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Impact of public educational spending on the Schooling outcome

(The case of Ethiopia)

By:

Wubishet Asres

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This is to certify that the thesis prepared by Wubishet Asres, entitled:

Impact of public educational spending on the Schooling outcome

(The case of Ethiopia) and submitted in partial fulfillment of the requirements for the Degree of Master of Arts (Applied Economic Modeling and forecasting) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Abstract

This study examines the effect of government educational spending on schooling outcome in Ethiopia using the econometric methods of Ordinary least square. The study attempts to measure the impacts of public spending on educational sector using annual data set on public educational expenditure, adult literacy rate, and macroeconomic uncertainty proxied by consumer price index for the period 1980/81-2011/12.All the variables under consideration are stationary at their respective first difference of their growth rate. The results indicate that schooling outcome which is proxied by adult literacy rate positively related with all the identified explanatory variables except the consumer price index. The study found that public educational spending impacts positively and strongly schooling outcome. The policy implication of this study is that, current government should continue its monetary and fiscal measures so as to contain the growth of inflation since in the long run it have a negative effect on educational outcome.

Acknowledgement

First and foremost, I would like to thank God for giving me the courage and strength to start and finish my project. Then I would like to extend my heartfelt thanks to my advisor Dr. Tassew Woldehanna for his valuable comments and my classmates and colleagues of MOFED who assisted me by contributing ideas to enrich this thesis.

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Chapter One

Introduction

1.1 Background of the study

In the mainstream economic literature, public education expenditures have been recognized as a key aspect of fiscal outlays in most developing countries of the world. The reasons put forward in defense of government involvement in education financing are not far-fetched. Empirically, education and human capital have been found to have a positive and significant effect on economic growth (World Bank, 1980; Barro, 1998; Barro & Sala-i- Martin, 1995), reduce fertility rates (Moock & Jamison, 1988), improve health and enhance social and political participation (Hill & King, 1991).

According to Sen (1999), education has both intrinsic and instrumental value. It is desirable not only for the individual but also for the society as a whole. Education as private good benefits directly those who receive it, which in turn affects the individual's future income stream. At the aggregate level, a better educated workforce is thought to increase the stock of human capital in the economy and increase its productivity. Considering the externalities prevalent in education, it is widely accepted that the state has a key role to play in ensuring equitable distribution of educational opportunities to the entire population. This is particularly crucial in developing countries such as Ethiopia that suffer from high levels of poverty, inequality and market imperfections. Public intervention in education can lead to improvement in the future stream of individuals, enabling equitable distribution of wealth and help reduce poverty (Mukherjee, 2007).

Education being an important component of human capital has always attracted the attention from economists, researchers and policy makers. Governments are trying to improve Human capital by pumping more investments in education. Education increases an individual's earning potential, but also produces a 'ripple effect" throughout the economy by way of series of positive externalities (Michaelowa, 2000). Educational expenditure constitutes a significant share in government's 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 labor, education increases the productivity and earning of labor, 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.

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).

Furthermore, the justification of public spending on social goods, particularly education, is based on the classical literature on public goods, where it is argued that social goods provide a rationale for the allocative function of budget policy. It is argued that the public sector performs certain functions because some goods cannot be provided efficiently through the market system owing to apparent market failures or associated inefficiencies. Market failure occurs because the benefits created by social goods are not limited to one particular consumer who purchases the goods, as is the case with private goods. The non-rival or non-excludability nature of public goods has important implication for consumer behavior and on the provision of both private and social goods (Musgrave & Musgrave, 1989). Although the market mechanism is structured for the provision of private goods, the exclusivity of the title accorded purchasers of private goods is lacking in social goods. It would be inefficient therefore to exclude any consumer from partaking in the benefits of a social good since such consumption does not reduce or limit the benefits according to others (Onwioduokit & Tule, 2002).

According to the development plans and strategies documents (such as SDPRP, PASDEP and GTP**)** of Ethiopia, government spending has continued to increase and is planned to rise in the coming years. And, recently, in order to achieve the Growth and Transformation Plan (2010/11-

2014/15) objectives a higher resource requirement (a base case scenario of ETB 690.90 billion) has been projected compared to the previous year's plan period ETB 332.57 billion (GTP, 2010).And the education sector being part of the pro-poor sector is getting much attention from the government.

1.2 Statement of the problem

There is now a substantial literature exploring the relationship between public spending on education and outcomes such as enrolment rates. However, decades of intensive studies produce conflicting results. Most of these studies are based on cross-country data. Most studies revealed that the direct impact of public investment on measures of education attainment is weak (Noss, 1991; Mingat & Tan, 1992). Findings by Anand and Ravallion (1993) showed that there was no significant relationship between education outcomes and public education spending. Gupta et al. (1999) use ordinary least square and two stages least squares regression on a cross section of data from 50 developing and transitional economies. Results indicate that greater public spending on primary and secondary education has a positive impact on widely used measures of education attainment such as gross enrolment in primary and secondary education, gross enrolment in secondary education and persistence through grade four. Regression estimates showed that performance in the education sector is also affected by other factors such as per capita income, urbanization, and adult illiteracy, access to safe sanitation and water, and immunization. This is consistent with the findings of Mingat and Tan (1992).

McMahon (1999) found a negative and significant relationship between per pupil expenditures and the primary gross enrolment rate, and a positive and significant impact of total education expenditure as a proportion of GNP. Findings from the McMahon study suggest that increasing primary education expenditures has a positive and significant impact on the primary gross enrolment rate. However, it is noteworthy that this study does include per capita income as an explanatory variable, and probably these resource variables might have been used as proxy for per capita income. Colclough and Lewin (1993) include per capita income variables and found that expenditure as a proportion of GNP is not significant when entered separately.

In a study of five African countries, Ogbu and Gallagher (1991), attempt to establish whether education outcome are affected by the composition of public education spending. They reported

that enrolment rates are significantly affected by the composition of public education spending. Using a panel data for African countries from 1990 to 2002, the aim of Anyanwu and Erhijakpor (2007) was to investigate the relationship between government expenditure on education and enrolment at the primary and secondary school levels, with illustrations from the SANE countries (South Africa, Algeria, Nigeria and Egypt). Results provide support for the proposition that government expenditure on education impacts positively on education attainment. The evidence is stronger for secondary education.

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On the Ethiopian context, to mention among others even if there are studies undertaken on relation between Human Capital and Economic Growth by Woubet Kifle (2006) and Impact of Government Sectorial spending on Economic Growth a particular focus on Human capital and Agriculture Sectors (the case of Ethiopia) by Wendessen Tsadiku (2012) there are no studies undertaken specifically addressing the proposed study. So this proposed research is an attempt to fill the gap.

1.3 **Purpose and Significance of the study**

As mentioned in the GTP, in the plan period (2010/11- 2014/15) allocation of development finance will aim to support the overriding objectives of poverty eradication. Based on these objectives a larger share of total government spending planned to be allocated for development of pro-poor and development enhancing sectors education, health, agriculture, infrastructure and related sectors. Given the shortage of financial resources on one hand and numerous competing spending needs on the other hand; investigating the growth effects of spending on these sectors and to identify the short and long run effect of higher total government expenditure on growth is vital.

By utilizing some economic theory and empirical analysis the study will evaluate and analyzes the relationship between government spending and educational outcome in Ethiopia. I do hope that the study would provide guidance for policy makers. The study will also serve to back up policy decisions on allocating government investment and spending, enhancing the efficiency of the resource use.

1.4 **Objective and Research question of the study**

The main objective of the study is to investigate the effects of public educational spending on educational outcome (i.e. in terms of educational attainment as measured by adult literacy rate) in Ethiopia.

On the basis of the premises that findings of this research complement and/or supplement outputs of previous researches, particularly on the relationship between government spending and educational outcome, the project is meant to respond to the “Does public educational spending affects educational outcome significantly or insignificantly?”

1.5 Research Hypothesis

In the Ethiopian case; according to the GTP and previous policy documents, resource allocations have been guided by the government's pro-poor growth policy where by the lion's share of available resources are allocated to priority infrastructure and services that enhance pro-poor economic growth and social development. It is widely thought that the policy encourages and support investment, and hence promotes rapid and broad based economic growth. Thus based on a priori economic theory, the following tentative hypothesis is developed:

Government expenditure on education will have a positive effect on educational at least in the long run.

1.6 **Scope and Limitations of the study**

This study will look at the government spending effects of only the education sector Ethiopia. It should be known that this study has its own shortcoming such as inadequate availability of reference materials and the dearth of data itself is a limiting factor (such as quarterly data over the same time period and control variables). Also the major limitation is the time constraint.

1.7 Organization of the paper

The remaining part of the paper is organized in four chapters. Chapter two is devoted to a brief review of relevant theoretical and empirical literature. Chapter three provides description and analysis of government spending on educational sector and educational outcome in Ethiopia under different regimes. In this chapter other fiscal elements that govern the relationship between public expenditure and educational growth are also examined. This is followed by a chapter for econometric analysis of the impact of government spending on educational outcome growth in which Ordinary Least Square estimation Procedure is employed. Then chapter five is devoted for interpretation of results derived from econometric result. Finally, conclusions and policy implications are presented in chapter six.

Chapter Two

2.1 Background and Literature Review

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A number of studies have examined the effect of macroeconomic crises on schooling outcomes. However, the link between crisis and schooling attainment seems to be ambiguous. Kisswani (2008) explores the impact of the Great Depression on education, on race (whites and blacks) and gender (males and females), during the period 1930-1940. The results (using individual census data from 1960) show some evidence that the Great Depression affected the education of white individuals born between 1911 and 1915.

Schady (2002) analyzed the impact of macroeconomic crisis on education in Peru between 1988 and 1992. The author reported that crisis has no effect on attendance rates but noticed a significant decline in the fraction of children who are both employed and attend school. Using cross-country regressions, Flug, Spilimbergo and Wachtenstein (1998) report that macroeconomic shocks have negative effects on enrollment. Behrman, Duryea, and Szekely (2000) suggest that the poor macroeconomic prospects of the 1980's in Latin America set back the rate of growth of schooling attainment in the region. In Indonesia, Thomas et al. (2004) observed that the country's deep financial crisis of 1998 seemed to have had little effect on schooling outcomes. This is consistent with the works of Cameron (2000) and Pradhan and Sparrow (2000) which report some impact of the crisis on enrollment, although the effects tend to be small.

The message from the above review is clear. The empirical evidence on the interaction between public educational expenditure, macroeconomic shocks and schooling outcomes is inconclusive. Generally, it is difficult to draw policy conclusions from cross-country data; much however, depends upon the country specific situation. This is the motivation for this paper.

The relationship between government expenditure, education and economic growth is also empirically outlined in a number of empirical studies. These studies support the growth linkages emanating from government expenditure in promoting growth. But within the developing countries and less developed countries (LDCs) in the world, the relevance of government expenditure in promoting growth has been the subject of debate for some time, particularly, in sub-Saharan Africa (Landau, 1986).

The major contribution to the issue on the relationship between education and economic growth was first made by Adam Smith, followed by Marshall, Schultz, Bowman and others (Tilak, 2005). Over the time, economic offers a variety of theories and model for relating education and economic growth (Lucas, 1988; Romer, 1990; Rebelo, 1991; Francis and Iyare, 2006). These are mostly deal with endogenously generated economic growth and stresses on the role of human capital accumulation in economic growth (Chakraborty, 2005). Most of them viewed that human capital is an alternative engine of economic growth to technological change. However, to boost human capital, the country has to invest more on education. According to Dahlin (2005), an investment in education is very beneficial in the society, both at the micro level as well as macro level and affects the system both directly and indirectly.

The available literature reflects that over the last 40 years output has increased about 3.5% a year. Growth in the labor productivity, a major driver of increasing wages and standard of living, has raised about 2.4% per year. The contribution of education to labor productivity growth is estimated in different studies to be between 13% and 30% of the total increase. Whatever the contribution of education to growth in the past, investments in human capital (education) may rise in importance relative to investments in other forms of capital as we transition to a post-industrial, knowledge-based economy (Dickens et al., 2006). Human capital theory emphasizes how education increases the productivity and efficiency of workers by increasing the level of cognitive stock of economically productive human capability which is a

product of innate abilities and investment in human beings. The provision of formal education is seen as a productive investment in human capital, which the proponents of the theory have considered as equally or even more equally worthwhile than that of physical capital.

Most theoretical and empirical studies on education and economic growth, both cross-section and time series, under distinct theoretical approaches, have repeatedly proved the existence of a significant association (and causality) between the economic performance of national economies and the level of education of their population. Long-run historical approaches concerning economic backwardness have underlined how a poorly educated, trained and culturally unaware population have been a decisive factor of persistent low productivity levels, low labour mobility, slow structural changes, slow diffusion of innovation, preventing sustained economic growth to set in. Moreover, if an economy, though succeeding, at last, to achieve modern economic growth is not able to overcome rapidly the human capital accumulation gap, some loss of opportunities for the expected catch up growth will be met and growth rates will be comparatively small (Nunes, 2001).

Recent case studies on European economies, rooted in the systemic regulation theory, have analyzed the evolution of aggregate series for government expenditure on education and its relation to the cyclical economic growth in the long run, following Fontvieilles seminal work on the French case (Fontvieille, 1990). Some development economists of the structuralist school posit that some categories of government expenditure are necessary to overcome constraints to economic growth theory Chenery and Syrquin, 1975; Turnovsky and Fisher, 1995; Turnovsky, 1998).The findings of Landau (1983) showed that the share of government consumption in GDP reduced economic growth. These findings were consistent with the pro-market view that the growth in government constrains overall economic growth. These findings were robust to varying sample periods, weighting by population and mix of both developed and developing countries (104 countries).

The conclusions were germane to growth in per capita output and do not necessarily speak to increases in economic welfare. Economic growth was also found to be positively related to total investment in education. In a later study, Landau (1986) extends the analysis to include human and physical capital, political, international conditions as well as three year lag

government expenditure in GDP. Also, Landau (1986) asserts that the contribution of education to economic growth and development occurs through its ability to increase the productivity of an existing labor force in various ways. On the roles of total factor productivity (TFP) growth and factor accumulation, in the determinants of GDP growth and the links between education and growth. According to Chemingui (2005) an increase in government expenditure devoted to these three priority areas (agriculture, education, and health) will affect the economy through increase in sectoral or economy-wide TFP. In fact, good education and health care help the poor lead more productive lives, increasing the return on investment. As growth is mostly driven by labour and TFP including human capital, any investment intended to improve the productivity of labour and total factor productivity will improve the sustainability of economic growth in a given country, and through a more productive labour force, help to stimulate development of the private sector.

According to many recent studies, such as those conducted by Klenow and Rodriguez - Clare (1997) and Easterly and Levine (2001), cross-country differences in income levels and growth rates are mostly due to differences in productivity. Government expenditure on Research and Development (R&D), infrastructure, and human capital is believed to be one of the determinants of economic growth, mainly through improving total factor productivity. Thus, an indirect way for assessing the effect of public spending on economic growth is to use TFP as a dependent variable and to regress other variables on it mainly those that related to public spending, assuming that targeted public spending will improve TFP and through improvement of TFP, the economy will grow faster.

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 laboring 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.I07 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 economy growth by measuring the increments on 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 productivity of farmers and workers Jamison and Lau 1982) of education to the (such as Haddad 1988,

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).

2.2 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 factors 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;
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 in natural monopoly. This may give an opportunity for the private provider to ask for higher prices, indicating public provision as one possibility. In addition an economy 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 influences 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 a stage 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).

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Chapter Three

Trends of Government spending

The trend of Government spending has changed dramatically within the last ten years. Thus, it is important to monitor trends in the levels and composition of government expenditures, and to assess the causes of the change over time. It is even more important to analyze the relative contribution of sectors expenditures to GDP and poverty reduction, as this will provide important information for more efficient targeting of these limited financial resources.

3.1 Growth and Composition of government spending

At the most aggregated levels, the composition of government expenditures has an impact on the output of the public sector in particular and in the economy wide in general. The classification of functions or socio-economic objectives; that general government units aim to achieve through various kinds of outlays, such as economic, social, general and other services. The composition of expenditures reveals the priority setting of an economy, for instance, when a large share of spending is devoted to future oriented areas such as education and R &D. Considering the ratio of total government spending to GDP which measures the amount of government spending relative to the size of the economy is more important.

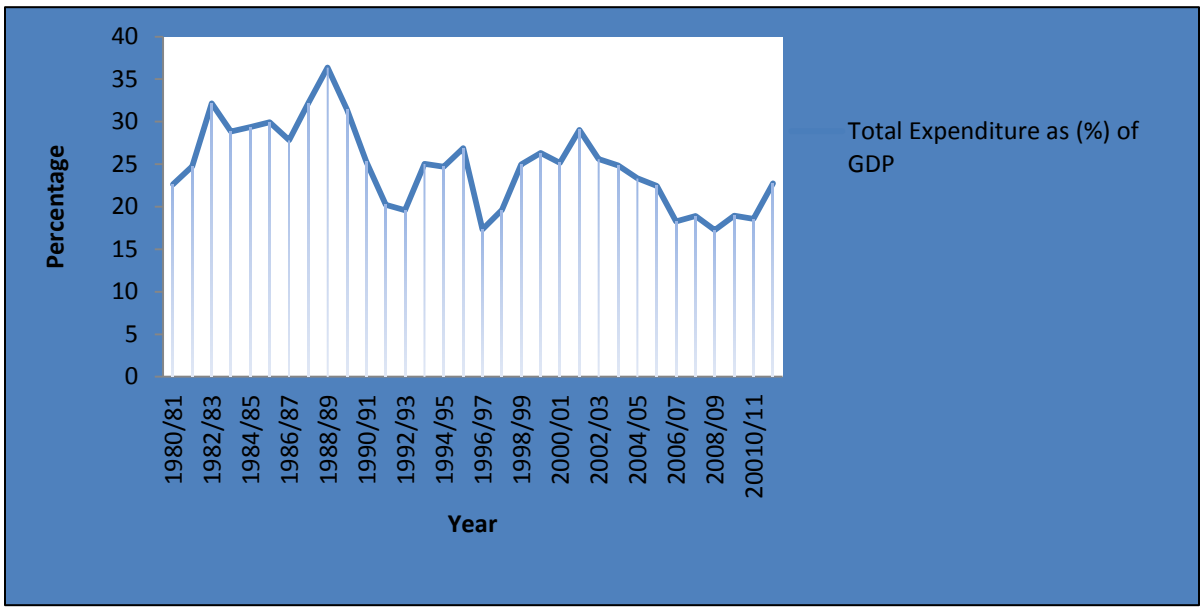

Figure3.1 Level of total government spending as percentage of GDP

In the Derg regime government spending show a tremendous fluctuation ranging from a high of 33.51% in 1988/89 and a low of 18.01% of GDP in 1974/75. On average, government spending was 25.22% of GDP over the seventeen years of the regime. The share of government spending on average reached 28.21% of GDP between the year's 2000/01-2004/05 and the share decreased by about 22% for the last six years average (19.1%).

In broader terms, government expenditure has two components, recurrent and capital expenditure. There is no definite line dividing the two. However, capital expenditure may loosely to be taken to mean government expenditure for economic and social development expressed in financial terms. On the other hand, recurrent expenditure (RE) is related to financial out lays by the government to run state administration of government defense and security and provision of social and economic services. Unlike capital expenditures (CE), recurrent expenditures are mainly for government consumption.

3.2 Public Expenditure on Pro-Poor Sectors

There is consensus that the extent to which growth will be pro-poor depends on the amount of Human capital the poor possess, usually referring to education, skills training and good health, which is essential for the poor to take advantage of economic opportunities. With regard to the composition of pro-poor sectors, the available data of government spending from 1980/81-2011/12 is analyzed and interpreted to produce a viable track of record of shares of government spending for pro-poor sectors. Presently the Ethiopian government had agreed with donors on the following sectors such as expenditure on Education, Health, Agriculture and natural resource development and expenditure on road and urban development. Whereas spending on micro and small scale entries agency, women, youth and children to some extent they do have some component of pro poor nature but it is difficult to sort out the pro poor part. During the period under study it can be shown that the share of pro-poor spending has been spending increasing especially during the last five years. Generally it can be shown here that the share of pro-poor spending has been increasing over the last five years. The following graph depicts this feature.

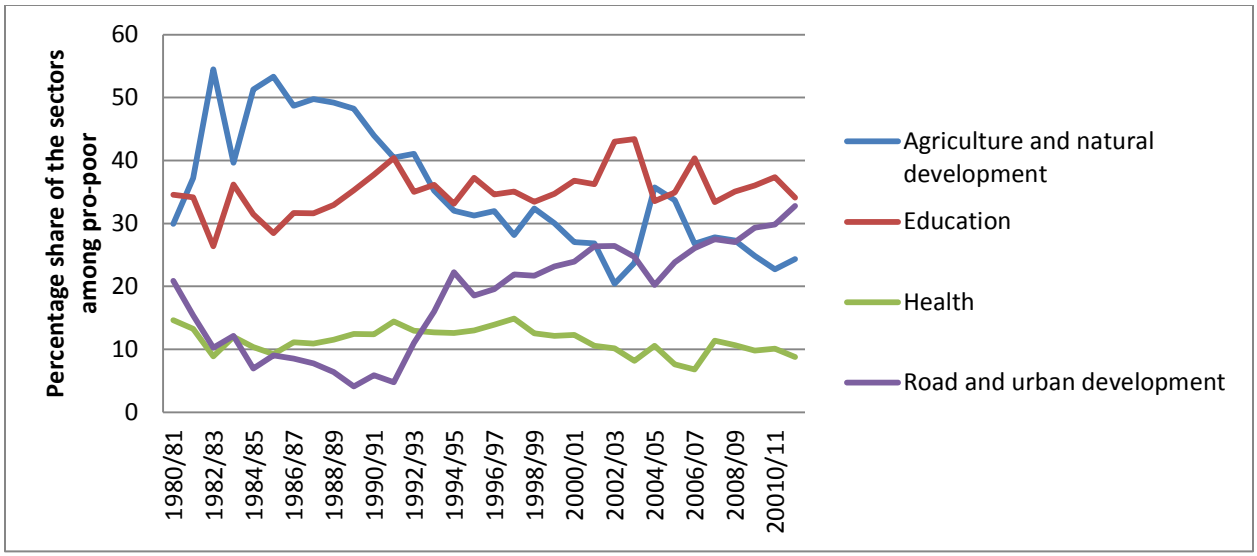

Figure 3.2 Classification of total expenditure (pro-poor and non-pro-poor)

During the period under study as it is shown on the above graph, after the year 2004/05 the share of total pro-poor spending had surpassed the rest non pro- poor spending. Among the sectors of pro-poor spending expenditure on education has been increasing in the past decade. The following figure depicts what the composition of pro-poor sectors look like during the period under study.

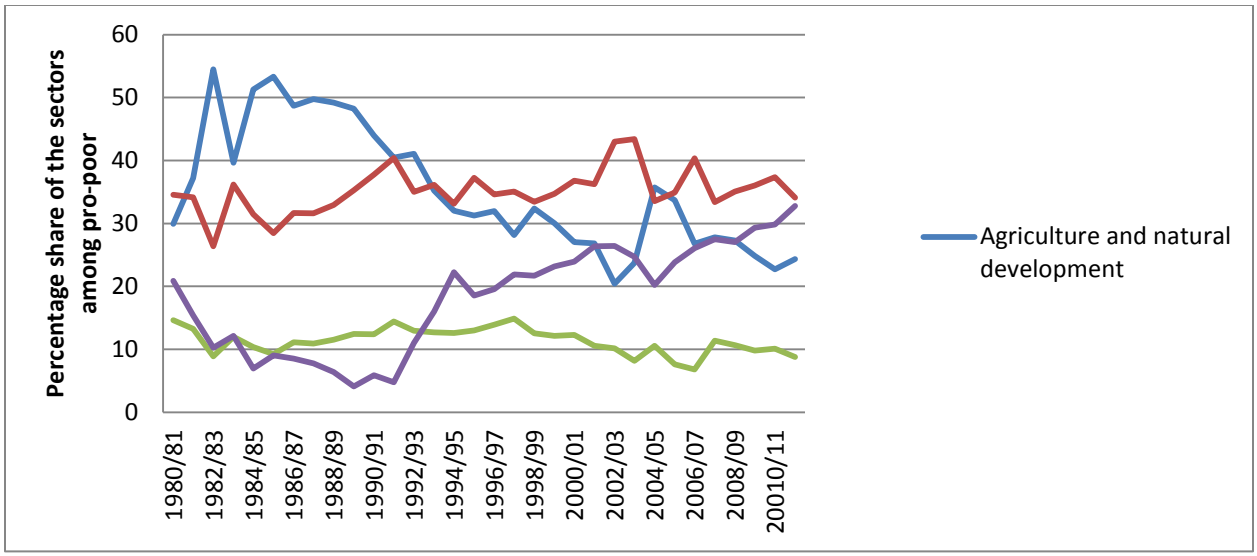

Figure 3.3 Composition and trend of the pro-poor sectors

Since the attention of the project is on education sector, I will be focusing only on the education sector among the pro-poor sector. As it is shown on the above graph, among the pro-poor sectors education has been at the top especially for the past decade. According to the data the minimum share of the sector was 2.3% of GDP in 1999/00 while the highest was 5.4% in 2011/12.During the period under study the education sector share has reached 24.9% and 43.4% of the total government expenditure and Pro-poor spending respectively. Since education is major instrument of abolishing poverty and poverty is one aspect of Millennium Development Goal (MDG) that is aimed to be achieved in the year 2015, the current government has been giving due attention in recent years to education through its budget assistance(government expenditure). The following figure depicts the share of education as percentage of GDP.

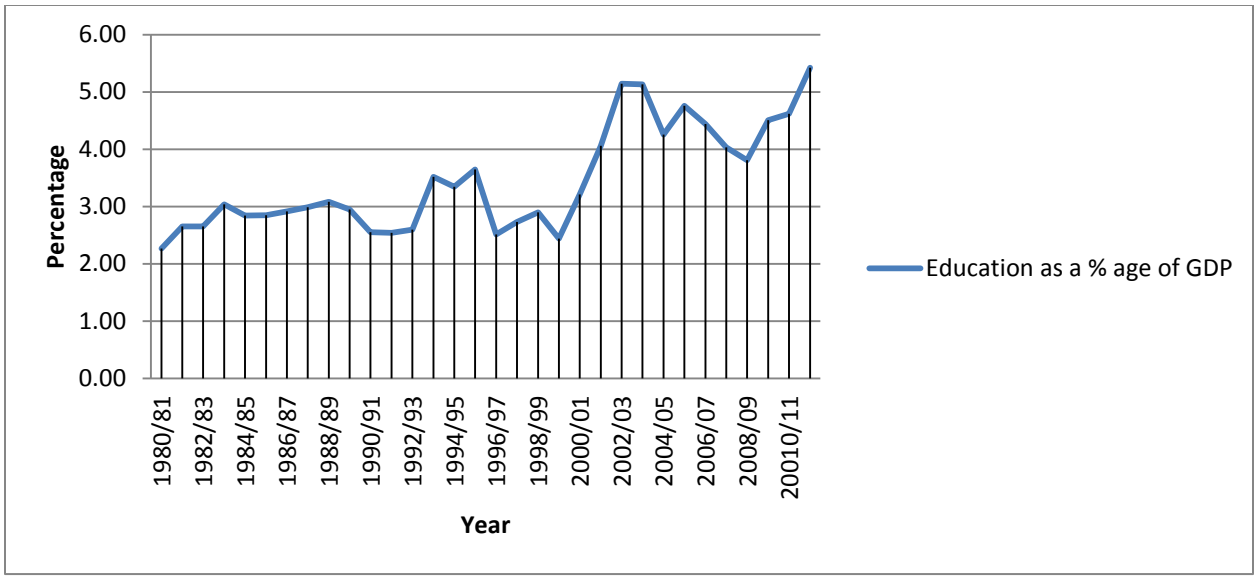

Figure 3.4 Education expenditure as percentage of GDP

During the period under study as it is shown on the above graph, the educational expenditure as percentage of GDP registered its minimum of 2.3 % in the year 1980/81 and registered its maximum of 5.4 % in the year 2011/12.

Chapter Four

Methodology and Econometric Modeling

To empirically investigate the relationship between government educational spending and educational outcome in Ethiopia, econometric regression approaches is developed and the model developed here to empirically examine the relationship between government spending and schooling outcome , which is a variant of Co integration and Error Correction Model applied by Gupta et al (1999 and 2002) a general model showing the relationship between public education spending and schooling/educational outcome is developed. This model is a modified education production function which is complemented with a series of control variables introduced into the model.

4.1.1 Model Specification

Generally, an education production function describes the nexus between combinations of schooling inputs, economic and non-economic inputs and the resulting output. The production process depends, in part, on the education subsystem and its resource input but also on the noneconomic, social, economic and physical conditions. The general model used by Gupta et al. (1999) is an education production function given as:

Where:

L_{it}: educational attainment, as measured by adult literacy rate of country i at time t

PEX_{it}: Public expenditure on education as a percent of GDP of country i at time t.

MAU: Macroeconomic uncertainty (derived by percentage change in annual inflation rate, where inflation rate is based on the consumer price index)

The public expenditure is expected to have a positive effect on educational outcomes. Gupta et al. (1999) underscored the fact that as household incomes rise, the relative cost of enrolling children into school is reduced, suggesting that increasing income would be associated with rising enrolments. In individual economic terms, literacy also has payoffs and it is a worthwhile investment. This, by implication, will improve literacy rate in the long run. In addition, at higher income levels, the demand for education would increase, assuming education is a normal good. The choice of adult literacy rate as a proxy for educational outcome is also supported by Gupta et al. (1999). Schady (2002) has shown that macroeconomic crisis affect education outcomes. The total effect of a crisis on educational attainment depends on the relative magnitude of the changes in the marginal costs and benefits from education. It is instructive to note that many variables have been used in literature to gauge macroeconomic instability. These include inflation rates, variability of real exchange rates, real interest rates, fiscal deficits terms of trade and external debt (Olaniyan, 2000). Macroeconomic uncertainty, derived by percentage change in annual inflation rate is employed in this study, where inflation rate is based on the consumer price index. This variable has been used as proxy for macroeconomic uncertainty due to non-availability of appropriate data. The inclusion of the variables in the model is supported by earlier literature review.

Assuming a linear relationship between the dependent and the independent variables, the estimated equation (2) can be written as follows:

Where Log LIT_{it} = log of educational attainment, as measured by adult literacy rate

Log PEX_t = log of Public expenditure on education as a percent of GDP.

Log CPI t= log of Macroeconomic uncertainty (derived by percentage change in annual inflation rate, where inflation rate is based on the consumer price index). From the discussion in the previous section, the a priori expectations are: $\alpha_{2>0,}$ $\alpha_{3<0,}$

The scope of the study covers the period between 1980/81 and 2011/12. These are the years for which all the data are available. All the time series data employed were sourced from the Ministry of Finance and Economic Development, United Nations Educational, Scientific and Cultural Organization (UNESCO) institute for statistics (2012) and augmented by relevant publications of the World Bank (WB) Meta data for Ethiopia May 2013.

4.2 Estimation techniques

Most time series variables are non-stationary. The first or second differenced terms of most variables will usually be stationary (Adam, 1993; Perman, 1989). Therefore, the study, first, examines stochastic characteristics of each time series by testing their stationarity using Augmented Dickey Fuller (ADF) tests. Furthermore, co-integration test will be carried out.

According to Komolafe (1996), two variables are said to be co-integrated if there exist a long run relationship between the dependent and independent variable. The co-integration arises out of the need to integrate short run dynamics with long run equilibrium between economic variables. The co-integration test is done by employing Johansen (1988) framework by comparing the likelihood ratios against their critical values at five percent. If the various test performed support the fact that co-integrating relationships exist between the dependent and any (or a combination) of its explanatory variables, then there will be the need to estimate a parsimonious error correction model (ECM). The ECM is then employed to analyze the response of educational/schooling outcomes to a stimulus in the explanatory variables in a dynamic setting. The ECM is accepted when the residuals from the linear combination of non-stationarity I (I) series are themselves stationary. The acceptance of ECM implies that the model is best specified in the first difference of its variables. Consequently, the application of co-integration paradigm will guard against the loss of information from long-term relationships in the first differences (Azeez & Falusi, 2003).

CHAPTER FIVE

DATA ANALYSIS AND INTERPRETATION OF RESULTS

5.1 Introduction

This section relied on an econometric analysis of the relationship between public expenditure on education and educational estimates which is proxied and estimated as spending on education and literacy rate respectively in Ethiopia. To achieve the major objective of the paper, the existence of a statistical relationship among the variables is carried out in two steps. Initially the order of integration of the variables is investigated using standard tests for the presence of unit roots and the second step involves the static or levels' regression to find the long-run values (coefficients) for the variables and interpret the results.

5.1.1 Unit Root Test

Empirical work based on time series data often assumes that the series are stationary in their levels. Actually we often obtain very high value of R^2 in excess of 0.9 when we regress one time series variable on another time series variable even though there is no meaningful relationship between the two variables. This situation gives us a spurious regression. It is, therefore imperative to find out if the relationship between economic variables is spurious or nonsensical. To determine the non-stationary property of these time series variables, both in the levels and in the first difference, the relevant Augmented Dickey Fuller (ADF) tests have been employed with and without time trend.

A time series variables Y_t is said to be stationary if it's mean, variance and auto
Covariance are independent of time and

$E(Y_t) =$

When one or more of the above conditions fail, the process Yt is said to be non-stationary.

A time series Y t which is itself non-stationary but becomes stationary after first differencing.

i.e., $Y_t = Y_t - y_{t-1} =$

Since differencing will remove the trend effect from the data the inclusion of time trend in the test is not important (see the next table).

Table 3 ADF test in first difference

Variable	ADF statistics	Critical values	Order of Integration
DlogLit	-5.708	1%=-3.716	Stationary at first difference
DlogPex	-5.700	5%=-2.986	Stationary at first difference
DlogCpi	-4.798	10%=-2.624	Stationary at first difference

So as it is shown on the above table all of the variables involved are stationary at their first difference of the growth rates.

5.1.2 Co-integration and error-correction

In order to examine the extent to which schooling outcome is related to government sectorial spending, the theory of co-integration and error correction model (ECM) is applied, with the help of this procedure, it is possible to examine the short run and long run relationship between the variables. The Johansen co-integration procedures are used to test the presence of co-integration between the variables.

The presence of co-integration implies that even if the dependent and independent variables are non-stationary, the deviations (i.e., the residuals from the estimation of the equation) are stationary which implies the existence of long-run tendency towards equilibrium.

Table 4 Co-integration test using Johansen tests

vecrank literacyrate_log Pubexp_log cpi_log, trend(rconstant)					
Johansen tests for cointegration					
Trend: rconstant				Number of obs=30	
Sample: 1983 - 2012				Lags=2	
maximum Rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	9	97.3405	.	40.4239	34.91
1	15	111.04143	0.59884	13.0221*	19.96
2	19	115.20365	0.24231	4.6976	9.42
3	21	117.55246	0.14494		

From the Johansen co integration test result we can see that the trace statistic at r = 0 of 40.4239 exceeds its critical value of 34.91 and we reject the null hypothesis of no co-integrating equations. In contrast, because the trace statistic at r = 1 of 13.0221 is less than its critical value of 19.96, we cannot reject the null hypothesis that there are one or fewer co integrating equations. Therefore the variables are co-integrated and the number of co integrating equations between these three variables is one.

Since the variables are co integrated and estimation by differencing obscures the long run information I used vector error correction model (VECM) which is concerned for both long run relationships and short run dynamics.

Based on this result the vector error correction model (VECM) can be given by**:**

$$\Delta x_t = \Gamma_1 \Delta x_{t-1} + ... + \Gamma_{k-1} \Delta x_{t-k} + \Pi x_{t-1} + u_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

Where $\Gamma i = -(I - A1 - ... - Ai)$ defines the dynamic (or short-run) impacts and $\Pi = -(I - \Pi 1 - ... - \Pi k)$ expresses the equilibrium (or long-run) relationships in the system. Π decompose into two $(n \times r)$ matrices such that:

$\Pi = \alpha\beta$

Where r is the rank of Π.

Π will generally be a null matrix with a corresponding rank of zero.
α is an (n x r) dimension measuring the speed of adjustment towards the steady state path
β = matrix of long-run coefficients (Johansen, 2010)

5.1.2.1 Estimation Result of Vector Error Correction Model (VECM)

The interpretation of VECM estimation result can be done by short-term and long-term interpretation distinction. In the short-run, the interpretation focuses on analysis of variables derived on logD_literacyrate, logliteracyrateDL$_{t-1}$, logPubexpLD.$_{t-1}$, and logcpi LD.$_{t-1}$. Whereas in long term, variables are treated as operator lags backward that is log literacyrate, log Pubexp, and log cpi.

The short- run interpretation of the VECM is as follows:

- As the literacy rate of last year (logliteracyrateDL_{t-1}) increase by one percent, the literacy rate will decrease by 20.5 but the coefficient is insignificant;
- In the short run as the public expenditure (log$PubexpLD_{t-1}$) increases by one percent the literacy rate will increase by 2.1 but the coefficient is insignificant;
- As the consumer price index (log$cpi\ LD_{t-1}$) increases by one percent the literacy rate will decrease by 1.3 but the coefficient is insignificant;

The long- run dynamics result shows that:

- In the long run as the public educational expenditure (Log Pubexp) increases by one percent the literacy rate will increase by 201.9 percent and the coefficient is significant;
- The rise in consumer price index (Log Cpi) by one percent will decrease the literacy rate by 71.8 and the coefficient is almost significant;
- ECT (error correction term) is the speed of an adjustment (or equilibrium correction) coefficient that loads deviations. Thus the loading matrix links the long- and short-run components of the model and comprises coefficients which feedback information about long-run disequilibrium to the short run for correction; the magnitude of each 'error correction' coefficient determines the speed of adjustment towards the equilibrium state and the ECT is negative, implying the model is stable and the adjustment is towards the equilibrium. In our model it is negative that, it adjusts towards the equilibrium by 2.89 percent and it is stable.

Table 5 Vector error-correction output

Vector error-correction model					
Sample: 1983 - 2012		No. of obs=30			
		AIC=-6.402762			
Log likelihood = 111.0414		HQIC=-6.178634			
Det(Sigma_ml) = 1.22e-07		SBIC=-5.702163			
Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_literacyrate~g	4	.024908	0.6048	38.25513	0.0000
D_Pubexp_log	4	.127582	0.3340	12.54	0.0138
D_cpi_log	4	.140155	0.2543	8.52393	0.0742

	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
log D_literacyrate						
_ce1L1.	-.028918	.0065568	-4.41	0.000	-.0417691	-.0160668
log literacyrate LD.	-.2052748	.1932643	-1.06	0.288	-.5840659	.1735163
log Pubexp LD.	.0212093	.0338319	0.63	0.531	-.0451001	.0875187
log cpi LD.	-.0130179	.0372577	-0.35	0.727	-.0860417	.060006

Cointegrating	Equations

Equation	Parms	chi2	P>chi2
_ce1	2	8.26784	0.0160

Identification: beta is exactly identified						
Johansen normalization restriction imposed						
Beta	Coef.	Std. Err.	Z	P>z	[95% Conf. Interval]	
_ce1						
log literacyrate	1	.	.	.	.	.
log Pubexp	2.019937	.7510414	2.69	0.007	.5479226	3.491951
log cpi	-.7185611	.2907549	-2.47	0.013	-1.28843	-.1486919
_cons	-4.785445	.81829	-5.85	0.000	-6.389264	-3.181626

Chapter Six

Summary, Conclusion and Recommendation

6.1 Discussion and conclusion

In this paper I tried to investigate the impact of government spending on education in Ethiopia for the period between 1980/81 up to 2011/12. The objective of this paper is to investigate if there is a positive and strong correlation between level of public educational spending and educational outcome. In the short run, the relation between the public educational expenditure and the literacy rate is positive and even if the magnitude is only 2.1 percent it supports the theoretical literature. Since it takes time for the results of government educational expenditure transmitted through educational outcome as it is proxied by literacy rate. Also, in the short run, as theoretical literature supports the macroeconomic uncertainty as it is proxied in our case by using consumer price index, do have a negative relation with the outcome on education as it is proxied by literacy rate.

In the long run, public educational expenditure do have a positive effect on educational outcomes as it is proxied by literacy rate and the as the output depicts the coefficient is significant which is consistent with the theoretical literature. The other variable which is negatively affecting the educational outcome is the macroeconomic uncertainty which in our case proxied by consumer price index.

The econometric result confirmed that public educational spending impacts positively and strongly the schooling outcome. According to the econometric result based on the period under study, education sector being the largest sector receiving the lion share from government expenditure among the pro-poor sectors it is yielding the desired result. But among the explanatory variables included in the model, macroeconomic uncertainty as is it is proxied in our case using consumer price index is affecting educational outcome literacy rate negatively. So government should continue its effort with its prudent fiscal and monetary policy in order to contain the increment of the inflation rate, since in the long run it creates difficulties on educational outcome.

6.2 Recommendations

Based on the results obtained, the following recommendations could be made. The results obtained so far within education sector is very encouraging and education being part of pro-poor sector is getting the priority position, government should continue with its priority sectors of the pro-poor expenditure. According to the variables under considerations consumer price index that was taken to proxy the macroeconomic uncertainty is creating some sort of difficulties for the smooth functioning of educational outcome. So it calls for the government continued the current fiscal and monetary policy so as to contain the growth of inflation rate which is negatively affecting the educational outcome.

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Appendices

Appendix A: Time series values for the variables under consideration

Year	Lit rate	Pub expenditure (as % of GDP))	CPI
1981	19.90	2.26	9.50
1982	20.70	2.65	10.00
1983	21.50	2.65	10.00
1984	22.40	3.04	10.90
1985	23.20	2.84	13.20
1986	24.00	2.84	11.60
1987	25.00	2.91	11.10
1988	25.90	2.99	11.80
1989	26.80	3.08	13.10
1990	27.70	2.95	13.80
1991	28.60	2.55	20.00
1992	29.60	2.54	20.40
1993	30.60	2.60	21.30
1994	31.60	3.52	22.70
1995	30.20	3.34	26.10
1996	33.60	3.65	23.70
1997	34.70	2.51	23.10
1998	35.70	2.73	23.10
1999	36.90	2.90	25.50
2000	38.10	2.44	26.00

2001	39.10	3.21	23.20
2002	40.30	4.06	22.90
2003	41.50	5.14	27.00
2004	42.70	5.13	27.60
2005	41.00	4.25	30.60
2006	40.00	4.76	33.90
2007	41.38	4.44	39.00
2008	42.19	4.03	60.60
2009	42.99	3.80	62.20
2010	43.80	4.50	66.80
2011	44.61	4.62	92.20
2012	45.41	5.42	111.40

Source: world Bank Meta data and MOFED

Appendix B Output from Dickey- Fuller result for stationary

```
. dfuller literacyrate_log, lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        31

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)            -2.229           -3.709            -2.983           -2.623
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.1961

. dfuller Pubexp_log, lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        31

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)            -1.454           -3.709            -2.983           -2.623
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.5563

. dfuller cpi_log, lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        31

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)             1.433           -3.709            -2.983           -2.623
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.9973
```

```
. dfuller fdliteracyrate_log, lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        30

                                 ———— Interpolated Dickey-Fuller ————
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)             -5.708            -3.716            -2.986           -2.624
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.0000

. dfuller fdPubexp_log, lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        30

                                 ———— Interpolated Dickey-Fuller ————
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)             -5.700            -3.716            -2.986           -2.624
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.0000

. dfuller fdcpi_log, lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        30

                                 ———— Interpolated Dickey-Fuller ————
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)             -4.798            -3.716            -2.986           -2.624
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.0001
```

Appendix C Co-integration and error correction output

```
. vecrank literacyrate_log  Pubexp_log cpi_log, trend(rconstant)

                       Johansen tests for cointegration
Trend: rconstant                                         Number of obs =      30
Sample:  1983 - 2012                                              Lags =       2
-------------------------------------------------------------------------------
                                                           5%
maximum                                      trace    critical
  rank    parms       LL       eigenvalue  statistic    value
    0      9       97.3405          .       40.4239    34.91
    1      15     111.04143     0.59884     13.0221*   19.96
    2      19     115.20365     0.24231      4.6976     9.42
    3      21     117.55246     0.14494
-------------------------------------------------------------------------------

. vec literacyrate_log  Pubexp_log cpi_log, trend(rconstant)

Vector error-correction model

Sample:  1983 - 2012                                   No. of obs      =        30
                                                       AIC             = -6.402762
Log likelihood =  111.0414                             HQIC            = -6.178634
Det(Sigma_ml)  =  1.22e-07                             SBIC            = -5.702163

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_literacyrate~g      4     .024908   0.6048   38.25513   0.0000
D_Pubexp_log          4     .127582   0.3340      12.54   0.0138
D_cpi_log             4     .140155   0.2543    8.52393   0.0742
----------------------------------------------------------------

------------------------------------------------------------------------------
                   |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------------+----------------------------------------------------------
D_literacyrate_log |
               _ce1 |
                L1. |   -.028918   .0065568    -4.41   0.000    -.0417691   -.0160668
                    |
   literacyrate_log |
                LD. |  -.2052748   .1932643    -1.06   0.288    -.5840659    .1735163
                    |
         Pubexp_log |
                LD. |   .0212093   .0338319     0.63   0.531    -.0451001    .0875187
                    |
            cpi_log |
                LD. |  -.0130179   .0372577    -0.35   0.727    -.0860417     .060006
```

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	2	8.26784	0.0160

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
literacyrate_log	1	.	.	.	.	.
Pubexp_log	2.019937	.7510414	2.69	0.007	.5479226	3.491951
cpi_log	-.7185611	.2907549	-2.47	0.013	-1.28843	-.1486919
_cons	-4.785445	.81829	-5.85	0.000	-6.389264	-3.181626

. veclmar

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	6.6678	9	0.67166
2	6.4663	9	0.69249

H0: no autocorrelation at lag order

. vecnorm, jbera skewness kurtosis

Jarque-Bera test

Equation	chi2	df	Prob > chi2
D_literacyrate_log	15.166	2	0.00051
D_Pubexp_log	0.718	2	0.69834
D_cpi_log	14.424	2	0.00074
ALL	30.308	6	0.00003

Skewness test

Equation	Skewness	chi2	df	Prob > chi2
D_literacyrate_log	-.69749	2.432	1	0.11885
D_Pubexp_log	.24712	0.305	1	0.58056
D_cpi_log	1.426	10.167	1	0.00143
ALL		12.905	3	0.00485

Kurtosis test

Equation	Kurtosis	chi2	df	Prob > chi2
D_literacyrate_log	6.1917	12.733	1	0.00036
D_Pubexp_log	2.4254	0.413	1	0.52057
D_cpi_log	4.8453	4.256	1	0.03910
ALL		17.403	3	0.00058

. vecstable, graph

Eigenvalue stability condition

Eigenvalue	Modulus
1	1
1	1