FREE PRIMARY EDUCATION IN KENYA: DETERMINANTS OF THE PRIMARY EDUCATION BUDGET

By

John M. Njoroge

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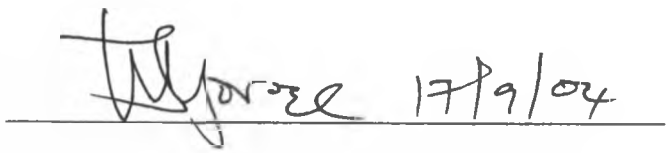
Declaration

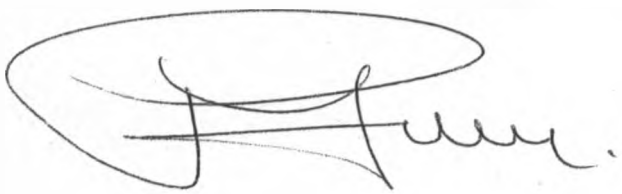
This research paper is my original work and has not been presented for a degree in any other university.



John Mungai Njoroge

This research paper has been submitted for examination with our approval as university supervisors

Dr. Tabitha. Kiriti



Mr. Raphael M. Kabando

Dedication

This paper is dedicated to my wife Nancy and my children Christine Wanjiru and Francis Njoroge.

Acknowledgement

I thank all those who assisted me in many ways to prepare this research paper. First I am greatly indebted to my supervisors Dr. Tabitha Kiriti and R.M. Kabando who made the research a learning process through their valuable comments, advice and guidance throughout the process. Their patience with me was intriguing.

Special thanks goes to my employers Ministry of Education and the Africa Economic Research Consortium for the financial support that enabled me complete my studies.

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It is difficulty to individually acknowledge all those who assisted me directly and indirectly in their small way. To all of them I say thank you. Above all I thank the almighty God for making everything possible for me to finish my studies.

Finally I would like to state that I am solely responsible for all the errors and omissions in this paper.

List of Abbreviations

ASAL - Arid and Semi Arid Land

CBS - Central Bureau of Statistics

DEB - District Education Board

DFID - Department of Foreign and International Development

ECD - Early Childhood Education

EFA - Education For All

FPE - Free Primary Education

GDP - Gross Domestic Product

GER - Gross Enrolment Rates

GOK - Government of Kenya

IT – Information Technology

KCPE – Kenya Certificate of Primary education

KCSE – Kenya Certificate of Secondary Education

MOEST- Ministry of Education Science and Technology

MPET- Master Plan on Education and Training

MTEF - Medium Expenditure Framework

NARC - National Rainbow Coalition

NER - Net Enrolment Rates

NFE - Non-Formal Education

NGO - Non-Governmental Organization

OPEC - Organization of Oil Exporting Countries

PTA - Parents Teaches Association

SIDA - Swedish International Development Agency

SWAP - Sector Wide Approach

TSC - Teachers Service Commission

UNESCO - United Nations Science and Cultural Organization

UNICEF - United Nations Children and Education Fund

UN – United Nations

UPE - Universal Primary Education

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ABSTRACT

Education in Kenya consists of both formal and non-formal systems. The formal system popularly known as 8.4.4 spans through pre-primary, primary, secondary and university education. The 8.4.4 system was introduced in 1985 and its main features are eight years of primary education, four years of secondary education and four years of university education

The study endeavored to analyze the education budget and had the following objectives.

- To establish the main determinants of primary education budget.
- To establish the implications of government education policies on the primary education budget.
- To draw policy recommendations in the light of the research findings.

The study established that education has been a fundamental strategy for human capital development and a crucial vehicle for enhancing the quality of life besides economic development since 1963. Over the last 34 years, the Government, households, communities and the private investors have striven to enhance the development of education in the country. The efforts of various players in investing in this sector have been guided by the various policy documents such as the Education Act Cap 211 of the laws of Kenya, National Development Plans and Sessional Papers (in particular sessional Papers Nos. 10, 6, 1 and 2 of 1965, 1988, 1992 and 1996) respectively. The study also established that the education system has undergone radical changes and various reforms all aimed at accelerating enrolments, retention and completion rates at all levels of education in the country.

The study shows that the government continues to provide and pay teachers in all public primary schools besides meeting other administrative costs of the sector. Expenditure on school supplies and equipment had up to the end of 2002 been minimal. These costs including the construction, maintenance of schools and staff houses have been the responsibility of the parents and communities.

Studies cited in the research have shown that there is a lot of inefficiencies in the allocation and utilization of financial, human and materials resources. They have identified the main

costs of primary education all over the world are teacher salaries, learning and teaching materials and other non wage costs.

The study reports the main determinants of primary education budget in Kenya as teachers salaries, non wage cost which includes development expenditures, total education budget and to some extent enrolments. It also reveals that the government policies including Free Primary Education and cost sharing policies are important but no significant determinants of primary education budget.

In conclusion the study found that the continued increase in teachers salaries and the low and erratic GDP growth rates are likely to be detrimental to the provision of quality and affordable free primary education.

CHAPTER 1

1.0 Introduction

1.1 Background

At independence the country inherited a system of education which was fragmented and faced with many challenges because it had been designed along racial and religious lines. Each of the three major races namely the Whites, Asians and the Blacks had its own schools and curriculums. The religious denominations had established their own schools which only admitted those who followed their faith. These needed to be addressed in order to harmonize and enhance education and training for the newly independent nation. The challenges then included:

- Lack of a unified legal framework in the education system for all racial and religious groups.
- Lack of a unified education curriculum.
- Inadequate physical infrastructure, equipment, learning and teaching materials.
- Inappropriate education and training opportunities to meet the growing demand for skilled human resource.
- Racial and religious hostilities among stakeholders involved in the education provision.
- Inadequate number of qualified teachers.
- Negative attitudes towards education.

However after independence the Kenya government through the various policy documents namely the national plans, taskforce reports, commissions and sessional papers continuously articulated the importance of education as a driving force to social and economic development. The government endeavored to address all the challenges through various reforms to the sector which have included overhauling of the education system in order to encourage greater participation by Kenyans. Over the years there has been remarkable expansion in primary education, both in terms of the number of schools established and in the number of children enrolled.

In 1963 there were only 6,058 primary schools with an enrolment of 891,103 pupils. By 1980 the number of public primary schools had increased to 10,255 with an enrolment of 3,926,629 pupils. This impressive increase in both the number of primary schools and enrolments in the 1970's and 1980's was attributed to two events. The first significant increase was in 1974 when payment of tuition fees was abolished for lower primary classes 1 to 4. This resulted in a 49% increase in enrolment from 1,816,017 pupils in 1973 to 2,705,878 pupils in 1974. The second one was in 1979 after the abolition of tuition fees for the rest of the classes 5 to 7 and the introduction of the Free School Milk Programme. Enrolments then increased by 23.5% from 2,998,894 in 1978 to 3,926,629 in 1979.

By 1990 there were over 16,000 primary schools with a total enrolment of 5.3 million children (girls constituting 49%). In 2002 there were about 18,901 primary schools both private and public with an enrolment of slightly over six million children and 177,752 teachers. Out of this teaching force, 95% of the were trained and was supplemented by an unknown number of untrained teachers hired by both the TSC and the Parent Teacher Associations (PTA) of the individual schools. It was also estimated that during the same year, about 12.4% or 1.4 million primary school eligible children were not enrolled in schools.

The government continues to employ and pay teachers in all the public primary schools besides meeting other administrative costs of the sector. Expenditure on school supplies and equipment had up to the end of 2002 been minimal. These costs including the construction, maintenance of schools and staff houses have been the responsibility of the parents and communities. Indeed almost all primary schools constructed and equipped after independence have mainly been built by parents or on *harambee* basis i.e self-help initiatives.

The provision of education has been very expensive to both the government and households taking over 22% of the total government expenditures and close to 7% of the GDP. Primary education takes slightly over 55% of the total education budget from the government. Table 1.1 shows the total government and total primary education budget from 1970 to 2003 in Kenya shillings. The table uses data from 1970 which is the year when there was the handover of primary education to the central government from the local authorities and communities. It was also a period also characterized by various reforms to the basic education which

included partial abolition of tuition fees at primary level by the government of the late president Jomo Kenyatta and later complete abolition by retired president Moi immediately after he ascended to power following the demise of the founding father of the nation. This was an era where primary education was essentially a "free primary education regime" Other reforms included the changing of the education system from 7- 4 - 2- 3 to the now popular 8-4-4 system.

Table 1.1 shows that the primary education budget has been growing at an average of more than 10% annually since 1970. The primary budget jumped from a partly Ksh 0.325 billion in 1970 to over Ksh 47 billions by 2003.

The total government budget grew from a partly Ksh 2.780 billions in 1970 to over Ksh 330. billions by the year 2003. There were serious fluctuations in the total government budget over the study period which was attributed to the seven parliamentary and presidential elections. The total government budget rose from Ksh 44 billion in 1987 to Ksh 62 billion 1988 which was an election year. Again table 1.1 show that the total budget jumped abnormally from Ksh 183 billion to Ksh 313 billion between 1996 and 1997 and then to a low of Ksh 243 billion in 1998. This was an election year and the country experienced the highest budget deficit ever.

Table 1.1: Total Government and Primary Education Expenditures growth from 1970-2003

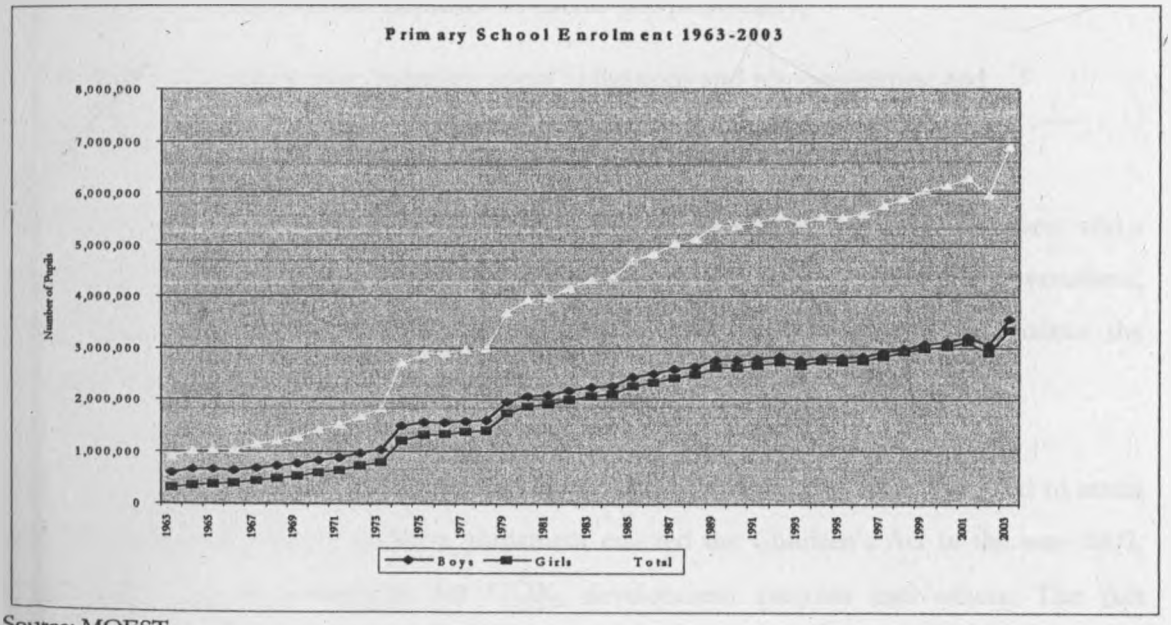
Year	Primary School Expenditure (Ksh. Millions)	Percentage Growth rate	Total Government. Expenditure (Ksh. millions)	Percentage Growth rate
1970	325.99		2,780.78	
1971	335.92	3.04	3,892.79	28.57
1972	404.26	20.34	4,028.14	3.36
1973	496.32	22.77	4,603.34	12.50
1974	678.91	36.79	6,028.84	23.64
1975	855.40	26.00	7,462.10	19.21
1976	851.99	(0.40)	8,195.28	8.95
1977	1,006.78	18.17	11,807.78	30.59
1978	1,200.25	19.22	13,952.20	15.37
1979	1,230.20	2.50	15,368.80	9.22
1980	1,990.68	61.82	19,005.80	19.14
1981	2,163.70	8.69	22,450.00	15.34
1982	2,270.72	4.95	23,810.00	5.71
1983	2,420.72	6.61	24,950.00	4.57
1984	2,857.87	18.06	31,220.00	20.08
1985	3,626.55	26.90	32,910.00	5.14
1986	4,361.46	20.26	41,640.00	20.97
1987	5,022.93	15.17	44,300.00	6.00
1988	5,860.49	16.67	62,038.00	28.59
1989	6,214.22	6.04	70,121.00	11.53
1990	7,556.43	21.60	80,470.00	12.86
1991	7,944.31	5.13	87,330.00	7.86
1992	9,402.61	18.36	121,300.00	28.00
1993	11,766.15	25.14	180,200.00	32.69
1994	15,262.50	29.72	184,734.00	2.45
1995	16,365.21	7.22	190,993.60	3.28
1996	17,676.84	8.01	183,742.50	-3.95
1997	24,587.76	28.10	313,373.78	41.37
1998	25,008.07	1.71	243,335.47	-28.78
1999	25,510.61	2.01	226,155.07	-7.60
2000	26,423.49	3.58	268,430.49	15.75
2001	28,007.81	6.00	283,294.85	5.25
2002	32,015.55	29.30	310,989.00	8.91
2003	47,496.08	21.74	330,005.00	5.76

Source: GOK Printed Estimates (Various issues)

The ability of government and the households to shoulder the burden of providing basic education to their children has over the past years been undermined by the rising poverty levels and low economic growth rate in the country. The second Kenya Human Resource Development Report of Kenya (2001) revealed that 56% of the Kenyans live below the poverty line and that 30.7% of the children who are out of school cited affordability as their main reasons of being out of school.

In addition to the expansion in the number of primary school enrolments, there has been a significant improvement in the participation of girls in education. At independence, only a third of the enrolments in primary schools were girls. By 2001, the proportion of girls had risen to nearly 50 %. Figure 1.1 shows the enrolments in all the public primary schools since independence. It is worth noting that there were three significant shocks in enrollments in 1974, 1979 and in the year 2003. These are periods when education was either partially or fully declared free through abolition of levies and tuition fees. The enrolments increased from a partly 890,108 in 1963 to 6,906,356 by the end of 2003 as shown in figure 1.1. During the year 2003 when the FPE policy was implemented enrolments in all the public primary schools increased by over 14% from 5,968,241 pupils to 6,906,356 by the end of 2003. On the other hand primary school expenditures increased from Ksh. 32 billion in 2002 to Kshs. 47.5 billion.

Figure 1.1 The Enrolment Trends from 1963 to 2003



Source: MOEST

Past initiatives to enhance the primary education sub sector in the country as depicted by the various commissions, task forces and working parties have been a reflection of the government's commitment to internationally established frameworks and conventions for development of the education sector. Kenya ratified the recommendations of the Jomtien World Conference on Education For All in 1990 and is thus a signatory to the UN Human Rights Charter and the Convention on the Rights of Every Citizen. This right was reiterated in

2000 when 1,500 participants from 155 nations met in Dakar, Senegal and reaffirmed basic education as a human right and adopted the World Declaration on Education For All (EFA) Article 1. The conference also reiterated the right of every child to education and emphasized the duty of every state government to provide education to all its citizens.

In this regard, education policies in the country have been geared towards the realization of the following goals.

- Foster national unity;
- Prepare and equip the youth with knowledge, skills and expertise to enable them play an effective role in the life of the nation;
- Serve the needs of national development;
- Provide for the full development of talents and personality;
- Promote social justice, morality, social obligations and responsibilities; and
- Foster positive attitudes and consciousness towards other nations.

Education has also been seen as a fundamental strategy for human capital development and a crucial vehicle for enhancing the quality of life. Over the last 34 years, the Government, households, communities, parents and the private investors have striven to enhance the development of education in the country.

Most of the official education documents current and past also emphasizes the need to attain UPE and EFA by 2015. In addition parliament enacted the Children's Act in the year 2002, which spells out responsibilities for GOK, development partners and others. The Act provides for free and compulsory primary education for every Kenyan child.

1.2 The Budgetary Process

Since the year 2000 the country adopted a new budgetary process known as the Medium Term Expenditure Frame Work budgetary system whose aim is to link policy, planning and budgeting. Essentially what it means is that the sector whose policy priorities have the highest impact on poverty reduction and wealth creation is given the highest budgetary allocation.

This is a departure from the previous incremental budgetary process where all ministries annual budget were increased by a certain percentage across the board in total disregard to the importance of their programmes. The new budgetary process is a bidding process where sectors and ministries and sub-sectors compete for resources in a round table.

The ministry of education competes for resources from the human resource development sector with the Health, Labor and Home Affairs ministries among others to take care of the non-salary costs. The salaries and allowances are sought from the public administration sector. After the ministry resource allocation is determined, department are the required to submit and defend their own proposals before they can be allocated their budgets. These departments include primary education, university, technical and early childhood development among others.

1.3 The Education System

Education in Kenya consists of both formal and non-formal systems. The formal system popularly known as 8.4.4 spans through primary, secondary to the university. This system was introduced in 1985 and its main features are eight years of primary education, four years of secondary education and four years of university education

The Ministry of Education Science and Technology oversees the running of formal education in the country. Through examination, it ensures transition from one level to the other. At the end of the first eight years, pupils sit for the Kenya Certificate of Primary Education (KCPE). Those who proceed for secondary education sit for the Kenya Certificate of Secondary Education (KCSE) after four years. Candidates who pass this examination proceed to the university. Other training and educational opportunities are available for those who do not qualify to go to the university.

Post-primary and post secondary education is offered by various ministries. Non-Formal Education is provided by various Government departments, private organizations, NGOs and religious organizations. The Non formal system recently introduced is meant to take care of the over age and those with special needs or living in the informal settlements with no education facilities.

1.4 Management of Education

The Ministry of education science and technology has delegated the running of all public educational and training institutions to school committees, Boards of Governors, Parent Teacher Associations and the sponsors. This is clearly articulated in the Education Act, which also spells out the specific roles of these bodies.

The above education management structures are expected to formulate policies and guidelines to control and regulate school developments, financial provisions, discipline, employment of non-teaching staff and the general welfare of their institutions.

1.5 Cost Sharing Policy

This was part of the World Bank and IMF prescription introduced to contain the escalating public sector expenditures on social sectors in most developing countries in the 1980's. It was aimed at increasing the non-wage costs in the service sectors and increased economic development in these countries. In the case of Kenya education sector this was implemented following the recommendations of a presidential working party on education in the next decade and beyond popularly known as Kamunge Report. However the implementation was effected in 1989 when parents were expected to shoulder more responsibilities in terms education financing at all levels. At the primary school level there was the introduction of user fees and levies which included examination fees, activity fee, non teaching staff salaries, operation and maintenance of schools besides continuing with the construction of school facilities.

1.6 Definition of Free Primary Education

The Education Sector Review Report (2003) defines FPE as an education system or policy that allows all children access to education without discrimination. It removes all obstacles that hinder children of school going-age from accessing and completing primary education as the case in many urban slums, rural areas and Arid and Semi-Arid Lands (ASAL). The government abolished all levies and tuition fees in all public primary schools as from January 2003 as part of its fulfillment of its pre election pledge to Kenyans during their election campaigns in 2002.

The government and development partners have been meeting the cost of basic teaching and learning materials, wages of critical non-teaching staff and co-curricula activities. The government gives a capitation grant of Kshs 1020 per child per year to all the public primary schools besides meeting the teacher salaries, curriculum development services and other administrative costs. The grant has been allocated as shown by Table 1.2 with the major items being tuition and textbook allocations.

Table1.2 Capitation Grants Items

Items	Amount in Ksh. Per pupil
Tuition	360
Textbooks	210
Supplementary textbooks	55
3 pencils per year	15
Duster, chalks, and registers	5
Illustrative charts	5
Support staff wages	112
Maintenance and improvements	127
Activity	43
Quality assurance	29
Local travels and Transport	21
Electricity, water and conservancy	10
Postage/telephone and P.O. rental	22
Contingencies	6
Total	**1,020**

Source. MOEST

FPE is therefore aimed at being an all inclusive education that addresses the learners needs within the mainstream schools and at the same time advocates for all children regardless of their background to access quality education in their neighborhood schools. The government thus considers the provision of primary education as central to poverty reduction.

The declaration of FPE in 2003 saw the government embark on a vigorous campaign to mobilize resources locally and from outside the country. The various education development partners and stakeholders responded very well and contributed significantly to the financing of

FPE policy implementation. Their contributions during the financial years 2002/2003 and 2003/2004 came in various proportions as shown in Table 1.3

Table 1.3. Government and Donor Contribution to FPE Programme 2003- 2004

Contributing Agency	2002/2003Financial Year (Ksh. billions)	2003/04 Financial Year (Ksh. billions)
GOK	5.4	9.0
World Bank	-	3.753
DFID/SIDA	2.6	0.809
WFP (Feeding Program)	-	1.056
OPEC	-	0.753
UNICEF	0.117	-
Totals	8.117	15.353

Source. MOEST

Table 1.3 shows that DFID and the World Bank are the main donors to the primary education sub-sector. The WFP contributed Ksh. 1.056 million, which was to be used for the primary school feeding programme. The main stakeholders include among others the parents/communities, development partners/donors, the government, the private sector and the civil society. It is also worth noting that though the contributions of other stakeholders namely parents and NGO's are not included in the table, they have also made enormous contribution in the implementation of FPE programme

1.7 Role of Parents/Communities under the FPE Regime

Parents and communities are supposed to meet the cost of examination for class 8, buy uniforms for their children, provide hot lunches, pay for the pupils transport cost to school, pay for boarding facilities, meet the cost of health care for the children, initiate income generating activities at the school level and at the same time develop and maintain physical facilities in primary schools.

Free Primary Education policy does not therefore stop community initiatives in cases where schools were already maintaining certain facilities and services for pupils such as hot lunches, swimming pools, computer classes, transport, boarding facilities or even employing their own teachers.

1.8 Role of MOEST

The Education Sector Review (2003) spell out the role of the MOEST as -

- To appoint credible trustees for the Free Primary Education Fund and ensure funds disbursed to the schools are properly used and managed.
- Strengthening the capacities of local institutions, school management committees and District Education Boards (DEB) in planning and implementation of FPE.
- Ensuring proper management and efficient use of school resources through continous capacity building of school committees and teachers.
- To support in the purchase and provision of basic teaching and learning materials (chalk, books, rulers, pens and games materials).
- Developing a long-term plan for training and deploying the teaching force.
- Ensuring quality education by improving the teacher/pupil ratio and by providing opportunities for teachers to undergo in-service training on a continuous basis.
- Continues to pay the teacher salaries and allowances.
- Continuously review and supervise curriculum development and implementation.
- Ensure complementary Non-Formal Education (NFE) opportunities for out-of-school over age children and youth.
- The MOEST will also continue to manage the low cost boarding schools and the school-feeding programme in Arid and Semi-Arid Lands (ASAL).

Beside the above the MOEST will continue to formulate and coordinate the implementation of the national education policies.

1.9 Role of the Development Partners

The development partners are expected to continue playing a significant role in covering some of the emerging costs under the FPE and at the same time supplement the governments budgetary provision to the primary school sub sector both recurrent and development. Some of the donors continue to assist in the construction of the physical infrastructure to ease congestion in the existing facilities. Assistance has been provided through the sector wide approach (SWAP), i.e. funding part of the overall spending in education on the basis of agreements on education policies and the Medium Term Expenditure Framework (MTEF)

provisions for the sector. It will also follow a detailed Public Expenditure Review (PER) recommendations prepared at the end of each financial year.

The main development partners to the education sector are the World Bank, DFID, SIDA, OPEC, UNICEF, JICA and UNESCO among others. Currently the main support being given by the donors is mainly in the areas of technical assistance, construction of classrooms, learning and teaching materials.

1.10 Problem Statement

On attaining independence the government committed itself to providing basic education to all citizens as part of its development strategy of eradicating poverty, ignorance, disease and improved welfare and productivity of the nation. The commitment was first articulated in the "Sessional Paper No.10 of 1965 on *African Socialism and its Application to Planning in Kenya* and the subsequent Development Plan of 1966 - 1969.

The commitment was implemented with the first step being the government taking over the responsibility of paying teachers, providing the learning and teaching materials as well as other equipment, while the local communities built schools. In an attempt to enhance access to basic education tuition fees was abolished for classes one to four in 1974 following recommendation of the Ominde Commission (1966) and in the entire primary schools sector in 1979 through a presidential decree. The primary education budget was further enhanced when the government started the free milk progsrsmme for all the public primary school pupils in 1979 aimed at enhancing enrolments, retention and participation rates.

The partial implementation of the free primary education in 1974 saw a huge influx of children to public school with enrolments increasing by almost 50% from 1.8 millions to over 2.7 million pupils. The complete abolition of tuition fees and introduction of free school milk in 1979 brought another upsurge in primary enrolments but within a short time enrolments started to decline. This was attributed to the introduction of hidden costs/levies like development funds, activity fees and uniforms. The introduction of the cost sharing policy in 1989 worsened the scenario with enrolments, retention and completion rates declining drastically in the early 1990's.

The provision of education has been very expensive to both the government and households taking over 35% of government recurrent expenditures and close to 7% of GDP. Primary school education takes over 55% of the education budget from the government. Abagi and Olweya (1999) found that on average an urban household spends about 30-40% of their income on education while rural households spend up to 60 %.

Despite renewed government commitment to the provision of Free Primary Education and increased budget allocation for the primary education sub-sector, the issues of education quality, inefficiencies, costs and financing have remained elusive. Considerations on realistic teaching/learning resources, financing of teaching staff and provision of adequate physical infrastructure are some of the shortcoming identified as obstacles to the achievement of UPE. Since March 2003, the financing of FPE has been based on a unit cost of Kshs. 1,020 per child regardless of location and regional disparities. The capitation grant ignores the full cost of primary education at different grades and only takes care of part of the recurrent costs. Parents on the other hand continue to bear a sizeable amount of the cost burden in terms of uniforms, food, health, transport and provision of physical facilities.

The low and erratic economic growth rate experienced in the country in the last few years has continued to limit resources available for education and training. Economic indicators show that the country's GDP growth rate has only been 1.3% over the last five years. This is lower than the government expenditure growth rate, which currently averages more than 10% annually. The above coupled with over reliance on donor financing in the primary subsector especially in the provision of learning and teaching material affects the provision of primary education negatively. It is also worth noting that donors and the communities finance over 80% of the education development budget.

The growth of the primary education budget on the other hand has been equally high in the recent past and may have been attributed to the rising cost of education, increasing enrolments and the 1997 teachers salary award which is being implemented in phases. On average the over all education budget growth averaged 10% per annum over the study periods (GOK, budget printed estimates).

The study therefore try to establish the real determinants of the primary education budget in light of the low GDP growth rate, high poverty levels, tight government fiscal policies, introduction of cost sharing policy, high population growth rates, introduction of the FPE policy and the rising cost of education in the country. The study will also attempt to establish the implication of government education policies on the primary education budget.

1.11 Objectives and Purpose of the Study

The broad objective of the study is to analyze the primary education budget in Kenya with a view to drawing policy implications. Specifically the objectives of the study will be: -

- To establish the main determinants of primary education budget;
- To establish the significance of government education policies on the primary education budget
- To draw policy recommendations in the light of the research findings;

1.12 Significance of the Study

The study is motivated by the fact that despite the various government policy pronouncements and the implementation of the FPE policies in 1974, 1979 and 2003 there has been a notable upsurge in enrolments which have been temporary and have not been sustained. The government, parents, Non Government Organizations and the donors recognize that although major strides have been made in education in quantitative terms there are still serious shortcomings in primary education financing.

Despite the heavy investment and the introduction of the 8-4-4 system of education, enrolment at the primary level has been characterized by regional and gender disparities and declining enrolment rates (Abagi and Odipo, 1997). Similarly, the quality and relevance of primary education have been wanting. The education sector has also continued to experience high wastage as a result of repetition and high dropout rates even with increased budget allocation over the years.

All past initiatives including increased government budgetary allocations, primary school enrolments short up but were not sustained because within a short time they started to decline. Again it has been observed that the primary education budget has continued to rise even with declining rates of enrolments. This conflicting situation thus calls for the study to distinctively determine the determinants of primary education budget. The introduction of the cost sharing policy in 1989 worsened the scenario and resulted in many children dropping out of the education system.

The endeavor to provide free primary education and substantially subsidized post-primary education has been a major challenge to the Government and the households over the years. The study attempt to establish the reasons behind the rising primary budget allocation despite the government freeze on teacher recruitment since 1997/98 financial year.

Increased government expenditures and low economic growth has continued to overburden the state budgetary provisions. This has been worsened by the debt burden and withholding and late release of donor funding. Again with constrained government budgetary provisions to the social sector and the evident expansive demand pose a serious challenge to the achievement of the primary education sub-sector goals.

There is therefore need for the government and its development partners to identify the best way to contain the rising primary education budget and ensure that resources are efficiently managed both at the national and school levels. This will ensure efficiency in school management and enrolment, retention and completion rates are improved within the government's fiscal constraint. The study will therefore attempt to establish the main determinants of primary education budget and identify those that also have a significant impact on primary education achievements.

CHAPTER 2

2.0 Literature Review

2.1 Theoretical Literature

Most of the economic theories which have dominated the development of social sciences in the developing countries have been categorized under two broad paradigms namely the equilibrium and the conflict paradigms (Kabiru, 1980). The two paradigms although exhibiting variations and emphasis have had a remarkable influence not only in the development of social science but also in studies of education and the society.

In the 1950's and 1960's most of the education studies in the western nations and in most of the developing countries were carried out from a structural functionalist theorem and mainly focused on education as an instrument of social mobility, inculcating values necessary for system maintenance and of influencing change in the society. Equality of educational opportunities was therefore seen as a means of opening channels of mobility to the under privileged individuals in the society and reducing overall inequality. The emphasis here was on schools as an instrument of equalizing opportunities through its inputs and effects (Kabiru, 1980). Two theories therefore emerged under the structural functionalism namely Human Capital and Modernization theories.

The Human Capital approach theory was very popular in the sixties and emphasized on education as an investment which is vital to economic growth. An influential theory of development of African education in the sixties was on the development of knowledge, skills, and capacities through increased investment in basic education. In other underdeveloped countries the emphasis was placed on the need to invest in the development of human resource as a means of overcoming underdevelopment (Karabel and Hasley, 1977), where they pointed out that –

The theory suggests that nations of the third world were not poor because of internal characteristics but in most notably was their lack human capital. As with the poor within the advanced countries nothing in the situation of the under developed called for radical structural changes. Development was possible if only they would improve the quality of their woefully adequate human resource.

Modernization theory is deeply rooted in the structural functionalism. Coleman (1965) set the tone for interpretation of education in the process of modernization. He started by asserting the crucial role education played in the nationalist struggle and the subsequent emergence of elites in the post-colonial societies. Education was perceived as a prerequisite for economic growth and was a highly visible commodity putting it in great demand in post-colonial societies. The role of education is to provide skill and training required for the society to cope with the process of differentiation and inevitable specialization. Basic or primary education was thus unquestionably the master determinant in the realization of equality in a modern society and the reason for massive investments in the education sectors and the reason for high education expenditures in most of the developing countries.

Abernating (1969) study on the development of education in Nigeria illustrated Coleman's notion of development syndrome in the analysis of the role of education in the process of political development. He summed up political development as an aspect of modernization in three notions namely:

a) Capacity and the ability of the political system to achieve its major goals. Here the role of education is to provide literacy skills and manpower for the government.

b) Integration where education is supposed to integrate the society, particularly in situations where ethnic and regional tendencies are strong.

c) Equality - provision of education improves income levels. Education is a welfare item that all people should receive.

In the seventies there was an upsurge of interest in studies on education utilizing theories that fell under the conflict paradigm. Studies under these categories placed less emphasis on education in the process of change, mobility and alternating inequality in the society. They however emphasized on the role of education in reproducing the unequal relations of production in the society (Kabiru, 1981). They assumed that school couldn't be an instrument of equalizing opportunities as long as inequality in the production process is the main feature of the society.

Increased investment in primary education has therefore been widely recognized as a key component in a country's development process. With this realization many governments in

the developing countries have devoted a substantial amount of their total expenditure to primary education based on the demand for education opportunities and these theories.

In Kenya the Sessional Paper No. 10 of 1965 on *African Socialism and its Application to Planning in Kenya* identified poverty, ignorance and disease as the major impediments to national development. Education was then not only seen as a basic human right but a major tool for the development of the skilled manpower required to rejuvenate the economy. This led to the eventual takeover of some of the financial responsibilities that had been left to the communities like payment of teacher's salaries in all the public schools.

The Education Commission of 1964 (Ominde Commission) whose mandate included among other things identifying the causes of declining enrolment and non-attendance of school by the school going population found the tuition fees and levies as the main cause of the high out of school population. The commission recommended among other things the provision of universal primary education for classes one to four through increased primary education budget allocation. This commission was closely followed by the National Committee on Education Objectives and Policies of 1976 (Gachathi Commission) which recommended the abolition of tuition fees for classes 5 to 7.

Mitha, et. al (1995) found that there were discrepancies in access, quality and equity in primary education. The findings and recommendations of this study led to the preparation of the National Master Plan on Education and Training (MPET) in 1997. The MPET addressed five challenges facing the development of basic education in Kenya:

i) The mismatch between formal learning in institutions and economic opportunities in society;
ii) Inadequate national co-ordination of education and training;
iii) Pressure on the public budget allocation to the sub-sector;
iv) Increasing user costs; and
v) Decline in school enrolment rates and quality of education at the primary level.

The Jomtien Conference of June 1990 which was followed by the World summit for children committed nations to the realization of the Education For All (EFA) by the year 2015. After

Jomtien the Kenya government set up a mechanism and framework for realizing EFA goals. Initially, the government set the year 2005 target for the realization of Universal Primary Education. The Kenya Human Development Report 2001 after the World Education Forum held in Dakar in April 2000 indicated positive developments towards the realization of the Jomtien aspirations.

The EFA hand-book (2001) articulates the major primary education sub-sector issues and concerns that have to be addressed in order to achieve EFA by 2015. Education issues have also been articulated in all the major policy documents such as the Poverty Reduction Strategy Paper of 2002, annual Economic Surveys, Development Plans and sub-sectoral surveys. All these have called for enhanced funding for primary education sub sector.

As part of the National Rainbow Coalition (NARC) election pledge of free primary education, the party's manifesto stipulated that the implementation of FPE beginning in January 2003 was a national priority. Indeed during his inauguration in December 2002, President Kibaki reiterated his government's commitment to the provision of free and compulsory education for all school going age children. This has already been implemented with increased budgetary allocations to the primary education sub sector to take care of the anticipated increase in enrolments.

2.2 Empirical Literature Review

Studies have been carried out to establish the determinants of the cost of education in a number of countries. In a study on education cost evaluation in Uganda, Benet (1969) used recurrent expenditure and enrolment data for the years 1963-70 to estimate the recurrent cost requirement of both primary and secondary schools in Uganda. From a unit recurrent costs and enrolment data he projected total recurrent outlays for 1971.

Abagi and Odipo (1997) in their study on the efficiency of primary education in Kenya, *Situational Analysis and Implication for Education Reform* found that the operation of primary education faced the problem of inefficiencies. They carried out their study using both primary and secondary data and found that completion rates remained very low, i.e. less than 50% during the 1990s. Besides this the pupil teacher ratio was also low at 31:1. In their study they

indicated that the teaching and learning time and resources were not utilized efficiently in most of the public schools. They found that the main causes of the inefficiencies were inappropriate education policies, misallocation of resources to educational levels, teacher based factors like teacher's attitude, time utilization, school environment, household based poverty, social cultural factors and gender issues.

Olav (1969) used educational cost models in planning and constructed a simultaneous equation model to estimate total recurrent costs of having a nine-year compulsory education in Norway. He decomposed the total recurrent costs into expenditures on teacher's salaries, furniture, books and other costs of education. By solving the system he obtained estimates of total recurrent costs. He found that expenditures on teacher's salaries were the main determinant of education recurrent costs in that county.

In a study on population growth and education in LDCs Chau (1972) sought to estimate the recurrent cost of primary education by using teacher's salaries and other learning and teaching materials as the explanatory variables. Using cross section data he estimated a single equation regression model. He found that the coefficients for teaching and learning materials costs were insignificant. This suggested that these schools were adequately provided with learning and teaching materials. He attributed the growth of education expenditures in developing countries to rapid population growth, increase in student enrolment and the teacher numbers.

The World Bank (1981) attributes high unit costs in education in sub-Saharan Africa to high teacher's salaries which sometimes contributes to more than 80% of education recurrent budgets. It suggests greater efficiencies in the utilization of resources.

Eicher (1984) in his study on education costing and finance in developing countries, with a focus on Sub Saharan Africa observed that rising costs of education is the main factor leading to failure of many governments of developing countries to finance the maintenance costs of their school system.

Russell (1994) carried out an analysis of the provision of FPE in Lesotho. He found that besides the government guaranteeing basic education for all the Basotho children by providing

the minimum basic requirements, the parents continued to play a significant role in the country's endeavor to achieve better completion and enrolments in Lesotho. The study revealed that the implementation of the FPE programme was done in phases.

Olembo et. al (1982) in their study on financing of education in Kenya used teacher's salaries and other allowances to explain the high and rising education expenditures. He found that teachers wage bill accounted for 85% of the MOEST recurrent budget during the financial year 1979/80. They also found out that the overall education recurrent budget increased by 45% between 1979 and 1981 following the implementation of the Waruhiu teacher salary award.

Kimalu et. al (2001)in their study on education indicators in Kenya between that increased investments in education have established a comprehensive network of schools resulting in an impressive expansion and access to education at all levels. Adult literacy rates quadrupled from 20% in 1963 to 73% in 1997. The expenditure on primary education has continuously risen e.g. between 1991 and 2001 they observed that public expenditure on education accounted for about 28.5 percent of the total government expenditure with the primary sub sector taking about 55% of the same.

Bedi et al. (2002) in their study on the decline in primary school enrolment in Kenya used a linear conditional utility function to determine the factors that influence primary school enrolments in Kenya. They used the following specific schooling option function:-

$U_i=ß_1b+ß_2c+\varepsilon_i$

Where the ß's are the coefficients that were estimated and ε_i is the error term. They found that among the determinants of enrolment is cost of education both monetary and the opportunity cost and household income.

2.3 Over view of the Literature

Most of the studies reviewed have established that the declining enrolments rates are as a result of rising cost of education which has mainly been attributed to teacher's salaries, costs of learning and teaching materials and dwindling government revenue or incomes. These have also been the main causes of low retention and completion rate besides the deterioration in the quality of education. The donor component to the primary education budget is reflected as development budget in the government budget although the expenditures are recurrent in nature. It is also worth noting that most of the development activities have been financed exclusively by parents/communities through either levies charged such as activity and building fees or the commonly known *harambee* movement.

The studies have however failed to determine whether the implementation of some of the government policies over the years have had any significant influence on the ever increasing primary education budget in the country.

CHAPTER 3

3.0 Methodology

3.1 Theoretical Framework

The study borrows a lot from Chau (1972) who used a linear equation regression model with a dependent variable and several explanatory variables to estimate the recurrent costs of both primary and secondary education in the developing countries. He used cross section data on teacher's salaries and other learning and teaching materials. He established that teachers salaries were the most significant determinants of the recurrent education budget

However, the study uses Greene's (1997) methodology which states that a multiple linear regression model is most conveniently used to study the relationship between a dependent variable and several independent variables because it is easy and straightforward to interpret. The generic form of the linear regression model takes the following form

$Y_i = f(x_{i1}, x_{i2}, \ldots x_{ik}) + \dot{e}_i$ .....(1)

or rewritten as-

$Y_i = \propto + \beta_1 X_{i1} + \beta_2 X_{i2} + \ldots\ldots\ldots + \beta_K X_{ik} + \dot{e}$, I=1…n..... .....(2)

Where Y_i is the dependent variable and $X_1 \ldots\ldots X_k$ are the independent variables.

3.2 Model Specification

To analyze the main determinants of primary education budget we make use of the various variables as specified in regression equation three. The study will use a double log linear regression model where primary education budget is the dependent variable and the independent variables will include primary school enrolments (Enl), primary teacher salaries (Pts), Primary education non-wage costs (PNWc), total government expenditure (TGB), GDP growth rate (GDPr), Total education budget(TEB), Cost sharing policy(CSP) and government policies (GPFPE).

Because the study focuses on the determinants of the primary education budget the model will take the following form;

PEB = f(Enl, PTs, PNWc, TEB, TGB, GDPr, CSP, GPFPE). .....(3)

Equation 3 will assume a Cobb Douglas functional form which can be written as follows-

$PEBi = Enl^{\beta 1} \cdot PTs^{\beta 2}, PNWc^{\beta 3}, GDPr^{\beta 4}, TEB^{\beta 5}, TGB^{\beta 6}, GPFPE^{\beta 7}, CSP^{\beta 8}$ .....(4)

Linearalizing the above equation will result in the following equation

$$\ln PEB_t = \alpha + \beta_1 \ln PEn + \beta_2 \ln PTs + \beta_3 \ln PNWc + \beta_4 \ln GDPr + \beta_5 \ln TEB + \beta_6 \ln TGB + \beta_7 GPFPE + \beta_8 CSP + \dot{e}_t \quad \text{.....(5)}$$

We introduce two dummies to take care of the government policies namely the cost sharing policy and Free primary education policy. The equation takes the following form which is the final equation to be regressed.

$$\ln PEB_t = \alpha + \underset{(+)}{\beta_1 \ln PEn} + \underset{(+)}{\beta_2 \ln PTs} + \underset{(+)}{\beta_3 \ln PNWc} + \underset{(+)}{\beta_4 \ln GDPr} + \underset{(+)}{\beta_5 \ln TEB} + \underset{(+)}{\beta_6 \ln TGB} + \underset{(+)}{\beta_7 D_1 GPFPE} + \underset{(-)}{\beta_8 D_2 CSP} + \dot{e}_t \quad \text{.....(6)}$$

Where.

PEB_t - primary education budget

PEnl - number of pupils enrolled in public primary schools

PTs – Primary Teacher salaries

TEB – Total Education Budget

PNWc – Primary education non - wage costs

TGB - Total government budget

GDPr - Gross Domestic Product growth rate

GP – Total Government Policies on 8-4-4

CSP- Cost sharing Policy

GPFPE – Government Policy of Free Primary Education

D1 and D2 - Dummies

β's - Coefficients to be estimated

α - Intercept

$\dot{e}_t$ - Error term

The signs under the variables are the expected partial derivatives. The enrolment coefficient is expected to be positive. It is expected that as enrolment increases PEB will also increase. The

Cost sharing policy is expected to have a negative sign implying that the introduction of CSP is expected to lead to a reduction in the PEB.

In this study we assumes the dependent variable is a log linear function of a number of log linear independent variables and an error term. The dependent variable is the primary education budget while the independent variables in this study will be teacher salaries, primary education non- wage costs, number of pupils in primary schools, total government budget, government policies. The expenditure figures are in nominal terms while the enrolments are in absolute terms. The log linear function is used because of its ability to capture the second order effect such as elasticities (Greene, 1997). The method of estimation used is simple OLS because it is easy and straightforward to interpret.

The primary education budget will be both recurrent and development components. The teacher's salaries are calculated by aggregating the salaries and allowances of both trained and untrained primary schools teachers.

3.3 Hypothesis

The study test the following hypothesis

H_o: $\beta_i=0$: Government policies do not determine the primary education budget.

H_1: $\beta_i=1$: Government policies determine the primary education budget

3.4 Data Sources

The data used is time series and covers a period of thirty-four years from 1970 to 2003. The study uses data on primary education enrolments from 1970 to 2003 in public schools. Data for private schools is not properly documented as some of the schools existence are not even known to the authorities especially in the informal settlements.

Focus will be on both recurrent and development government expenditures. The private schools expenditures are excluded from the analysis. The components to be included are of necessity the expenditures under the Central government budget since 1970. This year is

significant to the study as it marked the year when the primary education financing was transferred from local authority management to the central government.

Primary schools enrolments were collected from the Ministry of education and Teachers Service Commission statistical section. The data on Primary education budget, teachers salaries, total education budget, the total government budget and GDP growth rates was extracted from Economic Surveys (various issues), GOK budget printed estimates, Statistical Abstracts (various issues), Education Commission Reports, Public Expenditure Review documents, World Bank publications, Kippra research publications, Institute of Policy Analysis and Research documents. Information on Various government policies was also collected from the various education task forces and commissions reports and downloads from the web sites among others.

3.5 Data type

Specific data to be used include primary school enrolments, total education budget, total government budget, primary school enrolment, GDP growth rates, teachers wage bill, teachers Salaries and GDP growth rates, Primary education non wage costs . The data used in the study is shown in Table 3.1 below.

Table 3.1 **The variables in Ksh Millions and million pupils**

YEAR	PEB	ENL	PTS	PNWC	TEB	TGB	GDPr	GP FPE	GP CSP
1970	325.99	1.427	280.60	45.39	537.04	2,780.78	6.60	0	0
1971	335.92	1.525	285.58	50.34	661.40	3,892.79	5.70	0	0
1972	404.26	1.675	343.32	60.94	796.84	4,028.14	8.40	0	0
1973	496.32	1.816	421.88	74.44	892.78	4,603.34	6.40	0	0
1974	678.91	2.734	577.08	101.83	1,193.50	6,028.84	4.00	1	0
1975	855.40	2.881	775.75	79.65	1,379.12	7,462.10	5.10	1	0
1976	851.99	2.924	782.86	69.13	1,549.08	8,195.28	4.70	1	0
1977	1,006.78	2.971	944.75	62.03	1,830.50	11,807.78	8.60	1	0
1978	1,200.25	2.997	1,080.23	120.03	2,182.28	13,952.20	5.70	1	0
1979	1,230.20	3.710	1,107.18	123.02	2,236.74	15,368.80	3.10	1	0
1980	1,990.68	3.920	1,791.61	199.07	3,619.42	19,005.80	3.30	1	0
1981	2,163.70	3.980	1,947.33	216.37	3,934.00	22,450.00	4.80	1	0
1982	2,270.72	4.185	2,043.65	227.07	4,128.58	23,810.00	2.40	1	0
1983	2,420.72	4.324	2,178.64	242.07	4,401.30	24,950.00	3.10	1	0
1984	2,857.87	4.386	2,572.08	285.79	5,196.12	31,220.00	0.90	1	0
1985	3,626.55	4.702	3,263.89	362.65	6,593.72	32,910.00	4.10	1	0
1986	4,361.46	4.935	3,925.31	436.15	7,929.92	41,640.00	3.60	1	0
1987	5,022.93	5.031	4,520.64	502.29	9,132.60	44,300.00	4.80	1	0
1988	5,860.49	5.124	5,274.44	586.05	10,655.44	62,038.00	5.20	1	0
1989	6,214.22	5.389	5,903.51	310.71	11,298.58	70,121.00	3.90	0	1
1990	7,556.43	5.392	7,178.61	377.82	13,738.96	80,470.00	3.20	0	1
1991	7,944.31	5.456	7,547.09	397.22	14,444.20	87,330.00	3.40	0	1
1992	9,402.61	5.530	8,932.48	470.13	17,095.66	121,300.00	2.80	0	1
1993	11,766.15	5.429	11,177.84	588.31	21,393.00	180,200.00	3.40	0	1
1994	15,262.50	5.557	14,499.38	763.13	27,750.00	184,734.00	3.90	0	1
1995	16,365.21	5.536	15,601.01	764.20	32,604.00	190,993.60	4.50	0	1
1996	17,676.84	5.765	16,911.60	765.24	33,890.00	183,742.50	4.60	0	1
1997	24,587.76	5.920	23,845.72	741.98	46,226.30	313,373.78	2.30	0	1
1998	25,008.07	5.868	24,258.20	749.87	47,225.08	243,335.47	1.06	0	1
1999	25,510.61	5.883	24,759.37	751.24	48,259.80	226,155.07	2.40	0	1
2000	26,423.49	5.85	25,327.37	1,096.12	49,861.79	268,430.49	(0.20)	0	1
2001	28,007.81	5.89	26,880.82	1,126.98	54,653.00	283,294.85	1.20	0	1
2002	32,015.55	5.93	34,703.37	4,312.18	66,417.93	310,989.00	2.30	0	1
2003	47,496.08	6.92	36,716.20	10,779.89	80,234.74	330,005.00	2.10	1	0

Source Economic Survey, Statistical abstract and Government publications (various)

From table 3.1 it can be seen that PEB rose from Ksh. 25.9 million in 1970 to over Ksh 47billion by 2003. Enrolments increased from a mere 1.42 millions to more than 6.92 million over the study period. Tabulations and graphical presentations will be used to enrich the research report in the data presentation.

The total government budget rose from Ksh 2.57 billion in 1970 to over Ksh 330 billion in 2003. This represents an increase of over 10,000% over the study period. It is also worth noting that GDP growth rate has been declining over the same period reaching a bottom low of –0.2 in the year 2000.

The study uses log and we therefore convert the data into logs to get the variables shown in table 3.2 from which we carry the stationarity and other analytical tests.

Table 3.2 Log of the Variables

YEAR	lnpeb	lnenl	lnpts	lnpnwc	lnteb	lntgb	lngdpr	GPFPE	CSP
1970	5.787	0.356	5.637	3.815	6.286	7.930	1.887	0	0
1971	5.817	0.422	5.655	3.919	6.494	8.267	1.740	0	0
1972	6.002	0.516	5.839	4.110	6.681	8.301	2.128	0	0
1973	6.207	0.597	6.045	4.310	6.794	8.435	1.856	0	0
1974	6.520	1.006	6.358	4.623	7.085	8.704	1.386	1	0
1975	6.752	1.058	6.654	4.378	7.229	8.918	1.629	1	0
1976	6.748	1.073	6.663	4.236	7.345	9.011	1.548	1	0
1977	6.915	1.089	6.851	4.128	7.512	9.377	2.152	1	0
1978	7.090	1.098	6.985	4.788	7.688	9.543	1.740	1	0
1979	7.115	1.311	7.010	4.812	7.713	9.640	1.131	1	0
1980	7.596	1.366	7.491	5.294	8.194	9.852	1.194	1	0
1981	7.680	1.381	7.574	5.377	8.277	10.019	1.569	1	0
1982	7.728	1.432	7.622	5.425	8.326	10.078	0.875	1	0
1983	7.792	1.464	7.686	5.489	8.390	10.125	1.131	1	0
1984	7.958	1.478	7.852	5.655	8.556	10.349	-0.105	1	0
1985	8.196	1.548	8.091	5.893	8.794	10.402	1.411	1	0
1986	8.381	1.596	8.275	6.078	8.978	10.637	1.281	1	0
1987	8.522	1.616	8.416	6.219	9.120	10.699	1.569	1	0
1988	8.676	1.634	8.571	6.373	9.274	11.036	1.649	1	0
1989	8.735	1.684	8.683	5.739	9.332	11.158	1.361	0	1
1990	8.930	1.685	8.879	5.934	9.528	11.296	1.163	0	1
1991	8.980	1.697	8.929	5.984	9.578	11.377	1.224	0	1
1992	9.149	1.710	9.097	6.153	9.747	11.706	1.030	0	1
1993	9.373	1.692	9.322	6.377	9.971	12.102	1.224	0	1
1994	9.633	1.715	9.582	6.637	10.231	12.127	1.361	0	1
1995	9.703	1.711	9.655	6.639	10.392	12.160	1.504	0	1
1996	9.780	1.752	9.736	6.640	10.431	12.121	1.526	0	1
1997	10.110	1.778	10.079	6.609	10.741	12.655	0.833	0	1
1998	10.127	1.770	10.097	6.620	10.763	12.402	0.058	0	1
1999	10.147	1.772	10.117	6.622	10.784	12.329	0.875	0	1
2000	10.182	1.766	10.140	7.000	10.817	12.500	-0.020	0	1
2001	10.240	1.773	10.199	7.027	10.909	12.554	0.182	0	1
2002	10.572	1.780	10.455	8.369	11.104	12.648	0.833	0	1
2003	10.768	1.934	10.511	9.285	11.293	12.707	0.742	1	0

Source: computed

We use the dummy to represent government policies. The two policies are the cost sharing policy and free primary policy. The dummies are: -

D1 1 – Years when there is cost sharing

0 - when there is no cost sharing

D2 1- Years when there is free primary education

0 - Years when there is no free primary education

CHAPTER 4

4.0 Data Analysis

The data analysis look at descriptive statistics, correlation matrix of the dependent and independent variables. Under the data analysis also there are presentations of the test results for stationarity on each variable used and finally the empirical model regression results.

4.1 Descriptive Statistics

This section describes the nature and characteristics of the data used for estimation. In particular we consider measures of central tendency of the variables namely the Mean, Maximum, Minimum, Standard Deviation, Skewness and Kurtosis. In total we have 34 observations with different mean and standard deviation for each observation as shown in table 4.1.

Table 4.1 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis
Peb	34	10182.32	12236.78	325.99	47496.08	1.424369	4.254859
Enl	34	4.458529	1.498893	1.43	6.92	-.6375681	2.283715
Pts	34	9363.511	10864.8	280.6	36716.2	1.146884	3.049618
Pnwc	34	818.8038	1908.001	45.39	10779.89	1.146884	23.55331
Teb	34	18645.39	21930.3	537.04	80234.74	1.239607	3.443922
Tgb	34	101615.3	109880.9	2780.78	330005	.8548452	2.221246
GDPr	34	3.863529	1.958357	-.2	8.6	.4085397	3.290332
Gpfpe	34	.4705882	.5066404	0	1	.1178511	1.013889
Csp	34	.4411765	.5039947	0	1	.2369396	1.05614

Source: Generated

The dependent variable which the PEB has a mean value of Ksh 10,182.32 million as shown in Table 4.1. It has a minimum of Ksh. 325.9 million and a maximum value of Ksh. 47,496. 08 million while the standard deviation is Ksh. 12, 236.78 million. The variable is skewed to the right with a value of 1.424 and a kurtosis over 4.254.

The independent variables are Pts, Enl, PNWC, GPFPE, TEB, TGB, GDPr and CSP have different values of mean and other measure of central tendencies. The primary teacher

salaries have a mean of Ksh 9,363.511 millions with a standard deviation of Ksh. 10,864.1 millions had a minimum and maximum values of Ksh. 280.6 millions and Ksh. 36,716.2 millions respectively.

Likewise the enrolment variable had a mean of 4.458 millions with a standard deviation of 1.498 millions while its minimum and maximum values are 1.43 and 6.92 millions respectively. This variable has a skewness of -.6375 meaning that it is skewed to the left.

The other variable is PNWC and it captures the primary education non wage costs including development expenditures with a mean of Kshs 818.8 millions, a maximum, minimum and Kurtosis values of 10,779.89, 45.39 and 23.55 respectively. Other variables have different values of the different measures as shown in the Table 4.1.

4.2 Correlation Analysis

Correlation analysis assist in capturing the expected signs before the regression is carried out. Besides, it gives a quick test on whether the dependent variables and explanatory variables are correlated. Two variables may have a positive correlation or negative correlation or they may even be uncorrelated.

Table 4.2 Correlation matrix

	DFLNPEB	CSP	DFLNENL	DFLNPNWC	DFLNPTS	DFLNTEB	DFLNTGB	LNGDPR
DFLNPEB	1.000	-0.085	0.208	0.514	0.955	0.874	0.439	0.077
CSP	-0.085	1.000	-0.393	-0.086	-0.063	-0.147	-0.179	-0.367
DFLNENL	0.208	-0.393	1.000	0.117	0.169	0.184	0.085	0.120
DFLNPNWC	0.514	-0.086	0.117	1.000	0.262	0.399	-0.019	-0.137
DFLNPTS	0.955	-0.063	0.169	0.262	1.000	0.837	0.484	0.145
DFLNTEB	0.874	-0.147	0.184	0.399	0.837	1.000	0.527	0.134
DFLNTGB	0.439	-0.179	0.085	-0.019	0.484	0.527	1.000	0.247
LNGDPR	0.077	-0.367	0.120	-0.137	0.145	0.134	0.247	1.000

Source: computed

Variables which have positive correlation in relation to the dependent variable in this study are PTS, GPFPE, TGB, TEB, PNWC and GDPr. The CSP has negative correlation. The primary education budget is highly correlated to total education budget and teacher salaries as they have a value that is approaching one.

On looking at the correlation matrix, the co linearity between the other variables is low implying the regression is able to identify effects of explanatory variables on the dependent.

4.3 Stationarity Test

A time series is said to be stationary if its distribution remains invariant with respect to time. The series is non-stationary if the distribution changes with respect to time. It is often difficult to represent time series with past and future intervals of time by simple algebraic models if the process is non-stationary. It has been noted that non-stationarity in variables can be a cause of spurious and inconsistent regression. A spurious regression has R-squared and t-statistics that appear to be significant but the results are without any economic meaning. For inconsistent regression we have a time dependent mean implying that the value of the coefficient of the regression will not itself be constant. However, if stationary, the process can be modeled with fixed coefficients that can be estimated from past data. It is therefore necessary to test for stationarity when using time series data.

A number of approaches exist for testing stationarity of time series data or existence of unit roots. We however use the Augmented Dickey Fuller (ADF) test for the order of integration. We first give a graphical analysis of the variables in log form.

4.3.1 Graphical illustration of stationarity

The graphical illustrations use the log series data in Table 3.2 namely the log of teachers salaries, log of primary non wage costs, log of total education budget, log of total government budget and the log of GDP growth rate. The Government policies have not been graphed because the variables are qualitative in nature and are thus presented as dummies.

Figure 4.1

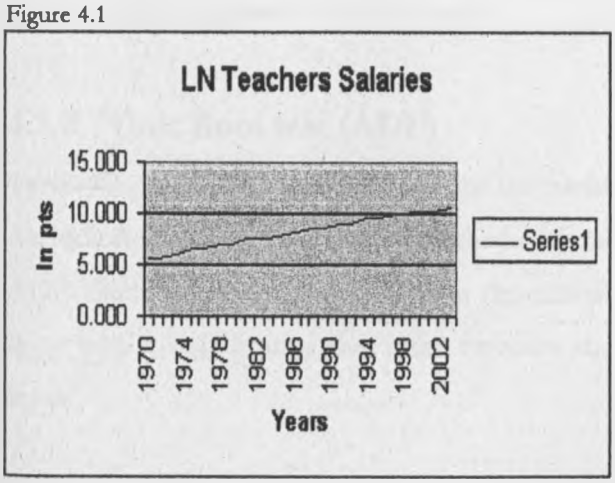


Figure 4.2

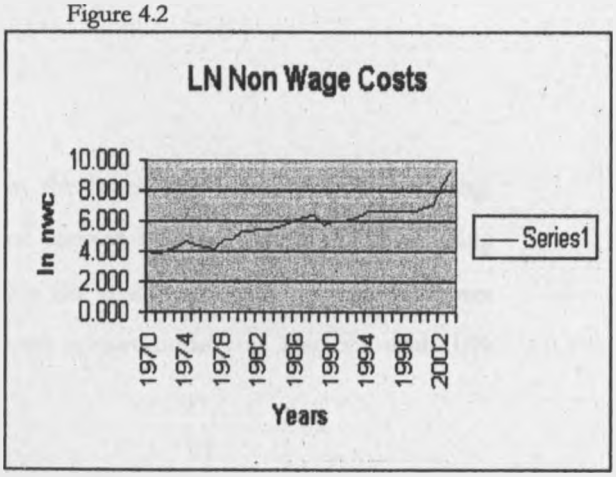


Figure 4.3

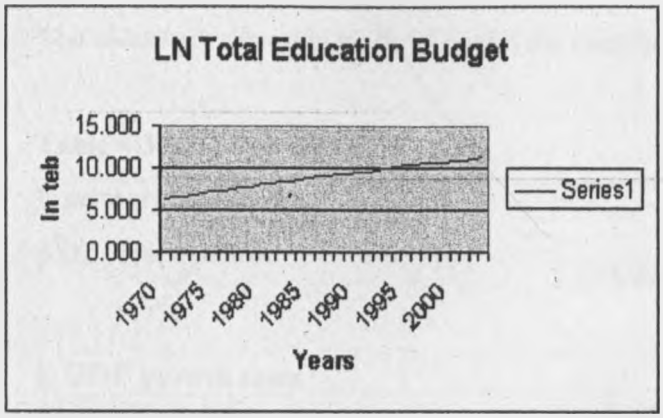


Figure 4.4

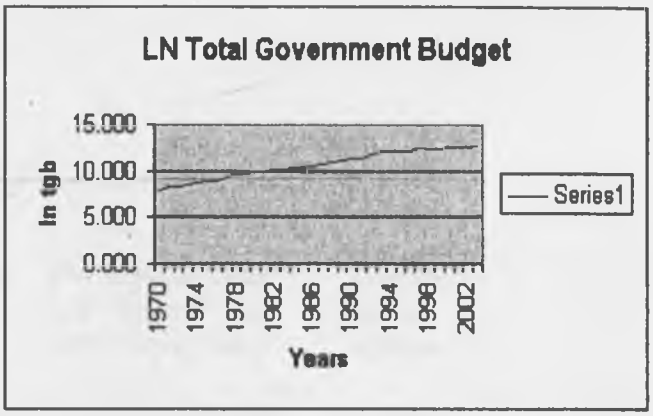


Figure 4.5

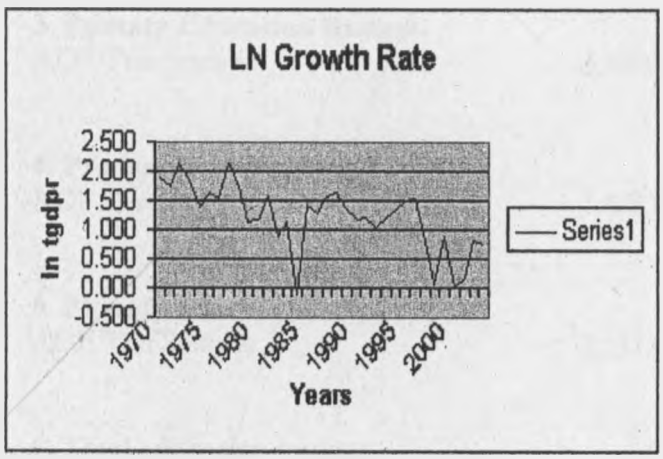


Figure 4.1, 4.2, 4.3, 4.4 shows that the series have trends over the years. This is a sign of are non-stationarity of the variables. Figure 4.5 the GDP growth rate appear to have no trend which is a sign of stationarity. However the variables have to be subjected to further tests to ascertain that they are in deed stationary.

4.3.2 Unit Root test (ADF)

Table 4.3 present the unit root test for the variables in the levels and after first differencing. As indicated in the Table, the hypothesis of unit root cannot be rejected in all cases using ADF. Since the t-values are less than the critical values (in absolute terms) we can interpret these results as indicating that most variables are in-deed non-stationary at 1%, 5% and 10% levels.

The results are shown in table 4.3 for all the variables

Table 4.3 ADF test results in levels

1. primary enrolment			
ADF Test Statistic	-3.428636	1% Critical Value*	-3.6496
		5% Critical Value	-2.9558
		10% Critical Value	-2.6164
2. GDP growth rates			
ADF Test Statistic	-3.022573	1% Critical Value*	-4.3082
		5% Critical Value	-3.5731
		10% Critical Value	-3.2203
3. Primary Education Budget			
ADF Test Statistic	-3.329026	1% Critical Value*	-4.2712
		5% Critical Value	-3.5562
		10% Critical Value	-3.2109
4. Primary Non Wage Costs			
ADF Test Statistic	-1.428359	1% Critical Value*	-4.2712
		5% Critical Value	-3.5562
		10% Critical Value	-3.2109
5. Primary Teacher Salaries			
ADF Test Statistic	-2.237258	1% Critical Value*	-4.2712
		5% Critical Value	-3.5562
		10% Critical Value	-3.2109
6. Total education budget			
ADF Test Statistic	-2.308692	1% Critical Value*	-4.2712
		5% Critical Value	-3.5562
		10% Critical Value	-3.2109
7.Total Government budget			
ADF Test Statistic	-0.905167	1% Critical Value*	-4.2712
		5% Critical Value	-3.5562
		10% Critical Value	-3.2109

Source: Computed

Most of the variables have an ADF statistics which is less than the critical values in absolute terms at the 10%, 5% and 1% level. When looking at the ADF we ignore the sign and look at the absolute figures. As a result of the non-stationarity reflected in the above results we difference the variables, which are non-stationary to make them stationary before we regress the model. The only variable found be stationary is the GDP growth rate as shown in table 4.3.

The results of the differencing are as shown in table 4.4 below.

Table 4.4 ADF test results after differencing

1. D(LNENL,2)			
ADF Test Statistic	-3.267277	5% Critical Value	-2.9591
		10% Critical Value	-2.6181
2. D(LNNWC,2)			
ADF Test Statistic	-3.973094	5% Critical Value	-3.5614
		10% Critical Value	-3.2138
3. D(LNTEB,2			
ADF Test Statistic	-6.227669	5% Critical Value	-3.5614
		10% Critical Value	-3.2138
4. D(LNTS,2)		5% Critical Value	-3.5614
ADF Test Statistic	-4.097343	10% Critical Value	-3.2138
5. D(LNPEB,2)			
ADF Test Statistic	-3.574018	5% Critical Value	-3.5614
		10% Critical Value	-3.2138
6. D (LNTGB,2)			
ADF Test Statistic	-5.967106	5% Critical Value	-3.5614
		10% Critical Value	-3.2138

Source: computed

After differencing the log of the variable they become stationary at 5% and 10% levels respectively as shown in table 4.4

4.4 The empirical results of the final regression model

The final regression model 4.5 was regressed with the parameter β's showing amount by which the PEB will change in response to a 1% change in the respective variable when all other variables are maintained at a given level. The results of the final regression results in Table 4.5 shows that teacher's salary is the most significant determinant of the primary education budget.

Table 4.5: Final regression results

Dependent Variable: DFLNPEB
Method: Least Squares
Date: 08/19/04 Time: 11:01
Sample(adjusted): 1971 2003
Included observations: 32
Excluded observations: 1 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000613	0.013027	0.047030	0.9629
DFLNENL	0.042619	0.031290	1.362046	0.1864
DFLNPNWC	0.087321	0.007922	11.02306	0.0000
DFLNPTS	0.810322	0.038697	20.93999	0.0000
DFLNTEB	0.097812	0.048483	2.017472	0.0555
DFLNTGB	0.008345	0.018430	0.452775	0.6550
GPFPE	0.002580	0.008711	0.296154	0.7698
LNGDPR	-0.003467	0.005239	-0.661812	0.5147
CSP	-0.004242	0.009875	-0.429584	0.6715
R-squared	0.990552	Mean dependent var		0.154563
Adjusted R-squared	0.987265	S.D. dependent var		0.112628
S.E. of regression	0.012710	Akaike info criterion		-5.660636
Sum squared resid	0.003715	Schwarz criterion		-5.248398
Log likelihood	99.57017	F-statistic		301.4158
Durbin-Watson stat	1.860788	Prob(F-statistic)		0.000000

R^2=. 99, DW=1.86, F-Statistics=301.4158

The study reports an R- squared of 0.99 and an adjusted R^2 of 0.98. This implies that the explanatory variables explain 99% of the variations of the dependent variable. The regression also reports an F statistics of 301.41, which implies that the variables are jointly significant.

From the final regression results Table 4.5 it can also be concluded that three of the explanatory variables are significant at 5% and 10% levels of significance. These variables are PTS, PNWC, and TEB. The PTS has the expected sign meaning that it is positively correlated with the dependent variable.

The Durbin Watson statistics is used to test for serial correlation of variables. In the study it is reported at 1.88, which is close to the critical value of 2, which implies that serial correlation is not a serious problem.

GDP growth rate has a negative coefficient meaning that it does not conform to theory in this study. However other studies observe that the impact of this variable will depend on the base year used. The negative sign can also be explained because we are using the growth rate rather than the actual GDP. Again this was the only variable that was fond to be stationary and thus did not require to be differenced (see table 4.3)

The only variables that are able to explain the determinants of primary education budget from the government significantly are primary teachers salaries, primary non-wage costs, total education and to lesser extent enrolments & FPE policy. The significance and coefficients of these variables in the regressions results confirm this. The reason for the low coefficient especially on the FPE policy is probably explained by the fact as it was being implemented in 2003 the teacher salaries Phase II was also being implemented thus diluting the impact of increased NWC budget.

The cost sharing policy had a negative coefficient of 0.0042 and a t statistic of – 0.429. The results confirm the expected sign although the variable is not a significant determinant of primary education budget. The reason for the insignificance could be explained by the fact the primary budget could not be reduced due to its composition i.e. teacher salaries took 95% of the budget while non wage cost was about 5%. The only practical option for the government was to reduce the budget growth rate. It is however an important policy variable.

CHAPTER 5

5.0 Conclusion, Recommendations and Policy Recommendation

The importance of primary education to the country has been clearly outlined in this research paper. The study was aimed at empirically testing the main determinants of primary education budget. The study had three specific objectives, first to establish the main determinants of primary education budget and secondly to find out the significance of government education policies on the primary education budget in light of the declining low economic growth and the escalating costs of education in the. The final objective that will be accomplished in this chapter was to draw policy recommendations on the general education based on the findings. This would enhance policy design, implementation and evaluation in accelerating enrolments; retention and completion rates besides improving resource allocation and targeting for enhance efficiency.

The study established that primary teachers salaries is the most important determinant of the primary education budget in the country. Essentially the study established that it take over 95%o the teacher budget. Other factors like the non-wage costs and total education budget which included the development expenditures are important also in the determination of how much is allocated to the primary sub sector. It is also worth noting that government policies implemented over the study period that included free primary education policy and the cost sharing policy are important but not significant determinants of the primary education budget. They all reported the expected signs signifying their importance in the study.

However it is important to point out that primary enrolment was expected to be a significant determinant especially in light of the implementation of the FPE policy but it was not because the free primary education allocations impact was overshadowed by the implementation of the teacher salaries awards during the study period. Finally we can conclude that the issue of teachers wage bill continues to affect the efficiency in the provision of education as the government is unable to meet adequately the education cost leaving a sizable burden to the parents. This compounded by the high poverty levels in the country leaves parent with no options other than keep their children at home. This has been the main cause of non-sustainability of high enrollment rates.

In view of above uncertainties in the education system the study make the following recommendations.

5.1 Policy recommendation

- The Government should look for ways of sustaining its commitments specially the policies relating to primary education through increased resources for learning and teaching materials. This could be achieved through rationalizing some of the basic education activities like the school feeding and bursary programmes.

- The government should also endeavor to provide affordable quality primary education that all Kenyan are able to access irrespective of their social economic status. This is education that has minimal financial requirement from the parent's majority of who live below the poverty line.

- The ministry of education should improve and promote quality and relevance of primary education for individual and the country's development. The ministry should intensify the supervision and inspection services to ensure high standards of education are maintained in all education institutes. This could be achieved through increased resource allocation to the school inspection service department.

- The ministry in charge of basic education should device way of mobilizing resources for sustainable delivery of relevant education, research and technological services both locally and from outside the country.

- The government and the stakeholders should strength institutional and professional capacity building programmes for educational managers, administrator's teachers, and school administrators to improve efficiency in resource management and service delivery.

- There should be an intensive mobilizing for all the education partners including the private sector and communities to support and own the development of good quality education for all.

- Special consideration should be given to the disadvantaged children, especially girls and the disabled. Special programmes should be introduced to integrate these children into the regular learning institutions. This calls for additional investment in infrastructure by the government.

- The government should endeavor to increase the pupil teacher ratio from the current 35:1 to at least 45:1 in order to improve on the efficiency of resource utilization. This could be done through introduction of alternative teaching methods like double shift and non-formal programmes.

- The government should promote sectoral collaboration in addressing crosscutting problems like poverty and HIV/AIDS, early marriages especially for girls and return to school for child mothers. This will ensure increased primary school enrolments, retention and completion rates.

- Deliberate efforts should be made to manage the effects of globalization on basic education especially through introduction of IT curriculum at primary level. This will help in the modernization of the school curriculum and adoption of modern and appropriate technologies in the country.

Finally the government and specifically the policy makers should look at ways containing and probably lowering the teachers wage bill from the current high of 96.7% of the primary education budget and increase the primary non-wage costs to at least 15%. The primary non-wage cost includes the development component of the primary education budget. This needs to be enhanced to reduce the burden of infrastructure provision from the parents and communities.

5.2 Limitations of the Study and Data

One of the major limitations of the study is the reliability of data as different data sources give different figures and in some cases data from the same source differ. Another problem as was anticipated is the problem of bureaucracy in the government departments.

The study used of budgeted figures which sometimes do not reflect the actual expenditures. During financial years the government sometimes revise the budget allocations either upwards or downwards depending on the prevailing fiscal situation. This is sometimes caused by non-release of donor funding or change in government policy. To avoid this problem the study used the approved estimates i.e the figures that have been approved by parliament and normally approved in the third quarter of the financial year and are very close to the actual expenditures.

5.3 Suggestion for further Research

From the study it can bee noted that there is need for further research in education financing and policies. Specifically more studies should be carried out in the following areas: -

- The Long-term implication of the escalating education expenditure on the development of the country.
- The impact of FPE policy on the government and households incomes.
- The efficiency of teacher utilization in the country in light of the hefty wage bill the government continues to incur every month.
- The sustainability of the current FPE policy (2003).
- An impact assessment of the cost sharing policy especially on education and what went wrong?

Appendices
Appendix: 1

Table 1.2: Enrolment In Public Primary Schools By Sex. 1963 - 2003

Year	Boys	Girls	Total
1963	586,274	304,829	891,103
1964	657,635	357,084	1,014,719
1965	662,753	379,393	1,042,146
1966	647,580	395,836	1,043,416
1967	689,795	443,384	1,133,179
1968	725,030	484,650	1,209,680
1969	762,827	519,470	1,282,297
1970	836,307	591,282	1,427,589
1971	881,007	644,491	1,525,498
1972	956,620	719,299	1,675,919
1973	1,025,113	790,904	1,816,017
1974	1,491,531	1,214,347	2,705,878
1975	1,561,501	1,319,654	2,881,155
1976	1,554,124	1,340,493	2,894,617
1977	1,587,420	1,387,429	2,974,849
1978	1,594,359	1,400,535	2,994,894
1979	1,953,350	1,744,896	3,698,246
1980	2,062,615	1,864,014	3,926,629
1981	2,078,576	1,902,586	3,981,162
1982	2,178,169	2,006,433	4,184,602
1983	2,249,242	2,074,580	4,323,822
1984	2,269,240	2,110,992	4,380,232
1985	2,434,903	2,267,511	4,702,414
1986	2,512,487	2,330,945	4,843,432
1987	2,603,986	2,427,354	5,031,340
1988	2,638,423	2,485,158	5,123,581
1989	2,766,002	2,623,146	5,389,148
1990	2,766,376	2,625,943	5,392,319
1991	2,796,972	2,659,024	5,455,996
1992	2,840,472	2,723,515	5,563,987
1993	2,760,929	2,667,457	5,428,386
1994	2,814,825	2,742,183	5,557,008
1995	2,802,305	2,734,091	5,536,396
1996	2,843,355	2,754,301	5,597,656
1997	2,933,982	2,830,873	5,764,855
1998	2,994,554	2,925,167	5,919,721
1999	3,082,200	2,982,100	6,064,300
2000	3,117,600	3,037,900	6,155,500
2001	3,200,433	3,114,293	6,314,726
2002	3,060,169	2,908,072	5,968,241
2003	3,556,609	3,349,746	6,906,355

Source:. Ministry of Education, Science and Technology (Statistical section)

Appendix: 2

ADF TEST Results

1. Primary enrolments

ADF Test Statistic	-3.428636	1% Critical Value*		-3.6496
		5% Critical Value		-2.9558
		10% Critical Value		-2.6164
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNENL(-1)	-0.122476	0.035721	-3.428636	0.0018
D(LNENL(-1))	-0.110221	0.175511	-0.628	0.5349
C	0.228093	0.056415	4.043126	0.0004
R-squared	0.301705	Mean dependent var		0.047241
Adjusted R-squared	0.253547	S.D. dependent var		0.081304
S.E. of regression	0.070245	Akaike info criterion		-2.38461
Sum squared resid	0.143095	Schwarz criterion		-2.24719
Log likelihood	41.1537	F-statistic		6.264869
Durbin-Watson stat	1.980261	Prob(F-statistic)		0.005477

2. GDPgrowth rates

ADF Test Statistic	-3.022573	1% Critical Value*		-4.3082
		5% Critical Value		-3.5731
		10% Critical Value		-3.2203
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDPR(-1)	-0.76968	0.254644	-3.022573	0.0057
D(LNGDPR(-1))	-0.019526	0.206426	-0.094591	0.9254
C	1.350896	0.493906	2.735127	0.0113
#NUM!	-0.023353	0.012242	-1.907584	0.068
R-squared	0.392816	Mean dependent var		-0.03296
Adjusted R-squared	0.319954	S.D. dependent var		0.534762
S.E. of regression	0.440991	Akaike info criterion		1.327857
Sum squared resid	4.861824	Schwarz criterion		1.516449
Log likelihood	-15.25393	F-statistic		5.391229
Durbin-Watson stat	2.013255	Prob(F-statistic)		0.005312

3. Primary Education Budget

ADF Test Statistic	-3.329026	1% Critical Value*		-4.2712
		5% Critical Value		-3.5562
		10% Critical Value		-3.2109
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNPEB(-1)	-0.562297	0.168907	-3.329026	0.0025
D(LNPEB(-1))	0.147106	0.177139	0.83046	0.4133
C	3.382489	0.955021	3.541796	0.0014
#NUM!	0.08275	0.025468	3.249181	0.003
R-squared	0.31083	Mean dependent var		0.154735
Adjusted R-squared	0.23699	S.D. dependent var		0.112502
S.E. of regression	0.098271	Akaike info criterion		-1.68571
Sum squared resid	0.270402	Schwarz criterion		-1.50249
Log likelihood	30.97128	F-statistic		4.209521

Durbin-Watson stat	2.121467	Prob(F-statistic)		0.01409
4. Primary Non Wage Costs				
ADF Test Statistic	-1.428359	1% Critical Value*		-4.2712
		5% Critical Value		-3.5562
		10% Critical Value		-3.2109
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNPNWC(-1)	-0.352875	0.247049	-1.428359	0.1642
D(LNPNWC(-1))	0.415099	0.254549	1.630728	0.1141
C	1.344032	0.95135	1.412762	0.1687
#NUM!	0.04501	0.026469	1.700455	0.1001
R-squared	0.15195	Mean dependent var		0.167708
Adjusted R-squared	0.061087	S.D. dependent var		0.340063
S.E. of regression	0.329513	Akaike info criterion		0.734064
Sum squared resid	3.0402	Schwarz criterion		0.917281
Log likelihood	-7.745029	F-statistic		1.672301
Durbin-Watson stat	2.115542	Prob(F-statistic)		0.195551
5. Primary Teacher Salaries				
ADF Test Statistic	-2.237258	1% Critical Value*		-4.2712
		5% Critical Value		-3.5562
		10% Critical Value		-3.2109
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNPTS(-1)	-0.367507	0.164267	-2.237258	0.0334
D(LNPTS(-1))	0.0218	0.187715	0.116132	0.9084
C	2.255184	0.903101	2.497156	0.0187
#NUM!	0.053269	0.0254	2.097171	0.0451
R-squared	0.234714	Mean dependent var		0.151764
Adjusted R-squared	0.152719	S.D. dependent var		0.11202
S.E. of regression	0.103112	Akaike info criterion		-1.58953
Sum squared resid	0.2977	Schwarz criterion		-1.40631
Log likelihood	29.43244	F-statistic		2.862538
Durbin-Watson stat	2.064683	Prob(F-statistic)		0.054579
6. Total education budget				
ADF Test Statistic	-2.308692	1% Critical Value*		-4.2712
		5% Critical Value		-3.5562
		10% Critical Value		-3.2109
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNTEB(-1)	-0.394092	0.170699	-2.308692	0.0286
D(LNTEB(-1))	-0.013453	0.192451	-0.069903	0.9448
C	2.674199	1.063536	2.514442	0.0179
#NUM!	0.057689	0.025995	2.21925	0.0347
R-squared	0.220113	Mean dependent var		0.149949
Adjusted R-squared	0.136553	S.D. dependent var		0.100292
S.E. of regression	0.093193	Akaike info criterion		-1.79183
Sum squared resid	0.243177	Schwarz criterion		-1.60861
Log likelihood	32.6692	F-statistic		2.634207
Durbin-Watson stat	2.006458	Prob(F-statistic)		0.069364
7.Total Government budget				

ADF Test Statistic	-0.905167	1% Critical Value*		-4.2712
		5% Critical Value		-3.5562
		10% Critical Value		-3.2109
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNTGB(-1)	-0.143669	0.158721	-0.905167	0.3731
D(LNTGB(-1))	-0.210372	0.198769	-1.058376	0.2989
C	1.401489	1.261063	1.111355	0.2759
#NUM!	0.017491	0.024511	0.713602	0.4814
R-squared	0.153288	Mean dependent var		0.138749
Adjusted R-squared	0.062569	S.D. dependent var		0.151555
S.E. of regression	0.146737	Akaike info criterion		-0.88388
Sum squared resid	0.602892	Schwarz criterion		-0.70066
Log likelihood	18.14201	F-statistic		1.689697
Durbin-Watson stat	1.998344	Prob(F-statistic)		0.191866

Appendix: 3

Variable Differentials

Year	DFLNENL	DFLNPEB	DFLNPNWC	DFLNPTS	DFLNTEB	DFLNTGB
1970	NA	NA	NA	NA	NA	NA
1971	0.066000	0.030000	0.104000	0.018000	0.208000	0.337000
1972	0.094000	0.185000	0.191000	0.184000	0.187000	0.034000
1973	0.081000	0.205000	0.200000	0.206000	0.113000	0.134000
1974	0.409000	0.313000	0.313000	0.313000	0.291000	0.269000
1975	0.052000	0.232000	-0.245000	0.296000	0.144000	0.214000
1976	0.015000	-0.004000	-0.142000	0.009000	0.116000	0.093000
1977	0.016000	0.167000	-0.108000	0.188000	0.167000	0.366000
1978	0.009000	0.175000	0.660000	0.134000	0.176000	0.166000
1979	0.213000	0.025000	0.024000	0.025000	0.025000	0.097000
1980	0.055000	0.481000	0.482000	0.481000	0.481000	0.212000
1981	0.015000	0.084000	0.083000	0.083000	0.083000	0.167000
1982	0.051000	0.048000	0.048000	0.048000	0.049000	0.059000
1983	0.032000	0.064000	0.064000	0.064000	0.064000	0.047000
1984	0.014000	0.166000	0.166000	0.166000	0.166000	0.224000
1985	0.070000	0.238000	0.238000	0.239000	0.238000	0.053000
1986	0.048000	0.185000	0.185000	0.184000	0.184000	0.235000
1987	0.020000	0.141000	0.141000	0.141000	0.142000	0.062000
1988	0.018000	0.154000	0.154000	0.155000	0.154000	0.337000
1989	0.050000	0.059000	-0.634000	0.112000	0.058000	0.122000
1990	0.001000	0.195000	0.195000	0.196000	0.196000	0.138000
1991	0.012000	0.050000	0.050000	0.050000	0.050000	0.081000
1992	0.013000	0.169000	0.169000	0.168000	0.169000	0.329000
1993	-0.018000	0.224000	0.224000	0.225000	0.224000	0.396000
1994	0.023000	0.260000	0.260000	0.260000	0.260000	0.025000
1995	-0.004000	0.070000	0.002000	0.073000	0.161000	0.033000
1996	0.041000	0.077000	0.001000	0.081000	0.039000	-0.039000
1997	0.026000	0.330000	-0.031000	0.343000	0.310000	0.534000
1998	-0.008000	0.017000	0.011000	0.018000	0.022000	-0.253000
1999	0.002000	0.020000	0.002000	0.020000	0.021000	-0.073000
2000	-0.006000	0.035000	0.378000	0.023000	0.033000	0.171000
2001	0.007000	0.058000	0.027000	0.059000	0.092000	0.054000
2002	0.007000	0.332000	1.342000	0.256000	0.195000	0.094000
2003	0.154000	0.196000	0.916000	0.056000	0.189000	0.059000

Source: computed

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