***
Age 7	0.029	0.013	0.045	0.001	-0.008
	(-0.37)	(-0.12)	(-0.44)	(-0.04)	(-0.05)
Age 8	0.136	0.078	0.198	0.048	0.081
	(1.69)*	(-0.67)	(1.92)*	(1.65)*	(-0.43)
Age 9	0.094	0.119	0.08	0.029	0.019
	(-1.27)	(-1.11)	(-0.81)	(-1.05)	(-0.11)
Age 10	0.164	0.178	0.157	0.05	0.222
	(2.16)**	(-1.62)	(-1.57)	(-1.46)	(-0.64)
Age 11	0.201	0.157	0.238	0.034	0.317
	(2.79)***	(-1.49)	(2.71)***	(-1.17)	(-0.92)
Age 12	0.323	0.351	0.307	0.144	0.425
	(3.29)***	(3.12)***	(1.82)*	(-1.62)	(2.34)**
Age 13	0.515	0.556	0.487	0.16	0.876
	(6.21)***	(5.02)***	(4.05)***	(4.85)***	(3.97)***
Age 14	0.905	0.903	0.923	0.228	1.763
	(9.22)***	(6.62)***	(6.64)***	(4.98)***	(6.90)***
Age 15	1.26	1.271	1.263	0.412	2.295
	(5.18)***	(4.12)***	(3.23)***	(4.78)***	(3.68)***
Age 16	1.706	1.618	1.803	0.678	2.804
	(9.90)***	(6.86)***	(7.45)***	(4.86)***	(8.37)***
Age 17	2.03	2.307	1.783	0.583	3.547
	(9.03)***	(6.53)***	(6.35)***	(5.49)***	(9.63)***
Age 18	2.226	2.876	1.604	0.86	3.599
	(9.70)***	(7.52)***	(7.52)***	(4.55)***	(7.99)***
Male	0.131			0.061	0.159
	(2.17)**			(1.65)*	(-1.03)
Niassa	-0.588	-0.558	-0.616	-0.473	-0.502
	(5.39)***	(3.21)***	(5.83)***	(4.48)***	(6.03)***
Cabo Delgado	-0.439	-0.37	-0.497	-0.439	-0.31
	(3.23)***	(2.05)**	(2.51)**	(4.62)***	(-1.08)
Nampula	-0.722	-0.68	-0.771	-0.432	-0.783
	(4.64)***	(3.18)***	(3.46)***	(4.21)***	(2.03)**
Zambezia	-0.581	-0.517	-0.63	-0.471	-0.412
	(5.29)***	(3.41)***	(4.13)***	(4.97)***	(2.14)**
Tete	-0.423	-0.387	-0.459	-0.377	-0.175
	(4.84)***	(3.12)***	(3.78)***	(4.07)***	(1.65)*

Manica	-0.429	-0.345	-0.512	-0.231	-0.356
	(5.36)***	(3.00)***	(4.44)***	(2.20)**	(3.58)***
Sofala	-0.49	-0.289	-0.698	-0.431	-0.362
	(5.12)***	(2.40)**	(5.12)***	(4.36)***	(2.87)***
Inhambane	-0.121	-0.025	-0.215	-0.18	0.249
	(-1.24)	(-0.18)	(-1.53)	(1.83)*	(1.86)*
Gaza	-0.222	-0.185	-0.251	-0.227	-0.015
	(2.65)***	(-1.57)	(2.14)**	(2.46)**	(-0.14)
Maputo Province	-0.252	-0.264	-0.226		-0.221
	(3.22)***	(2.42)**	(2.01)**		(2.21)**
Rural	-0.455	-0.469	-0.432		
	(6.01)***	(4.29)***	(4.14)***		
Constant	-1.388	-1.562	-1.129	-0.44	-2.926
	(3.22)***	(2.42)**	(2.10)**	(-1.35)	(3.49)***
Observations	9679	4962	4717	3626	6053

Robust z statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

4.6.2. Determinants of primary school attainment

The probit regressions below considered whether children completed full primary school (EP2) or not (Table 4-7). A pupil who enrolled in grade 1 at 6 years of age and did not fail any grade should finish EP2 at 12 years. Therefore, the age group considered for this set of regressions was between 13 and 18 years. Female headed household had the most significant impact on probability of girls of finishing EP2 (34%). It seems that female headship induces more children to attend primary school. However, the preference of mothers for girls was visible. A female headed household only increases the probability of boys' primary attainment by 12%. The explanatory variables, income, education of the head of household and male had a positive and significant impact on a pupil's achievement in primary school. As one would expect, the age dummies showed that as age increased, there was more probability of having completed primary education. Concerning regions, most of the provinces had less chances of primary school attainment compared with Maputo City (reference category). Surprising was that Inhambane had more probability of pupils' success than Maputo City, once other factors had been controlled for. Being a pupil in rural areas of Mozambique had an adverse impact on primary education, which decreased the probability of primary completion by 51%.

The gender models again show the preference of mothers to more strongly induce girls than boys to school. Being a girl in female headed household increases the probability by 39% and being a boy only increases the probability by 18%. The income of the household was important for girls' primary completion. A percentage increases in daily income will increase the probability of girls' primary completion by 0,162 years. Helping parents in domestic activities, earlier marriage and pregnancy were possible negative factors that contributed to poor primary attainment among girls in rural areas. Income was a more important determinant of primary attainment in urban areas than in rural areas. The variables, education of the head of household and female headship, had a similar impact on increasing the probability of primary education in both rural and urban areas. Moreover, boys in urban households had more probability of primary completion (33%) than the ones in rural households (23%).

Table 4-7 – Marginal Effects (at mean) of determinants of primary education attainment from probit model (Ages 13-18) – General, Gender and Location models

	Dependent Variable: Primary Education Completion				
	General	**Male**	**Female**	**Rural**	**Urban**
Log of per capita consumption	0.110	0.127	0.162	0.124	0.201
	(3.47)***	(2.09)**	(3.12)***	(1.93)*	(3.65)***
Female Headed Household	0.344	0.184	0.389	0.451	0.394
	(4.57)***	(1.57)	(4.23)***	(2.86)***	(3.40)***
Education of Head of Household	0.070	0.095	0.083	0.090	0.084
	(10.36)***	(7.56)***	(7.36)***	(5.82)***	(8.09)***
Age 14	0.334	0.320	0.514	0.311	0.516
	(4.68)***	(2.52)**	(4.01)***	(2.16)**	(4.37)***
Age 15	0.560	0.744	0.674	0.665	0.765
	(7.12)***	(5.25)***	(4.88)***	(4.23)***	(5.99)***
Age 16	0.689	0.863	0.865	0.833	0.916
	(9.40)***	(6.52)***	(6.77)***	(5.63)***	(7.85)***
Age 17	0.687	0.956	0.783	0.737	1.031
	(9.62)***	(7.17)***	(6.33)***	(5.11)***	(8.70)***
Age 18	0.790	1.329	0.643	1.061	0.950
	(10.35)***	(9.08)***	(5.23)***	(7.01)***	(8.12)***
Male	0.222			0.327	0.233
	(4.45)***			(3.20)***	(2.85)***
Male* Female Headed Household	-0.225			-0.196	-0.318
	(2.03)**			(0.840)	(1.98)**
Niassa	-0.393	-0.526	-0.511	-0.993	-0.410
	(3.90)***	(2.83)***	(3.99)***	(3.68)***	(4.04)***

Cabo Delgado	-0.382	-0.617	-0.285	-0.887	-0.471
	(3.42)***	(3.30)***	(1.44)	(3.50)***	(2.73)***
Nampula	-0.486	-0.607	-0.666	-0.982	-0.687
	(5.58)***	(3.95)***	(4.18)***	(5.14)***	(4.74)***
Zambezia	-0.445	-0.587	-0.518	-1.005	-0.399
	(5.04)***	(3.72)***	(3.33)***	(5.29)***	(2.60)***
Tete	-0.187	-0.272	-0.204	-0.679	-0.158
	(2.20)**	(1.74)*	(1.42)	(3.61)***	(1.190)
Manica	-0.131	-0.188	-0.148	-0.532	-0.186
	(1.90)*	(1.43)	(1.29)	(2.84)***	(1.88)*
Sofala	-0.218	-0.055	-0.473	-1.046	-0.161
	(2.97)***	(0.41)	(3.58)***	(4.90)***	(1.470)
Inhambane	0.155	0.269	0.154	-0.209	0.254
	(1.91)*	(1.74)*	(1.12)	(1.240)	(1.83)*
Gaza	0.108	0.130	0.154	-0.154	-0.023
	(1.42)	(0.88)	(1.25)	(0.89)	(0.21)
Maputo Province	0.023	0.069	0.006		-0.133
	(0.33)	(0.50)	(0.05)		(1.40)
Rural	-0.509	-0.620	-0.669		
	(9.95)***	(6.29)***	(7.96)***		
Constant	-1.654	-1.810	-2.162	-2.197	-2.627
	(5.68)***	(3.25)***	(4.57)***	(3.88)***	(5.29)***
Observations	4221	2179	2042	1423	2798
Pseudo R-Squared	0.244	0.253	0.251	0.1655	0.146

Positive outcomes; Robust z statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

4.6.3. Determinants of enrolment status

Sections 4.6.1 and 4.6.2 dealt with determinants of educational attainment in general and primary school educational attainment in particular: One issue related to the above mentioned was the current enrolment status. In other words, which factors did contribute to current enrolment status? Descriptive work presented in section 4.3.2 showed that: 1) there were more male than female enrolments; 2) there was low enrolment in rural areas; and 3) there were possibly access problems and low availability of schools in rural areas (mainly ESG1 and ESG2). This section makes the comparison between the descriptive and empirical work. The main model (Table 4-8) demonstrates that household characteristics (income, female headship, education of head) and individual characteristics (being male, age) had a positive influence on enrolment status. For

example, being a boy increases the probability of being enrolled by 29%. The negative coefficient in rural variables shows the inequality of enrolment status between urban and rural locations. On the one hand, for girls the most important positive factor was being in a female headed household. On the other hand, being in rural areas had a negative impact on girls' enrolment. In rural areas the main negative factors given by pupils to not enrol were distance to school, earlier marriage and low perception about importance of school (see section 4.3.4 for more details). Regarding urban areas costs of education (direct and indirect), grade repetition and vacancies were given as the main factors. The model by location shows that income was more important for urban areas than for rural ones. Two possible factors can be associated with this feature. Firstly, in urban areas had more attainment associated costs (fees, uniforms and other costs) and therefore only households with high income were able to afford education. Secondly, within rural areas there was not a lot of variation in terms of households' income and for that reason it (income) will not matter in this location. For children in rural areas, being in a household in which a female was the head had a positive and strong impact on enrolment status.
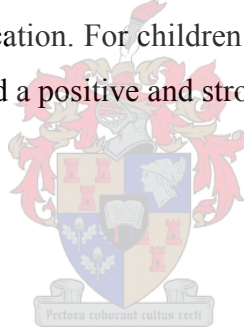
Table 4-8 – Marginal Effects of determinants of enrolment status from probit model (Age < 19) –
General, Gender and Location models

|	Dependent Variable: Enrolment Status				
	General	**Male**	**Female**	**Rural**	**Urban**
Log of per capita consumption	0.235	0.280	0.212	0.178	0.426
	(5.72)***	(4.38)***	(4.03)***	(3.91)***	(4.79)***
Female Headed Household	0.356	0.328	0.344	0.497	0.028
	(4.96)***	(3.26)***	(3.82)***	(5.52)***	(0.23)
Education of Head of Household	0.060	0.042	0.075	0.069	0.034
	(7.02)***	(3.32)***	(6.85)***	(6.41)***	(2.28)**
Age 7	1.721	1.888	1.582	1.718	1.834
	(5.65)***	(2.73)***	(5.82)***	(4.95)***	(2.69)***
Age 8	1.341	1.485	1.232	1.482	1.092
	(9.64)***	(7.21)***	(6.75)***	(8.61)***	(4.78)***
Age 9	1.230	1.747	0.996	1.176	1.414
	(12.72)***	(8.96)***	(9.38)***	(10.52)***	(7.99)***
Age 10	1.313	1.457	1.239	1.389	1.223
	(11.63)***	(7.12)***	(12.14)***	(13.04)***	(4.95)***
Age 11	1.235	1.513	1.067	1.220	1.295
	(13.52)***	(9.89)***	(9.44)***	(11.67)***	(6.47)***
Age 12	0.294	0.000	0.000	0.322	0.211
	(15.80)***	(11.64)***	(10.73)***	(12.97)***	(10.70)***
Age 13	-0.058	0.000	0.000	-0.082	-0.006
	(15.09)***	(10.61)***	(10.79)***	(12.50)***	(8.80)***
Age 14	1.721	1.888	1.582	1.718	1.834
	(14.61)***	(10.81)***	(9.90)***	(12.24)***	(8.61)***
Age 15	1.341	1.485	1.232	1.482	1.092
	(9.31)***	(8.75)***	(5.81)***	(10.18)***	(3.92)***
Age 16	1.230	1.747	0.996	1.176	1.414
	(11.26)***	(10.09)***	(7.09)***	(8.71)***	(7.85)***
Age 17	1.313	1.457	1.239	1.389	1.223
	(11.85)***	(8.11)***	(8.61)***	(9.44)***	(7.67)***
Age 18	1.235	1.513	1.067	1.220	1.295
	(12.24)***	(9.25)***	(8.07)***	(9.51)***	(8.44)***
Male	0.294			0.322	0.211
	(5.85)***			(5.74)***	(2.16)**
Niassa	-0.740	-0.760	-0.720		-0.483
	(6.48)***	(4.36)***	(5.03)***		(5.09)***
Cabo Delgado	-0.557	-0.589	-0.510	0.334	-0.874
	(5.10)***	(3.64)***	(3.42)***	(2.39)**	(5.69)***
Nampula	-0.603	-0.508	-0.681	0.254	-0.799
	(5.42)***	(3.10)***	(4.69)***	(2.02)**	(5.12)***
Zambezia	-0.209	-0.204	-0.209	0.567	0.149
	(2.07)**	(1.33)	(1.56)	(4.51)***	(0.84)
Tete	-0.391	-0.389	-0.400	0.350	-0.101
	(4.03)***	(2.73)***	(3.02)***	(2.70)***	(0.78)

Manica	-0.246	-0.203	-0.276	0.583	-0.344
	(2.70)***	(1.47)	(2.25)**	(4.26)***	(3.64)***
Sofala	-0.539	-0.307	-0.689	0.232	-0.533
	(5.62)***	(2.02)**	(5.63)***	(1.61)	(5.20)***
Inhambane	0.117	0.077	0.175	0.889	0.080
	(1.09)	(0.49)	(1.24)	(6.36)***	(0.51)
Gaza	0.230	-0.004	0.443	0.939	0.619
	(2.15)**	(0.03)	(3.11)***	(6.80)***	(3.89)***
Maputo Province	0.381	0.320	0.460	1.252	0.343
	(3.43)***	(2.04)**	(2.94)***	(6.34)***	(2.93)***
Rural[3]	-0.388	-0.352	-0.429		
	(5.48)***	(3.39)***	(4.78)***		
Constant	-2.091	-2.251	-1.848	-2.830	-3.541
	(5.74)***	(3.99)***	(3.95)***	(6.41)***	(4.73)***
Observations	11471	5712	5759	4825	6646
Pseudo R-Squared	0.220	0.232	0.221	0.186	0.243

Positive outcomes; Robust z statistics in
parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

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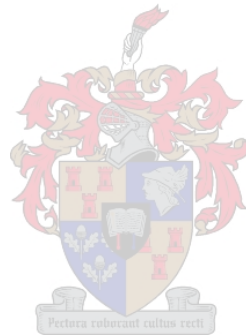
[3] Niassa was dropped for the regression in rural model (fourth column) because all observations were in rural areas

4.7. Conclusion

This chapter started by analysing past studies on determinants of school enrolment and attainment in Mozambique. These studies found that household characteristics (income, education of head), children's characteristics (age and gender) and location are the most important demand factors in educational attainment in Mozambique. The following section described some indicators of schooling. The country is dominated by low literacy rates and great inequality of education in terms of gender, location (rural and urban) and provinces. The percentage of males who enrol in the system was greater than girls and urban areas had higher enrolment and attainment rates than rural ones. In rural areas, on average more than 80.73% of adult residents did not have any formal education.

The levels of primary and secondary education were very low compared with urban areas. The reported reasons for low attainment in rural areas were earlier marriage, low perception of importance of education and distance/availability of schools. The two most populated provinces of Mozambique, Nampula and Zambezia, presented the worst scenarios of educational attainment. In Zambezia, 79% of population had no formal education, only 19% had primary education, 3% had secondary education and few had a higher education level. Moreover, there were large differences in educational profiles between the three income groups (richest, middle and poorest).

The methodology adopted in empirical work helped to analyse important education indicators. The results of the empirical research were as follows. As one expected, the main model showed that household income, age, education of head of household and a child being male had a positive impact on education attainment. However, rural residence had an adverse impact on schooling. These results were in line with others in empirical studies of determinants of education in Mozambique and other developing countries. Being in other provinces and after controlling for other factors, rather than Maputo City and Maputo Province, also had a negative impact on educational attainment. In addition to this, an interesting result came from the positive and significant impact of female-headed household on educational attainment in both rural and urban households. This

was a new result because the past studies in Mozambique did not give the necessary importance to this variable. The model for location of household found that the income variable was not strong in explaining differences in education attainment and primary completion in rural areas, but was positive and significant for urban households. The reason found for this pattern was the low variation of income within rural areas. The variables female headship and education of the head of household had similar patterns for rural and urban areas. Moreover, the probit model for primary school completion demonstrated that female headship; education of the head and being male had a positive and significant impact on primary education completion. The most significant effect came from female headed household, which increases the probability of girls' primary education completion by 34% and boys' completion by 12%

In conclusion, the demand determinants of household characteristics (income, parents' education, headship), individual characteristics (gender and age), location (rural and urban), and Provinces were important variables to explain variations in education attainment, primary education and enrolment in Mozambique. However, the conclusions made in this chapter and the ones presented in Chapter III were important but not enough to explain school enrolment and achievement in Mozambique. In Chapter III, availability of schools, qualification of teachers, costs of education and education funding were identified as factors that affect educational achievement. Hence, it is important to investigate other factors on the supply side of education for more explanations about low levels of education attainment within the country. The factors are related with dimensions of school quality, namely school and classroom dynamics, material inputs and time to learn. Therefore, the next chapter deals with an analysis of the dimensions of school quality in Mozambican education system.

CHAPTER FIVE - ANALYSIS OF SCHOOL QUALITY
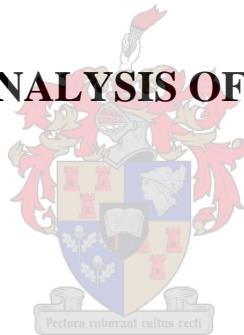
5.1. Introduction

The Millennium Development Goals (MDG's) declaration states that all children (boys and girls) should be able to complete primary school by the year 2015. (United Nations, 2006: 6) Sub-Saharan countries are far from achieving the goal of universal primary completion and rural population and girls are less likely to attend school in these regions (United Nations, 2006: 6). The Mozambican context does not differ a lot from other developing countries. An earlier analysis on this research demonstrated that the Mozambican education system is characterized mainly by low enrolment rates, high failure and dropout rates, and inequality of education attainment in terms of gender and income groups.

The descriptive and empirical works found that both supply factors (school access, qualified teachers and cost of education) and demand determinants (income, parents' education, headship of household, gender, age, location and Provinces) were important variables to explain this poor achievement. However, the dimension of school quality was not analysed in detail in the case of Mozambique. A recent evaluation on school access and learning outcomes in developing countries identified school quality as one of the important determinants of school outcomes (World Bank, 2006). The study also stated that universal primary completion should not be the only important target in developing countries. The focus should be also on improving school outcomes (mainly for disadvantaged pupils) and improving the efficiency of the education systems, through better management.

In this context, the conclusions presented in chapters III and IV did not analyse school factors that affect education quality. For that reason, this chapter presents an analysis of school quality in the Mozambican education system, using the Southern African Consortium for Monitoring Educational Quality (SACMEQ) dataset. Following a brief overview of empirical studies did under SACMEQ, the database and methodology of the empirical work is presented. A description on pupils' achievement (reading and mathematics scores) and its relationship with Socio-economic Status and teachers'

achievements are presented in section 5.4. In section 5.5, the main results of the empirical work undertaken from the SACMEQ II database, can be found. For better analysis on pupil achievement two main models were presented for both reading and mathematics scores: 1) at pupil-level and 2) at school-level. The chapter concludes with a summary of the main findings.

5.2. Background on SACMEQ studies

A study on school effectiveness in Southern and Eastern African countries (Lee et al, 2005: 207-246) had identified the key school factors that affect pupils' outcomes. Between SACMEQ countries there were differences in terms of Socio-economic Status (SES) and literacy achievement. Mozambique was reported as an extremely disadvantaged country (the SES was below SACMEQ average) (Lee et al, 2005: 220). Despite the low SES, Mozambique literacy achievement in grade 6 was above the SACMEQ country average. In terms of school effectiveness, most of the grade 6 pupils had repeated at least one grade, where Seychelles had the lowest and Mozambique had the highest percentage, and schools located in rural areas performed worse than ones in urban areas.
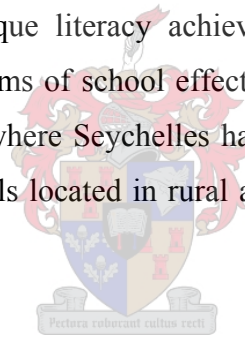
From the empirical model adopted in this study, using literacy scores as dependent variable, grade repetition and socio-economic status of the children had a significant impact on schooling outcomes (Lee et al, 2005: 227). In the cases of Seychelles and Mozambique, grade repetition was not a strong prediction of schooling outcomes, due to the low and high repetition rates mentioned above. Regarding the differences in school achievement, the school average SES, physical and human resources, location and quality of teachers were the main determinants of literacy achievement. However, it is important to mention that the relationship between quality of teachers and achievement were found strong only in Botswana, Mozambique, Namibia and Seychelles ((Lee et al, 2005: 232).

Due to the findings of the study the authors suggested that policymakers in these countries should focus their attention on providing physical resources and better human resources (teachers and administrative personnel) to improve education quality.

An evaluation of South African schooling outcomes compared to other SACMEQ countries, this time using numeric scores as proxy of output, had identified Socio-economic Status and parents' education as important variables to explain educational performance (Van der Berg & Louw, 2006). Moreover, other individual characteristics, such as possession index, materials, meals and extra tuition also played an important role for pupil achievement in the South African context (Van der Berg & Louw, 2006: 7). However, South African pupils, compared with the average of other SACMEQ countries, performed numerically worse in at a given level.

Concerning school variables that affect attainment, good physical resources, teachers with experience and tertiary education, classroom factors (high frequency of homework and low teacher absenteeism) had a positive effect on schooling outcomes in South Africa (Van der Berg & Louw, 2006: 8). In Summary, due to high availability of physical, financial and human resources, pupils in the South African education system should perform better than other Southern and Eastern African countries. Van der Berg and Louw (2006: 14) concluded by stating that historical background (apartheid) and inefficiency of schools were the main determinants to explain poor performance within the education system.

In the case of Seychelles, in contrast with South Africa, the major differences in pupils' achievement were found to be within schools (Leste & Davidson, 2004: 116). This illustrates the inequality existent between group of pupils, mainly caused by differences in SES of pupils and schools and resources within schools. On the one hand, the literacy scores of Seychelles were reported as the highest in SACMEQ countries and it represented an indicator of high achievement of these pupils in terms of reading. On the other hand, the achievement in Mathematics was poor compared with literacy scores. As a consequence of this, the Ministry of Education implemented a project to improve the

teaching of mathematics (Leste & Davidson, 2004: 119). In the case of Botswana, Lesotho and Swaziland, a study was undertaken to identify the major factors that affect Mathematics achievement in these countries.

The results showed that gender, location and socio-economic background of the pupil were the important variables to explain school achievement (Polaki & Khoeli, 2005: 22-26). In Kenya both mathematics and reading scores were analysed. The results showed that the main determinants for mathematics are pupils' characteristics (age, gender), school characteristics and environment (school socio-economic background, pupil teacher ratio and behaviour problems); and for reading it were pupils' characteristics (age, socio-economic background) and pupil teacher ratio (Thuku & Hungi, 2005: 30; Onsomu et all, 2005: 23-24). They also found that the differences in achievement (mathematics and reading) were between and not within schools. In Namibia, large differences in school outcomes were found between provinces and the main determinants of achievement were a school-level variable – teacher qualification and training (Shaningwa, 2005: 55-56).

5.3. Data and Methodology

The present section describes the data and methodology used in this Chapter. The first part describes the data from SACMEQ 2000. The following part specifies the econometric model used. The last part explains the reasons for the inclusion of variables in the regressions.

5.3.1. SACMEQ II 2000

The dataset used for analysis of school quality analysis was the second project of the Southern African Consortium for Monitoring Educational Quality (SACMEQ). The survey had the objective of identifying the major determinants of pupil achievement in Grade 6 in 14 Southern and Eastern Countries, namely: Botswana, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland,

Tanzania, Uganda, Zambia and Zanzibar[4]. SACMEQ 2000 was composed of 42 000 pupils in 2 300 public and private schools and contains indicators about pupils, teachers, management resources and school characteristics of the 14 countries. Reading and Mathematics tests were done for both pupils and teachers. The reading tests consisted of narrative prose, expository prose and structured information (documents). Number, measurement and space-data were the dimensions of the Mathematics tests (Passos et al, 2005: 13-14). In addition to this, questionnaires for teachers and principals were conducted. In the case of Mozambique, 3 177 pupils in 176 schools were included in the database. The sample was drawn from pupils attending grade 6 randomly and a two - stage stratified sample was constructed. The first stage was stratification by Provinces and the second stage was the school level. The response rates among schools were 98% and among pupils 89% (Passos et al, 2005: 23).

The descriptive statistics for pupil-level variables (table 5-1) show that 60% of grade 6 pupils in 2000 were boys. On the one hand, Cabo Delgado (73%), Nampula (71%), Niassa (68%) and Zambezia (68%) were the provinces with high proportions of boys attending grade 6. On the other hand, Maputo Province (46%), Gaza (51%) and Maputo City (51%) were the provinces with lower proportion of boys at grade 6 and therefore revealing less gender inequality in education attainment. More than 60% of pupils in the survey were located in rural areas and this pattern was visible for all provinces with the exception of Maputo City (31%) and Sofala (47%). The average age of grade 6 pupils was 15 years and it was above the correct age of 11 years[5]. This can be a result of later enrolment and high repetition rate.

The socio-economic status of the pupils (SES) for Mozambique was low (-0.73). The SES runs from -3.4 to 5.3, and it was constructed using Principal Component Analysis (PCA). The provinces that have pupils with high socio-economic status were Maputo City (0.48) and Maputo Province (0.45). The description of school level variables is presented in table 5-2. The average socio-economic status of schools was low and was

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[4] Tanzania and Zanzibar were treated as different countries.
[5] Pupils should enroll at school with 6 years

driven by low SES among pupils attending grade 6 in 2000. As one would expect, the School SES was high in provinces like Maputo City and Maputo Province but low in other provinces of Mozambique. The socio-economic status was also low among the rural schools. The most dramatic situation in terms of pupil-teacher ratio was Gaza, where the pupil teacher ratio was 86. All other provinces were below the country average. In terms of school facility index (runs from 0 to 23), the schools in Mozambique had poor resources, given an average index of 7. The provinces with low school index were Inhambane (4), Nampula (5), Gaza (6) and Zambezia (6).

Regarding learning materials, the school average proportion of pupils having an own book in each of mathematics and reading was only 58%. It seems that there was a great concentration of resources in two provinces, namely Maputo City and Maputo Province. On average, pupils take 7 to 8 meals. Considering the total of 9 possible meals, it seems that the country index was not low. Concerning, efficiency, the pupils attending grade 6 repeated on average 1.3 times. Surprising, Maputo City (1.56) and Maputo Province (1.50) were the regions with high average number of years of repetition. Grade repetition is also a concern in the other 13 SACMEQ countries, where 50% of all pupils in grade 6 had repeated one grade (Ikeda, 2005: 17). The education system was also characterized by low participation of females in teaching and management activities. For example, only 26% of all teachers were female. The provinces with high proportion of female teachers were Maputo City (47%), Maputo Province (41%) and Sofala (41%).

Some literature on economics of education demonstrates a positive relationship between female teachers on pupil achievement and for that reason this variable is investigated in our empirical work. The provinces with high teachers' training average were Maputo City, Manica, Nampula and Sofala. 42% of pupils in grade 6 attend extra tuition classes. Niassa with 55% was the province with the highest proportion of pupils attending extra tuition and Maputo City with 36% was the lowest. High proportions of pupils attending extra tuition can be interpreted as a proxy of poor achievement and therefore it seems that pupils at Niassa province were more likely to perform worse than their counterparts in Maputo City.

Table 5-1 – Descriptive Statistics for Pupil-level variables

	All	**Cabo Del**	**Gaza**	**Inhambane**	**Maputo**	**Manica**	**Maputo**	**Nampula**	**Niassa**	**Sofala**	**Tete**	**Zambezia**
Sample Size	3177	257	296	255	348	272	281	354	235	275	271	333
Male (%)	59.68%	73.16%	50.80%	56.28%	51.25%	66.46%	45.92%	70.49%	68.12%	65.48%	61.65%	67.97%
Rural (%)	68.30%	90.45%	86.18%	82.09%	30.61%	100.00%	79.86%	83.05%	93.23%	47.39%	68.37%	62.31%
Mean of Age	14.51	16.43	14.57	14.46	14.04	14.59	14.13	14.77	15.05	14.13	14.31	14.80
	1.90	2.59	1.87	1.85	1.63	1.72	1.73	1.81	2.10	1.83	1.84	1.92
Socio-economic status	-0.73	-1.74	-0.93	-1.24	0.48	-0.91	0.45	-1.48	-1.17	-0.60	-1.15	-1.62
	1.95	1.27	1.67	1.74	1.95	1.68	2.11	1.59	1.87	1.97	1.67	1.55
Reading Score	516.66	459.89	503.98	507.78	549.07	511.54	529.58	533.80	453.77	512.90	488.10	513.79
	64.67	72.27	64.54	56.51	57.55	65.71	67.58	53.35	73.91	58.22	54.86	49.75
Mathematics Score	530.01	497.91	525.65	540.89	546.51	543.38	534.73	539.21	488.20	522.53	510.74	516.68
	56.73	55.40	54.70	56.35	49.07	58.02	64.56	51.63	52.21	56.47	54.00	54.02

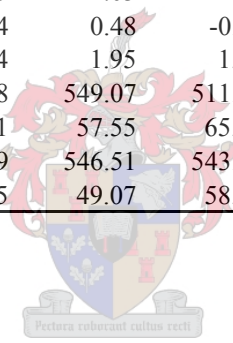Notes: Standard deviation in brackets

Table 5-2 – Descriptive Statistics for School-level variables

	All	Cabo Del	Gaza	Inhambane	Maputo C	Manica	Maputo P	Nampula	Niassa	Sofala	Tete	Zambezia
Sample Size	**3177**	**257**	**296**	**255**	**348**	**272**	**281**	**354**	**235**	**275**	**271**	**333**
School socio-economic status	-0.74	-1.80	-0.93	-1.23	0.51	-0.95	0.42	-1.50	-1.22	-0.55	-1.10	-1.58
	1.24	0.77	0.80	0.99	0.63	0.92	0.92	1.06	1.15	1.22	1.13	0.98
Average Reading Score	516.70	459.36	504.23	508.45	549.45	512.61	528.77	534.24	453.36	512.87	489.48	514.63
	37.17	31.04	43.30	26.00	23.44	26.53	27.65	23.18	30.80	26.00	24.18	23.72
Average Mathematics Score	530.44	497.62	525.88	541.10	547.45	543.80	535.49	539.89	487.60	522.27	510.72	517.69
	28.16	21.48	28.06	34.77	15.75	24.49	24.60	20.21	17.11	16.77	19.45	25.13
Average Pupil Teacher Ratio	51.64	41.56	86.17	50.15	51.05	50.42	46.02	46.50	34.33	48.17	38.70	49.17
	37.57	16.00	94.81	23.38	12.68	14.61	15.20	12.84	14.88	15.69	8.04	19.25
Average Class size	52.37	52.44	51.71	51.50	56.29	48.49	51.39	55.78	51.51	49.61	50.67	49.84
	11.20	9.72	9.24	10.71	11.75	6.69	6.58	11.79	17.18	8.46	9.85	13.87
School facility index (Min: 0 Max: 23)	7.40	7.41	5.63	4.19	11.66	6.22	9.85	4.74	6.78	9.80	6.39	5.91
	4.20	3.02	2.94	2.87	2.44	3.60	3.46	3.27	3.28	5.36	2.83	3.24
Pupils with own book (%)	58.44%	46.64%	47.41%	57.96%	62.80%	72.99%	48.87%	51.89%	45.12%	66.18%	73.85%	62.90%
Average meal index (Min: 0 Max: 9)	7.60	7.84	7.76	7.93	7.29	8.18	7.86	7.91	8.05	7.01	7.19	7.26
	0.77	0.55	0.65	0.69	0.74	0.36	0.58	0.47	0.61	0.81	0.79	0.82
A. grade repetition - No of times (M:3)	1.29	0.84	1.36	1.36	1.56	1.25	1.50	1.07	1.02	1.07	1.06	1.34
	0.35	0.23	0.24	0.21	0.32	0.24	0.35	0.31	0.23	0.21	0.36	0.27
Female teachers (%)	26.42%	0.00%	31.64%	24.87%	46.77%	17.19%	40.57%	8.79%	0.00%	40.65%	21.74%	13.39%
Female principals (%)	15.55%	9.45%	13.84%	33.50%	33.18%	0.00%	36.88%	3.83%	0.00%	6.98%	0.00%	0.00%
Teacher's training (Min: 0 Max: 4)	1.89	1.70	1.68	1.23	2.49	2.29	1.87	2.05	1.69	2.53	1.85	0.99
	1.24	1.08	1.29	1.25	0.76	1.25	1.34	1.18	1.20	0.87	1.35	1.11
Pupils' extra tuition classes (%)	41.62%	49.60%	39.13%	41.90%	36.41%	52.16%	39.09%	39.99%	55.09%	44.84%	42.74%	39.88%

Notes: Standard deviation in brackets

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5.3.2. Econometric Specification

This chapter now turns to econometric modelling for multivariate rather than uni- or bivariate analysis. The econometric model used in the empirical work follows the educational production function presented in chapter II. The model is based on demand-side determinants, supply-side factors and school quality indicators of education. The general model for pupils' achievement in literacy and numeric tests can be presented in the following terms:

$$TS = \alpha + \beta_1 P + \beta_2 S + \beta_3 C + \beta4 L + \beta_5 R + \mu_i$$

Where:

TS – Test Scores (Mathematics or Reading scores for grade 6 pupils)

P – Pupils' Characteristics (Age, Gender, SES, Parental education, possession index, books, number of meals)

S – School characteristics (SES, physical, human, teaching and organizational resources)

C – Classroom dynamics (Homework, teachers' gender, teacher absenteeism, tuition)

L – Location (urban and rural)

R – Provinces

The model at School-level was applied in the following way:

$$ATS = \alpha + \beta_1 S + \beta_2 C + \beta3 L + \beta_4 R + \mu_i$$

Where:

ATS – Average School Test Scores (Average Mathematics or Reading scores for grade 6 pupils)

S – School characteristics (SES, physical, human, teaching and organizational resources)

C – Classroom dynamics (Homework, teachers' gender, teacher absenteeism, tuition)

L – Location (urban and rural)

R – Provinces

The regressions used the method of Ordinary Least Squares estimators (OLS). The OLS model is used in this empirical work for estimating the determinants of pupils' achievement in grade 6. In order to make the results of the regressions representative of the population in the survey, the estimates are done by using weights (pupils' and school weights) (Deaton, 1997: 71). In addition to this, the estimates report robust standard errors.

5.3.3. Definition of Variables

Dependent variables

The general models used the results of mathematics and reading scores as dependent variables. The mathematics test consisted of number, measurement and space-data dimensions and its scores vary from 222 to 759 points. Reading test scores ranged between 156 and 715 points. The dimensions of evaluation on reading tests were narrative prose, expository prose and document. Further analysis at school level was developed. For that the average scores (mathematics and reading tests) of each school was used as dependent variables. The main objective was to analyse if the differences in school achievement were mainly resulting from a pupil effect or a school effect. The two new variables were included also in the regression model as dependent variables.

Pupils' Characteristics

The pupil variables used in the regression were age, gender and socio-economic status. For age created were dummies for pupils under the age of 11 (right age for grade 6) and

over the age of 11. Pupils aged 11 years was the omitted age variable. The idea was to better interpret the coefficients on age using categorical variables rather than continuous value. The other control variable used was male, in order to analyse the differences in terms of gender attainment, shown to be important in the literature. The proxy used for income was the socio-economic status of the pupils, derived by home conditions and possession index, using Principal Component Analysis (PCA) (Van der Berg & Louw, 2006: 4). The education of the father and the mother were experimented with but were found statistically insignificant due the multi-colinearity with socio-economic status.

Schools' Characteristics

For the analysis on pupil level, the variables pupil teacher ratio, frequency of homework given, gender of the teacher and school facility index were used. In a country where the pupil teacher ratio is 52, it is important to investigate this factor on pupil achievement. The average homework given is also investigated here. The dummy variable (homework 3) stands for 1 if the pupil did his/her homework three times a week and 0 if not. The other dummies on homework were excluded due the fact that they were statistically insignificant. Another dummy variable on female teachers was created to investigate their influence on pupils' achievement in mathematics and reading. The school facility index varied from 0 to 18 and was used as proxy for quality of infrastructure in each school.

For school level regressions the average of homework given, pupils with own book, meals a day, teachers' training and extra tuition were included. In addition to this, headship of school (gender), average socio-economic status and class size were also analysed. In the school level analysis the average pupil teacher ratio was replaced with average class size, because the latter better explained variations in school achievement.

Regions and Location

Geographical factors are important to understand education achievement in Mozambique. This work demonstrated great disparities of educational attainment between provinces

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and by place of residence. For this reason two geographical dimensions were included in the model: Provinces and place of residence (rural/urban). Due the findings in the earlier analysis, 10 provinces were included in the model, and Maputo City was taken as the reference category. It is also important to mention that most of the provinces had high proportions of pupils in rural settlements.

5.4. Data Analysis

5.4.1. Pupils' Achievement

The reading and mathematics scores show that the country performs well in the regional context. The SACMEQ average is 500 and Mozambique, in both Reading (517) and Mathematics (530), lies above the average (Table 5-3). However, the achievement is not equally good across the country in both subjects. Provinces like Maputo City (549), Nampula (534) and Maputo Province (530) were the provinces in which grade 6 pupils achieved the highest literacy scores within the country. In contrast, Cabo Delgado (460) and Niassa (454) were the provinces with low achievement in reading tests. These two provinces also had a poor achievement in numeric tests. Manica (543) and Inhambane (541) were provinces that had a good achievement in mathematics tests and they were closer to the average of Maputo City (547).

Even knowing that the results of both tests were not directly comparable, it is important to mention that Maputo City was the only province in which the pupils did better in reading than in mathematics. Regarding gender dimension, boys performed better than girls on reading scores, but this difference was not significant. In mathematics scores the difference between girls and boys was greater. Finally, pupils in urban areas performed better than ones in rural areas. The gap between rural and urban areas in reading scores was considerable but in mathematics scores there was not a great difference.

Table 5-3 – Grade 6 Pupils' achievement by Province, Gender and Location

	Test Scores	
	Reading	**Mathematics**
Provinces		
Cabo Delgado	459.89	497.91
Gaza	503.98	525.65
Inhambane	507.78	540.89
Maputo City	549.07	546.51
Manica	511.54	543.38
Maputo Province	529.58	534.73
Nampula	533.80	539.21
Niassa	453.77	488.20
Sofala	512.90	522.53
Tete	488.10	510.74
Zambezia	513.79	516.68
Gender		
Girls	514.07	519.48
Boys	518.41	537.03
Location		
Rural	533.34	536.71
Urban	508.92	526.92
Mozambique	**516.66**	**530.01**

Further analysis on pupils' achievement is presented in Figure 5-1. The kernel distribution for mathematics and reading scores shows that the pupils' achievement in mathematics scores was weak compared with reading scores.
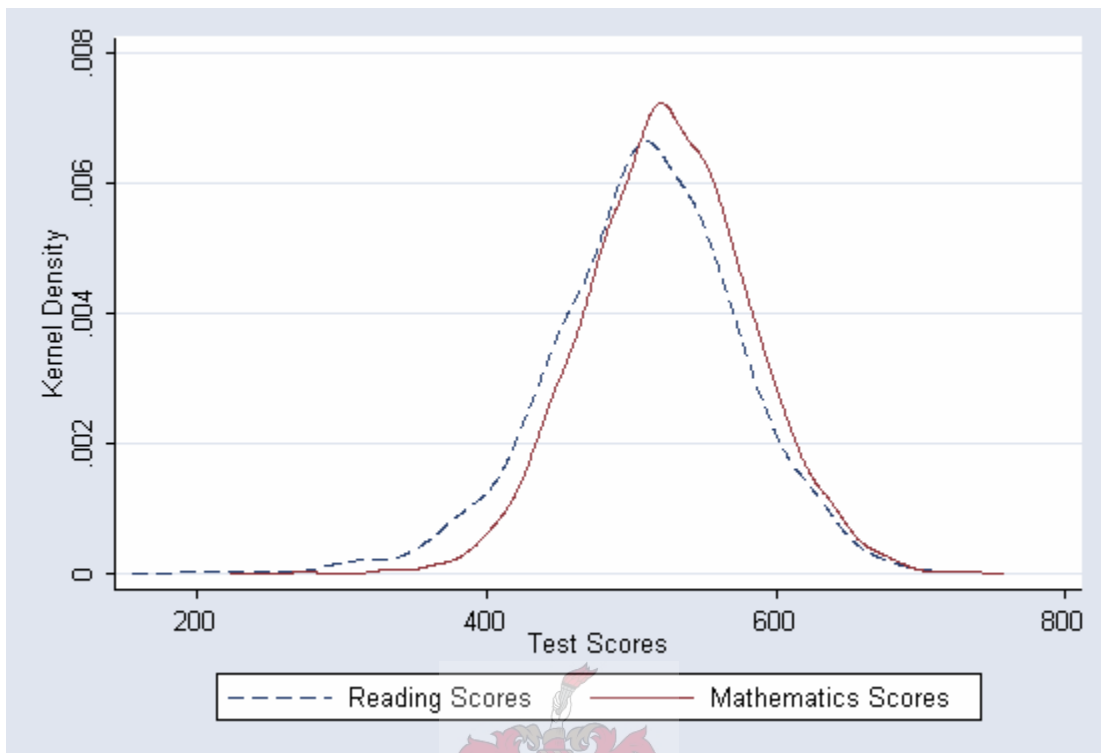
Figure 5-1 – Kernel density curves on mathematics and reading scores

5.4.2. Pupils' Achievement and Socio-economic Status

This section analyses the relationship between pupils' achievement and socio-economic status (SES). Figure 5-2 shows the Lowess regression on pupils' reading score versus socio-economic status. A Lowess regression means that the function was estimated using a locally weighted regression parameter. The dots illustrated in the graph represent the number of pupils in the sample. There is a slope on trend line, which means that the reading scores increase as the SES scores increase, although not very strongly.
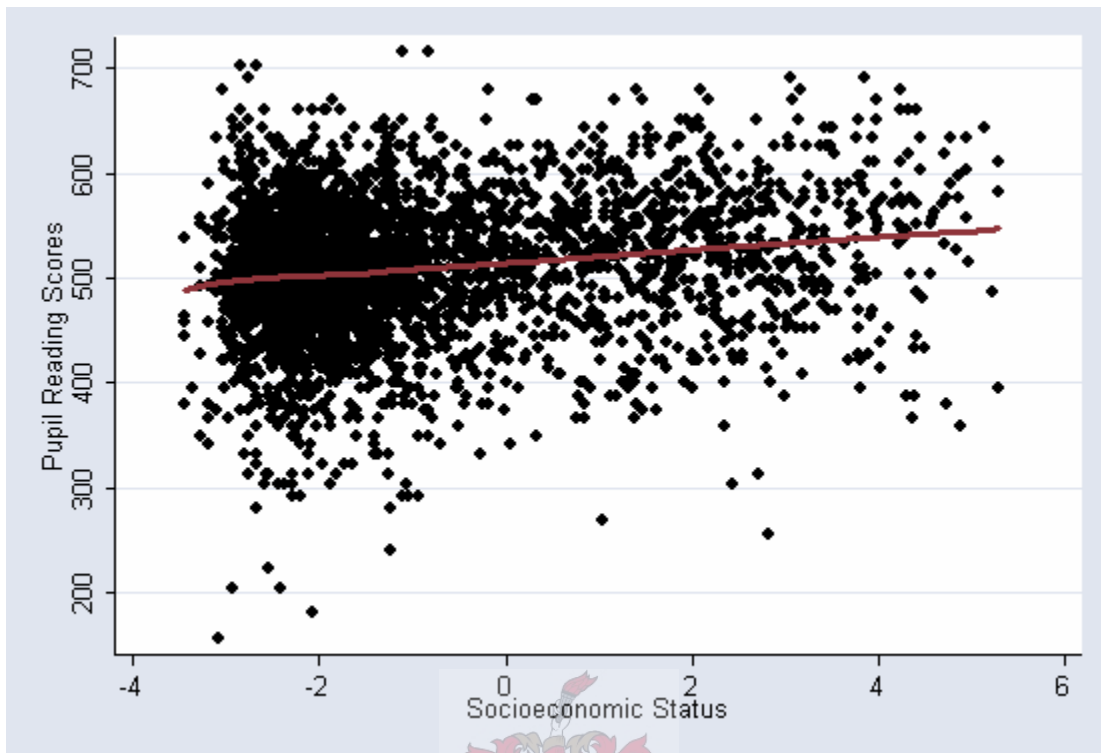
Figure 5-2 – Lowess regression on pupil reading score

The Lowess regression on mathematics score versus SES scores tells a different story about the relationship between achievement and income. The trend line is flat across the range of SES scores. In other words, variations in SES scores will have a little impact on mathematics scores.

Figure 5-4 shows the Lowess regression on mathematics and reading scores. The mathematics line has less slope than the reading. It could be caused by more randomness of scores in this subject. It is important to mention that the scale used in figure 5-4 is different from the ones used in figures 5-2 and 5-3.
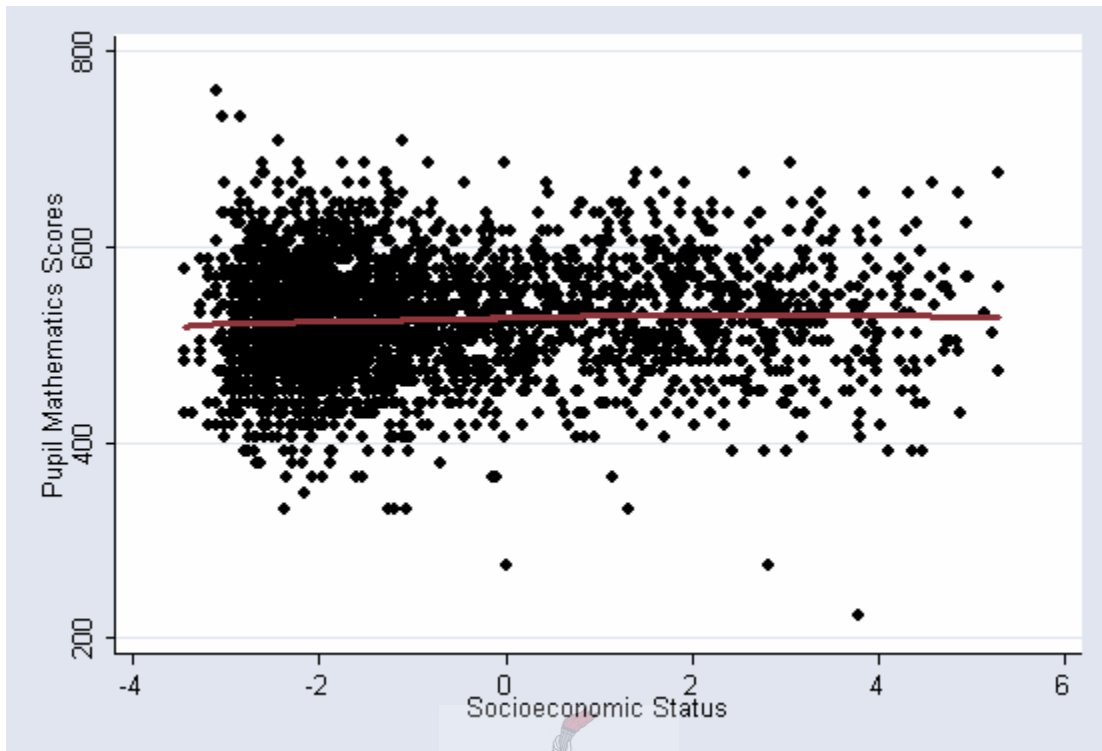
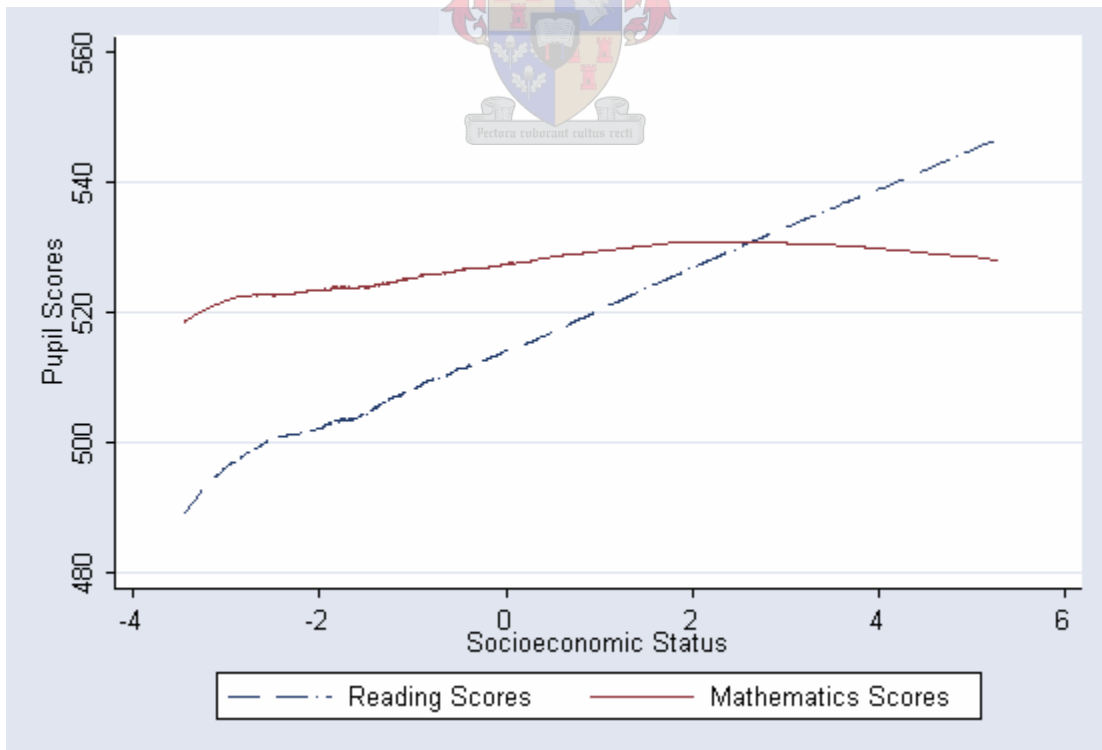**Figure 5-3 – Lowess regression on pupil mathematics scores**

Figure 5-4 – Lowess regression on pupil reading and mathematics scores

In addition to pupil-level analysis, the next figure shows the Lowess regression for schools' average achievement and their average SES. Now dots represent schools. The regression on reading scores gives an upward slope and implies a positive relationship between school socio-economic status and average reading scores (Figure 5-5). This is a similar result with the one found in the pupil analysis for reading scores.
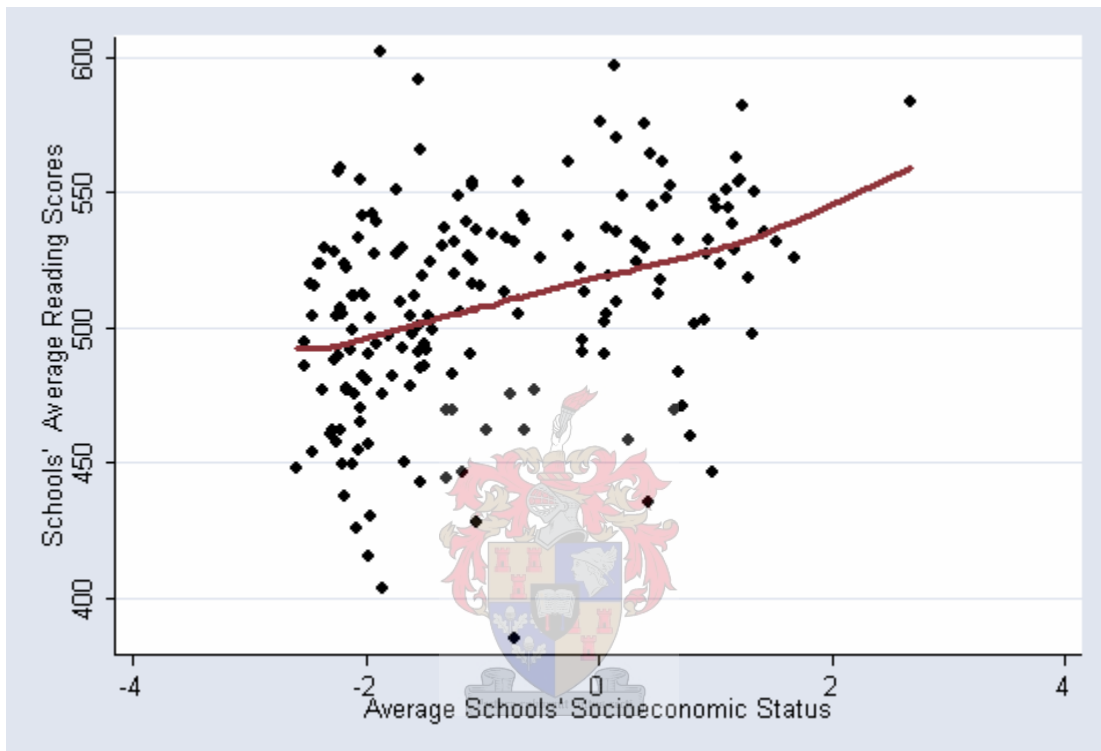
Figure 5-5 – Lowess regression on schools' average reading scores

Regarding the average mathematics scores, the line of the regression is flatter than the one in reading scores, although there is some slope (Figure 5-7). If one compares the line of mathematics at pupil level (Figure 5-3) and the one in school level analysis (Figure 5-6) In this case, the differences in mathematics results cannot be attributed to differences in socio-economic status of the school to the a extent as for reading. As SES scores increases, there is no great effect on mathematics scores. One can conclude from mathematics results that schools were inefficient in transforming the available resources into desired education achievement.

Figure 5-6 – Lowess regression on schools' average mathematics scores

Figure 5-7 – Lowess regression on schools' average mathematics scores

5.4.3. Teachers' Achievement

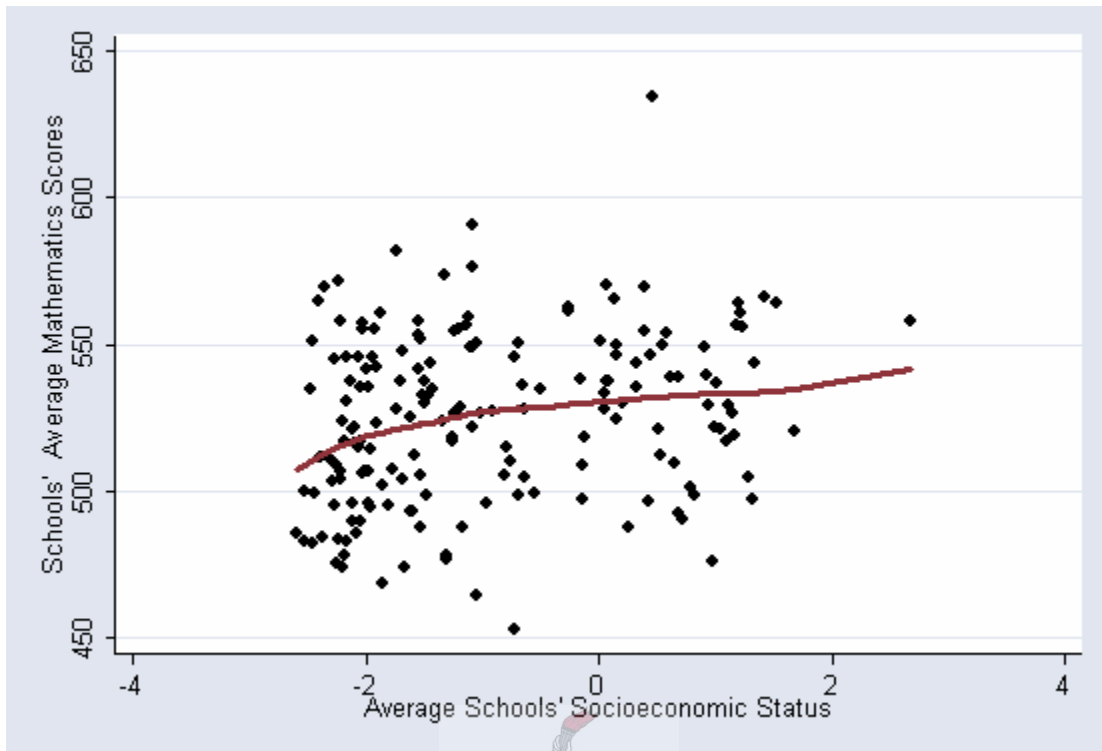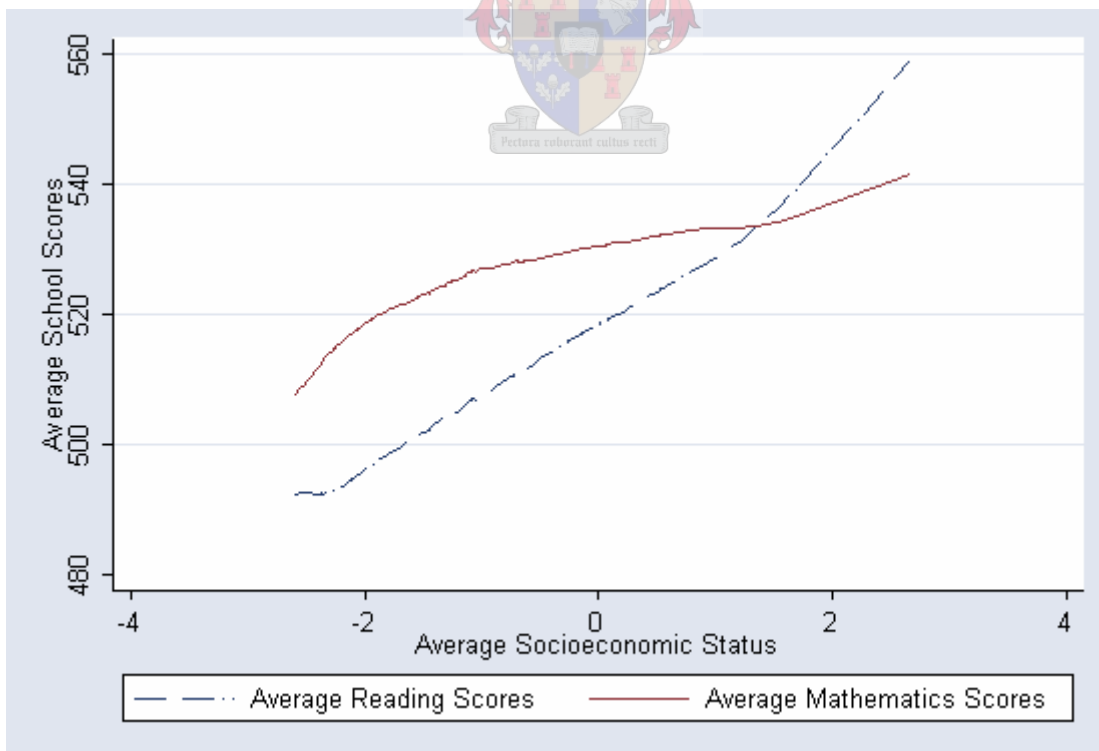The SACMEQ data also gives important information on teachers' achievement (Table 5-4). The country's average score for teachers was 783 points for mathematics and 716 points for reading. As in pupils' achievement, the provinces with highest reading results were Maputo Province (755), Nampula (740) and Maputo City (738). It means that the reading scores of pupils may be associated with literacy scores of their teachers. Concerning mathematics' scores, Nampula (837), Maputo City (818) and Gaza (806) were the provinces with high achievement. The differences between female teachers' mathematics results and male teachers' were significant. The same does not happen in the reading tests, where the differences in gender achievement were low. In contrast with teachers' achievement in mathematics, teachers in rural areas had a slightly better achievement on reading tests.

Table 5-4 – Teachers' achievement by Province, Gender and Location

	Test Scores	
	Reading	Mathematics
Provinces		
Cabo Delgado	687.46	750.80
Gaza	712.73	805.73
Inhambane	666.61	769.21
Maputo City	737.79	817.58
Manica	712.97	776.75
Maputo Province	754.55	778.55
Nampula	740.18	837.10
Niassa	716.21	769.72
Sofala	714.53	782.04
Tete	711.09	744.89
Zambezia	685.34	697.88
Gender		
Male	717.14	791.93
Female	715.74	760.55
Location		
Rural	716.71	778.90
Urban	715.26	791.02
Mozambique	**716.25**	**782.79**

A further analysis on differences in mathematics and reading achievements was presented in Figure 5-8. The achievement on teachers' reading scores was weak compared with mathematics' scores. The gender dimension on teachers' achievement also entered our analysis (Figure 5-9 and 5-10). For reading scores female teachers performed on average worse than male teachers, but their scores registered less variation. The differences between males and females were also visible in mathematics' test scores.

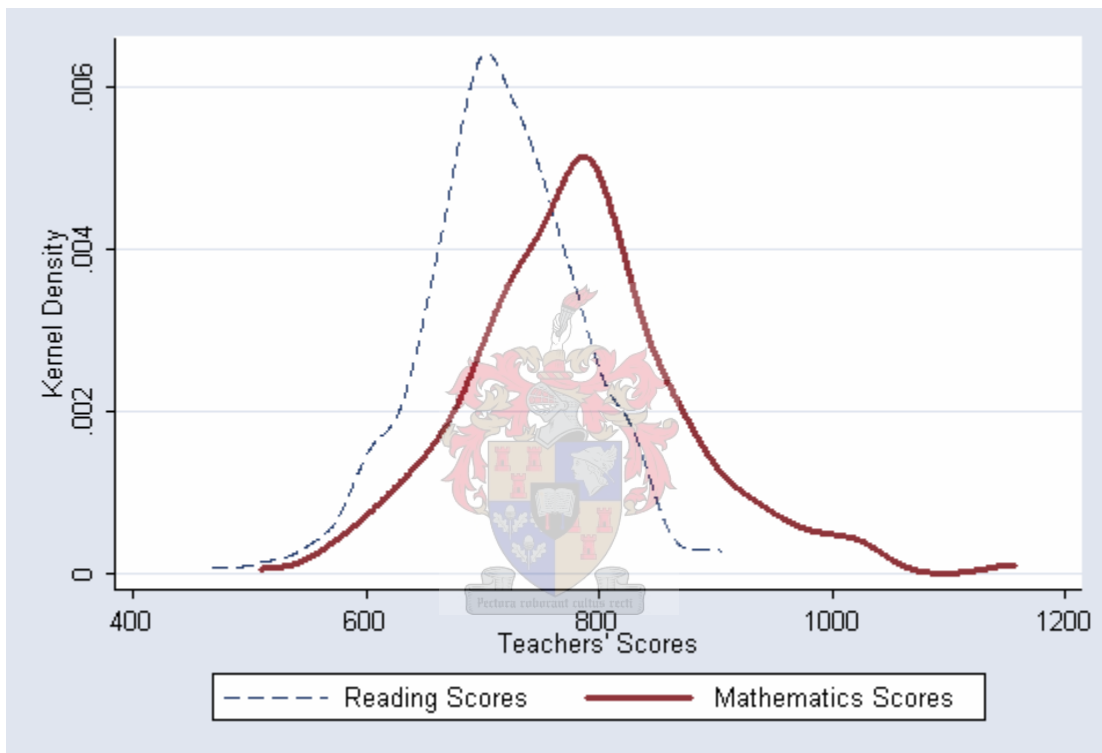

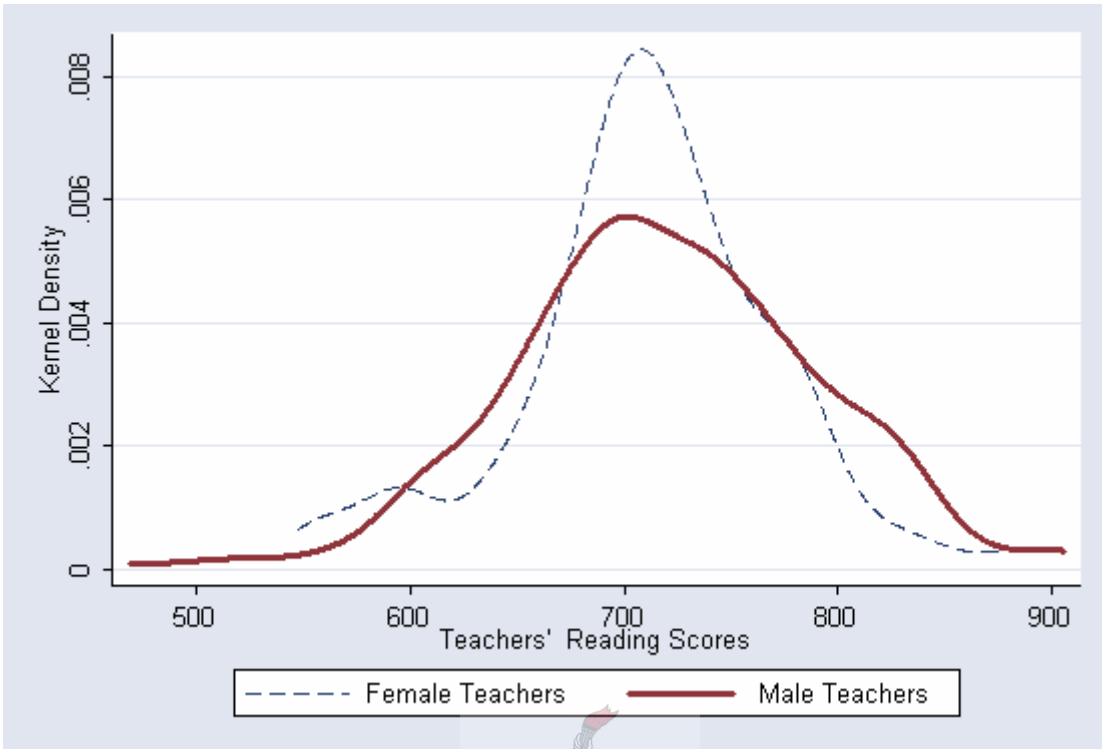**Figure 5-8 – Kernel density curves on teachers' mathematics and reading scores**

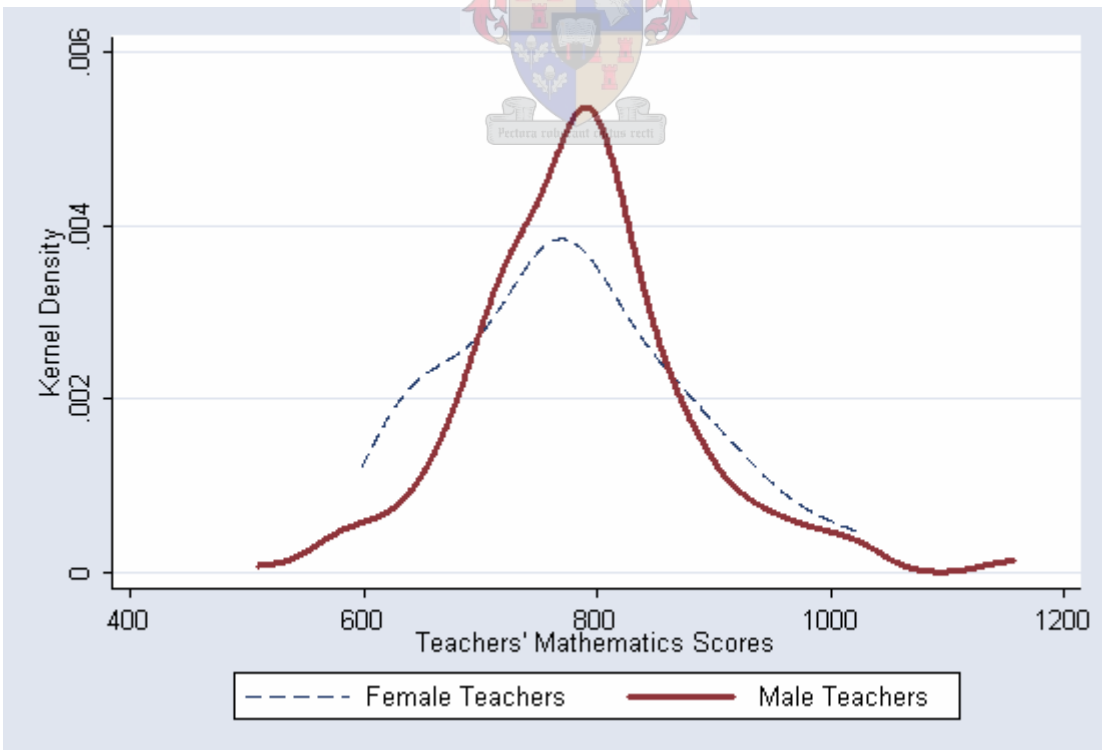**Figure 5-9 – Kernel density curves on teachers' reading scores by gender**

Figure 5-10 – Kernel density curves on teachers' mathematics scores by gender

5.5. Regression Results

This section presents the main results of the empirical work undertaken using the SACMEQ II database. For better analysis on pupil achievement two main models are presented for both reading and mathematics scores. At pupil level, the results can be found in subsections 5.5.1 and 5.5.2 and for school level in subsections 5.5.3 and 5.5.4.

<u>5.5.1. Pupil-level analysis: Reading Scores</u>

The results of our analysis on Reading Scores are presented in table 5-5. The analysis is divided into three models:

1) **Model 1 –** This is the general model, which includes all explanatory variables;
2) **Model 2 –** Includes provinces of Maputo (Maputo City as reference category) and excludes pupils' socio-economic status.
3) **Model 3 –** Includes SES and excludes provinces.

The three models were a result of an earlier analysis which detected that SES may be correlated with provincial dummies. As the dependent variable is continuous (reading test scores) the method used was Ordinary Least Squares (OLS). The approach used for explanatory variables was general to specific, where the most important variables were all included in the model and some of them were dropped after a first analysis.

From the more general model (model 1), it is possible to say that pupils' characteristics contribute strongly to explaining differences in reading achievements. Pupils' overage in grade 6, perform worse than those in the right age. Being a boy increases the achievement by almost 11 points. The socio-economic status of children is positively correlated with achievement but it does not increase school achievement substantially. The SES squared demonstrates that the relationship between reading scores and SES is convex. Regarding the school variables, it seems that the pupil teacher ratio has a negative impact on reading achievement. However, it is important to mention that reducing the pupil teacher ratio by

10 would only have increased reading achievement by 9 points. The little effect of class size reduction on pupils' achievement is also demonstrated in a study of all 14 SACMEQ countries, where it is suggested that other classrooms factors, such as teaching quality and practices, should be taken into consideration (Kariuki & Guantai, 2005: 20). Therefore, the other classroom factors are also investigated in our model. The frequency of homework given to pupils has a strong effect on achievement.

If a reading teacher gives homework at least three times a week, it will increase reading points by 16 points. The other school variables such as female teacher and school facility index also have positive impacts on pupils' achievement. Turning to geographical dimensions, controlling for other variables, all provinces perform worse than Maputo City, as one would expect from the earlier analysis. The provinces with problematic results are Niassa and Cabo Delgado. Nampula and Maputo Province are the provinces that are closer in achievement (after considering other variables) to the capital of Mozambique. Not surprising is also the fact that pupils in rural areas perform worse than those in urban areas. From the comparison between model 2 and model 3, it is possible to draw the following conclusions. First, the SES and provinces variables are correlated. Second, the provincial model (model 2) explains variations in reading scores better than the one using SES, as indicated by the R-Squared of 18%. Third, the rural dummy is correlated with provinces.

In summary, the achievement in reading scores is mainly driven by differences between provinces, pupils' characteristics (age, gender) and classroom dynamics (homework).

Table 5-5 – OLS estimates for Reading Scores

	Reading Scores		
	Model 1	**Model 2**	**Model 3**
under 11 years	23.256	26.231	11.081
	(-0.83)	(-0.92)	(-0.41)
over 11 years	-13.724	-16.337	-13.594
	(1.91)*	(2.24)**	(1.93)*
Male	10.684	10.414	9.356
	(4.20)***	(4.10)***	(3.59)***
Socio-economic Status	1.633		2.963
	(2.23)**		(3.96)***
Socio-economic Status Squared	0.655		0.505
	(2.01)**		(-1.48)
Pupil Teacher Ratio	-0.096	-0.099	-0.046
	(2.95)***	(3.00)***	(-1.56)
Homework - Three times a week	16.082	15.577	12.439
	(1.68)*	(-1.64)	(-1.33)
Female Teacher	5.903	6.444	12.235
	(1.91)*	(2.09)**	(3.92)***
School Facility Index	1.104	1.251	1.167
	(2.83)***	(3.25)***	(3.20)***
Cabo Delgado	-77.54	-79.513	
	(12.38)***	(12.77)***	
Gaza	-29.285	-30.623	
	(4.96)***	(5.20)***	
Inhambane	-25.356	-26.314	
	(4.24)***	(4.38)***	
Manica	-23.696	-24.757	
	(3.53)***	(3.72)***	
Maputo Province	-15.558	-14.917	
	(2.71)***	(2.62)***	
Nampula	-2.56	-3.782	
	(-0.48)	(-0.71)	
Niassa	-88.424	-89.169	
	(12.01)***	(12.18)***	
Sofala	-33.523	-34.926	
	(6.12)***	(6.41)***	
Tete	-51.516	-53.187	
	(9.61)***	(9.92)***	
Zambezia	-24.279	-25.882	
	(4.70)***	(5.03)***	
Rural	-6.486	-7.167	-16.062
	(2.08)**	(2.36)**	(5.22)***
Constant	528.688	533.805	511.773
	(39.22)***	(39.53)***	(40.98)***
Observations	2917	2917	2917
R-squared	0.18	0.18	0.07

Robust t statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

5.5.2. Pupil-level analysis: Mathematics Scores

The analysis of mathematics scores followed the same procedure as that in reading. The general model (model 1 in table 5-6) demonstrates that few variables explain the achievement in mathematics. In contrast with reading; SES, frequency of homework and pupil-teacher ratio have the right sign but are statistically insignificant. Being a boy seems to be an important factor for mathematics achievement. The gender differences in mathematics achievement in Mozambique were also reported in a study of *Learning Environment and Mathematics Achievement*. Mozambique and six other SACMEQ countries showed differences in favour of boys (Ndalichako, 2005: 7). In general, all provinces perform worse than Maputo City. The other models presented in table 5-6 reinforce an earlier conclusion that SES is correlated with provinces. The poor regression on mathematics scores can be attributed to problems of efficiency in teaching mathematics within the Mozambican education system.

Table 5-6 – OLS estimates for Mathematics Scores

	Mathematics Score		
	Model 1	**Model 2**	**Model 3**
under 11 years	11.492	13.192	4.686
	(-0.51)	(-0.59)	(-0.22)
over 11 years	-19.412	-19.732	-19.594
	(3.16)***	(3.21)***	(3.15)***
Male	22.124	21.572	18.838
	(9.55)***	(9.37)***	(7.96)***
Socio-economic Status	0.105		2.429
	(-0.15)		(3.70)***
Pupil Teacher Ratio	0	-0.006	0.036
	(-0.01)	(-0.2)	(-1.34)
Homework - Three times a week	10.872	11.667	2.816
	(-1.57)	(1.69)*	(-0.44)
Cabo Delgado	-50.371	-55.093	
	(9.60)***	(11.59)***	
Gaza	-18.848	-23.078	
	(3.91)***	(5.18)***	
Inhambane	-1.739	-5.798	
	(-0.31)	(-1.08)	
Manica	-5.078	-10.13	
	(-0.9)	(1.95)*	
Maputo Province	-9.866	-13.822	
	(1.82)*	(2.70)***	
Nampula	-9.499	-13.707	
	(2.11)**	(3.34)***	
Niassa	-59.344	-64.219	
	(10.64)***	(12.52)***	
Sofala	-27.614	-29.552	
	(5.47)***	(6.07)***	
Tete	-37.704	-41.095	
	(7.93)***	(9.27)***	
Zambezia	-32.85	-35.772	
	(7.28)***	(8.42)***	
Rural	-6.284		
	(2.20)**		
Constant	546.406	545.455	534.45
	(55.57)***	(55.80)***	(58.56)***
Observations	2999	2999	2999
R-squared	0.12	0.12	0.04

Robust t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

5.5.3. School-level analysis: Reading Scores

The school-level analysis for reading scores was done by using the average reading score for each school and including also new explanatory variables at school-level. These new variables better explain the variations in reading scores than the ones in pupil-level analysis (Table 5-7). The average pupil teacher ratio and the proportion of repeaters in grade 6 were included in the first model. The average pupil teacher ratio was dropped because average class size better explains variations in achievement. The proportion of repeaters was significant but gave the wrong sign. These results are better than the ones in pupil-level analysis (R-Squared of 53%). On the one hand, the average SES has a positive impact on reading scores. On the other hand, the average class size has a negative impact on pupils' achievement.

In addition to this, schools in other provinces perform worse than the schools in Maputo City. Urban schools are more likely to perform better than rural schools. Comparing model 2 and 3 shows the same pattern as in pupil-level analysis: SES could be correlated with provincial dummies. In model 3, rural dummy and the proportion of pupils having extra tuition classes became statistically significant. The extra tuition can be considered as a parallel education to the one provided by the education system. A study in six SACMEQ countries demonstrated that the proportion of pupils attending extra tuition classes is high and is growing over time (Paviot et all, 2005: 18). The study also demonstrated that pupils with high SES and educated parents are more likely to attend extra tuition classes. In addition to this, the study found that extra tuition is associated with better school achievement (Paviot et all, 2005: 16-17).

In the case of Mozambique, where 42% of grade 6 pupils were attending extra tuition classes in 2000, the coefficient on extra tuition classes is negative (model 3). However, it does not imply that extra tuition classes had a negative impact on reading achievement. The most plausible reason is the fact that extra tuition serves as remedial instruction for most of the pupils (Paviot et all, 2005: 17). In other words, the extra tuition classes are a result of poor achievement of grade 6 pupils in reading, conditional upon all other factors.

Table 5-7 – OLS estimates for Average Reading Scores

	Average Reading Score		
	Model 1	**Model 2**	**Model 3**
School Socio-economic Status	4.476		7.363
	(1.74)*		(2.94)***
Pupils with own book	11.168	9.018	17.83
	(-0.9)	(-0.74)	(-1.61)
Average meal index (Min: 0 Max: 9)	2.982	4.131	
	(-0.74)	(-1.11)	
Average Class Size	-0.581	-0.568	-0.262
	(2.95)***	(2.77)***	(-1.08)
Av. Homework given (Min: 0 Max:4)	9.184	7.772	11.423
	(-1.2)	(-1.06)	(-1.51)
Teacher's training (Min: 0 Max: 4)	1.86	2.472	2.676
	(-0.73)	(-0.97)	(-1.01)
Pupils' extra tuition classes	-12.823	-14.472	-32.114
	(-1.18)	(-1.31)	(2.44)**
Female principals	0.907	2.435	6.841
	(-0.12)	(-0.33)	(-0.93)
Cabo	-70.671	-78.599	
	(6.25)***	(7.64)***	
Gaza	-31.89	-37.528	
	(1.93)*	(2.36)**	
Inhambane	-27.374	-33.802	
	(2.23)**	(2.76)***	
Manica	-32.207	-35.293	
	(2.54)**	(2.93)***	
Maputo P	-15.384	-14.864	
	(1.66)*	(-1.55)	
Nampula	1.682	-5.841	
	(-0.15)	(-0.61)	
Niassa	-83.892	-89.565	
	(7.05)***	(8.17)***	
Sofala	-31.591	-34.546	
	(2.91)***	(3.34)***	
Tete	-51.913	-56.318	
	(5.28)***	(5.78)***	
Zambezia	-22.943	-29.451	
	(2.17)**	(2.93)***	
Rural	-8.463	-11.623	-13.947
	(-1.58)	(2.26)**	(2.22)**
Constant	524.778	523.044	507.548
	(14.21)***	(14.21)***	(18.80)***
Observations	162	162	162
R-squared	0.53	0.52	0.24

Robust t statistics in parentheses	* significant at 10%; ** significant at 5%; *** significant at 1%

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5.5.4. School-level analysis: Mathematics Scores

The school-level achievement in Mathematics is reported in table 5-8. The general model (model 1) demonstrates that few variables explain variations in mathematics' scores. The average class size has a negative impact on mathematics' scores. Differences between Maputo City and other provinces of Mozambique are also visible. Model 3 (model without provincial dummies) shows that average SES has a positive impact on school achievement. It is also demonstrated that the proportion of pupils attending extra tuition classes (earlier identified as a proxy of low achievement) has a negative sign in its coefficient.

The results shown in table 5-8 reinforce the idea that mathematics achievement is a concern in the Mozambican education system and it may be caused by problems of efficiency within the system. A descriptive study for all 14 SACMEQ countries also concluded that the factors that affect mathematics achievement are complex and only differences in location (in favour of urban areas) were conclusive (Ndalichako, 2005: 1).
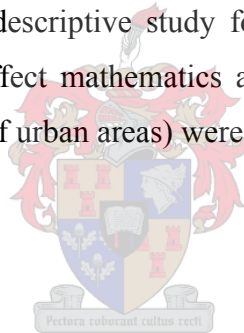
Table 5-8 – OLS estimates for Average Mathematics Scores

|	Average Mathematics Score		
	Model 1	**Model 2**	**Model 3**
School Socio-economic Status	0.648		3.372
	(-0.24)		(1.84)*
Average Class Size	-0.347	-0.342	-0.184
	(2.03)**	(1.98)**	(-1.04)
Teacher's training (Min: 0 Max: 4)	2.795	2.904	3.132
	(-1.43)	(-1.52)	(-1.49)
Pupils' extra tuition classes	-12.905	-13.298	-21.527
	(-1.09)	(-1.05)	(1.71)*
Female principals	4.847	5.094	12.152
	(-0.62)	(-0.62)	(-1.52)
Cabo	-42.124	-43.046	
	(4.46)***	(5.44)***	
Gaza	-20.147	-20.721	
	(1.99)**	(2.16)**	
Inhambane	2.393	1.731	
	(-0.17)	(-0.14)	
Manica	-2.596	-2.818	
	(-0.25)	(-0.28)	
Maputo P	-11.515	-11.228	
	(-1.4)	(-1.4)	
Nampula	-2.084	-2.955	
	(-0.25)	(-0.42)	
Niassa	-54.679	-55.206	
	(5.93)***	(6.72)***	
Sofala	-24.925	-25.318	
	(3.12)***	(3.46)***	
Tete	-32.029	-32.656	
	(3.63)***	(4.20)***	
Zambezia	-24.135	-25.033	
	(2.42)**	(2.94)***	
Rural	-3.153	-3.632	
	(-0.61)	(-0.86)	
Constant	564.44	564.387	543.32
	(50.24)***	(49.83)***	(46.11)***
Observations	162	162	162
R-squared	0.38	0.38	0.13

Robust t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

5.6. Conclusion

The objective of this chapter was to analyse school quality in Mozambique and its implication for pupils' achievement, using SACMEQ 2000 dataset. The reading and mathematics scores showed that the country performed above the SACMEQ countries' average. However, the preliminary analysis detected gender-, regional- and location- inequalities in tests scores. Maputo City performed better than the rest of the provinces, in mathematics and reading tests. Boys' were far better in mathematics but the differences in reading tests were not large. The gap between rural and urban areas in reading scores was considerable but in mathematics score there was no great difference.

The Kernel distribution for mathematics and reading scores showed that the pupils' achievement in mathematics was weak compared with reading scores. Moreover, the relationship between pupils' achievement and socio-economic background (SES) was also analysed. The reading scores increase significantly as the SES scores increase, but variations in low SES scores will have little impact on mathematics scores. The analysis at school level confirmed also that differences in reading scores can be attributed to differences in SES, but for mathematics scores achievement is still unexplained.
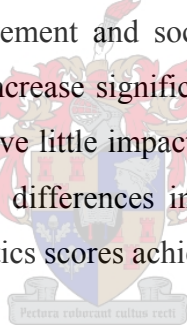
A possible reason for poor achievement in mathematics was that some schools were not efficient in transforming resources (human, organizational, financial and material) into desired outcomes (school achievement). In addition to this, the analysis on teachers demonstrated that differences between female teachers' mathematics results and male teachers were significant but the same did not happen for reading results. The achievement on teachers' reading scores was weak compared with mathematics scores.

From the empirical work, being a boy in a high SES family and of the right age had a positive impact on reading scores. The pupil-teacher ratio had a negative impact on reading scores, but its reduction will have only a small impact on achievement. If a reading teacher gives homework at least three times a week, it will increase reading scores by 16 points. Female teacher and a high school facility index also had a positive

impact on reading achievement. The geographical variables showed that all provinces performed worse than Maputo City and pupils in urban areas performed better, in reading scores, than their counterparts in rural areas. Regarding the mathematics model, the only conclusive statement was that being a boy in Maputo City had a positive impact on achievement.

The poor regression on mathematics score can be attributed to problems of efficiency, in teaching mathematics, inside the Mozambican education system. In the case of school level analysis on reading scores, the average SES had a positive impact on pupils' achievement. It also found that being in Maputo City and other urban areas was advantageous in reading achievement. The average class size had a negative impact on pupils' achievement. Moreover, 42% of grade 6 pupils were attending extra tuition classes and the coefficient on extra tuition classes was negative.

The plausible explanation for this was the fact that extra tuition served as remedial instruction for most of the pupils who under-performed. Finally, the school-level analysis on mathematics scores reinforced the idea that mathematics achievement was a complex phenomenon in the Mozambican education system and it may be caused by problems of efficiency within the system rather than by the presence of specific facilities or pupil and school characteristics.

In summary, the results of this analysis confirmed the importance of demand variables, such as age, gender, income, region and place of residence. These results are line with the ones obtained in chapter IV (Demand determinants). It was also possible to conclude that school quality, in terms of management, facilities, availability of human resources (pupil teacher ratio) and classroom activities, matters for educational achievement in Mozambique. In addition, it is visible that variations in educational achievement in Mozambique are the result of problems of efficiency within schools.

CHAPTER SIX - CONCLUSIONS AND RECOMMENDATIONS

6.1. Overview of the study

The objective of this study was to analyse the educational performance in Mozambique. The study started with a brief characterization of the country and its education system. In chapter I a description of important education indicators in Mozambique was also presented.

In the following chapter aspects of efficiency in education and education policies were discussed, using the educational production function approach. In addition to this, supply and demand factors that influence educational achievement were presented using theories from the economics of education and evidence from empirical studies, mainly from developing countries. The literature review highlighted critical inputs for the study and served as a guideline for the next chapters.

An analysis of supply conditions were presented in chapter III. Availability of schools, characteristics of teachers, educational budget and policies in education were the points touched on. Reports from the Ministry of Education and official publications of Mozambican government were used in this chapter.

In chapter IV an empirical approach was conducted with the purpose of analysing the effect of demand factors on educational achievement. The second Mozambican household survey (IAF 2002/2003) was used as data source. The chapter described some indicators of the educational attainment in Mozambique, such as literacy rates of provinces and locations, followed by other indicators of education and income of the households. Moreover, an econometric model and techniques (interval regressions, probit) were applied in this chapter.

An analysis of school factors that affect education quality was done in chapter V. The empirical work was undertaken using the SACMEQ II dataset. The variables used as a

proxy for educational achievement were mathematics and reading scores of Grade 6 pupils in 2000.

Give this overview of the study, the next section turns to the main conclusions of the thesis.

6.2. Conclusions

The following conclusions can be draw from this thesis:

Conclusion 1 – High poverty rates and low literacy levels

Mozambique is one of the poorest countries in the World and more than half of the population lives below the poverty line. One of the solutions to eradicate poverty could be improving the literacy levels of the population. However, the general adult literacy rate is only 54% and the literacy among women is only 41%. In addition to this, provinces such as Niassa, Cabo Delgado, Nampula, Zambezia, Tete, Sofala, Inhambane and Gaza still have very low literacy rates. In rural areas, where most of the population (68%) resides, only 34% of the population is literate. With this literacy profiles it is going to be difficult to improve the living conditions of the population and urgent steps should be taken to address the low education levels among the Mozambican population.

Conclusion 2 – Rapid growth of enrolments and number of schools

Between 1992 and 2003 (11 years), the number of pupils enrolled more than doubled in the national education system. The number of schools also increased rapidly. However, it was shown in the study that growth of enrolments should take place with improvement of school quality and school inputs. Despite the fact that number of pupils and school availability increased, the number of qualified teachers did not follow this trend. In addition to this, the survival rates within the Mozambican education system were found

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to be low. On average, for a pupil who enrolled in school, the probability of reaching grade 10 was only 3%.

Conclusion 3 – Low availability of Schools in rural areas and some provinces

Schools are not well distributed across levels of education, regions and place of residence. The number of schools for EP1 and EP2 is high, but for higher levels of education (ESG1 and ESG2) is low. The presence of secondary schools is also low in provinces other than Maputo City and Maputo Province. Most of the secondary schools are located in urban areas. The issue of availability of schools should be addressed, because this study showed that distance and costs of travelling to school are negative factors for educational attainment in Mozambique.

Conclusion 4 - Weak performance of the education system

The analysis on different datasets demonstrated that school achievement is still low in Mozambique. Mozambique registered a low Net Enrolment Rate (NER). Excluding Maputo City and Maputo Province, all provinces follow the same pattern of low enrolment rates. Enrolment rates are also low in the poorest quintiles of the income distribution. In an earlier conclusion, the low survival rates on transition from primary to secondary education were also mentioned. Related to this are the high repetition rates and high dropouts in the education system.

As a consequence, secondary education attainment is very low in the Mozambican system. Supply factors also contributed negatively to this poor performance. There is no adequate response, in term of human resources, to the rapid increase in enrolment rates. The consequences were the high pupil-teacher ratio and lack of qualified teachers in the system. As result, the Ministry of Education hired teachers without teacher training. In 2003, the percentage of teachers without qualification in rural areas was 47% and in urban areas 25%.

Conclusion 5 – Great inequality of education achievement by Province, Place of Residence, Income group and Gender

The education achievement in Mozambique is far from being equal. The possible cause of this inequality is the poor distribution of supply (schools, teachers) across provinces and place of residence. The gender inequality in education achievement is also visible, in favour of boys. Moreover, the education profiles showed that high income groups are more likely to perform well until high levels of schooling. It seems that pupils perform better who are in high income household, in major urban areas like Maputo City. If one of the objectives of education is contributing to lowering inequalities, it is not currently happening in the Mozambican education system.

Conclusion 6 – Poor education funding and future challenges

Education funding is poor. Schools are not financially autonomous and incapable of collecting funds for daily activities. The education budget is mainly funding by external sources (donors). Most of the budget is currently used for school construction and equipment. Other aspects, such as teachers' training, teachers' incentives and learning materials are second priority. In addition to this, the future of education funding should be addressed carefully and two factors should be taken in account. First, government should provide, every year, an additional budget of USD 3.5 millions to compensate for the cost of school fee abolition. Second, the escalation of AIDS will mean USD 7 millions to make up for the deaths and absence of teachers.

Conclusion 7 – Demand determinants have an impact on educational achievement

The empirical work in this study showed that household characteristics, such as high levels of parents' education and female headed household, have an impact on educational achievement. Individual characteristics (age and gender) also influence the achievement of the children at school. Boys are more likely to perform better than girls. These findings have strong policy implication. Moreover, the province and place of residence of the

children are also important determinants of their achievement at school. Controlling for other variables, being in Maputo City and/or in major urban areas has a positive impact on school achievement.

Conclusion 8 – Supply conditions and school quality also have a strong impact on educational achievement

Supply conditions play an important role in education in Mozambique. The availability of schools, school facility (type of construction, libraries and other infrastructure) and qualified teachers are key factors for school achievement. The costs of education (direct and indirect) also contribute to school attainment. Part of the empirical work demonstrated that school achievement is mostly a school effect. This is also related to the fact that some schools are inefficient in transforming resources into school outcomes. It was also reported that teaching activities, such as homework, and female teacher are positive factors for pupils' achievement. A larger class size has a small but negative impact on school outcomes.

The phenomenon of extra tuition was also analysed. Extra tuition is common in Mozambique due the low achievement of pupils in general. However, two important issues should be analysed. First, the SACMEQ II did not provide information about who provided the extra tuition to the pupils. If the activity is mainly done by teachers, as a part-time job, it will be dangerous for the education system, because it will be associated with emergence of a parallel education system and problems of corruption within the system. Second, if the extra tuition requires additional spending from parents, it will imply that inequalities in education attainment will persist in future because only well-off households will be able to pay for it.

Conclusion 9 – Part of the educational achievement in Mozambique is still unexplained

The demand, supply and school quality dimensions explained some of the variations in school outcomes. However, part of the educational achievement in Mozambique is still unexplained. There are other factors influencing pupils' achievement that were not clarified from the reports and datasets used in this study. Factors such as children's abilities and effort were not included in these studies. Other important information about teachers and principals' of schools were also not explored. Moreover, the management process in schools and some of the classroom dynamics could not be analysed. For example, when one used pupil mathematics scores as a proxy of school outcomes, few variables statistically explained the variations in these scores.

Conclusion 10 – Other conclusions

There are some other conclusions of this study. Mozambique performed well in the SACMEQ context. The achievement in mathematics is a complex phenomenon and should be analysed in further research. The achievement of teachers' reading scores was weak compared with mathematics scores

6.2. Evaluation of the achievements of the present study

For the purpose of the reader's evaluation, the objectives, data, methodology and expected outcomes of the study presented in Table 1-5 is linked with the study results.

Table 6-1 – Evaluation of the achievements of the Study

Objective	Data and Method	Outcomes	
		Expected	**Results**
Objective 1: Compare the determinants of education in developing countries, as contained in the literature review, with the situation in Mozambique	Literature review	Identification of important variables of analysis	• High poverty rate • Low literacy rates • Rapid growth of enrolments and schools • Unequal distribution of schools • High pupil-teacher ratio • Low percentage of qualified teachers
Objective 2: Understand the supply factors that influence enrolments and education attainment in Mozambique	Reports Descriptive report SACMEQ 2000 data	Description of the important supply conditions and factors that are relevant to this study	• Low availability of schools in rural areas and provinces • School facility • Qualified teachers • Costs of education • Poor education funding and future challenges
Objective 3: Evaluate the efficiency of the current education system in Mozambique	Descriptive report Household survey data	Indicators of education efficiency in Mozambique	• Weak performance of the education system • High grade repetition • High dropout rates • Low survival rates • Mozambique has a good achievement in SACMEQ context

Objective	Data and Method	Outcomes	
		Expected	**Results**
Objective 4: Analyse the importance of each of the demand determinants to education in Mozambique	Household Survey data 2002/03 SACMEQ 2000 data Empirical research	Identification of the demand determinants and their relevance for education attainment in Mozambique	• Great inequality of education achievement by Province, Region, Income group and Gender • Individual characteristics (Age, Gender) • Household characteristics (Parents' education, headship and income) • Place of residence (rural/urban) • Provinces
Objective 5: Analyse the implication of school quality on education attainment in Mozambique	SACMEQ 2000 Descriptive and empirical work	Indicators of school quality Importance of school quality for educational attainment	• School effect on achievement • Frequency of homework • Class size/pupil-teacher ratio • Female teachers • Extra tuition classes
Objective 6: Contribute information to assist policy makers with decisions regarding education in Mozambique.	Literature review Descriptive data output Empirical work output Report	Relevant information for decision makers	• Weak performance of education system • Low qualification of teachers • Inequalities in educational attainment • Availability of schools and school facilities • Poor educational funding • Better collection of data on education

6.3. Recommendations

One of the objectives of this study was to use the analysis to contribute to the progress of the education system in Mozambique in particular, and for the development of the country in general. It is therefore recommended that:

Recommendation 1 – Improve the literacy rates of the population

The education sector should continue with the effort of growing the enrolment rates and attainment in the education system, followed by an improvement of school quality indicators. Conditions should be created to retain children in school until high levels of education. The government should also continue to invest in technical education. Another issue not properly addressed in this study, is the relationship between programs of technical schools and the needs of the labour market. However, this link between schools and the labour market is crucial. It is also recommended that the education system keep the evening shift to ensure adult education and studies for part-time pupils.

In addition to this government should provide incentives for households who have children at school. The type of incentives can be fiscal and via transfers.

Recommendation 2 – Improve the qualification of teachers

The study found that a high proportion of teachers in the education system do not have a teacher training. For teachers that are currently teaching without any qualification, it is necessary to provide training programs, on a part time basis. For future recruitment, it is recommended that candidates should have a qualification for the position that they are applying for and that the selection process should be strict. In addition to this, on-the-job training activities should be provided.

Recommendation 3 – Improve the school quality

The school quality should be improved in the following dimensions: 1) Time to learn; 2) Material inputs; and 3) School and class dynamics (Lloyd, 1998: 11). Regarding time to learn, besides the normal time of school, it is important that schools should provide extra tuition for pupils with low achievement. The extra tuition could be paid for the teachers who provide it and it will constitute an extra earning for them. This policy can solve three problems. Firstly, the fact that currently only children in high income households can afford extra tuition classes. Secondly, it can prevent corruption among teachers. Informal tuitions will encourage teachers to teach incomplete program at schools and give the full program for pupils who attend extra tuition classes. Lastly, it will improve learning outcomes among pupils with low achievement. The direct implication of this policy is the additional budget to pay teachers.

Concerning material inputs, efforts should be made to ensure that in every school the basic school facilities, such as infrastructure, equipment and amenities, are provided. Moreover, learning materials (textbooks, library books and maps) will also help the learning process. On top of that and related with the previous recommendation, the teachers' qualification, training, incentives and other core factors should be addressed.

Related with school dynamics, principals should provide the necessary school environment with the objective of better learning outcomes and interaction between pupils and teachers. The study showed the importance of extra class activities, such as homework, and it is important that this should be implemented within the education system.

The improvement of school quality will contribute to reducing the high repetition and dropout rates, and improve the survival rates within the system.

Recommendation 4 – Expand access to school ensuring (not compromising) quality of education

The effort that government is currently doing to expand the school network should continue. The expansion of schools to rural areas is fundamental. It is also important that access to secondary schools should be more equal across provinces and place of residence. The expansion of schools should be planned in line with other actions, such as teachers' training. This can be the solution to reduce the trade-off between expansion of schools and school quality. The expansion will contribute to reducing some inequalities in terms of educational attainment in some provinces and rural areas.

Recommendation 5 – Develop a specific program to reduce gender inequalities in education

The gender inequalities in terms of educational achievement were visible from the analysis done in this study. Therefore, it is recommended that the Ministry of Education should develop a plan to reduce the gender inequality. For that, there will be a need for deepen research on girls' achievement at school.
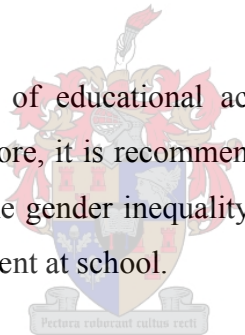
Recommendation 6 – Research Project on Education Funding

The abolition of school fees and pandemic of AIDS were reported earlier as future challenges for education funding. In addition to this, this study recommended the expansion of schools, more material inputs for schools and more qualified teachers for the education system. Moreover, it was also recommended that extra tuition should be provided at schools as a part-time job for teachers. All these policies and plans will require a large additional budget. Therefore, it is recommended that Ministry of Education should find alternative sources of funding. One way to deal with this, is to involve schools in the process of obtain funds. Schools should be able to develop activities in order to finance part of the management and learning activities. However, a

research project on education funding should be developed in order to provide better solutions for this problem.

6.4. Final remarks

This study is a small contribution for the subject of educational performance in Mozambique. There were limitations to the conceptual framework. Firstly, the empirical work on household survey did not analyse the determinants of secondary school attainment, because there were not enough observations. Variables such distance to school and the possession of learning materials were not available in the household survey. Therefore, it was not possible to analyse the direct impact of these variables on school achievement. It is recommended that data of this nature and other relevant education data should be collected in the future household surveys. It is also recommended that data on income, wages and educational attainment, should be collected in a different way. In the case of educational attainment, the data should be collected in a continuous way, i.e., exactly the number of years of education of each individual in the sample rather than in intervals (no education, EP1, EP2, ESG1, ESG2, Tertiary). The data collection on income should better, mainly in rural areas. It was stated that income in these regions may be underestimated due to the other sources of income in rural areas.

Regarding the analysis of SACMEQ data, variables like socio-economic status, parents' education, teachers' characteristics (qualification, training and experience) and grade repetition did not work on explaining variations in test scores (mainly in mathematics). It does not imply that these variables are not important for school achievement. This fact can perhaps be attributed to data collection problems. So, it is recommended that future surveys of this nature should take into consideration these aspects of data collection, because they are extremely important for research projects. Collection of other indicators on school efficiency is also important for further analysis of school achievement in the Mozambican education system. These indicators should be related to management processes in the schools and learning processes within classrooms. In the case of Mathematics results, more field work is necessary to find out what factors affect achievement in this subject.

Finally, there were dimensions linked to education performance in Mozambique that were not analysed in this study. Some examples are the link between education and the labour market, returns to education and the relationship between education and economic growth. It is recommended that future research on education in Mozambique investigate these dimensions.

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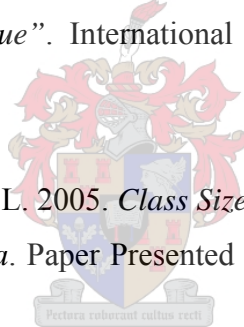
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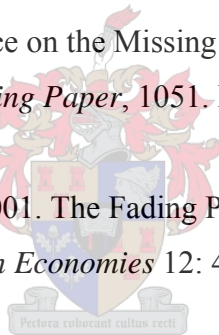
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