FACTORS GOVERNING ENROLMENT AND PUBLIC EXPENDITURE ON EDUCATION IN ETHIOPIA

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Factors Governing Enrolment and Public Expenditure on Education in Ethiopia

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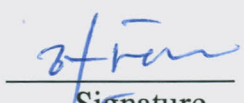
Ato Getachew Yoseph Examiner	 Signature

Dedicated to my late father Ato Awol Mustafa
(May Allah forgive his Soul)

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ABSTRACT

An effort is made to identify and determine the effects of the economic and demographic factors that influence the rapid growth of the educational system in Ethiopia. In doing this, the paper reviews the theoretical and empirical arguments for the rapid investment on education in the world. The analytical model constructed by Schultz (1985) to address the same problem is used. The model enables us to determine the effect of the factors identified to influence the growth of the system, in production-demand framework as constraints and conditions affecting the costs of, and demands for educational services.

In the empirical estimation per capita income per adult, relative price of teachers, relative size of school age population and proportion of urban population are identified as the major factors governing the growth of the system. It is found out that the moderately growing income per adult, the decreasing relative price of teachers and the constantly growing urbanization significantly contributed to the growth of public expenditure on education. The rapidly growing school-age population squeezed and constrained the growth of public expenditure.
On the other hand, from the components underlying this expenditure per school child, it is seen that the rapidly increasing enrolment with decreasing expenditure per student was made possible by; the relative substitution of physical resources by human resources and the absolute depreciation of physical resource intensity per student.

In addition to these, the effect of economic and demographic factors on expenditure per school child by school levels and on the enrolment rates of males and females are also discussed. Finally, the implications of these findings on the existing education system of the country are also analyzed.

CHAPTER I

1. INTRODUCTION

1.1 Statement of the Problem

Educational expenditure constitutes a significant share in governments' budgetary expenditures. Individual families also set aside a good share of their private disposable income to school their children, foregoing the productive contribution the children would have made to family income had they not attended school. This is mainly because, it is generally recognized that the private and social rate of return to education is worth investing in (Psacharopoulos 1985, Jamison and Lau 1982). The return to education can be measured in economic, social and political terms. By enhancing the quality of labour, education increases the productivity and earning of labour, contributing to the economic development of the nation. In addition, because of the quasi-public nature of education, governments highly involve in the provision of education (Jimenez 1990). There can be an economic explanation for the rapid expansion in world demand for education both privately and socially and hence, to the rapid expansion of school systems in the last decades.

On the other hand social and political objectives are put forward as explanations for the rapid expansion of the educational system. This can be observed from the Universal Declaration of Human Rights in 1948 which declared "Basic education for all" as an important social objective, re-affirmed by the Alma-Ata Declaration in 1978 and the Jomtien Declaration in 1990 (Appleton and Mackinnon 1993). Recently, the concern with the poorest also reinforced the emphasis on the social sectors, especially on education. It is observed that the trickle-down effect of economic growth to the poor is small and slow, and in the process of structural adjustment, it is argued, that the poor are susceptible to the negative effects of structural adjustment and education and health are identified as having most direct value to the poor (Baltimore 1990).

In the past three decades, the expansion of the school system in Ethiopia has been spectacular. The expected years of schooling, defined as the sum of six times the primary, six times the secondary and four times the higher education enrolment ratios (Schultz 1985), increased by more than 50 percent from 1968 to 1993. Public expenditure on education increased more than 5 times in absolute terms in the period under study. Though this high growth shows the government emphasis given to education, economic and demographic factors are proposed to influence this process. The factors that influence and govern this process and

the magnitude of the effect are relevant issues that have to be investigated (Schultz 1985).

On the other hand, the rapid increase in public expenditure on education has been neutralized by the rapid growth of school age population, which led to a fall in public expenditure per student. But it seems the decreasing per capita expenditure on the student did not mitigate the growth in enrolment. The way the education system adjusts to this incompatible growth in inputs and enrolment is also a matter of concern.

1.2. Objectives and Significance of the Study

The strong and quick development vision of most developing countries in 1950s and 1960s induced theoreticians and empirical researchers to identify important factors that lead to economic growth. Education being an important explanatory of the rapid economic growth of most developed countries, (see chapter 2), the strong priorities given by governments of developing nations seems to be appropriate. Though the rapid expansion of the educational system can be mainly explained by this especial development policy and political priorities attached to it, this expansion is proposed to be influenced by economic and demographic factors, identification of these factors is one of the objectives of this study.

In a country like Ethiopia, where public schools constitute more than 90 percent of educational system of the nation, the expansion of the system highly depends on the expenditure of the government on education hence, it is important to investigate the factors that influence the system. As the case is in most developing countries, the growth of public expenditure in Ethiopia is constantly depreciated by the rapid growth of school age population. In spite of the decreasing tendency of the per capita expenditure of the student enrolment continued to increase in the period under study in general. This makes interesting to see the process of adjustment of the system. Beside these, the emphasis given to womens' education, which is argued to contribute to the decrease in child mortality, high fertility, and to the improvements of child and family health (Rosenzweig 1989 and Sander 1986) increased the participation of women in education. Schultz (1985) showed that economic and demographic factors have different effects on male and female enrolment rates. In Ethiopia the share of womens' enrolment rate, from the total enrolment ratio, increased by 87 percent from 1968 to 1993 making the male and female enrolment ratio to be 16 % and 12 % respectively. As the difference between enrolment rates of male and female still exists, it is important to see how economic and demographic factors are influenced by the sex difference.

Thus, the main objectives of this study are;

1. to identify and determine the values of the economic and demographic factors that influence and govern the rapid growth of the educational system.

2. to analyze the process of adjustment of the educational system to the incompatible growth of inputs and enrolment.

3. to identify the role of sex difference in the effects of the economic and demographic factors, if any.

In a country such as Ethiopia, where there are scarce public funds and low starting level of human resources, studies such as this, which emphasize the external factors that influence the growth and evaluation of the educational system have particular relevance. This is because in trying to provide educational opportunities to all citizens it is important to consider factors that can influence the process of expansioning the school system. In addition, recent policy concern for the method of financing education, the challenge to increase enrolment rates in the country and the implications of recent increase in the price of important input to education (that is, salary increase introduced in November 1993) makes such a study timely.

In analyzing the adjustment process of educational system it is hypothesized that, first the resource intensity of education may have decreased which have an implication on the quality of education. Second the unit costs of production of educational services may have decreased. In order to analyze this, public expenditure per school child is divided into four observable components which will be shown in the analysis of the model to be used.

1.3 Sources of Data and Organization of the Study

There is a need for data on enrolment, number of teachers, expenditures on current and capital account, estimates of GNP in constant prices, urbanization, and the population age composition. These are taken from Basic Education Statistics of the Ministry of Education, CSO Statistical Abstract and different publications of Ministry of Finance and Ministry of Economic Development and Cooperation.

The schools expenditure data refer to that of actual expenditure reported by the Ministry of Finance. This is because there is a substantial difference between the budgeted and actual expenditure. Data on enrolment and numbers of teachers are taken from the summarized time-series data reported in the Education statistics of the Ministry of Education (1994). For this study the enrolment and the numbers of teachers refer to that of the

Government Schools, operated by the Ministry of Education. The demographic data are based on the Analytical Reports of the Census of 1984. All monetary variables are in real terms deflated by GDP deflator. It is important to remember that the data on the enrolment rates are most likely a deflated one. This is because the data do not take into account the drop-outs which is high in Ethiopia.

The income variable refers to the real GDP per adult population. The relative price of teachers refer to the average salary of teachers divided by the real GDP per adult population in the country. Relative size of population is arrived by calculating the proportion of school-age population from total population and the proportion of urban population calculated by dividing total urban population by total population of the country.

In analyzing the adjustment process of the education system the expenditure per school-age population is divided into observable components comprising enrolment ratio, average salary, teacher-student ratio and physical capital intensity. The enrolment ratio refers to the total enrolment divided by total school-age population, average salary refers to the total salary expenditure to total number of teachers, teacher-student ratio is arrived by dividing total number of teachers by total number of students and an index of physical capital intensity is arrived by dividing total school expenditure by total teachers' salary

expenditure.

In the next chapter the background for the study and a review of the literature will be presented. These include the theoretical and empirical arguments on the role of education in economic development, the reasons for government involvement in the provision of education and the theoretical arguments on the public expenditure growth. The third chapter deals with the development of educational system in Ethiopia in the last four decades. The model to be used in this study will be presented in the fourth chapter. The empirical results and the conclusion will be presented in the fifth and sixth chapter respectively.

CHAPTER II

2. Background and Review of Literature

The adequate provision of education is taken to be a major economic, social and political objective of both developed and developing countries' governments. Especially in LDCs, as most countries became independent in the 1950s and the 1960s, education was envisioned as the path to development and to more cultured and modern society (Psacharopolous 1985). The expansion of education is supported by its expected contribution to economic development, income distribution, poverty alleviation, and in the building of more cultured, equitable and politically aware society. As given below, the literature on the role of education in economic and social developments is extensive. Thus, this is discussed separately in section 2. Then, the reasons for government involvement in the provision of education and theoretical and empirical analyses of the growth of public expenditure particularly on education are discussed.

2.1. The Role of Education in Economic Development

The expansion of education observed in the last three decades in both developed and developing countries is spectacular. Enrolment increased at all levels of education.

Enrolment in the world increased by more than 3.5 times with annual growth rate of 7.5 percent from 1950 to 1985. During the period 1960 to 1985, public expenditure on education increased by about 13 times. The share of educational expenditure from the world national product has increased from 3.9 in 1960 to 5.8 percent in 1985 (Haddad 1988).

Comparing the expansion in the developing countries to that of the developed countries, we see that the share of developing countries in the expansion of the world education system is high. Enrolment increased at an average annual rate of growth of 12 percent at primary, 37 percent at secondary and 43 percent at higher levels in developing countries and the corresponding figures for developed countries are 0.8 percent, 2.9 percent and 9.6 percent respectively. Public expenditure on education increased by 13.5 times in developing countries during 1960-85, compared to 9.9 times in the developed countries (Haddad 1988).

The significant level of investment on the expansion of educational systems and high enrolment achieved during this period have been discussed by a number of writings and empirical studies made in this period on the issue of the role of education in economic development.

Education, including both technical training and general education, is argued to contribute to economic growth by

providing workers with productive skills and the ability to modify their routines in response to adynamic environment (Dension 1962, Welch 1970, Schultz 1975).

The relationship between education and economic development has been discussed by both classical economic writers and current economists. Although comprehensive treatment on the economics of education is lacking in the early economic writings, they did emphasize the importance of education in social development and considered the question of how education should be financed. More specific attention to the role of education in economic development was sparked by the concept of investment in human capital which developed in the United States and United Kingdom in the late 1950s and 1960s to explain those aspects of economic growth unaccounted by the traditional factors of production, such as land, labour and physical capital.

In this chapter we will see important writings on the issue of the role of education to economic and social development from both the theoretical and empirical view point observed by different economists and what we have learned from different empirical research.

2.1.1 The Role of Education in the Early Classical Writings

The argument that education contributes to the development

of the society has a long history. It is generally recognized that spending on education has economic and social pay-offs seen from both private and public stand points.

Adam Smith argued that education is both component of civil rights and efficiency. He saw the Scottish Parish school as a model that could be run cheaply and efficiently and argued that:

> **... the expense is ..., no doubt, beneficial to the whole society. This however might perhaps with equal propriety, and even with some advantage, be defrayed altogether by those who receive the immediate benefit of such education and institution, or by the voluntary contribution of those who think they occasion for either the one or the other. (Smith 1776, PP.300.1 as quoted in Vaizey 1968)**

He also identified that Scotland's system of national education as contributing to the ".... the superior intelligence, and the providential orderly habits of the people" (Smith 1776, as quoted in Vaizey 1968). He argued that although private provision of education lead to best education, there was a need for public education for the poor to "... prevent the almost entire corruption and degeneracy of the great body of the people" (Smith 1776 as quoted in Vaizey 1968).

Ricardo pointed the contribution of education to economic development by being an augmentation to physical capital. Together with Malthus, Ricardo saw education as a means of

inculcating habits which would lead to family size reduction (Malthus 1820 as cited in Vaizey 1968).

In stating the importance and objectives of the public education Mill wrote:

> **... An effective national education, of the children of the labouring class, is the first thing needful...It may be asserted without scruple that the aim of all intellectual training for the mass of the people should be to cultivate common sense; to qualify them for forming a sound practical judgment of the circumstances by which they are surrounded" (Mill 1867, P.107 as quoted in Vaizey 1968).**

In his Principles of Economics, Marshall (1910) referred to education as a 'national investment' and identified financing of education between private (parents) and the state as the major concern for the economist.

2.1.2 Educational Investment And Human Capital

The economic perspective on role of education took on a new form in the middle of the 20th century. An attempt to account for economic growth by measuring the increments in the area of cultivated land, persons employed and new investments in the physical capital created a puzzle late in 1950's. A large portion of the growth in the economy could not be accounted for by the commonly identified factors of production. Different attempts

were made to explain this 'residual', including an attempt to account for human capital as a factor contributing to economic growth. This concept got focused after the 1960s, when Schultz analyzed educational expenditure as a form of investment (Schultz 1961) and Becker published a book entitled "Human Capital" (Becker 1964). These and other seminal writings on human capital sparked a multitude of theoretical and empirical writings on the contributions of education to economic and social development which can be grouped as follows:

1) Macro studies of the contributions of education to economic growth (such as Denison 1962, Psacharopoulus 1985).

2) Micro Studies of the contributions of education to the productivity of farmers and workers (such as Haddad 1988, Jamison and Lau 1982).

3) Analyses of rates of return and cost-benefits of education, (such as Blaug 1970, Becker 1975).

4) Studies concentrating on the contribution of education in decreasing social inequality and alleviating poverty (such as Kuznets 1955, Tinbergen 1977).

2.1.2.1 Education and Economic Growth

The attempt to account for economic growth in the developed economies by the traditional factors of production: land, quantity of labour and physical capital resulted in a significant proportion of economic growth attributed to 'the residual'. In the beginning this residual was attributed to 'technical progress' (Solow 1957) but writers like Denison (1962) showed that human capital, especially education, could explain a significant part of the residual.

Before the leading economists in this field, Aukurut (1959) found that 1.81 percent of the growth in the Norwegian economy could be attributed to human factors, particularly education. Most pioneering studies were made on the United States data. Denison (1962) estimated that 23 percent and 42 percent of the growth rate in the per capita income between 1909-1929 and 1929-1957 respectively, could be due to education. This same writer later found that 21 percent of the growth during 1948-1973 was due to increased levels of education of the labour force (Denison, 1974). Jorgenson (1984) also found that 15 to 25 percent of growth in GNP per capita in the U.S. during 1948-76 is accounted for by education. Estimates made in other areas of the world using the same method of analysis also found that education explained a significant level of the growth in the economy, though the rate differ across countries. Psacharopoulos (1984) showed that education explained the economic growth from 0.8 percent in Mexico to 25 percent in Canada, and the average

(for 29 countries) being 8.7 percent. Similar estimates for developing countries showed that 12 to 23 percent in economic growth can be attributed to education (Psacharopoulos and Woodhall 1985).

Comparisons made to explain differences in the level of development across countries with human capital showed consistent results. Accordingly, education explains a quarter to a third of the differences in income levels between the United States and a group of 28 countries (Krueger 1968).

Studies that tried to correlate educational indicators and per capita income in 1954-1959 period (in 50 countries) found a correlation coefficient of 0.53 between GNP per capita and percentage proportion of GNP invested in education and 0.64 between GNP per capita and post-primary enrolment (Curle 1964). Using a croos-section data (for 69 countries) the same high correlation had been found between GNP per capita and secondary education (Benett 1967).

Econometric analysis also implied the same positive relationship between education in general and development. Using 83 countries' data for the 1960-1977 period Hicks (1980), found that an average 20 percent increase in the literacy rate is associated with 0.5 percent higher economic growth rate. Using a pooled data for the period 1960-1963 and

1970 to 1973 for 88 countries, Wheeler (1980), found that an increase in literacy from 20 percent to 30 percent lead to an increase in real GDP by 8 percent to 16 percent in real GDP.

It is also observed that education's role in economic growth varies with the level of economic development and over time. Accordingly Benavot's (1985) study, using 50-110 developed and developing countries data for different periods of time, show that primary education has positive and significant effect on economic growth during all periods (1930 to 1980), both in developed and developing countries. Secondary education has a strong negative effect in less developed countries and weak and positive effect in the developed countries during 1930-1950 period and had a positive effect both in developed and developing countries during 1955-1970 period and this effect is weakened in the period between 1965 and 1980. The relationship between economic growth and tertiary education was also found to be insignificant.

These and many similar studies confirm the positive and significant correlation between education and macro economic growth.

2.1.2.2 Education and Productivity

In trying to identify the economic contributions of education at a micro economic level, one can use either an

earning function as a proxy for marginal productivity or directly measure the economic impact of education or training on the productivity of workers from production function analysis. It is recognized that productivity measures based on production function analysis are much better in analyzing the economic impact of education, especially in non-competitive economy, since earnings do not reflect the economic value of the labourer. But because of data problems and complexity of methods of analysis, productivity measures are not as numerous as earning studies (Metcalf 1985).

Most productivity measures are concerned with the relationship between farmers' education and their agricultural production. There are also studies that analyze the effect of education on productivity in an industry. Education affects workers productivity by developing abilities to decode new information, choose optimum combinations of crops and agricultural practices and different input combinations, and produce efficiently (Haddad 1988).

Using survey data on types of farms, education of farmers, physical inputs and outputs in Korea, Malaysia and Thailand concluded that education had a positive and significant and quantitatively important effect on output (Jamison and Lau 1982). Similarly Lockheed, Jamison and Lau (1980) using a survey of 18 studies concluded that a farmer with 4 years of education had an

average productivity of 8.7 percent higher than one with no education. With complementary inputs the return of the farmer with 4 years of education went up to 13 percent.

Studies on the effect of education on productivity in the industrial sector are not conclusive. Research on the effect of education and training on the productivity of two electrical machinery factories in India shows that education had a positive effect on the industrial productivity, especially when there was in house training within the firm (Fueller 1970).

2.1.2.3 Cost-Benefit Analysis and Rates of Return to Education

Analysis of cost-benefit and rates of return to education have an advantage in the sense that they will provide a means for evaluating alternative investment projects. The large number of analyses for different countries at different points in time suggest that the economic pay-off to education is high and is larger than most other investments.

Many analyses have applied net present value and rates of return calculations to education (Blaug 1970, Psachoropoulos and Woodhall 1985). Empirical estimates using these methods are mostly criticized because of costing methods, the tendency to draw sample only from the urban labour force, and the failure to

correct for ability differences, social class and unemployment among those with different levels of education. Despite these limitations, the results still give us important insights suggesting that: (e.g Becker 1975, Psacharopoulos 1985)

(1) The highest overall social rates of return to education are generally seen in the lower income, agricultural economies and in the marginally industrialized economies,

(2) the highest pay-off to education in these lower-income and middle-income countries is at the primary level and,

(3) as countries industrialize, increase their GDP per capita, and invest more in education, rates of return to education tend to fall overall, and the return to lower education levels tends to fall relative to the pay-off to higher educational levels.

(4) The gap between private rates of return to education and the social rates is highest in the lower and marginally industrialized middle-income countries.

Although it is difficult to compare the rates of return over time between using different methods, results from the United States and Korea using large census samples support the tendencies revealed by the cross-section data. In the U.S, rates

to secondary education fell relative to the level of return in the early 1970s (Freeman 1976, Psachoropoulos 1980), and continued their secular decline in the late 1970s and 1980s (Carnoy et al 1988). The Korean rates show similar relative decline of secondary rates between 1974 and 1986 (Ryoo 1988).

A recent updated study confirmed earlier results. Primary education still has highest return from other levels of education. Educating females has been shown to be "marginally more beneficial" than educating males (psacharopoulos 1993). And the same diminishing returns to investment rules applies in education. The other observation is that, though average rate of return to education fell with economic development, the rates were still high compared to other expected returns, reaching the commonly taken opportunity cost of capital, that is 8.7 percent in OECD countries (Psacharopoulos 1993, Table 1).

2.1.2.4 Education, Income Distribution and Poverty

Many studies show a positive contribution of education in decreasing income inequalities and contributing to the alleviation of poverty both in U.S and other countries (kuznets 1955, Tinbergen 1977, Chiswick 1971 and Ahluwalia 1974). But education's ability to decrease income inequality and poverty,

it is argued, depends on the system of education, on the way it is financed and other socio-economic factors, such as employment probabilities, wage structure and fiscal base, etc. Furthermore it is shown that change in educational composition have an effect on inequality (Knight and Sabot 1983).

Education's contribution to poverty alleviation is also evidenced by different empirical studies. Analyzing 66 less developed countries, Fields (1980) observed a decrease of poverty in each country with attainment of a higher level of education. A significant negative correlation, between reduction of poverty and an attainment of higher level of education, is also found by Tilak (1986), using 29 countries' data.

Thus, by increasing income, reducing fertility and contributing to better health, a well-planned and financed education, can contribute to the reduction of income inequalities and poverty. The effect would still be higher when education is combined with other factors that contribute to economic growth.

In conclusion, it is important to mention that, there are studies that tried to indicate a weak relationship between education and economic development. Historically Lundgreen (1976) indicated that in 19th century Germany, expansion of education was found to have weak effect on economic output. And Leven (1982) argued though, expansion of formal education

preceded economic growth in current developing countries, the expansion of formal education followed economic development in developed countries. Inconsistent relationship between education and economic development was also observed in an East African case-study by Rado and Jolly (1965). Theoretically, education is said to serve only as 'screening device' and 'credential mechanism' (Arrow 1973, Spence 1973). But it is already observed that, a multitude of empirical studies and historical analyses showed the positive contribution of 'right education' to the economic development, which is confirmed by both macro and micro evidences. Historically, also the now developed nations had widely spread literacy at the beginning of the 19th century (Tilak, 1990). And as observed from japan and the Newly Industrialized countries (NIC's), the building of human capital contributed to their high growth rate (Naya and McCleery 1994).

The theoretical analyses and the results of empirical studies generally concluded that, in most economies, investment in education contributes positively and significantly to the development of the economy. High investment in education increases productivity of workers. The rate of return to education is higher than most other investments both in terms of private and social returns. A well-planned and efficient investment in education contributes to the minimization of inequalities in income distribution and in alleviation of poverty in the society. In addition, the externalities of investment in

education to health, population reduction and in the building of a more cultured and politically aware society are important.

2.2 Reasons for Government Involvement in the Provision of Education

The significant involvement of the government in the provision of education may be justified by the quasi-public nature of education. The main reasons for this nature are the presence of externalities, increasing returns to scale, alleviation of poverty and income distribution (Appleton and Mackinnon 1993).

Externalities exist if some of the benefits or negative impacts are not mediated through the market. This leads to disequilibrium between demand and supply which leads to an inefficient market. In addition to its significant private benefits, education creates positive externalities to the society by creating easy transmission of information which facilitates economic and social interactions. This is one of the important factor for economic and social development (Berger 1985). When public resources are limited and a rapid population growth creates a pressure on public resources, education is identified as an important and efficient means of controlling population growth (Summers 1992). Education contributes socially by creating

a well-informed and cultured society by: i) creating a group of future decision makers; and, ii) helping to transmit moral and social values and different health information (Appleton and Mackinnon 1993).

Where populations are dispersed rather than concentrated high transportation costs to the points of learning can give rise to the 'natural monopoly'. This may give an opportunity for the private provider to ask for higher prices, indicating public provision as one possibility. In addition economies of scale is manifested in most higher education thus, a need for public action to control the pricing of the natural monopoly (Appleton and Mackinnon 1993).

Although investment in human capital is recognized to have high returns compared to most other investments, for the investor to capture the returns or avoid a high risk of default makes potential creditors to be reluctant in providing loans to this kind of investment. By giving different legal protection and subsidizing these loans, the government can mitigate the failure of the secondary market (Appleton and Mackinnon 1993).

Like other potential investors in education parents see only the private monetary benefits and not the positive social returns from educating their children. The presence of this positive externality would lead to under-investment by parents in schooling their children.

2.3 Public Expenditure Growth

Public expenditure defined as the costs of providing goods and services through the public sector budget reflects the policy choices of government (Brown and Jackson 1994). Though political factors and policy objectives largely determine growth of the public expenditure, economic factors such as: the rise in the general price level, the growth in GNP and population composition and growth influence this process (Schultz 1985).

In most developed and developing countries there has been a constant growth of public expenditure in the last three to five decades, seen in both absolute terms and relative to GDP (Musgrave 1984). The important and significant growth observed in the public expenditure attracted many theoreticians and empirical researchers to study the factors that determine and influence this growth. As early as 1876, Wagner and Tolison (1876) suggested that as economic growth continues, the share of the public sector in the economy will rise as a result of the intensification of existing activities and extension of new activities. This is what later has been termed as the 'law of increasing state activities' (Tilak 1989). Wagner's assertion is found to be difficult to analyze public expenditure since it does not indicate the determinants and the causes for the growth of public expenditure.

In the development models of public expenditure growth, Musgrave argued that public expenditure is directly related to the stages of economic development. In the early stages, there is a need for high government investment for the 'take-off'. In the middle stages of development, government investment compliments the private sector while continuing to deliver goods and services. This is needed because there is a market failure at all stages of the economy. In the high stages of development Musgrave argued that the GNP share of public expenditure falls, (as cited in Brown and Jackson 1994).

Peacock and Wiseman (1961) identified the major factors behind the growth of public expenditure. Basing their analyses on the underlying politics of the fiscal system, that is 'governments like to spend more money that citizens do not like to pay more taxes, and that governments need to pay some attention to the wishes of citizens' (as quoted in Brown and Jackson 1994, p.89), Peacock and Wiseman proposed that increases in public expenditure in the catastrophic cases, especially in war time, exceed the limitation on taxation leading to higher post-war civilian expenditure. This increase in expenditure would have a displacement effect, a concentration effect and an inspection effect. The displacement effect mainly consisted of shifting public revenues and expenditures to new levels, where they would be accompanied by changes in the relative importance of central and local governments, with the former assuming new

functions and taking over functions of the latter (concentration effect). Simultaneously, these shifts would force the attention of governments and people to problems of which they were formerly less conscious (inspection effect).

By identifying factors related to the economic system, level of development and other sociological and demographic factors, Pryor (1968) asserted that public expenditure would be higher in the centrally-planned economy than market economies resulting from extensive involvement of the governments of socialist economies. In addition, factors such as GDP, technological change, urbanization, industrialization, tastes and price levels are identified to be important in determining public expenditure and its growth.

Based on these major theories of public expenditure growth extensive empirical studies have been made. In their empirical study Goffman and Mahar (1971) considered the age structure of the population to have been a dominant factor in public expenditure growth in six Caribbean countries during the post world war II period. Other demographic factors, like urbanization were found to have a significant impact on public expenditure (Deutch 1961 and Thorn 1971 as cited in Tilak 1989).

Empirical studies based on international comparisons in expenditure growth identified different factors for the growth

of public expenditure. In their comprehensive study based on cross country data, Heller and Diamond (1990), identified demographic factors (such as growth of population), income factors (such as gross national product) and other factors (such as share of population in particular sector of the economy) to be significant explanatory variables for the growth of public expenditure. Other studies emphasizing economic growth and other demand side factors also got significant results (Fabricant 1952, Martin and Lewis 1956).

After studying the growth of Canada's public expenditure growth, Bird (1970) concluded that understanding of government expenditure and its growth over a period of time requires a greater recognition of social and political factors. Hence, identified environmental, technological, economic, political and administrative factors as possible factors influencing the growth of expenditure.

The rapidly growing public services such as education, health and other social services argued by Andic and Vervedca as being a result of the submergence of the informal security of the village and extended family replaced by the formal state security to fill the gap in providing health, social services and education to the society as a whole (Andic and Vervedca 1964).

In a recent study of the post 1974 expenditure growth of the

government of Ethiopia, Teshome (1994) identified the socialist economic policies, the nationalization of private property, the expansion of bureaucracy and the series of 'campaigns' conducted during the 'Derg' regime as being the major contributors to the rapid growth of public expenditure. In addition, though the share of economic services declined, the social services maintained their share at that of 1950s and 1960s expenditure level. But this is accompanied by declining standards of social services particularly that of health and education services, aggravated by high population growth and by declining rate of private participation in the delivery of social services. Thus, the Ethiopian expenditure seems to confirm Wagner's thesis of the inevitable growth of public expenditure as economy grows and Peacock and Wiseman's proposal that government expenditure grow in step-like fashion (Teshome 1994).

In an effort to identify the factors responsible for the growth of government expenditure and the reasons for the existing disbursement among different programs, Ghirmai (1990), asserted that as in most other countries the government expenditure in Ethiopia is affected more by non-economic factors. He regressed the ratio of recurrent expenditure on education to GNP on: per capita income, domestic revenue per capita, the ratio of recurrent government expenditure on education to total government expenditure and introduced a dummy variable for the change of government, got significant values for all variables in which the

model explained about 99 percent of the variation in the dependent variable.

Borcherding and Deacons (1972) designed a model of public spending on education, based on theory of collective decision-making, thereby testing the significance of certain variables assumed by the theory to be important determinants of the levels of state and local government expenditures on education. In this study it is generally seen that:

- education is price inelastic that is, expenditure on education is not responsive to the price of education,
- income elasticities are generally less than unity,
- grant-in-aid elasticities are low lying between 0.0 and 0.4.

Using the data for 89 countries for the period 1960 to 1980, Schultz observed that expected years of schooling increased by 32 percent from 1960 to 1981 in low income countries and by 46 percent in middle income countries (Schultz 1985). In the poorest countries especially, though the school-age population more than doubled from 1950 to 1980 the expected schooling provided to the 'average child' increased. On the other hand in these low income countries, it has been seen that the resources allocated to education per capita by central government appear to have declined. Thus, in this study in addition to analyzing how

economic and demographic factors could influence the process of this expansion in school systems, hypothesis regarding the incompatible relation between the inputs of the education systems and its output are tested.

In a study by Schultz (1985), it has been found that a significant part of the growth in the public expenditure is attributed to the growth in real income per adult, income elasticities being 1.4 and 1.5 for primary and secondary schools respectively. The declining price of teachers' salaries relative to average income is another factor contributing to the growth of enrolment, by lowering the unit cost of providing schooling to a growing fraction of the child population. On the other hand, the rapid population growth decreased the resources available per child affecting the quality of education provided to both primary and secondary levels though it seemed that it had not affected the quantitative expansion significantly (Schultz 1985).

CHAPTER III

3. THE DEVELOPMENT OF THE EDUCATIONAL SYSTEM IN ETHIOPIA

In analyzing the development of the educational system of the country it is important to have the general framework of the environment in which the educational system has developed. This includes historical events, economic and political development, policy changes and other related situations which can affect the development of the educational system.

In this chapter we focus on the general development of primary and secondary education emphasizing policy development and the expansion of educational opportunity in the country.

3.1 Foundations in Educational System of Ethiopia

Ethiopia has its own traditional system of education to provide its youth and adults with opportunities and settings to learn in a purposeful and organized manner. The 'Quranic' and Coptic religious organizations were the only suppliers of learned people in most parts of the country until the introduction of formal education (Pankurust 1962). In this study we focus on the formal education, which is a hierarchial system of modern

education established in the institutional settings and being the major concern for policy.

The emergence of modern education in Ethiopia although, credited to Emperor Menilik II, concrete educational policy in Ethiopia can only be identified after the expulsion of Fascist Italy in 1941 (Fasil 1990). In this period beside the effort to reconstruct the destroyed schools, an effort was made to expand and diversify educational structures. Soon after independence, the Ministry of Education and Fine Arts was established, strengthened later in 1947 by a Board of Education. The Board was assigned responsibility for overall future development of education in the country under the direct supervision of the Emperor.

The 1940s, though characterized by no definite policy and strategy for the development of the educational system, important foundations had been laid in the history of education system of the country. The year 1943 witnessed the establishment of the first secondary school in Addis Ababa, the Haile Selasie Secondary School. To mitigate the problem of teachers in the primary and secondary schools a beginning was made in the training of primary school teachers and an in-service teacher training program was also initiated in which provincial teacher were required to participate during the rainy season, when they are in recess. It was during the 1940s that the Commercial and

Technical schools were also established to help the emerging commercial and industrial sectors (Fasil 1990).

In the late 1940s it was already felt that the expansion of the educational sector was hampered by scarcity of resources. Hence, in 1947, the Imperial Government proclaimed the Educational Tax proclamation, aimed at enabling each province to develop education in self-supporting bases. Subsequently, the Educational Expenditure proclamation was issued so as to create the local Educational Board, which ensure the implementation of the Educational Tax proclamation.

The outcome of the effort made in the 1940s in the educational sector was significant. Enrolment in the government schools exceeded 50000 in the primary level and 6000 and 1600 in the middle and secondary schools respectively. The number of government schools exceeded 400 in early 1950s (see Table 1).

TABLE 1: TOTAL ENROLMENT IN GOVERNMENT SCHOOLS IN THE FALL OF 1952 (ERITREA NOT INCLUDED)

	MALE	FEMALE	TOTAL	% FEM.
PRIMARY (1 -4)	45397	6699	52096	12.9
MIDDLE SCHOOLS (5-8)	5416	637	6053	10.5
SECONDARY SCHOOLS	1471	141	1612	8.7
HIGHER EDUCATION	100	1	101	.01

Source: Trudeau (1964) Higher Education in Ethiopia, Montreal, p.9 (in Fasil, 1990).

Trudeau neatly sums the development of educational sector in the 1940s Ethiopia, it worth quoting Trudeau (1964) in which he neatly summarized the development pattern of the sector saying;

> **There were no definite expressed education policy ---education was considered a necessary investment and one that would soon pay returns. (p.33)**

At the beginning of the 1950s, the expansion of the educational system was already constrained by the organizational and resource capacity of the country. The report of the U.S Operation Mission to Ethiopia, for example, indicated the then prevailing problem in the number and quality of teachers and the limited material capacity. The report also identified the low

starting level of the educational system relative to the total population (Progress Report 1952).

Following the report of the U.S Operation Mission to Ethiopia, the Advisory Group of the U.S, which came to Ethiopia in 1953, together with the officials of the Ministry of Education formed a committee charged to undertake comprehensive review and make recommendations for the development of the sector. The committee submitted a comprehensive report in 1955, entitled-Ten Year Plan for the Controlled Expansion of Ethiopian Education.

Regarding primary education, the committee proposed a free access to basic education to all citizens through community schools with a four-year program that was mainly aimed at facilitating the communicative power of the learners and to enable the individual to deal with everyday problems. In addition the report recommended the qualitative upgrading of the schools through the reduction of class size, the creation of separate classes for the 'overage' pupils and strengthening of teacher training (Trudeau 1964).

In the middle and secondary schools the quantitative expansion of the schools was suggested, in which the middle schools were planned to reach 141 within a maximum output of 3500 pupils. In the secondary level, the number of students were planned to increase to 1300 which is the accommodation capacity

of higher education facilities. The general impact of the plan was to lay firm foundation of the educational system of the country by broadening the base for the then structure beside its adjustment significance in the development of educational system (Ten Year Education plan 1955). The proposals and recommendations of the ten year plan of 1955 were included in the First-Five Year Development Plan (1957-1961).

In general, the development of the educational system was constrained by lack of resources especially in the financial aspect. It is observed that most of the plans of this period remained on paper. It is argued that some which were tried were not successful mainly because of lack of commitment on the part of the officials put in charge of these actions (Teshome Wagaw 1979).

The growth of enrolment in the 1950s was significant at all levels. As can be seen from Table 2, enrolment in the primary schools increased from 52366 in early 1950's to 125736 in the beginning of 1960's. Similarly enrolment increased by more than 5.5 times and 5.9 times in the middle and secondary schools respectively (See Table 2).

TABLE 2 ENROLMENT IN GOVERNMENT EDUCATIONAL ESTABLISHMENTS 1952/1953_1961/1962

YEAR	PRIMARY SCHOOLS		MIDDLE SCH.		SECONDARY SCH.	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
1952/53	45397	6969	5416	637	1471	141
1953/54	52744	8505	6610	829	1923	202
1954/55	58846	10587	7556	842	2353	240
1955/56	66089	14397	9886	1269	2820	381
1956/57	80261	18446	12758	1760	3802	483
1957/58	88584	21524	16414	2452	4892	472
1958/59	88307	22953	20274	3453	6036	1201
1959/60	89896	26301	23307	4669	6771	871
1960/61	96271	28757	24855	5426	7136	1142
1961/62	95644	30092	26133	6809	8037	1385

Source: Ministry of Education and Fine Arts, School Census for Ethiopia, 1961/62 p.20 **(in Fasil 1990).**

The failure of the community schools proposed in the Ten Year plan was mainly a result of low acceptability in the rural areas and low experience and capacity of the system (Tradeau 1964).

Though the growth in enrolment in the 1960's was significant when assessed in absolute terms, the participation rate was still very low. Participation rate in the primary schools was only 10 percent and 1.5 percent in the middle schools. In which the overall participation rate was only 4 percent for all levels of education (Fasil 1990).

3.2 The Second Phase of the Development of Educational System in Ethiopia

One of the important challenges in the development of the Ethiopian educational system in the 1960s and 1970s came from the Conference of African states in 1960 hosted by Ethiopia. The States met to have an inventory of educational needs and draw a program of action for the coming years in the continent. The conference by analyzing the then existing situations of education in most African states proposed a short-term and long-term plan for development of education in the continent (Fasil 1990).

In this conference it was found out that the Ethiopian educational system was in its early stage. Ethiopia's participation rate in the primary level (3.8 percent) was higher only to that of Niger (3.3 percent). The participation rate of 0.5 percent in the secondary level was also amongst the lowest compared to countries like Ghana (24 percent) (Fasil 1990).

The Conference drew a short and long-term plan covering the years between 1961 and 1966 and from 1960 to 1980 period respectively. The recommendations for the long-term included:

_ compulsory, free and universal primary education,
_ 30 percent of the learners who complete primary education would be admitted to the secondary level,
_ constant improvement of the quality of education.

In the mean time the plan for short-term proposed;

_ an attainment of 51 percent in the year 1966 in the primary level with annual growth rate of 5 percent,
- the participation rate in the secondary level would be 9 percent at the end of 1966,
- improvement of teachers training and developing adult education program.

The recommendations and short-run and long-run plan of this Conference obviously contributed to the effort made in the 1960s and 1970s (Fasil 1990).

3.2.1 The Second Five Year Development Plan (1963-1967)

Following this Conference of African States the Ministry of Education prepared a plan to fulfil the twenty year plan set by

the conference. Consequently officials requested UNESCO to dispatch an expert group to study and report on the needs for investment in education. Though, the immediate aim was to analyze the investment requirement to meet the need for skilled manpower of the Second Five Year Development Plan (SFYDP), the report of the UNESCO Group was issued after the launching of the Five Year plan. In the SFYDP special attention was given to technical education.

The UNESCO Mission found out that deficiencies were seen at all levels, both seen relative to the requirement of the SFYDP and to that of the total school age population of the nation (UNESCO 1962). The expert group also indicated a serious lack of resources to meet the manpower requirement of the SFYDP, in which 75 percent of the resources were expected to be drawn from external sources. In spite of these, at the end of the plan period the reported achievement was encouraging. Enrolment in the government schools increased by more than 113 percent in the primary and by 214 in the secondary level. Besides, the targeted number of class rooms was achieved by 92.2 percent in the primary and by 124.5 percent in the secondary level (see Table 3).

TABLE 3 The Second Five Year Development Plan 1963_1967

LEVEL	SFYDP TARGETS 1967	ENROLMENT 1963	ENROLMENT 1967	GROWTH OF ACTUAL (%)
ENROLMENT				
PRIMARY	275900	204410	312207	113.2
SECONDARY	35880	5837	76607	214.2
CLASS ROOMS				
PRIMARY	6669	5010	6144	92.2
SECONDARY	1280	1014	1593	124.5

Source: Third Five Year Development Plan 1968-1973, Imperial Government of Ethiopia

3.2.2 The Third Five-Year Development Plan (1968-1973)

The plan proposed the need for: expansion of education to the rural poor, a more relevant curricula to the tradition of the people and the economic system of the country. It was also aimed to facilities a national medium of communication through the development of Amharic; and, up grading the quality of education in the country (TFYDP 1968-1977).

The plan aimed to increase the participation rate to 18 percent in the primary schools, of which 60 percent would enter to the Junior Secondary schools. Enrolment in the secondary schools was planned to increase by 67 percent at the end of the plan period.

In the primary level, 105 percent of the target was achieved, while the achievement was 154 percent in the secondary level. Numbers of teachers in the government schools increased by 93 percent in the primary and 132 percent in the secondary schools as compared to plan targets.

TABLE 4 ENROLMENT AND PUBLIC EXPENDITURE GROWTH BETWEEN 1968_1973 (in '000)

LEVELS	ENROLMENT		PUBLIC EXPENDITURE		PERCENTAGE GROWTH IN	
	1968		1968	1973	EXP.	ENR
PRIMARY	339	645	13316	59063	344	90
JUNIOR SECONDARY	38	85	4561	5915	30	123
SENIOR SECONDARY	23	75	10830	18885	74	226
TOTAL	401	804	28707	83863	192	101

Source: Calculated From Yearly Statistical Report of Ministry of Education and Ministry of Finance of Different Years.

3.2.3. Educational Sector Review of 1971

The Addis Ababa Conference of African States though targeted 71 and 15 participation rate in 1970/71 in primary and secondary schools respectively, the achievement in the early 1970s was only 18 and 4.5 percent in primary and general secondary levels. Thus, the need for a new and comprehensive evaluation of the educational system was recognized. This gave rise to the Education Sector Review of 1971 (Fasil 1990).

The main objectives of the Review was to recommend the necessary steps that should be taken to improve the attainment of schooling at all levels (Fasil 1990). The participants identified the following as the major problems of the sector:

(i) lack of relevance of the curriculum to the development and tradition of the country and,

(ii) inequitable distribution of educational opportunities and its organizational system.

The participants recommended the restructuring of the system with emphasis on providing education to the Ethiopian population as a whole (Ministry of Education, 1972).

The new structure of the educational system proposed the Minimum Formation Education (MFE). The MFE was expected to take four years of education to enable the learner to attain a required knowledge in his life in the community. And enrolment was proposed to be increased by 3.1 and 0.3 million by the year 1989/90 in the First and Second levels respectively (Ministry of Education 1972).

Even though the proposals of the Review were not implemented, it contributed to the revolutionary change witnessed

in 1974, not only in the education sector but also in all economic,social and political systems of the country (Fasil 1990).

In summarizing the development in this period it can be said that the plans and well intentions in this period were not matched by concrete actions. The gaps between Ethiopia and other african countries in the educational development seemed to increase in this period (Teshome W. 1979). Other writer also observed the problem of funds as the major constraint in the develpment of the educational system in the period 1960s (Mulugeta 1967 as cited in Teshome 1979).

3.3. The Development of Education in Socialist Ethiopia

The revolutionary change in Ethiopia after the revolution of 1974 can be clearly witnessed in the education sector as well. Different structural and policy changes had been introduced in the educational system to create a socialist educational system.

The first measure taken in the education sector was to nationalize the rapidly growing private schools, specially in the urban areas in 1975. Though, Foreign Community and Mission schools were not nationalized, the participation of the private sector in education was completely eliminated.

The adoption of the National Democratic Revolution (NDR) programme as a bridge between the 'feudal' system and the anticipated socialist one, became the major policy paper of the Military Government. In this programme, education was proposed to be provided free of charge to broad mass step by step. The main aim of education was regarded to be its role in the class struggle (Program of NDR 1976).

In proclamations issued in 1976 and 1984, the main functions of the Ministry of Education were identified to be the preparation of educational policy which comply with national, political, economic social needs and implement the same when approved by the council of ministers. And ensure that the educational curriculum is prepared on the basis of socialist lines (Fasil 1990).

The establishment of the National Revolutionary Development Campaign and the Central Planning Supreme Council in 1978 and its replacement by the proclamation for the establishment of the Office of the National Committee for Central Planning, enabled the formulation of a series of annual plans and later the preparation of the Ten-Year Perspective Plan (1984-1994). Before the launching of the Ten-Year Perspective plan, the general educational policies of the country were indicated in the programs of the Workers Party of Ethiopia and was elaborated by

the Ministry of Education in its New Direction of Education in 1985. In these documents the objectives of education were said to be the preparation of students for production and the creation of scientific and socialist consciousness (Ministry of Education 1985). In addition poly-technic education was identified as playing an important role in socialist Ethiopia. It was also expected that citizens be provided poly-technic education as long as they had the academic capacity to follow the course.

3.3.1 The Ten Year Perspective Plan (1984-1994)

The Ten Year perspective (TYPP) was a comprehensive socio-economic plan covering the period 1984/85 to 1994/95. In this plan, the main goals of the education sector were regarded as being an instrument to: attain the basic needs of the people and struggle against the 'feudal' system. The production of manpower requirement in the ten years period and eradication of illiteracy were also identified as other goal of the education sector (Ministry of Education 1988).

At the end of the plan period 66.6 percent, 35.6 and 10 percent participation rates were planned to be attained in the primary, junior secondary and senior secondary schools respectively (Ministry of Education 1988).

The actual increase in the years between 1974 and 1991

both in enrolment and public expenditure was significant. The total enrolment increased by 224 percent and the total public expenditure grew by 264 percent. Total enrolment ratio increased from 9 percent in 1974 to 18 percent in 1991.

TABLE 5 ENROLMENT AND PUBLIC EXPENDITURE GROWTH IN ETHIOPIA 1974_1991 (IN '000)

LEVEL	ENROLMENT		PUBLIC EXPENDITURE		PERCENTAGE GROWTH IN	
		1991	1974	1991	EXP.	ENR
PRIMARY	743	2157	56430	237332	320	190
JUNIOR SECONDARY	106	349	19382	59113	205	229
SENIOR SECONDARY	61	446	19973	52282	162	631
TOTAL	910	2952	95785	348727	264	224

Source: Calculated From Yearly Statistical Report of Ministry of Education and Ministry of Finance of Different Years.

3.3.2. THE EVALUATIVE RESEARCH ON THE GENERAL EDUCATION SYSTEM OF ETHIOPIA

The rapid expansion of education in Ethiopia was not

accompanied by a compatible increase in the resource input to the sector hence, constant quality deterioration characterized the sector. This was identified by different studies, for instance the Educational Sector Review of 1973 identified the root causes of the problem. This saw the birth of the Evaluative Research on the General Education System of Ethiopia (ERGESE 1985). The main objective of the ERGESE was to improve the quality of Ethiopian education to meet the educational objectives of the Ten Year Perspective Plan.

By identifying the decreasing resource intensity of the Ethiopian education at all levels overtime, the ERGESE project recommended the needed adjustments to be taken to improve the quality of education. These include:

- re-fresher courses and in-service training for teachers,
- improvement in salary of teachers and establishing a code of professional ethics in the educational field,
- improving the provision and administration of resources through community participation.
- Improvement of the evaluation system of the country.

However, non of these recommendations were implemented immediately.

In spite of the enormous growth both in enrolment and public expenditure in Ethiopia during the 'socialist' period, the educational system had been characterized by many problems. These includes deterioration of quality, a decrease in enrolment in the last few years and increasing number of unemployed school leavers.

3.4 The New Educational and Training Policy of Ethiopia

The fall of the 'Derg' regime in 1991 brought a socio-political change in the country. The Charter of the Transitional Government of Ethiopia (TGE) and the New Economic policy of TGE indicated the need for liberalizing the economy. The documents also envisaged a social system which would comply to the freedom of nations and nationalities. These changes implied the need for a policy change in the education sector as well. Thus, the New Education Policy of Ethiopia (EEP-94) was introduced.

The EEP-94 indicated that the main problems of the educational system of Ethiopia to be the quality and inequitable distribution of education and training at all levels. In addition the objectives and structure of education and its relevance, the evaluation system, the medium of instruction, the resource intensity and management of the system were identified as being

inappropriate. The results of these shortcomings meant that:

_ learners were not active in problem solving,
- it was not possible to initiate the society to protect and wisely use its natural resources,
- it was not possible to strengthen the learners' participation in social and economic development of the country.

The main causes for these problems were argued as being: wrong policies of the previous regimes and the undemocratic administration of the country. The new policy indicated the need for solving these problems step by-step through;

_ expansion of relevant basic primary education for all,
_ improvement of efficiency and quality of education and equity in access to education and training at all levels,
_ the development of diversified training with appropriate ties with research and development.

To attain these intended goals, the government aimed to:
- upgrade the quality of teachers,
_ improve educational organization and management by changing the administration system from a centralized

to a decentralized one,

- encourage community participation and mobilizing resources in order to increase facilities in schools.

The new educational policy has also recognized the right to allow every child to learn in his/her mother tongue and stated,

> **... cognizant of pedagogical advantage of the child in learning in mother tongue and the right of nationalities to promote the use of their language,primary education will be given in the nationality languages (EEP-94, P.23).**

To solve the problem of depletion of resources in the education system the new Education Policy has set a strategy of cost sharing in which, after the general education of grade 10 the learners are expected to share the cost of their educational expenses.

In a country where the starting levels of education participation is very low (22 percent in primary, and 12 percent in the secondary in 1995) the emphasis given to the expansion of enrolment in the general education in the new policy is acceptable. As Ethiopia is a multi-ethnic country with diversified cultures, the principle of teaching in the mother tongue could be commendable. However, the scarcity of trained

manpower in the regional States, the limited financial capacity of the regions, and the need to keep with the national standards create a challenge to this policy. On the other hand, even though the education policy emphasized the need for equity, the cost sharing strategy may aggravate the inequalities prevailing in the higher educational levels.

The increase of salary introduced in 1993 to improve the living standards of teachers, in spite of its positive contribution to the motivation of teachers, could put a strain on the expansion of education.

CHAPTER IV

4. METHODOLOGY OF THE STUDY

In order to empirically analyze how economic and demographic factors govern growth in public expenditure on education, and hence enrolment, an analytical model must bring together the economic, political and social forces that determine the expenditures. These models include micro and macro models. The micro-models explain the decision process of the public choice which ultimately give rise to public expenditures (Brown and Jackson 1994) while the macro models will help us to explain the time pattern of public expenditures as governed by the specified economic and demographic variables.

In order to separate the relative importance of each factor that influences the growth of public expenditure on education and hence, on the growth of enrolment, it is important to estimate the elasticities of each variable with respect to public expenditure and enrolment.

In this section the model to be used in this study will be presented. Before this the summary of some models used in the

past studies and the factors that are expected to influence and govern the growth of the educational system will be discussed.

4.1. Over View of Methods Used in Past Studies

Most of the studies of the 1950s and 1960s based on the USA data tried to explain variations in spending levels between states, local governments, school districts etc. In these studies the general approach was to estimate the parameters of a general reduced-form equation of the kind:

$$E = \alpha_o + \alpha_1 I + \alpha_2 A + \alpha_3 X + U$$

where E is the total absolute spending for the level of government or per capita spending on the particular service, here education. I is the per capita income, A is the per capita grant-in-aid and x is a vector of socio- economic characteristics of the population and urbanization, U is a random error term (Brown and Jackson 1994). These studies were criticized for their ad hoc constructions with little basis in the theory of choice (Borcherding and Deacons 1972, Brown and Jackson 1994). In these studies, by assuming that local governments behaved as if they maximize the preferences of the median voter subject to a budget constraint, they try to derive a set of demand equations of the median voter for public services.

In the 1970s studies became more rigorous and theoretically consistent. Borcherding and Deacons (1972) modeled public

spending, which is derived from the received theory of collective decision-making, there by testing the significance of certain variables assumed by the theory to be important determinants of the levels of state and local government expenditures.

In analyzing the empirical patterns of the growth of educational expenditure and enrolment, a comprehensive model is constructed by Schultz (used in this study) which explains school expenditures and outputs. First, the micro model of the decision process that gave rise to the demand for public service hence, to the public expenditure on the education, was constructed. In doing this the expected political system and the technological possibilities were laid down. Subsequently reduced-form equations that embody parameters underlying investment supply function of education giving rise to the demand for education and the derived demand for educated labour was formed. This is because the same factors can influence the demand and supply in the educational system (Schultz 1985).

Schultz (1985) identifies the growth in income per capita of adults, relative price of education and demographic factors as important factors influencing the growth of the educational system in both developed and developing countries.

In the model to be used in this work, national income per adult, relative prices and demographic factors are proposed as

factors influencing public sector demand for schooling services which is represented by the demand of the median voter. It is observed that the same factors could influence and shift the supply for educated labour by affecting the rate of return to education. Thus, in trying to estimate school-expenditure and outputs the reduced-form equations will be used. Subsequently instrumental methods will be used to take care of the endogenity problem that arises as the relative price of teachers is simultaneously determined with the production costs and demands for schooling. Thus, unexplained variations in either production costs or consumer demand could be correlated with relative prices.

In order to explain the adjustment process of the educational system to the incompatible growth of the inputs and outputs of the educational system, the total expenditure to schooling service will be divided into its four observable components, representing enrolment ratio, teacher-student ratio, capital intensity and average teacher salary which will be regressed on the price, income and demographic factors.

4.2. Factors Influencing the Growth of public expenditure on Education and Enrolment

4.2.1. Demographic Factors

Demographic factors influencing the growth of the education system include size of school age population, urbanization and population age composition. These have been recognized by many studies including, that of Goffman and Mahar (1971), Williamson (1961) and Schultz (1985). The growth of school age population depreciates the available resources and constrains the increase in public expenditure on education by increasing the need for competitive social needs, therefore we expect a negative relationship between the per capita expenditure on education and growth of school age population. On the other hand, the growth in urbanization could decrease the price of education and increase the demand for education by facilitating the increasing returns to scale nature of education thus, having a positive relationship with public expenditure and enrolment. Cohort size, representing the relative size of school age population and the proportion of urban population are included in this study.

4.2.2 Income and Price Factors

It is often proposed that as income increases, people spend proportionately more on services, as a result, per capita income

is often used as a favorite explanatory variable of public expenditure growth. The law of demand, stating the negative relationship between the price of a normal good and its demand makes price of the public good another important explanatory variable. This can be seen in many empirical studies of public expenditure growth, including that of Borcherding and Deacons (1972) and Schultz (1985). In this study the per capita income per adult and relative prices of teachers to that of average per capita per adult are included.

4.3. The Model of the Educational Systems

In this paper the model used by Schultz (1985) will be used to see the factors influencing the expansion of schooling system in Ethiopia and the relation between inputs and output of the system.

Following Borcherding and Deacon (1972), the production function for educational services is assumed to take a standard Cobb-Douglas production function form, exhibiting constant returns to scale in the long-run. Which is represented by:

$$X = ZL^{\propto}K^{1-\propto} \quad \ldots\ldots\ldots\ldots\ldots (1)$$

where X is the output of educational services, L is labour input, k is physical capital input, $\propto$ is the share of wages in the

inputs, 1-∝ is the capital share and Z is a set of exogenous technological shifters that affect the unit cost of producing schooling in different environments, but are exogenous with respect to labour and capital productivity and use. This can also be the distribution of the population or/and the growth of the population.

Using the standard assumption in the analysis of private demand for public goods (Borcherding and Deacon 1972) it is also assumed that citizens know about costs of production and the benefits of government spending. Public and private educational institutions try to optimize their input allocations and production decisions as constrained by consumer incomes and perceived benefits of outputs on the one hand, and technological possibilities and relative inputs on the other. This enables us to express the unit price of the educational services or the marginal cost as a multiplicative function of the wage paid to labour in the educational sector w, and the return r required on public capital:

$$P=\left(\frac{1}{Z}\right)\left(\frac{W}{\alpha}\right)^{\alpha}\left(\frac{r}{1-\alpha}\right)^{1-\alpha} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where P is the price of public service, W wage of teachers, r is return on capital and Z is exogenous technological factors. Assuming that the return on capital remains the same overtime,

the real wage paid to teachers W, and the exogenous technological conditions Z, will be the only remaining constraints that would influence the marginal cost of education over time. Since teachers' salaries are observable or can be estimated easily from the current expenditure, the price equation can be rewritten assuming the rental rate on capital does not vary:

$$p_x = e^{\beta_0} Z^{\beta_1} W^{\alpha} e^{u_1} \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

where ßo is a constant, $ß_1 = -1$ and u_1 is a multiplicative error in the production technology affecting unit costs. Since $\propto$ is observable the effect of price variation can be estimated from data on teacher wages. In addition to lack of related data educational services are assumed to flow equally to all citizens who have equal numbers of eligible children to benefit. This may not represent reality accurately, however it can be justified as the best available alternative. And the median voter's demand for quantity of schooling is assumed to be log-linear in the tax t (or price), in the tax-payers' income y and in technological factors Z;

$$q = D t^{\eta} y^{\delta} Z^{\varepsilon} e^{u_2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

where t is the tax rate, y is income per capita, Z technological factors e^{u2} is a multiplicative error term in the demand relationship and η, δ, ϵ represent elasticities for the related variables.

E/P defined as expenditures per school child are then obtained by multiplying quantity demanded by price, where the general tax rate is equal to marginal price of school services, that is multiplying equation (3) by equation (4):

$$E/P = DY^{\delta} P_x^{(\eta+1)} Z^{\epsilon} e^{u_2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Substituting from the production technology (3) in for the price of educational services, logarithms are taken of (5) and the partial effects of income per adult, relative prices (teacher wage), and technological shifters on public educational expenditures per child are expressed as a combination of underlying household demand and production technology parameters:

$$\ln (E/P) = b_o + b_1 \ln y + b_2 \ln w + b_3 \ln Z + V \quad \ldots\ldots\ldots (6)$$

where

$b_0 = (n+1)\ (ß_0) + \ln D$

$b_1 = \delta$

$b_2 = ,\alpha\ (n+1) + \epsilon$

$b_3 = ß\ (n+1) + \epsilon .$

The errors from the production technology and household demand relationships are combined in V, and are assumed independent of Y and Z. Knowledge of the labour share of inputs $\propto_1$ permits the identification of the price elasticity, n. The net effect of

incomes, δ and the Z factors- cohort size and urbanization, on educational inputs and outputs can also be seen from estimates of the reduced form equation (6). Empirically it is convenient to see how income, price and demographic factors may affect the components of educational expenditures. Thus, educational expenditures are divided into a multiplicative function of four observable components:

$$E/P = (S/P)\ (T/S)\ (C/T)\ (E/C) \quad \ldots\ldots\ldots\ldots\ldots\ldots (7)$$

S/P represents, the enrolment ratio. T/S is the teacher to student ratio, taken as one possible indicator of the human resource intensity of schooling. C/T is the average salary of teacher. E/C is the ratio of total expenditures to salary expenditures, or an index of the physical capital intensity of the educational system. Logarithms of these four components of equation (7) are regressed on income, price, technology and population composition variables used to explain expenditures per-child. The sum of the log-linear regression coefficients for each conditioning variable in these four component regressions is equal to that variable's coefficient in the overall expenditure per child function.

We can write equation (7) in logarithmic form as:

$\ln (E/P) = \ln (S/P) + \ln(T/S) + \ln(C/T) + \ln(E/C)$ and this is decomposed as:

$$\ln (E/P) = ß_{11}+ß_{12}\ln y + ß_{13}\ln P_x+ß_{14}Z$$

$$\ln (S/P) = ß_{21}+ß_{22}\ln y + ß_{23}\ln P_x+ß_{24}Z$$

$$\ln (T/S) = ß_{31}+ß_{32}\ln y + ß_{33}\ln P_x+ß_{34}Z$$

$$\ln (C/T) = ß_{41}+ß_{42}\ln y + ß_{43}\ln P_x+ß_{44}Z$$

$$\ln (E/C) = ß_{51}+ß_{52}\ln y + ß_{53}\ln P_x+ß_{54}Z$$

In order to get the coefficients of equation

(6) we add up component effects as:

$$\beta_{1i}=\sum_{j=2}^{5} \beta_{ji}$$

$$i = 1...4$$

CHAPTER V

5. EMPIRICAL RESULTS

5.1. The Estimation Procedure

As described in the previous chapter one the data used in this study are time-series thus, there is a need to examine the time-series characteristics of each variable before examining any long-run equilibrium relationships between them. This involves testing the order of integration. This helps to avoid spurious regressions arising from using a non-stationary series if dependent and independent variables are not co-integrated. A time series variable is said to be integrated of order d if it becomes stationary after differencing d times in which the series is denoted as $X_t \sim I(d)$. A stationary series is denoted by I(0),and a non-stationary series with single unit root is denoted by I(1) (Adam 1992).

To test the order of integration, the Dickey Fuller (DF) test is used, and the Augmented Dickey Fuller (ADF) will also be used to take care of the small sample bias in DF test. The DF test is based on the equation:

$$Y_t=\beta_0+\beta_1 T+\beta_2 Y_{t-1}+E_t \text{----------} (8)$$

where Y_t is the series whose order of integration is to be tested and T represents the time trend.

Once we found that the variables are I(1), that is they are non-stationary, we test for co-integration. Even though this can be done by unit root test of the residual by running a static regression of educational expenditure per school child on all the non-stationarity explanatory variables and test for stationarity of the residual, according to Banerjee (1986) this test of estimation from unit root test of the residual has a small sample bias as cited in Maddala (1992), Therefore, the test of the hypothesis of no co-integration is rejected ultimately after checking the significance of the error correcting term in the short-term dynamic model. If the error correcting term is significant it proves the existence of long-run equilibrium relationship between the dependent and the explanatory variables.

Following this procedure, stationarity of the collected series is checked and all the variables except the proportion of urban population and capital intensity used in this study are found to be non-stationary using the ADF test. The variable for proportion of urban population is non-stationary with time trend and capital intensity is non-stationary with DF, giving ambiguous result for these two variables (see appendix 1). The co-integration of the long-run regression is then confirmed by the

short-run dynamic model (that is the error correcting term is significant).

The short-run dynamic model is described by the error correction model (ECM) which incorporates the short-run impacts and the feedback effects to indicate the speed of adjustment to long-run equilibrium (Engle and Granger 1987). in this model all the variables are differenced once, to make them stationary.

The above mentioned procedure is followed for total expenditure per school child and reported in Table 6. From the long-run equilibrium relationship the estimation for the components mentioned in equation (7) indicating the quantity, human resource intensity, average salary and physical capital intensity of the education sector is presented. In addition, the effects of the explanatory variables on school enrolment rates for males and females are estimated separately to see whether there is any gender difference on the effects of the explanatory variables on the quantity of education. In order to assess the effects of the explanatory variables on the expenditure per school child by school levels, the estimations for Primary, Junior Secondary and higher Secondary school levels are also presented.

5.2. Results and Analyses

Table 6. Estimated Elasticity of Total Expenditure Per School Child

Dependent Variable:-Total Expenditure Per School Child				
variable	The Short-run (dynamic) model		The long-run (static) Model	
	coefficient	T-Ratio	Coefficient	T-Ratio
Real Income per Adult	0.3750**	5.1733	1.0503**	3.6150
Relative Price of Teachers	0.5455*	5.3836	0.9007**	4.2903
Relative size of School-aged population	-0.5106	-1.1032	-1.0908*	-2.0584
Proportion of population Urban	1.9540**	3.1141	1.3286**	6.4707
constant	0.0233	0.4552	-4.0256*	2.0665
Error Correction term	-1.384**	-6.4079	_	_
Adjusted R^2	0.546		0.884	

** Significant at one percent significance level.
* Significant at five percent significance level.

As can be seen from Table 6, total school expenditure per school child increases with income in both the short-run and long-run. Specifically, in the long-run the income elasticity of total expenditure per school child, that is δ in equation (6), exceeds unity indicating the share of income expended on schooling tends to increase with real income per adult. The elasticity of total expenditure per school child with respect to relative price of teachers is 0.55 and 0.90 in the short-run and

long-run respectively. This implies that, in spite of the large share of the salaries in total expenditure (0.89), increasing salaries lead to only 0.55 percentage increase in the total expenditure in the short-run. In other words, the elasticity of the quantity of school services demanded, approximating enrolment, with respect to the price of labour, or ^{n} in equation (4) is equal to -0.39[1]. This contributed to the expansion of enrolment seen in the past decades, but this price response seems to be dumped in the long-run since ^{n} in the long-run is almost zero.

The relative size of the school-aged cohort, indicating the recent high population growth, is associated with lower expenditure per school-aged child. A one percent increase in the cohort size decreases the real expenditure per school-aged child approximately by -1.09 percent in the long-run. The coefficient in the short-run is not significant.

Urbanization increases the expenditure per school child both in the short-run and long-run. A one percent change in urbanization increases the expenditure per school child by 1.95 and 1.32 percent in the short-run and long-run respectively. This can be explained by the high demand of the urban population for

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[1]From eq. (6) the coefficient on the relative price of teacher wage variable in the expenditure function is: $b_2 = \alpha(^{n}+1)$ thus, the price elasticity $^{n} = (b_2/\alpha)-1$. (the sample mean for the share of salary expenditure from total expenditure is 0.89).

schooling.

The lagged residual coefficient is significant at the 1 percent significance level, validating the Error Correction specification. It indicates a speed of adjustment of about 138 percent from actual school expenditure per school child in the previous year to long-run expenditure per school child.

Table 7. The Estimated Elasticity of School System Enrolment and Inputs with Respect to Changes in the Explanatory Variables

Dependent variable	Real Income Per Adult	Relative Price of Teachers	Relative Size of School-aged Population	Proportion of Population Urban	Constant
Enrolment ratio	0.34	0.34	-3.74[a]	2.07[a]	-4.47
Physical capital intensity	0.14[b]	-0.17[a]	0.46[a]	-0.49[a]	-0.89
Teacher student ratio	-0.25	-0.23	1.98[c]	-0.24	-0.01
Teacher salaries	0.82[a]	0.96[a]	0.21	-0.02	1.34
Total School expenditure per School child	1.05[a]	0.90[a]	-1.09[b]	1.32[a]	-4.03[b]

a, b, c: underlying regressions are results are significant at 1, 5, 10 percent significance level respectively.

From the components underlying these income and price effects on total public expenditure per school child, we see that enrolment ratio is negatively affected by the relative increase of the cohort size significantly. And urbanization also significantly increases the quantity of education,that is, a one percent increase in the proportion of the urban population increases the enrolment ratio by 2.07. This implies that

urbanization increase the proportion of population attending formal education. The coefficients for real income per adult and relative price of teachers are statistically insignificant.

Physical Capital intensity is explained well by all variables. A one percent increase in real income per adult increases the physical capital intensity by 0.14 percent only. a one percent decrease in the relative price of teachers decreases the capital intensity by -0.17. Relative size of school age cohort increases the physical capital intensity at a decreasing rate, that is a one percent increase in the relative size of school-age children increases the physical capital intensity by 0.46 percent only. Urbanization decreases the capital intensity by 0.49 percent to a percentage increase in the proportion of urban population. This can be a result of economies of scale achieved when the population is densely populated.

The teacher-student ratio is not explained well by any of the variables except by the relative size of school age population. The relative increase of school age population increases the teacher-student ratio significantly. This can be a result of a high percentage increase in the number of teachers than that of students seen in Ethiopia in the last decades.

Although teacher salaries rise with real income gains per

adult, these salaries do not keep pace. The elasticity of 0.82 (Table 7) implies that the relative position of teachers' salaries decreases by 0.18 percent as real income per adult increases by one percent.

Table 8. Elasticity of Female and Male Enrolment ratio to **Changes in the Explanatory Variables**

dependent variable	real income per adult	relative price of teachers	relative size of school age population	proportion of urban population	constant
male enrolment rates	0.28	0.42	-3.93[a]	1.98[a]	-4.55
female enrolment rates	0.42	0.19	-3.52[a]	2.52[a]	-4.18

a: underlying coefficients are significant at one percent significance level.

As stated above increasing females participation in education helps in decreasing child mortality and improving family health. The effect of High increase in the relative size of population

was lower for the enrolment rates of females than that of males. Urbanization also increases enrolment rates of females more than that of males. The income coefficient though, increases the enrolment rates positively and is higher for females than males, it is statistically insignificant in both cases. The price coefficient is also statistically insignificant. These imply that the smaller effect of the increase of relative cohort size of the school-age population and increase in the urban proportion population decreases the gender gap seen in the country.

Table 9. Estimated Elasticity of School Expenditure per School Child by School levels

dependent variable	Real income per-adult	relative price of teachers	Relative size of school age population	proportion of urban population	constant
primary sch/exp. per/sch. child	1.010[c]	0.859[d]	0.179	0.550[b]	-1.888
junior Sch/exp. per sch.child	-0.875	0.914	-5.812[b]	3.826[b]	-4.278
second. Sch.exp. per sch.child	0.286	0.580[d]	-1.887[a]	0.814[c]	-7.622[b]

a,b,c,d show significance level at < 1, 1, 5 and 10 percent significance level respectively.

The estimation by school levels show us that in the primary schools the effect of per capita income per adult population is significant and implies that a percentage change in per capita income lead to the same amount of increase in the expenditure per school child. However, this income variable is found to be insignificant in the Junior and Senior Secondary schools.

The effect of the relative price of teachers implies that the elasticity of school services demanded with respect to the price of labour, that is n in equation 4.7 equals -0.25 and -0.43 in the Primary and Senior Secondary school levels respectively. This implies that the response of the senior School levels for the decrease of the school price seen in the past decades is much higher in the senior than the primary levels. The coefficient for junior schools is statistically insignificant.

The relative size of the school-aged population, taking account of the high population growth seen in the past decades, has negatively affected the expenditure per school child in the Junior and Senior secondary schools and its effect is much higher in the junior high school levels. The related coefficient for primary school levels is statistically insignificant. Urbanization increases the expenditure per school child at all school levels but its effect at the junior high school level is much higher than at primary and senior secondary levels.

CHAPTER VI

6. CONCLUSIONS AND IMPLICATIONS

The strong theoretical arguments and micro and macro economic empirical evidences on the contribution of education to economic growth coupled with quasi-public nature of education with positive externality and its usefulness as a means to preserve and transfer cultural values to subsequent generations made governments to invest more on education.

In the last three decades the growth of public expenditure on education and hence, enrolment in Ethiopia was remarkable. Real expenditure per school child increased by 209 percent in the years between 1968 and 1993. The enrolment ratio increased by 160 percent in primary, 267 percent in junior secondary and 516 percent in senior secondary schools. In spite of these, the number of school-aged children getting educational opportunity are very low. Enrolment ratio is only 18.6, 11 and 7.4 in primary, junior secondary and senior secondary levels respectively.

Beside these the real expenditure per student has been decreasing in the last 3 decades. Thus, it is important to investigate the factors that influence and govern the process of

the development of the system and the way the system adjusts to the incompatible growth between the inputs and the output.

In this paper economic and demographic factors are identified as factors that can influence and govern the process of the development of the educational system. These include per capita income per adult, relative factor prices of the inputs, production technology and demographic structure. In the model used in this study, the factors mentioned above are interrelated in production-demand framework as constraints and conditions affecting the costs of, and demands for educational services. A time-series data for the period between 1960 and 1985 (E.C.) of Ethiopia is used to test hypotheses within this framework. In addition to quantitative estimation of the total school system, differences on school levels in the effect of economic and demographic factors on the expenditure per school child is also estimated. Differences in school enrolment between males and females are also analyzed.

The empirical estimation showed that the income per adult has significant contribution to the growth of expenditure per school child, particularly in the long-run the income elasticity is high and elastic, implying that as per capita income per adult increases, expenditure per school child and hence the public demand for schooling service, increases significantly.

The declining price of teachers' salary relative to average income per adult is another factor contributing to growth of public expenditure per school child, hence to enrolment. This implies that in a situation with limited public resources, increasing the cost of labour, which constitutes about 90 percent of the total expenditure on schooling, could mitigate the growth of the expenditure per school child and hence of the total enrolment. This is of course with the assumption that the resources squeezed from teacher salaries will be diverted to fund the quantitative expansion.

The relative size of school-aged population indicating the growth of population seen in the last decades affected the expenditure per school child and enrolment ratio significantly, indicating the high growth of the relative size of school-aged population continuing its pressure on the growth of public expenditure on education and enrolment. The growth of the proportion of urban population increased both the expenditure per school child and the enrolment ratio significantly. This could be a result of high demand of urban population for schooling.

In this study we have seen that the public expenditure on schools have conformed to the expected behavior in respect to consumer incomes, relative factor prices and demographic constraints.

The intensity of physical capital in the school expenditure has been decreasing continuously with growth of relative salary expenditure, that is, there is a tendency to substitute physical capital intensity by human resource intensity. The percentage growth of income per adult and relative cohort size leads to lower percentage increase in the physical capital intensity. This implies that the physical resource intensity of schooling has been continuously depreciated. The decreasing physical resource intensity together with the relative decrease of salary of teachers, by decreasing the cost of education, contributed to the growth of enrolment.

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APPENDICES

APPENDIX 1

RESULTS OF UNIT ROOT TESTS FOR THE VARIABLES IN THE REGRESSIONS (IN LOG FORMS)

VARIABLES	STATISTIC	WITHOUT TREND	WITH TREND
SCHOOL EXPENDITURE PER SCHOOL CHILD :TOTAL	DF ADF (1)	-3.4396(-2.9850) -1.6785(-2.9907)	-3.5883(-3.6027) -2.1113(-3.6119)
INCOME PER ADULT	DF ADF(1)	-1.0140(-2.9850) -0.4238(-2.9907)	-3.0663(-3.6027) -2.0946(-3.6119)
PRICE OF TEACHERS	DF ADF(1)	0.1693(-2.9970) -0.1279(-3.0039)	-2.3102(-3.6219) -2.0225(-3.6331)
COHORT SIZE:TOTAL	DF ADF(1)	-0.9075(-2.9850) -1.2243(-2.9907)	-1.7626(-3.6027) -2.4099(-3.6119)
PROPORTION OF URBAN POPULATION	DF ADF(1)	-5.8628(-2.9850) -3.0850(-2.9907)	-0.3213(-3.6027) -0.1981(-3.6119)
TOTAL ENROLMENT RATIO	DF ADF(1)	-2.6388(-2.9850) -1.7796(-2.9907)	1.3198(-3.6027) -0.0186(-3.6119)
FEMALE ENROLMENT RATES	DF ADF(1)	-2.9023(-2.9850) -1.7544(-2.9907)	1.4839(-3.6027) 0.1464(-3.6119)
MALE ENROLMENT RATES	DF ADF(1)	-2.4612(-2.9850) -1.7867(-2.9907)	1.1893(-3.6027) -0.0685(-3.6119)
TEACHER-STUDENT RATIO	DF ADF(1)	0.8451(-2.9850) -0.5259(-2.9907)	0.3527(-3.6027) -0.5958(-3.6119)
CAPITAL INTENSITY	DF ADF(1)	-1.9293(-2.9850) -7.5199(-2.9907)	-2.4987(-3.6027) -6.7725(-3.6119)
AVERAGE SALARY	DF ADF(1)	-0.9164(-2.9850) -1.5049(-2.9907)	-2.6426(-3.6027) -2.6209(-3.6119)
EXPENDITURE PER SCHOOL CHILD:PRI.	DF ADF(1)	-3.6442(-2.9850) -1.4579(-2.9907)	-4.1200(-3.6027) -2.4625(-3.6119)
EXPENDITURE PER SCHOOL CHILD:JUN.	DF ADF(1)	-1.5989(-2.9850) -1.5592(-2.9907)	-1.7235(-3.6027) -2.3852(-3.6119)
EXPENDITURE PER SCHOOL CHILD:SEC.	DF ADF(1)	-1.6101(-2.9850) -1.7499(-2.9907)	-1.5577(-3.6027) -1.6233(-3.6119)
COHORT SIZE: PRI.	DF ADF(1)	-1.5340(-2.9850) -1.8773(-2.9907)	-1.3972(-3.6027) -2.2727(-3.6119)
COHORT SIZE: JUN.	DF ADF(1)	-0.3110(-2.9850) -0.4523(-2.9907)	-1.7996(-3.6027) -1.9270(-3.6119)
COHORT SIZE: SEC.	DF ADF(1)	0.6983(-2.9850) 0.5476(-2.9907)	-1.1949(-3.6027) -1.1809(-3.6119)
AVERAGE SALARY PRI. TEACHERS	DF ADF(1)	-1.3501(-2.9850) -1.9699(-2.9907)	-2.2922(-3.6027) -2.2336(-3.6119)
AVERAGE SALARY JUN. TEACHERS	DF ADF(1)	-1.7145(-2.9850) -2.0407(-2.9907)	-1.2762(-3.6027) -1.5516(-3.6119)
AVERAGE SALARY SEC. TEACHERS	DF ADF(1)	-0.4951(-2.9850) -0.4878(-2.9907)	-2.2349(-3.6027) -2.0136(-3.6119)

NOTE: The critical Values in brackets. The sample and observations for DF statistics are 1961-1985 and 25 respectively While they are 1962-1985 and 24 for ADF statistics respectively.

Appendix 2: Data Set

Table 1. REAL PUBLIC EXPENDITURE ON EDUCATION BY SCHOOL LEVELS IN ETHIOPIA (1960-1985 E.C.) (IN '000)

OBS.	DSAPR	DTOEPR	DSAJU	DTOEJU	DSASE	DTOESE
1960	12513.7	13316.4	1133.9	4560.7	6965.6	10829.7
1961	16850.3	22912.0	1225.6	6708.3	7528.5	13225.8
1962	22544.0	27109.7	928.8	4311.5	9443.7	13671.5
1963	25910.7	29519.6	1482.1	3296.6	10512.3	13631.0
1964	36283.8	46137.4	2188.3	3592.8	11664.8	13780.3
1965	41905.0	48405.0	2831.8	3707.9	12564.8	14774.7
1966	44186.5	50659.2	4334.9	5073.1	13636.4	16197.8
1967	41069.5	48727.7	14884.8	16736.8	15211.5	17246.8
1968	38247.9	41944.8	16915.2	18627.8	13864.0	16284.8
1969	39542.3	43475.6	15545.1	17524.0	12781.2	16024.7
1970	39603.1	41268.4	13975.6	15511.0	12594.9	14169.2
1971	42637.6	44246.6	13675.9	15248.4	12171.2	14662.1
1972	46533.1	47996.3	14089.5	15423.7	13471.8	15927.6
1973	52650.7	55161.5	16123.8	17722.2	14845.1	17121.2
1974	64972.9	68557.7	16864.3	19156.6	16885.0	20715.0
1975	74680.2	78090.5	16335.8	18582.3	20182.0	23229.2
1976	85130.8	87908.6	17960.5	19392.7	21782.7	23572.1
1977	87484.7	89628.7	18314.4	20119.7	22169.8	25139.7
1978	94498.2	97121.3	19059.2	20259.3	22485.2	24517.6
1979	111300.8	115111.2	23364.7	24507.3	25650.1	28247.1
1980	118228.0	121506.0	25105.8	25983.8	26376.7	27928.1
1981	121552.2	124038.6	26059.2	27085.9	25883.2	27248.6
1982	125148.7	127353.9	27123.6	27895.7	27004.5	8273.7
1983	111153.5	112336.9	24272.8	27980.4	24074.4	4747.0
1984	110634.8	111954.3	23836.2	24811.2	22984.2	3604.6
1985	130553.7	132262.9	25873.9	27278.7	23694.9	5252.7

Source: Ministry of Finance.

Table 2. ENROLMENT BY SCHOOL LEVELS AND SEX (IN '000)
(1960-1985 E.C.)

OBS.	PMR	PFR	JMR	JFR	SMR	SFR
1960	242.0	96.8	28.7	9.7	19.5	3.9
1961	270.4	111.9	36.2	12.3	23.6	5.2
1962	303.0	127.7	40.6	14.2	30.9	7.2
1963	326.9	144.1	47.7	15.7	39.0	9.6
1964	363.1	162.6	50.5	17.2	44.9	11.4
1965	385.1	171.8	56.2	20.0	52.3	14.1
1966	447.0	198.0	61.2	23.4	58.3	16.4
1967	512.0	230.9	75.1	31.2	45.6	15.4
1968	528.9	245.2	87.5	38.4	65.0	23.0
1969	598.5	274.7	89.0	40.5	92.7	35.2
1970	598.9	277.5	81.8	41.0	88.2	44.1
1971	722.4	336.7	88.4	49.0	103.1	57.4
1972	1000.2	493.6	107.4	57.6	117.3	63.5
1973	1189.6	609.1	123.1	63.7	136.8	74.9
1974	1340.1	711.0	145.3	74.5	150.1	81.0
1975	1407.8	788.2	164.0	83.8	162.6	89.6
1976	1386.4	803.5	178.3	93.4	175.1	96.3
1977	1320.9	808.6	182.8	106.2	172.6	104.2
1978	1342.3	836.0	204.5	124.9	175.2	110.8
1979	1522.9	926.1	237.9	147.2	191.8	119.3
1980	1621.2	964.6	258.5	162.3	232.0	139.3
1981	1574.4	974.7	241.1	160.5	254.2	163.9
1982	1444.3	912.6	214.5	154.5	264.1	178.6
1983	1316.8	840.5	197.0	152.2	260.1	185.5
1984	1049.4	732.8	166.1	139.6	227.1	181.2
1985	982.1	656.8	156.4	136.4	195.8	162.2

Source: Ministry of Education.

Table 3. SCHOOL AGE POPULATION BY SCHOOL LEVELS (IN '000)

OBS.	PAPM	PAPF	JAPM	JAPF	SAPM	SAPF
1960	2390.4	2223.0	703.1	555.7	984.3	972.5
1961	2456.0	2283.9	722.4	571.0	1011.2	999.2
1962	2521.5	2344.9	741.6	586.2	1038.2	1025.9
1963	2587.1	2405.9	670.8	601.5	1065.2	1052.5
1964	2652.7	2466.9	780.2	616.7	1092.2	1086.5
1965	2718.2	2527.8	799.5	631.9	1119.2	1105.9
1966	2783.8	2588.8	818.8	647.2	1146.2	1132.6
1967	2829.2	2631.0	832.1	657.7	1164.9	1151.0
1968	2905.5	2702.0	854.5	675.5	1196.3	1182.1
1969	2981.9	2773.0	877.0	693.3	1227.8	1213.2
1970	3058.3	2844.1	899.5	711.0	1259.3	1244.2
1971	3134.7	2950.3	921.9	728.8	1290.7	1275.3
1972	3222.4	2996.7	947.8	749.2	1326.9	1311.0
1973	3312.7	3080.6	974.3	770.2	1364.0	1347.8
1974	3402.9	3164.5	1000.9	791.1	1401.2	1384.4
1975	3493.1	3248.4	1027.4	812.1	1438.3	1421.1
1976	3661.8	3406.1	1077.0	851.5	1507.8	1490.1
1977	4005.5	3960.3	1112.6	880.0	1557.7	1540.1
1978	4253.9	3866.2	1149.7	1023.4	1839.5	1705.6
1979	4387.1	3990.7	1185.7	1056.3	1897.1	1760.6
1980	4518.4	4107.6	1221.2	1087.3	1953.9	1825.6
1981	4663.7	4242.7	1260.4	1123.0	2016.7	1871.8
1982	4932.6	4631.0	1298.0	1286.4	2336.5	2058.2
1983	4824.3	4518.7	1340.1	1329.0	2412.1	2259.3
1984	4418.1	4123.4	1299.4	1288.6	2339.0	2319.4
1985	4560.1	4255.9	1341.2	1330.0	2414.2	2393.9

Source: Calculated From Analytical Report of the Ethiopian National Census of 1984

Table 4. NUMBER OF TEACHERS BY SCHOOL LEVELS (IN '000)

OBS.	NTP	NTJ	NTS
1960	6.4770	1.2370	1.0960
1961	7.0960	1.4720	1.1860
1962	8.1740	1.6480	1.4860
1963	8.9920	1.6970	1.5780
1964	10.3220	1.9810	1.8900
1965	12.1010	2.2940	2.0410
1966	13.0430	2.5060	2.4820
1967	15.2550	2.9990	2.2460
1968	17.4790	3.3450	2.6560
1969	19.4260	3.3340	2.8660
1970	22.8850	2.1420	3.2820
1971	23.3120	3.3050	3.5970
1972	25.3070	4.0250	4.1520
1973	27.6280	4.1010	4.8500
1974	32.7000	4.6940	5.5190
1975	37.3970	5.3240	6.3620
1976	41.3720	5.3490	6.8840
1977	42.9890	6.1720	7.3440
1978	45.8600	6.5670	7.5740
1979	51.5500	7.7810	8.1940
1980	53.2130	8.4580	8.8670
1981	60.0970	9.3410	10.2330
1982	58.8730	9.1110	10.8450
1983	61.4480	9.6110	11.4210
1984	62.4140	9.9360	11.5040
1985	65.0910	9.6320	10.8970

Source: Ministry of Education.

List of Acronyms

DSAPR: Deflated Salary of Primary School Teachers.

DTOEPR: Deflated Total Expenditure for Primary Schools.

DSAJU: Deflated Salary of Junior School Teachers.

DTOEJU: Deflated Total Expenditure for Junior Schools.

DSASE: Deflated Salary of Secondary School Teachers.

DTOESE: Deflated Total Expenditure for Secondary Schools.

PMR: Enrolment of Males in Primary Schools.

PFR: Enrolment of Females in Primary Schools.

JMR: Enrolment of Males in Junior Schools.

JFR: Enrolment of Females in Junior Schools.

SMR: Enrolment of Males in Secondary Schools.

SFR: Enrolment of Females in Secondary Schools.

PAPM: Primary School-age Population of Males.

PAPF: Primary School-age Population of Females.

JAPM: Junior School-age Population of Males.

JAPF: Junior School-age Population of Females.

SAPM: Secondary School-age Population of Males.

SAPF: Secondary School-age Population of Females.

NTP: Number of Teachers in Primary Schools.

NTJ: Number of Teachers in Junior Schools.

NTS: Number of Teachers in Secondary Schools.

DECLARATION

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any other university. All sources of material used for the thesis have been duly acknowledged.

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