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HUMAN CAPITAL AND ECONOMIC GROWTH IN ETHIOPIA

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Abstract

This study investigates the impact of human capital on economic growth in Ethiopia over the period 1971-2005 using an error-correction methodology. Contrary to microeconomic studies, the macroeconomic evidence from this study shows that the human capital variable in the form of schooling has an insignificant impact on the level of output. Various analyses are provided in this respect. The deteriorating quality of education in the wake of significant expansion in the sector is an important element that puts into question the basic framework that education provides students with growth enhancing skills. Schooling might not actually be creating the required skills or raising worker's productivity. Besides, in the wake of a stagnant demand for labor, a rise in the supply of educated labor could only lead to a decline in the returns.

The study also questions the impacts of the economic policy directions and associated institutional settings, which could have been perverting the contribution to economic growth that would have been made from an expansion in educational investment. The key economic policy implication that comes out of this result is that the provision of schooling should be geared towards achieving broader socio economic goals with special emphasis on quality. Simply providing more schooling may yield little or nothing in the way of economic growth in the absence of other elements such as the appropriate market and governmental institutions and suitable policy environment in the labor market and other sectors of the economy to support a functioning modern economy. Schooling by itself is not a sufficient engine of growth.

CHAPTER ONE

INTRODUCTION

1.1 Statement of the Problem

Human resource development is one of the necessary conditions for all kinds of growth-social, political, cultural, or economic (Harbison and Myers, 1964). The concept that investment in human capital promotes economic growth actually dates back to the time of Adam Smith (1776) and the early classical economists who emphasized the importance of investing in human capital. The close connection between economic performance and human capital has led to the formulation of and popularization of human capital theory in expositions on economic growth.

Human capital theory as well as endogenous growth theory suggests that there are substantial economic effects of education on the micro and macro economic level.

Empirical studies including Schultz (1960, 1963), Denison (1962, 1974), Becker (1961), Harbison and Myers (1964), Tilak (1989), Nadiri (1972), Barro(1991), Mankiw, Romer and Weil(1992), Benhabib and Spiegel (1994) and many others have shown that increased education of the labor force appears to explain a substantial part of the growth of output in both developed and developing countries.

Until recently, the experience of the East Asian countries confirmed the importance of substantial investment in education and human capital formation. This was most apparent in the fast-growing Asian economies (Korea, Singapore, Hong Kong, Taiwan and China). The development of skilled labor force makes an important contribution to development. An educated, trained and more productive workforce contributes to a greater economic growth. It may therefore be argued

that investment in education pays off. Investment in human capital (e.g., higher expenditures on education and training) may play a more persistent role in the growth process.

However a study by Lant Pritchet (1996) showed that (especially for developing countries) the growth of educational capital per worker has had a mildly negative or no impact on the growth of these economies. He forwarded three reasons for this contradiction:

1st Due to its quality, schooling may not actually raise cognitive schools or productivity.

2nd Expanding the supply of education in the presence of stagnant demand for educated labor causes the economic return to education to fall rapidly.

3rd Due to the institutional set up in these countries, the improved cognitive skills acquired through education engage in privately remunerative but socially dysfunctional or wasteful activities so that aggregate output stagnates or even falls.

The recommendation in perspective was not actually "don't educate" rather "reform so that investments (past and present) in education will pay off". So studies that assess the contribution of human capital to economic growth have important implications for policy formulations. Institutions whether in the labor market or not influence the allocation of resources, whether human capital is employed in growth-enhancing activities or elsewhere. The education system is central to the development of skills, a fact long recognized by both policy makers and educators. And this has huge ramifications for economic growth and development. That is why it would be critically essential to look in to the policy perspective with respect to the education system in the effort to study the contribution of human capital to economic growth.

The whole literature on education and development has been ultimately concerned with the specific problem of measuring the effect of enhanced educational inputs upon economic outputs.

But this must be seen with a broader evolutionary and conceptual perspective, which attempts to examine the problematic relationship between education and development in the widest sense.

While the specifically economic literature concerns itself with the measurable individual and social returns to educational investment and uses this as an indicator of the contribution of education to economic development, the evolutionary perspective emphasizes the essentially interactive relationships between the economic and educational dimensions.

The formulation of educational policies is central to the provision of education to economic growth and development. It has been observed that politics profoundly influenced policy formulation as well as implementation under the various governments, which have ruled Ethiopia since the commencement of modern education.

There seemed to be no significant attempt at matching schooling (education) with manpower needs for economic growth and development except some efforts by the Imperial government (manpower planning department) and the socialist government (the central planning agency). Serious imbalances are observed between the skills generated by education and the actual needs of the nation. In some cases the number of graduates surpasses the absorptive capacity of labor markets while in others, critical shortage of skills continue to create difficulties. Part of the reason may be the fact that the education system has produced graduates for the wrong kind of jobs. In some cases, despite the large number of unemployed graduates, an “appropriately trained” labor force continued to be imported from abroad for certain sectors of the economy in the wake of brain drain. This disjuncture between educational attainment aspirations and labor market opportunities calls into question the contribution of education to this aspect of economic development.

Most educators and economists familiar with such matters are now in general accord that economic considerations should be given serious weight in formulating educational development plans. So the planners and the statesmen must be convinced about the need for the integration between the economy and education.

Issues that need to be considered include employment conditions of the educated, the role of education in the development process, the economic and political environment in which the educational planners (plans) are working and issues of utilization of educated labor force.

The interest is twofold. First, for the country itself there are very few studies that thoroughly analyze past human capital growth patterns with respect to their contribution to economic growth. And there are no studies that empirically appraise the direct impact of education on growth. In general, evidence on human capital and growth comes almost entirely from cross-country analysis. Single-country studies, however, may be more illuminating since they overcome the heterogeneity problem and take into account the unique historical information for each country.

Second, almost all the cross section studies have just been measuring the impact of human capital to economic growth and development. But this must be analyzed from a broader policy and evolutionary perspective. The longer-term problem is how to expand the level of education for growing populations in ways that contribute efficiently to the prospects for economic growth and development. And this goes with the problem of having an educational policy that is geared towards economic goals. So another purpose of this study in this respect is to fill the gap in terms of making a full conceptual analysis rather than just assessing the impact of human capital on economic outputs. The educational policies will be reviewed and evaluated in light of the ongoing socio economic transformations and developments. Meanwhile the policy review will

contribute to the debate on education policies and their role in human resource development and so in economic growth and development.

Ethiopia confronts recent low rates of economic growth, and as the social demand for education increases, policymakers must contend with the efficiency with which education is produced. Mulugeta Wodajo's remark in 1961 still echoes. "With her three thousand years of history, although Ethiopia is one of the oldest nations in the world, she is also one of the youngest. Nowhere else is this paradox more evident than perhaps in the field of education."

The study focuses on human capital as a determinant of economic growth. Even though human capital includes education, training, health, social capital, and more, the focus of the present study is on education. As Becker (1961) puts it, Education and training are the most important investments in human capital

1.2 Objective of the study

The general objective of the study is trying to examine the contribution of human capital to economic growth in Ethiopia over the past 30 years.

The specific objectives of the study are:

- To review and critically evaluate the human resource development policies under the various regimes with specific reference to education with respect to the contribution to economic growth.
- To assess (measure) the contribution of human capital to economic growth in Ethiopia using a time series framework.
- To derive policy implications from the empirical analysis for the future.

1.3 Significance of the Study

The intuition that expanding education is instrumental for a higher economic growth seems undoubted. However there has not been clear empirical evidence with respect to the contribution of education to economic growth. This paper tries to dwell on assessing the specific situation for Ethiopia.

Besides, the theoretical argument is usually based on empirical evidences which study the direct and indirect impacts of education on economic growth. But this must be seen from a broader perspective which analyzes the interactive relationship between human capital and economic growth. One of the basic directions in this respect is analyzing the policy framework in which education is provided. This paper tries to look in to this side so filling the gap which has been lacking in almost all empirical studies that analyze the contribution of human capital to economic growth.

1.4 Organization of the Paper

The paper has got seven parts. The first chapter will be Introduction. The second and third chapters present an overview of the Ethiopian economy and the Evolutionary Aspect of Human Resource Development Policies with reference to Education in Ethiopia and the Analysis in Perspective, respectively. The fourth and fifth chapters will come up with the Theoretical and Empirical Literature and model specification and methodology, respectively. The sixth chapter will be engaged in presenting the Empirical Analysis. Finally conclusion and recommendations will be provided in line with the outcomes of the study.

CHAPTER TWO

OVERVIEW OF THE ETHIOPIAN ECONOMY

Ethiopia is a landlocked nation with the second most populous country in Africa after Nigeria with a total population of about 73.8 million in 2003, of which 84.3% are rural and the rest 15.7% are urban dwellers with an annual growth rate of 2.8 per cent per annum.[1] It is one of the poorest countries in the world ranking 170 out of 174 countries in the Human Development Index (HDI).[2]

Ethiopia's per capita gross national income of US$100 in 2002 is much lower than the corresponding average of US$480 for Sub-Saharan Africa and US$420 for low-income countries as a whole.[3] Over the last 40 years, the country has not been able to sustain high growth rates, except for some short lived growth spurts, such as during the 1990's[4]

The country also suffers from frequent and severe droughts, averaging one per decade during the past 100 years, and one every three years during the last 10 years. The most recent drought occurred in 2002 and put as many as 12 million people at risk of starvation. The impact of these factors is reflected in the volatility of GDP growth: it expanded by 7 percent in 2000, grew by only 1.2 percent the following year, and by -3.8 percent in 2002.[5]

The cadence of economic growth over the last three decades or so was unsatisfactory. For instance, real total GDP has been growing at an average rate of 2.60 per cent during 1960-2002 while population has been growing on average by 2.71 per cent during the same period, implying

[1] UN (United Nations). 2005. World Population Prospects 1950-2050: The 2004 Revision. Database. Department of Economic and Social Affairs, Population Division. New York
[2] Ibid.
[3] World Bank, 2005
[4] World Bank, 2003
[5] World Bank, 2005

a 0.11 per cent decline in the growth rate of per capita income per annum. In terms of sectoral growth rates, agricultural GDP, industrial GDP, and service GDP grew on average by 1.35 per cent, 3.35 per cent, and 4.70 per cent per annum, respectively, during the period 1960-2002. Extreme fluctuations in agriculture have resulted in low overall average growth rate for the sector.

The performance of the economy varies by regime. In the last four decades, the Ethiopian economy has changed from a liberalized economy (till 1974) to a controlled one (1974-1989/90) and again back to a liberalized one (after 1991).

During the 1960/61 to 1973/74 period the economy achieved sustained economic growth. Between 1960 and 1970, for example, Ethiopia enjoyed an annual 4.4 percent average growth rate in per capita gross domestic product. The manufacturing sector's growth rate more than doubled from 1.9 percent in 1960/61 to 4.4 percent in 1973/74, and the growth rate for the wholesale, retail trade, transportation, and communications sectors increased from 9.3 percent to 15.6 percent.[6] Ethiopia's 4.4 percent average per capita GDP growth rate was higher than Sudan's 1.3 percent rate or Somalia's 1 percent rate but lower than Kenya's estimated 6 percent annual rate, and Uganda's 5.6 percent growth rate during the same 1960/61 to 1972/73 period. By the early l970s, Ethiopia's economy not only had started to grow but also had begun to diversify into areas such as manufacturing and services. However, these changes failed to improve the lives of most Ethiopians.

The structure and objective of the economy was changed alongside the objective of the socialist government during the period 1974-1991. The performance of the economy was the worst during

[6] According to data from the Ethiopian government's Central Statistical Authority.

the planned economic era in which real GDP registered an average growth rate of 2.3% cent per annum (per capita income growth being -0.4%) between 1974/75 and 1989/90.[7]

The period, 1992-2005, was characterized by a more liberal regime. The performance of the economy has shown improvement in the 1990s: real GDP grew on average by about 4.22 per cent. During 1990/91-1999/00, GDP and per capita GDP on average grew by 3.7% and 0.7% respectively. However, the performance of agriculture was very poor also in this regime: it recorded an average growth rate of 1.77 per cent.

During the 1992-2003 periods, the economy grew by an average of 4.22%; while the agricultural sector, the manufacturing sector and the services sector grew by 1.77%, 4.86% and 6.76% respectively. It is noteworthy that although agriculture is the mainstay of the economy and the focus of the government's development strategy, it was the industrial and services sectors that grew fastest. Of the total per year growth in total GDP over the period, 65.4 percent was contributed by the services sector, compared with agriculture's contribution of 18.2 percent.[8]

Due to the drought that hit Ethiopian agriculture in 2002/03 the real GDP growth fell from 7.7 per cent in 2000/01 to estimated 1.2 per cent in 2001/02 and an estimated negative growth of 3.8 per cent in 2002/ 03.[9] The value added in agriculture fell by 12 per cent (MOFED 2003).

Although the economy has shown a better performance in the 1990s, the improvements failed to be sustained as the economy continued to suffer from fluctuations due to weather conditions, civil war, drought, and policy failures.

[7] Geda, A. and Befekadu Degefe, 2002.
[8] Easterly, 2002
[9] Ibid.

Sustained economic growth is presumably cut off by low human capital, insufficient infrastructures leading to low marginal productivity of capital, low saving rates, and a swelling population. These poor conditions are overriding constraints to the development of an integrated economic base. Overall the growth performance has been too irregular and precarious for it is heavily dependent on the vagaries of nature and external shocks like political instability and war.

Characteristically for a low-income country, Ethiopia has a low life expectancy (only 42 years) and a high fertility rate (nearly six births per woman over her reproductive life). The fertility rate is estimated to be 5.3 children per woman in 2005. At the same time, the infant mortality rate is still among the highest in the world, with 95.32 deaths per 1,000 live births.[10] Factors that explain low life expectancy include multiple infectious diseases, among which malaria and AIDS are the predominant. Of the adults between 15 and 49, 4.4 per cent live with AIDS. The number of individuals with HIV/AIDS in the labor force is 1.4 million. It is estimated that the GDP loss per capita that can be attributed to HIV/AIDS per year is 2 per cent.[11]

The level of poverty has widened and deepened, the rate of unemployment has increased, political and economic insecurity have become the norm, and the majority of Ethiopians are desperately poor and hopeless. These economic and political upheavals are the fundamental reasons why probably most Ethiopians prefer to move to other countries now, and those who are already abroad may not be willing to return.

[10] The figures are taken from The World Bank, 2005

[11] HIV/AIDS and work: global estimates, impact and response, main table 1 quoted in The World Bank, 2005.

The Ethiopian economic transition towards a market economy with increasing private ownership has been one of the major objectives of the government since the beginning of the 1990s. The reform process has reached the level of implementation where, to a large degree, it has stopped.

Table 2.1 Evolution of Main Macroeconomic Indicators (1962/3 - 1999/00)

Years	1962/3-1966/67	196/3-1971/72	1972/3-1976/77	1977/8-1981/82	1982/83-1986/87	1987/88-1992/93	1993/4-1999/00
Real GDP growth rate (%)	4.7	4.0	1.3	2.3	3.7	-0.01	5.7
Investments as % of GDP	13.5	12.6	9.7	11.0	14.3	13.4	15.9
Savings as % of GDP	11.4	11.0	9.0	4.7	6.5	7.1	5.3
Exports and imports as % of GDP	24.1	22.1	26.5	29.1	26.0	20.2	37.8
Inflation (%)		1.7	11.4	10.7	3.4	11.8	3.8
Exports as % of imports (%)	83.6	86.6	95.8	53.6	53.7	52.3	56.4

Source: MEDAC, MOFED and CSA, various years quoted in Woldehana, Guta and Ferede, 2005.

Both cross-country and time series analysis have been used to identify the main sources of growth in Ethiopia.

Table 2.2 Sources of growth based on a time series model.

Fiscal Year	Sources of Growth			
	Output Growth	Capital	Labor	Total Factor Productivity
1960/1-1967/8	4.7	-0.4	1.4	3.8
19667/8-1977/8	2.7	-0.7	1.7	1.6
1977/8-1987/8	3.0	0.0	1.8	1.2
1987/8-1997/8	3.1	0.3	1.7	1.1
1997/8-2000/1	3.5	2.0	1.2	0.2

Source: Tassew Woldehanna, Fantu Guta, Tadele Ferede; December 2005, Labor market flexibility and employment and income security in Ethiopia.

The time series model shows the dominant role of labor in accounting for the positive growth in the period under analysis. Second, the contribution of capital, although disappointing in the first two sub-periods, seems to pick up during the 1990s. Third, the contribution of factor productivity, although not impressive, is in general positive while the contribution of education has not been analyzed and is not known. The long run models also depict a similar pattern about the contribution of factor inputs to growth.

Some of the key conclusions about the Ethiopian economy reported by Alemayehu and Befekadu (2002) include the following:

1. Over quite a long period of time and despite very different policy regimes, the structure of the economy has changed relatively little.
2. Growth performance is still dependent on a fragile economic sector and on exogenous conditions.
3. Over a long period of time the economy has performed below expectations, given initial conditions.

CHAPTER THREE

ETHIOPIAN EXPERIENCE IN EDUCATIONAL POLICY

What has been the record of educational policy making in Ethiopia? Were introduced reforms implemented? This part of the study tries to provide answers to questions of this type. Education policy is perhaps the contemporary equivalent of what four decades ago was known as "educational planning".[12] Practically every nation at one time or another proclaimed the intentions of making decisions that affect some aspect of education in society. It is in this wider sense that the term educational policy is used in this part of the study. In a country with so low an income per capita, education policies must be formulated with reference to their effect on the economy.

3.1 Education in the Early Years

Education in Ethiopia dates back to the Sixth Century when the Sabean alphabet was introduced along with Christianity. Beginning in the early years of the Christian era, the churches of Ethiopia developed school system which over the centuries served not only as focal points for learning but also prepared the nation's religious and governmental leaders.[13] Church education remained the predominant form of education until the commencement of modern secular education in Ethiopia. The indigenous system of church education had its parallel in the schools of Falashas, and the Quranic schools of the Muslims.

The education given under religious auspices aimed primarily at producing teachers who would be serving in the different centers of learning in the church and the mosque. With no other source

[12] G. Psacharopoulos, 1990.
[13] The Education Sector Review, 1972.

of trained personnel, Church education was basically providing priests, monks, deacons and teachers who served in the church and state as judges, governors, scribes, treasurers, and general administrators.

Because, any investigation in-to the workings of the environment and the universe in general is regarded as anti Christian and sinful, studies of the sciences, and domestic handicrafts were very limited and often discouraged. The primary urge was religious rather than scientific and developmental. "The primary purpose of church education was - - - to lead men to accepting the existing order of things as it is, to preserve whatever has been down through the years, and in turn to pass it unchanged to the next generation." (Girma Amare, 1964 quoted in Teshome, 1979). It tended to stifle healthy curiosity and independent thinking.[14] The Pedagogy was based on repetition and memorization, with strict adherence to the convention preferred by the teacher.

According to Teshome (1979), church education has not been impartial in the provision of education to the public and didn't serve the whole nation.

But no other church in Africa has had such a great impact on the development of education as the Ethiopian Orthodox Church. In the long history of church education, Ethiopia evolved a particularly Ethiopian education system. The full curriculum consisted of religious teachings, prose, poetry and poems as well as documentation in Geez and Amharic. It is emphasized that education has, meaning only when in its cultural context. But the pattern of education changed very little in contrast to the emerging socio economic transformations. And, an opportunity was lost to combine the educational effort of an ancient church with that of a government system. So, any account of education in Ethiopia must recognize the contributions made by church education.

[14] Teshome Wagaw, 1979

The religious institutions had not only inculcated common societal values in the population but had also been the custodian of the nation's literary treasures, religious writings and history.

In many parts of the world, philosophers, educators, development workers and cultural commentators are showing a new interest in and respect for not just the durably uniform and predictable modernist clichés for educational development, which are promoted by international agencies, but also for the largely fecund resources of culturally embedded traditional ideas and practice.

3.2 The Introduction of Modern Education

At the beginning of the twentieth century, the education system's failure to meet the needs of people involved in statecraft, diplomacy, commerce, and industry led to the introduction of government-sponsored secular education. The establishment of a central state authority and permanent urban seat of power, the development of modern economic sectors and the establishment of diplomatic and trade ties with the rest of the world were the major factors accounting for increased social demand for education in Ethiopia.

The establishment of modern schools was speeded up beginning at the turn of the 20th century owing to the efforts of Emperor Menelik and Ethiopian intellectuals who had returned from abroad during the time. Modern education officially commenced in 1908 with the opening of Menelik II School in Addis Ababa, marking a significant step in the history of modern education in Ethiopia. Soon after, Menelik himself opened three more schools.

The education system faced shortages of teachers, textbooks, and facilities. Foreign teachers, foreign books and foreign instructional materials were employed for primary and secondary schools. Foreign languages, elementary mathematics, and rudimentary science were taught in French to a limited number of students, along with Amharic and religious subjects.

The Ethiopian education system has been to a large extent foreign and alien to the nation's needs and requirements. It was emphasized that Ethiopian education should neither be French, American, British or Italian. It must be Ethiopian. Church education has laid the groundwork in this respect. But it was not possible to have a sensible extension of education to the existing socio economic conditions in the country, afterwards. Developments in the field of modern education can be discussed in the three phases as follows.

3.3 Education During the Imperial Period

During the Imperial period; in the initial phase and the more planned and coordinated expansion of education after 1941, the primary objective of education had been to produce trained manpower that could run the emergent state bureaucracy. Particularly after 1941, the government's main concern was to replace expatriates that worked at various levels in the state machineries by Ethiopian nationals. In this respect the perspective of education was very limited.

The Italian occupation (1936-1941) and the Second World War seriously disrupted the development of modern secular education started during the Menelik era. The emphasis

afterwards has been the establishment of an educational system that could provide for a small corps of clerical, technical and administrative personnel to run the government bureaucracy.[15]

It was after 1941 that a series of concrete educational policies were introduced for the promotion of education in the country. The Ethiopian Government continued to believe that education held the key to Ethiopia's development. To meet this need, reconstruction began with the re-establishment of the Ministry of Education in 1942. To enhance expansion, a Board of Education was established in each region and an educational tax was also introduced to partly finance education. To supplement government efforts, private and voluntary organizations were encouraged to open schools. The missionaries were also, for the first time, officially invited to participate in providing educational services (Ayalew Shibeshi, 1989). From 1942 until 1955, the Ethiopian Government was engaged in the expansion of the education system. The high expenditure on education in relation to total expenditure, as well as the rapid growth of student enrolment showed the commitment of the Ethiopian government to the expansion of education.

Non formal education in the form of adult education and literacy programs were coordinated and sponsored by the adult Education and Literacy Department of the Ministry of Education. Work oriented or functional literacy programs directed to workers in specific fields such as agriculture, textile and other activities were provided.

These efforts were also reinforced by the measures taken during the course of the three consecutive five-year development plans which have provided a strong role for education to play in the economy. In the third five year development plan, due attention was accorded to education and manpower development; among its objectives:

[15] G. A. Lipsby, 1962.

1. To provide educational opportunity for an increasing number of people, and particularly for the rural population, in part through the provision of more adequate networks of modest rural roads and bus services.
2. To provide an educational system with in which a more modern scientific outlook on life can be created, which will at the same time be in harmony with Ethiopia's ancient cultural traditions.
3. To provide an educational system that helps to develop positive attitude towards manual work and practical skills.
4. To place appropriate emphasis on the quality of education and promoting efficiency.
5. To provide a system with in which a more effective national medium of communication through the Amharic language can be realized.

Vocational education was introduced both at high school and college levels during the 1950's and the 1960's. The student enrollment increased continuously and significantly.

Besides, there was a strong initiation to coordinate schooling with the economic framework. This was exemplified by the Manpower Policy that aims at building a strong coordination between schooling and the rest of the economy. It aimed to make sure that the educational system becomes more closely related to the needs for skilled manpower of all types in the development of the country. The Manpower development plan attested to this noble cause.

The Third Five-Year development Plan points out the fact that in the final analysis economic and social development rests upon the coverage and quality of the educational system.

As a result, from 1942 to 1972, the education sector was allowed to expand with confidence and optimism. Gross Primary enrollment increased by 60% between 1968 and 1972. Between 1961 and 1971, the government expanded the public school system more than fourfold, and it declared universal primary education a long-range objective. In 1971 there were 1,300 primary and secondary schools and 13,000 teachers, and enrollment had reached 600,000.[16]

However, the optimism was not sustainable. The schools were found to be highly inefficient especially in terms of dropouts. 50% of the Grade one students had dropped out by the end of the second year of schooling. Grade five had less than 10 percent of the students of grade 1.[17]

The issue of equity was not properly addressed. Education in the beginning was an urban male dominated phenomenon. [18]

There was little concern about the quality and relevance of the education provided to the youths in the early period.[19] The school curricula contained little more than academic subjects.[20] There was extreme shortage of teachers and textbooks, although some British staff from the British Council was available to the government. The education system, which was introduced, was almost entirely imported. Most of the teachers were expatriates.

In May 1961, Ethiopia hosted the United Nations-sponsored Conference of African States on the Development of Education. Among other things, the conference highlighted Ethiopia's educational deficiencies. The Ethiopian education system, especially in primary and secondary education, was ranked the bottom among African nations. There were school and teacher

[16] MOE, Education Statistics, Annual Abstracts, 1960-1972.
[17] Fasil G. Kiros, 1990.
[18] G. A. Lipsby, 1962.
[19] Fasil G. Kiros, 1990.
[20] Ibid.

shortages, a high dropout rate, and low overall attendance rates (about 10 percent among all school-age children in the country), especially among females and rural children.

Concerns about the course of education were expressed beginning in the early 1950's. Though the curriculum was broadly based on international standards, its usefulness to the objective situation in Ethiopia was contentious. Although primary enrollment was only in the range of 20 percent of the school age group, the sector had by 1970 already produced thousands of secondary school leavers with very little chance of employment. The Imperial government was starting to feel the pressure of unemployed and unemployable educated manpower in the cities and towns of the empire.

So beginning the 1970's the major problem was not lack of resources as such but the inability of the economy to absorb those who were already graduates from the sector. In the early period of educational expansion, the issue of the unemployment of graduates of the school system was never a central problem until the 1970's.

Various efforts were initiated in response with the task of formulating the aims and objectives of Ethiopian education, devising means for distributing educational opportunity more equitably and ensuring coordination of education at all levels. One of the major concerns identified include the role of education in enhancing national development.

One of the significant responses is the launching of the Education Sector Review in October 1972 with the main objective of analyzing the Education and Training system of Ethiopia, and its capability for promoting economic, social and cultural development. The ESR revealed most of the problems in the Ethiopian education system. It suggested that:

1. The education system is too elitist, formalistic and rigid, despite attempts to diversify it through prevocational streams.
2. Educational objectives which give due cognizance to the Ethiopian culture and languages have not been clearly stated. This is actually shown by undue reliance on foreign books, languages and teachers.
3. The education system in which each education level is designed to prepare students for the next level is wasteful. Most students drop out without having attained employable skills.
4. Education opportunity is not equitably distributed.
5. The administration of education is highly centralized, inhibiting flexibility and local community participation and initiation.

The ESR recommended controlling student intake into middle and secondary level education so as to avoid a huge pool of unemployed secondary school leavers. Another recommendation was to expand basic education. Besides, the sector review recommended that, non formal education be accorded a strong emphasis.

With respect to financing, the government levied a special tax on agricultural land for financing primary education. Urban inhabitants send their children at the expense of the taxpaying rural landowners and poor peasants. The government attempted to rectify this imbalance in 1970 by imposing an education tax on urban landowners and a 2 percent tax on the personal income of urban residents. But the Ministry of Finance treated the funds collected as part of the general revenue and never spent the money for its intended purpose. Secondary and higher education were left to be financed by the central government.

Despite the fact that money spent on education increased from 10 percent of total government expenditures in 1968 to 20 percent in the early 1970s, funding remained inadequate. Expenditure on education was only 1.4 to 3 percent of the gross national product (GNP) between 1968 and 1974, compared with 2.5 to 6 percent for other African countries during the same period.

By 1974 primary school participation stood at 18 %, junior secondary at 7 % and senior secondary at 3 %.[21] The shift system whereby children go to school half a day, either in the morning or in the afternoon, still existed and was fully operational.

When the revolution erupted, only 15.3 percent of the age cohorts were attending primary schools. In the mid 1970's Kenya and Tanzania had reached a stage of universal primary education while The Sudan, Zimbabwe and Zambia had 51%, 72% and 95% of their primary school aged children enrolled at school, respectively (UNESCO, 1981). Thus, the participation rate in Ethiopia before the Revolution of 1974 was very low even by African standards.

3.4 Education During the Derg Regime

The structure and organization of educational activities were changed alongside the objectives of the socialist government. In the National Democratic Revolution Program of the Ethiopian Government (April, 1976), Educational Guideline was issued, which states, "There will be an educational program that will provide free education, step by step, to the broad masses". The government's newly stated goals for education were now (1) education for production, (2) education for scientific consciousness, and (3) education for political consciousness.[22]

[21] MOE, 1974-1975, Education Statistics, Annual Abstract.
[22] MOE, 1976, Education Statistics, Annual Abstract.

The new regime nationalized all private schools, except church-affiliated ones, and made them part of the public school system. Soon after the military government initiated reforms of the education system based partly on ESR recommendations and partly on the military regime's socialist ideology.

The general policy program did not provide an elaborate policy of education up until 1984/85 when A Ten Year Perspective Plan (1984/85-1994/95) was adopted with the following major goals of the education sector.

1. To provide education which will meet the basic needs of the people as well as serve the as an instrument in the struggle against feudalism, imperialism and bureaucratic capitalism.
2. To give priority to providing polytechnic education to all those children with in appropriate age bracket.
3. To provide skilled manpower in such numbers proportions and quality as needed.
4. To promote continued education
5. To eradicate illiteracy and expand pre school education.

As shown in the table below, the sector has expanded greatly since 1974. Between 1975 and 1990, primary enrollment continued to increase at the rate of 12% per annum thus covering about 38% of the school age group. Junior and secondary school enrollment also increased at about the same rate. By 1990, about 12% of the secondary school age population was enrolled in secondary schools. Although the problem of absorbing even the majority of secondary school leavers was becoming apparent by the mid-1980, the government deemed it wise to stress the importance of

education for the society as well as the individual.[23] Primary school participation exceeded 42 % of the relevant age group in 1983/84 and was 16.4 % in junior secondary schools. Participation in grades 9-10 and 11-12 reached 11 % and 7 % respectively during the same period.

Table 3.4.1 Summary of Education Data (1974/75-1983/84)

	1974/75			1983/84		
Level	No. of schools	Enrollment	No. of teachers	No. of schools	Enrollment	No. of teachers
Primary	3166	959000	21000	7125	2795000	48000
Junior secondary	507	124000	3800	829	295000	6000
Senior secondary	125	65000	2500	201	286000	7300

Source: MOE, Education in Socialist Ethiopia, 1984.

There were also changes in the distribution and number of schools and the size and composition of the student body. The military regime worked toward a more even distribution of schools by concentrating its efforts on small towns and rural areas that had been neglected during the Imperial regime. With technical assistance from the Ministry of Education, individual communities performed all primary school construction. In large part because of such community involvement, the number of primary schools grew from 3,196 in 1974/75 to 7,900 in 1985/86, an average increase of 428 schools annually. The number of primary schools increased significantly in all regions except three, including Eritrea and Tigray, where there was a decline.

While there were significant expansions, there were still variations among regions in the number of students enrolled and a disparity in the enrollment of boys and girls. Nevertheless, while the enrollment of boys more than doubled, that of girls more than tripled. Urban areas had a higher

[23] Tekeste Negash, 1996.

ratio of children enrolled in schools, as well as a higher proportion of female students, compared with rural areas.

In 1974/75 about 55 percent of senior secondary schools were in Eritrea and Shewa, including Addis Ababa. In 1985/86 the figure was down to 40 percent. Although there were significantly fewer girls enrolled at the secondary level, the proportion of females in the school system at all levels and in all regions increased from about 32 percent in 1974/75 to 39 percent in 1985/86.[24]

With respect to the internal efficiency of the system, in 1985/86 about 60% of the pupils enrolled in Grade 1 had dropped out compared to a figure of 40% during the Imperial regime.[25]

A major move towards expansion of non-formal education was made by the Socialist regime. Two main programs were launched, the National Work Campaign for Development through Cooperation, and The Ethiopian National Literacy Campaign. One of the success stories in the socialist regime has been the achievement in terms of reduction of illiteracy rate in the country. The national literacy campaign began in early 1975 when the government mobilized more than 60,000 students and teachers, sending them all over the country for two-year terms of service. This experience was crucial to the creation in 1979 of the National Literacy Campaign Coordinating Committee (NLCCC) and a nationwide effort to raise literacy levels.

The literacy rate, fewer than 10 percent during the Imperial regime, increased to about 63 percent by 1984, according to government figures. The literacy campaign received international acclaim when the United Nations Educational, Scientific, and Cultural Organization (UNESCO) awarded Ethiopia the International Reading Association Literacy Prize in 1980.

[24] Fasil G. Kiros, 1996
[25] Ibid.

Local languages were employed to provide literacy and post literacy education. The Ministry of Education also stocked reading centers with appropriate texts. These books focused on topics such as agriculture, health, and basic technology. To consolidate the gains from the literacy campaign, the government offered follow-up courses for participants up to Grade four, after which they could enroll in the regular school system. The basic problem associated with the literacy campaign was its unsustainable nature in the later days.

The basic explanations for the poor quality of education in the primary and secondary school are not different from those that prevailed in the past period except that the situation has been aggravated by the continued expansion of enrollment.

In 1984 the Ministry of Education embarked on a major evaluative study with particular attention to the quality of education. Some of the basic explanations for the poor quality of education on the primary and secondary schools were:

1. The increase of pupil-teacher ratios to 65 in primary schools, 47 in junior schools, and 41 in senior schools;
2. The fact that over 36 % of the primary school teachers had no specialized training and over 19 % had only short-term preparation;
3. The fact that over 42 % of the junior secondary schools teachers had no specialized training and over 43 % of the secondary school teachers had only 1 or 2 years of attendance in post-secondary programs;
4. The overcrowding of schools;

5. The shortage of educational materials;

6. Poor management.

In the 1980's the phenomenon of the "educated-unemployed" has been rising. In 1980/81 31.3% of the job-seekers had completed sixth grade level of education, twice the level of 1974/75.[26]

The role of the public sector increased substantially in the 70's, particularly in terms of employment. Establishments were often pressurized to have more employees than their needs. The Ministry of Labor and Social Affairs survey of public and private sector establishment employing more than 10 workers suggested that in 1983 the public sector employed 73 percent of those in wage employment (Pramila Krishnan, Tesfaye Gebre Selassie, and Stefan Dercon, 1998).

However, the proportion of the educated unemployed in search of jobs has been increasing. In 1980/81, 31.3% of the job seekers have completed a sixth grade level of education, proportionately almost twice the level of 1979/80. About the same proportion of job seekers had completed secondary education, mostly 12 Grade and nearly 5% had had technical training. The proportion of job seekers with some university education was about 2% in 1980/81 increasing from 0.4% in 1979/80.[27] The phenomenon of educated unemployed has become a matter of concern during this period.

The Derg failed to build on what was already achieved in the past. Recommendations of the ESR were barely followed as claimed. Private sector development and the development of the market incentive structure both in the education sector and in the labor market were highly discouraged.

[26] Ibid.
[27] Ibid.

The Education system has been centralized in both the Imperial and the Derg regimes. And the red tape in a highly decentralized system of education might incur wastes and stifle growth.[28]

3.5 Current Developments in Education

According to the Transitional Government of Ethiopia (1994), it was necessary to replace the educational system that served the "old discarded order by the new one". The development of the education sector in Ethiopia has been at an early stage. On the eve of the ongoing educational reform process, which began in 1994 following the endorsement of the New Education and Training Policy, enrollment in primary education stood at about 2.81 million. This includes over-age pupils that amount 34 % of the school-age population. Likewise, enrolment ratio in secondary level stood at about 15% and in the third level at 1 %.[29] Compared to African countries, Ethiopia's enrolment ratios fared among the lowest in primary education and somewhat better though below average in secondary education. Similarly, enrollment in all levels of education is male biased, the tertiary level being worse. (TGE, 1994)

The new strategy presupposes the overall lack of coordination between education, training, research and development efforts in the country.

The objectives of Ethiopian education as stated in the various documents of The Transitional Government of Ethiopia, The Education and Training Strategy (1994) are summarized as follows.

1. To provide a good quality primary education with an ultimate aim of achieving Universal Primary Education.
2. To make education relevant by providing problem solving skills and an all rounded

[28] Teshome Mulat, 1988.
[29] The figures are taken from the UNESCO report, 2002

education catering to the needs of the individual and the society.

3. To provide vocational education and training at different levels attuned to the manpower requirements of the economy.
4. To provide a secondary education of appropriate quality in an equitable way.
5. To promote higher education of good quality, relevance and focusing on Research & Development.
6. To make available special and non formal education in line with the needs and capability of the country.
7. To improve the quality of training, professional competence and career structure of teachers and other professionals.
8. To strengthen the management and organization of the educational system so as to make it decentralized, coordinated, professional and efficient.
9. Increase the financing of education by encouraging community participation, introducing cost-sharing mechanisms, involving the private sector in the provision of education.
10. To improve the collaboration and coordination of the education sector with other relevant sectors.
11. Production of lower, middle, and higher level skilled manpower than can participate in the country's economic growth and social development.

The structure of the Ethiopian education system encompasses formal and non-formal education (TGE, 1994). But it is not clear how the non-formal education will be implemented.[30] For this reason, it is viewed as open-ended in terms of training program and in terms of institutional

[30] Tekeste Negash, 1996.

arrangement. The emphasis has shifted to the formal education; addressing the problems of low enrolment in the formal schools, rectifying gender imbalance and the like.

Following the New Education and Training Policy, the structure of Education in Ethiopia, which was of 6-2-4, has been replaced by the 8-4 structure. Initially it offers 8 years of primary education divided into two cycles each having 4 years duration and 4 years of secondary education divided into another two cycles each having 2 years duration.

The New Education and Training Policy also addressed the issues of technical Vocational training. Thus, it is stipulated in the document that "Parallel to general education, diversified technical and vocational training will be provided for those who leave school from any level of education" (MOE, 1994) for the development of middle level manpower.

It was also stipulated that every “nation” and nationality has the right to learn in its own language at least at the basic education and general primary level. But this has put into question the speed at which the adaptation would take place in terms of preparation and provision of teaching materials and training of the appropriate pedagogical and managerial staff. This change has been revolutionary rather than a cautionary transformation. In this respect, a study by Workalemahu (2004) shows that the necessary preconditions were not fulfilled to select the language as a medium of instruction: there were no available curriculum materials; teachers did not get adequate training; there was imposition on those who don’t speak the local language.

Since the introduction of the New Education and Training Policy and a comprehensive development program for the sector, i.e., the Education Sector Development Program (ESDP), encouraging records have emerged in terms of coverage.

Aggregate enrolments in Grades 1-12 rose at a steady pace of about 9% a year between 1994/95 and 2003/04, and in grades 1-4, which is the first cycle of primary schooling , it grew even faster at an average of 15% a year. The education coverage at primary level, which was 26.2% in 1994/95 rose to 68.4% in 2003/04. The rural primary education coverage has increased on the average at the rate of 21.5% between 1994/95 and 1999/2000. The increment for females is also encouraging. GER for female students was below 20% in 1994/95 and this was raised to 59.1% in 2003/04. The female primary school participation has grown at the rate of 16.4% over the period at the rate of 24.8% in the rural and at a rate of 7.7% in the urban communities indicating that the issue of equity is being redressed.

Table 3.5.1 Gross and Net Enrollment ratios at primary level (1-8) (1999-2004)

	Net Enrollment ratio			**Gross Enrollment ratio**		
Year	**Male**	**Female**	**Total**	Male	Female	Total
1999/00	51.2	36.6	44.0	60.9	40.7	51.0
2000/01	55.7	41.7	48.8	67.3	47.0	57.4
2001/02	59.0	45.2	52.2	71.7	51.2	61.6
2002/03	60.6	47.2	54.0	74.6	53.8	64.4
2003/04	62.9	51.8	57.4	77.4	59.1	68.4

Source: Education Management Information System, (EMIS), MOE, 2005, Addis Ababa.

Although there is an encouraging sign towards the achievement of universal primary education (UPE) by 2015, the gross enrollment ratio is not a good indicator of primary school coverage for it includes the over- and under-aged children. Net enrollment ratio is the best way of measuring school coverage and refined indicator of access.

Analysis of NER data in Ethiopia shows that Ethiopia has a low chance of achieving UPE in 2015. According to the Education for All (EFA) Global Monitoring Report (UNESCO 2002),

only those countries whose NER is 80% and above currently can achieve UPE in 2015.[31] In this respect Ethiopia faces a great challenge with 57.4% NER in 2003/04. If the Net Enrolment Ratio (NER) is considered, the number of out of school age children is very high (42.6%). It is even worse for girls.

At secondary level the increment has also been found to be encouraging compared to the base year. Thus, in 1994/95 the enrollment, which was 6.6%, has grown to 10.3 % in 1999/2000. Here also the secondary school participation of girls is catching up with that of the boys. The former has grown from 5.7% to 8.5% whereas that of males grew from 7.5% to 12.0%.[32]

Table 3.5.2 General Secondary School Gross and Net Enrolment Ratios (1999/00 - 2003/04)

Year	**Gross Enrolment Ratio (GER)**			**Net Enrollment Ratio (NER)**		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**
1999/00	14.4	11.2	12.8	7.0	6.6	6.8
2000/01	16.1	12.1	14.1	7.1	6.1	6.6
2001/02	20.4	13.7	17.1	8.6	6.2	7.4
2002/03	24.0	14.3	19.3	10.1	6.7	8.4
2003/04	28.2	15.9	22.1	12.0	7.5	9.8

Source: Education Management Information System, (EMIS), Ministry of Educ., A.A.

[31] Universal primary education has been the major focus of the present education policy. Ethiopia has pledged UPE three times. The first was in 1961 at "Addis Ababa Conference on African Education" in which UPE was pledged to be reached in 1980. The second was in 1972 in which UPE was projected to be achieved before 2000 (Tekeste, 1990). The third promise was by the current government, and UPE has been sought to be reached before 2015.

[32] The figures are taken from the MOE, Annual Statistical Abstract of various years.

Enrolment in Technical and vocational training and education grew from less than 3000 students in 1995/96 to 87,158 students in 2003/04. In post-secondary education, enrolment has also ballooned, from around 18,000 in 1990/91 to more than 172,111 students in 2003/04. These trends are remarkable achievements given the pattern of stagnation, reversal and an even growth in the past.

Despite the progress in educational access, as the above indicators reveal, nearly half the children in Ethiopia in primary-school age (about 7 million 7- to 14-year-olds) do not go to school.[33] Low enrolment levels are a result of children never entering school and of the cumulative effect of high dropout rates in every grade of the primary cycles (Grades 1-8). Urban-rural gap is especially wide. The enrolment rates vary remarkably from region to region. For example, the GER in the entire Afar Region is 13.8 per cent, compared with 100 per cent in Addis Ababa, for the primary level education and 5.1 per cent, compared with 78.1 per cent in Addis Ababa, for the secondary level education (MOE, 2004).

The achievement in terms of non-formal education is poor. According to the Ethiopian Government and UNICEF statistics (FDRE & UNICEF, 2001), the illiteracy rate is approximately 73 per cent for females and 50 per cent for males. Non-formal education must have remained an important component in education in Ethiopia given the inadequate coverage of the education system and chronic problems of school drop out in the first grades on top of the existing socio economic conditions.

Complicating the problem of Ethiopian education is the recent erosion of educational quality. With respect to quality, a survey conducted by Eva Poluha (2001) revealed that the quality of

[33] World Bank, 2005

education is being impaired by defects that the Government cannot afford to remedy. These include teachers' wretched work conditions, lack of textbooks, lack of teaching aids and materials, and overcrowded schools. The GoE National Board of Assessment has recently studied quality of education at grade 4 level and found overall performance to be below average.

Quality of education may correlate with dropping out of schools. For example, dropout appears high in the first grade if the class sizes are large and there is lack of educational material. Ethiopian primary education has rather high dropout and repetition rates, indicating that resources are being wasted. The overall dropout rate for the primary level (Grades 1-8) was 17.8 per cent in 2000/01 and 17.1 per cent in 2002/03. The risk of dropping out is particularly high for first-grade students. Barely over 60 per cent of students survive to Grade 5 (UNESCO, 2005). At present 40 percent of each cohort of Ethiopian children still do not start first grade, and of those who do, an estimated 47 percent exit the system before attaining grade 5.

Repetition of classes may correlate with dropping-out. About one out of ten students used to repeat Grade 1, girls more often that boys. In school year 2002/03 the repetition rate for first-grade students was 3.9 per cent. The repetition rate increases in Grades 5, 7 and 8, as indicated in overall repetition rate for Grades 1-8, which was 6.7 per cent in 2002/03 (MOE, 2004).

First grade repetitions, however, have fallen with a policy of automatic promotion. This puts into question the quality of students finishing "the basic education" level. Because; primary education should provide a "basic education" which offers complete packages in the sense that whoever leaves with this package should be able to live, work and earn his living. The government hopes to provide basic education for all the primary school age children. But a system for developing

positive and wholesome attitude towards all useful work especially at the early ages is not well developed.

High repetition rates intensify the stress on already overburdened schools and increase the numbers of children and youth who eventually drop out of school completely. Too often, investment is thought to be simply more schools, and places for more kids in school. These are necessary conditions but insufficient alone to bring about needed development gains. More is needed, including increasing curriculum relevancy, training teachers to use the most effective pedagogy, improving the way schools are organized and managed, and involving parents and the larger community in supporting schools and ensuring quality education.

3.5.1 The Educational Attainment of the Workforce and the Labor Market

With respect to the educational attainment of the workforce, the number has risen over time due to massive investment since 1994. Yet, the gains have made only a modest impact on the illiteracy rate, which fell from 77 percent in 1994 to 71 percent in 2001. The educational profile of workers differs greatly across sectors. In agriculture, nearly 80 percent of the workers are illiterate, and 11 percent have between one and four years of primary schooling; workers have on average some 1.7 years of schooling. By contrast, in the formal sector, 28 percent of the workers are illiterate and workers have on average more than 7 years of schooling.[34]

While educated farmers are expected to be more wiling to adopt new farming techniques, to be able to manage their production better, and to be generally more productive,[35] the results[36] show

[34] The figures are taken from TheWorld Bank, 2005.
[35] Jamison and Lau 1982 and Rozenzweig, 1995 have summarized the international evidence in this regard.

that farmers' average years of schooling have no influence on agricultural productivity—a disappointing but not surprising finding, given the extremely low stock of human capital among farmers. The recommendation in perspective was to look into the type and quality of education being provided.

The fact that earnings rise with educational attainment is a pattern found among men and women workers, as well as among those in urban and rural areas. The patterns provide the fact that education is an attractive investment for individuals seeking salaried employment. For the country as a whole, the private returns follow a U-shape, in which they are highest at the lowest levels of educational attainment as well as at the top end.

Education also produces benefits through its impact on poverty and other indicators of the population's wellbeing. The recently completed World Bank (2004) study on poverty in Ethiopia underscores that while many factors are involved in reducing poverty, education plays a key role. Whereas the overall poverty rate is around 38 percent, the share of households living in poverty fell to 32 percent among those headed by someone with some primary education, and 21 and 9 percent, respectively; among those whose household heads have completed secondary and postsecondary education.

On all levels of the educational system, education and training has little relevance to practice and context and to preparation for the workforce and employability both in the urban and rural areas. The main problems facing the current TVET programs are: the range of occupational areas, trades, skills and knowledge covered by available training programs is very limited; girls and women are underrepresented in training programs, which is also due to the fact that existing

[36] Weir (1999) estimated standard production functions that relate the value of cereal crops to a set of inputs (land, human, and animal [ox] labor, and capital) as well as a set of household characteristics, including the educational attainment of the household head and all the adult workers on the farm.

provision mainly addresses typical male skills and occupations; and training provision for operating micro and small entrepreneurs and people in employment hardly exists.

Nearly 80 percent of country's workforce is still in agriculture today, and more than 90 percent of the workers are either self-employed or used as unpaid family labor—features that put a limit on the economy's capacity to absorb large numbers of educated labor into modern sector jobs. Data from the most recent labor force in 1999 suggest, for example, that among recent graduates, the unemployment rate was about 25 percent among those attaining grades 5–8 or vocational/technical education and 44 percent among those attaining general secondary education. Only among university graduates was the unemployment rate at a modest 4 percent. This situation has been exacerbated recently due to the continuous outflow of graduates from the different levels of education despite the stagnant demand for the graduates. Unless jobs outside public administration (which have increased greatly in recent years because of decentralization) become the major source of employment in the future, this situation could be a critical problem at hand. These patterns underline the importance of aligning the expansion pace of post basic education to labor market conditions.

Being ill equipped for self-employment, relatively huge numbers of graduates are pouring out of the school system, while the modern sector is far too small to absorb them. The educational system produce graduates for white-collar jobs, which alienates them from real world jobs. The appearance of 'graduate unemployed' casts doubts on the suitability of the school curricula. The urban biased curricula could not persuade young people to remain engaged in the rural activities. Moreover, the traditional agriculture sector, which is lacking minor investments, amenities and social services, is not attractive enough for the rural youth.

One of the major challenges for policy makers is to embed employment policies into a comprehensive employment framework that covers education, training, labor market, enterprise development and social policies. With around 50% of the urban men between age 15 and 30 unemployed, Ethiopia has one of the highest unemployment rates worldwide.[37] Surprisingly, Unemployment is concentrated among relatively well-educated first time job seekers who come from the middle classes.

In the last two decades, the economy, growing at a rate lower than the rate of growth of population of 3.0 percent, could not provide employment for the labor force that was growing by 760,000 annually (ILO/JASPA/1993). The total number of jobseekers registered by the Ministry of Labor and Social Affairs and its branch offices during 1979-1993 was about one million, 74 percent of which were aged 15-29, 33 percent attended high school; and a study by the same Ministry on unemployment in 55 towns in 1993 shows that 62 percent of the unemployed were women. Another study conducted by the Labor and Social Affairs Bureau of Addis Ababa Region, in 1994, shows that of the registered unemployed 8 percent were illiterate. 8 percent could read and write; 16 percent completed elementary school, and 15 percent completed junior secondary; about 50 percent completed grade 12, and 3 percent had technical and vocational training, 0.7 percent were college incomplete and 0.6 have competed college or university. Recently the trend of unemployment has been rising towards the more educated labor force.

There appears to be no design to promulgate comprehensive manpower strategies that would address the unemployment problems of the country and develop a strong nexus between education and the labor market.

[37] Pieter Serneels, 2005

Clearly there cannot be successful educational reform without successful economic change. In this regard, it is important to recognize that the demand for educated labor is a derived demand; one that is driven by how fast the modern sector of the economy grows.

Perhaps the government should look more carefully at the potential for informal education – perhaps with a more vocational focus from an earlier age. Besides it should engage in a design whereby the labor market could be more responsive to market phenomenon rather than non market factors as is usually observed.

The government has encouraged the involvement of the private sector in education. These government actions were intended to upgrade the education system and it achieved certain results. For example, various primary schools were constructed, curriculum has been upgraded, and administrative structures have been decentralized in some aspects. Previous policy failures in education have also come partly from failure to distinguish between regional, cultural and linguistic diversities. Even though the expansion of the private sector in education is an encouraging development, the appropriate regulatory framework associated with the expansion is not keeping pace especially in the higher education level.

With respect to financing, the policy states that government will cover the cost of education through grade ten, while the beneficiaries have to share the costs at the secondary and tertiary levels of education and training. Cost sharing was implemented in higher education institutions only in October 2003. Current reports indicate that beneficiaries have avoided repayment making the scheme unattractive and ineffective alternative revenue source. Information about the beneficiaries' whereabouts is not centrally or regionally well documented. Government would

not recover money for several years. The appropriate structural framework to put into effect the policy is not properly laid down.

At the outset, the problem associated with Ethiopian education has to do with the lack of policy design that was neither discussed nor agreed upon by the people. The main policy initiative is meant to implement policies as part of the Millennium Development Goals (MDG) put out by the UN and the World Bank. Because the Ethiopian educational policy is designed by donors and hence is donor-driven, it cannot adequately solve the Ethiopian socioeconomic problems. Largely, the 'change' has been taking place through top-down approaches without taking into account change agents and agency.

The motto should be “expand quality education” as opposed to “expand education”. While the failure of quality education is apparent, the present policy claims, “We will achieve educational participation even two years before 2015.” It is better to aim for a minimum quality education performance.

There is no doubt that the Ethiopian educational development being at its infancy compared to most of the countries in the Sub-Saharan Africa, a number of challenges are eminent. These can be summarized as follows.

1. The low level of literacy among the population.
2. Lack of the reorientation of the educational system towards problem solving approach and creative thinking that meaningfully contribute to economic growth and prepare the society for fast changing science and technology.
3. The high gender gap in enrollment between male and females particularly at the

secondary and tertiary levels.

4. The curricula have not distinctly laid out the objectives of particular level of education and training in accordance with the country's requirement and capacity. Instead, it tended to enroll as many students as possible and just moving them through the channel.
5. The mismatch between what they perceive the products of learning and the objective reality of the country led to frustration and hopelessness as opposed to being motivated and participating in the development of the country to bring about the change expected;
6. Education policymaking and implementation has been in crisis. There is lack of popular participation and abrupt disruptions of developments already achieved.

There is a strong call for significant investment and dramatic new attention to alternative education delivery systems because education had little chance of reaching enough people to be of use to societies. The curriculum was often inappropriate to the needs of the majority of people, particularly those from rural areas where the vast majority of populations lived, and where schooling was inaccessible.

Taken together, the characteristics suggest that while it makes good economic and social sense to universalize four years of appropriate primary schooling as soon as possible, the pace of expansion in subsequent grades may need to proceed in tandem with the economy's capacity to absorb well-educated graduates into jobs for which their training has prepared them.

CHAPTER FOUR

THEORETICAL AND EMPIRICAL LITERATURE REVIEW,

4.1 Theoretical Literature Review

There is a vast literature on the benefits of education stretching back to antiquity. Although the concept of investing in oneself to improve productivity is seemingly intuitive, the entire theory of human capital hinges on the paramount assumption that investments such as education do in fact translate into higher worker productivity.

The literature relating to human capital theory distinguishes among several types and means of education: formalized education at primary, secondary, and higher levels; informal education at home and work (Schultz, 1981), on the job training and apprenticeships (Mincer, 1974).

While the types and means of education are diverse, so too are the benefits derived from education. Education makes a perceived contribution to improvements in health and nutrition (Sweetland, 1996). In addition, education tends to effect a control on population growth and to increase overall quality of life (Becker, 1993). Education also provides the means to an enlightened citizenry able to participate in democratic and legal due process and to pursue values such as equality, fraternity, and liberty at both private and social levels (Swason & King, 1991). More education has been found to be associated with better public health and parenting, lower crime, better environment, wider political and community participation and greater social cohesion, all of which are in turn likely to feed back into economic growth (OECD, 1998). While these qualitative benefits may represent the most important contributions made by education,

each is difficult to measure quantitatively. Perhaps this explains why economic growth has become the benefit of choice for empirical analysis.[38]

Human capital theory suggests that individuals and society derive economic benefits from investment in people. The investment feature of this suggestion significantly differentiates human capital expenditures from consumption expenditures. The concept that investment in human capital promotes economic growth dates back to the time of Adam Smith (1776) and the early classical economists, who emphasized the importance of investing in human skills. Even if human capital theory formally evolved in this century, its bona fide conceptualization was articulated centuries ago (kiker, 1968 quoted in Sweetland, 1996).

Smith (1776) recognized that lack of education prevented a significant and valuable proportion of the population from working with the efficiency they would be capable of showing if they had been trained. Smith's two principal components which served as the foundation of all productive human capital frameworks were the following:

1. Labor inputs are not merely quantitative. They qualitatively include "the acquired and useful abilities of all inhabitants or members of the society" as well as "the state of the skill, dexterity, and judgment with which labor is applied".
2. Ability acquired through "education, study, or apprenticeship, always costs a real expense, which is a capital fixed and realized, as it were, in …person".

Ricardo, Malthus, and Mill, all supported the extension of education. However, smith's successors did not get deep into the problem as their school founding predecessor.

It was Alfred Marshall (1890) who took up smith's theory and in fact went further by saying that

[38] Woodhall, 1987

" . . . the most valuable of all capital is that invested in human beings". Acknowledging the views of Smith, Marshall (1890) centered his economic discussions of human capabilities on the premise that they are agents of productive wealth. But, Marshall empirically dismissed the inclusion of human capital in the market mechanism because it lacked a market exchange for determining value.

Fisher (1906) expressly stated, "Wealth in its broadest sense includes human beings". Besides, he implied that, participation in production processes constituted a form of capital: "in a complete view of production processes, the human machine is no more to be left out of consideration than machines which handle the wheat in its prior stages".

The incorporation of human capital into the mainstream of economic analysis and research is a new and lively development of the past five decades. The need for this development became apparent in the 1950's and the 1960's, when the application of empirical economic research to the concerns about economic growth and about income distribution revealed major defects not only in our understanding of each but also in our way of thinking about these matters. Two types of findings were especially significant [39]

1. The observed growth of conventionally measured inputs of labor and capital was by far smaller than the growth of output in the U.S. and in other countries for which long time series were available.
2. Data on personal income distribution which began to appear with greater frequency and detail showed that the variance of labor incomes rather than functional differences between returns to labor and to capital, represented major components of personal income

[39] Mincer, 1981

inequality.

The development of human capital theory was a response to these twin challenges. According to Mincer (1981), this led to the abolition of two simplifying but unduly inhibiting assumptions:

1. The restriction of the concept of capital to physical capital, and
2. The assumption of homogenous labor.

So the contribution of human capital theory to economics does not lie in a reformulation of economic theory, but in pushing back the boundaries of Economics beyond the sphere of market transactions.

The application of human capital concept to economic growth and to labor economics was initially pioneered independently by Jacob Mincer (1958), Theodore W. Schultz (1961) and Gary S. Becker (1961). At the microeconomic level, Mincer (1958) has shown that differences in individual human capital stocks and in their growth can explain much of the observed variation in the wage structure and in the personal distribution of income. Jacob Mincer developed a model for examining the nature and causes of inequality in personal incomes. To measure two major types of human capital formation, the model incorporated education and years of work experience.

The micro-economic analysis of investment in human capital is the underpinning of our understanding of the contribution of human capital to the aggregate level of income and its rate of growth (Mincer, 1981). Some critics question the inference that education increases productivity from the observation that it increases wages, still others assert that schools do not affect skills but serve merely as a filter to sort differences in ability which exist independently of schooling. If so the microeconomic relation between education and income would not carry over to the economy

as a whole. But empirical studies have shown that not only differences in wage rates but differences in productivity are related to differences in education and training of the labor force across countries and overtime. According to Mincer (1981) human capital is augmented both by learning and by selection. Mincer (1981) also documented the vital and manifold role of human capital formation in personal, national and global development.

Much of the present interest in the economics of education stems directly from a preoccupation with theories of economic growth and development. The discovery that increases in physical capital and labor did not, by themselves, explain economic growth led to an analysis of the factors determining the "residual"; in particular, the role of education and technical knowledge. In the 1960's Schultz (1961) and Denison (1962) showed that education contributes directly to the growth of national income by improving the skills and productive capacities of the labor force.

In his theory, Schultz (1961) used both the macroeconomic and microeconomic approach; the emphasis however was placed on the former. While Schultz predominantly asserted the prime relationship of education to human capital formation, the breadth of intellectual understanding he brought to the field encompassed many other types of human capital investment. He concentrated on five major categories of human capital investments: formal education, on the job training, study programs for adults, health facilities and service, and migration of individuals and families to adjust to changing job opportunities.

Reviewing the analytical constructs of human capital theory, Schultz discussed the problem of distinguishing between educational expenditures for consumption and for investment.

Becker (1964) examined the private and social benefits of on-the-job training as well as formal education for men, women, different races, and other groups from investments in different levels of education. He formulated and formalized the microeconomic foundations of human capital theory. After a while it became clear that the analysis of human capital could help explain much irregularity in labor markets and the economy at large.

After Schultz, Becker, Mincer and Denison, the relation of human capital to growth was neglected, as economists became discouraged about whether the available growth theory gave many insights into the progress of different countries. The revival of more formal models of endogenous growth has brought human capital once again to the forefront of the discussions (Romer (1986), Lucas (1988), Barro and Sala-i-Martin (1992), and Becker, Murphy and Tamura (1990)).

Modern theoretical attempts to explain the impact of education on growth can be divided into two broad categories. The Neoclassical Model represents the first class, while the second group is inspired by an endogenous growth approach.

The macroeconomic literature on the returns to education is mainly based on the Neoclassical Solow model which is further extended to incorporate human capital.[40] This model considers human capital as an accumulated factor of production and can be represented in a Cobb-Douglas production form:

$$Y = K_t^{\alpha} H_t^{\beta} (A_t L_t)^{1-\alpha-\beta} \qquad (1')$$

Where Y represents output level; A is the level of technology; K, H, and L are physical capital,

[40] This is initially pioneered by Mankiw, Romer and Weil in 1992.

human capital and labor respectively. It assumes that returns to physical and human capital are decreasing. On the long term growth path, the level of output is determined by the level of investment in physical and human capital, on the population growth rate and on exogenous technological progress. The empirical results of the influential paper (Mankiw, Romer, Weil, 1992) are conclusive. They show a significant positive impact of schooling on output per capita between 1960 and 1985.

In the mid 1980s, a new paradigm was developed in the literature, mostly due to Paul Romer (1986), which is now commonly known as *endogenous growth models*. By broadening the concept of capital to include human capital, the new endogenous growth model argues that the law of diminishing returns to scale phenomenon may not be true. However many empirical studies confirm that returns to capital, both physical and human, are decreasing.

In the endogenous growth approach human capital affects total factor productivity in two channels. First, higher levels of human capital directly influence productivity via its impact on domestic innovation. Secondly, higher levels of human capital cause improvements in total factor productivity by facilitating the adoption and implementation of foreign technology. The factors leading to endogenous growth (in particular technological change) are explicitly related to the stock of human capital. Technology and human capital are both "endogenous" to the system.

Most of the research in the new growth tradition is conducted using cross-country data. This involves problems of the quality of data and the heterogeneity across nations and cultures which is difficult to take into account in a cross sectional framework. A more intensive examination of specific case studies may be a promising path toward understanding the role of human capital in economic development.

While a significant role is accorded for education in economic growth, it is not clear whether the externalities at the lower or higher schooling levels are more important for economic development. Psacharopoulos (1994) asks whether one can weigh two very elusive items: (a) the positive externalities associated with a university graduate discovering a new vaccine; and (b) the negative externalities associated with 30 percent of the population being illiterate for their entire lifetimes. New growth theory, however, is preoccupied with a different question than is development theory: how to explain the persistence of growth rather than how to get it started. Critics ask whether there is anything new about new growth theory. What is the value added of the literature, at least as far as policy implications are concerned? It is argued that no guidance is offered towards the identification of appropriate interventions (Selowsky (1993), d'Autumne and Michel (1993)).

4.2 Empirical Literature Review

Whereas the field of human capital theory was officially established in 1960, significant empirical research supporting the field had been conducted since the 1950's. Although few economists would object that education has an important impact on macroeconomic growth, empirical evidence is difficult to interpret. While microeconomic effects are clearly documented in the literature and relatively unambiguous, this is not the case for macroeconomic effects. A multitude of empirical studies were carried out to test the effect of human capital on growth. However, overall, these studies do not come to reliable results.

When the growth accountants such as Fabricant, Abramovitz, Kendrick, and Solow found that most of the observed economic growth was not explained by conventional labor and capital

measures, they pointed directly at the possibility that the changing quality of the labor force may be an important component of the explanation for the appearance of this "residual".

It was Shultz (1963) who first connected his work with the puzzle of the "residual". He made an estimate of the growth in total human capital in the U.S, created by the educational system and considered how much of the growth in output it could account for (about one fifth was his estimate). He also asserted the economic function of education as human capital forming and in this way contributing to economic growth.

Jacob Mincer (1958) developed a model for examining the nature and causes of the inequality in personal incomes. To measure two types of education; formal and informal, Mincer's model incorporated years of education and years of work experience. He then found out that as more skill and experience are acquired with the passage of time, earnings rise.

One of the first attempts to measure the contribution of education to growth was made by Denison (1964), who argued that about 23 percent of the increase in U.S national income between 1929 and 1960 was due to the increased education of the labor force. He also performed a similar accounting in 1974, and found out that the measured contribution of education to economic growth remained substantially what it was before. Critics have however denied the possibility of quantifying the contribution of education to growth, but is fairly generally agreed that education is vital element in economic development. Denison however did not deny that there are lots of uncertainties in his theorizing.

Becker (1964) explored the rates of return on human capital investments in education and training. The fundamental basis of his exploration was stated as follows. "Probably the most impressive piece of evidence is that more highly educated and skilled persons almost always tend

to earn more than others". He also made clear that few, if any, countries have achieved a substantial period of economic development without having invested substantial amounts in their human capital.

The revival of more formal models of endogenous growth has brought human capital once again to the forefront of the discussions (see e.g., Romer (1986), Lucas (1988), Barro and Sala-i-Martin (1992), and Becker, Murphy and Tamura (1990)) after Schultz, Becker and Denison. Hicks (1980) examined the relationship between growth and literacy and life expectancy in eighty-three developing countries for the period 1960-77 and found the countries with fastest growth rates to have above average literacy and life expectancy. To check the reverse causality, Wheeler (1980) devised a simultaneous model for eighty-eight developing countries and found that a 20 to 30 percent increase in literacy causes an 8 to 16 percent increase in GDP.

Cross-country studies in the early and mid-1990s relating growth to proxies for the level of human capital such as educational finance, enrolment rates, adult literacy rates or years of schooling (Mankiw, Romer and Weil 1992, Levine and Renelt 1992, Barro 1991) generally found a positive effect, but in many cases this effect seemed to be greatly overestimated as compared to what one would expect on the basis of the microeconomic evidence (Topel 1999, Bliss and Klenow 2000). The most comprehensive evidence from cross-section regressions comes from Barro and Sala-i-Martin (1995). They find that educational attainment has significant, positive growth effects. Barro and Sala-i-Martin (1995) also test whether the tendency for countries with relatively low initial GDP to grow faster is enhanced when they have higher levels of human capital in the form of educational attainment. Their results confirm a significant role for education in this 'catch-up/convergence' process.

Nehru and Dhareshwar's (1994) conclusion which is also confirmed by Young (1995) is interesting, because it suggests that the rapid growth performances of the East Asian economies (often held up as examples for most countries to emulate) are substantially due to the educational investments they have made to raise their human capital stocks, rather than due to acquiring new technologies to make existing factors more productive.

Another study more relevant to the developing countries is Barro and Sala-i-Martin (1995) which considers the possibility of positive educational externality effects on fertility and health. And they do find significant positive effects of education on fertility and health. It seems that the weight of evidence is increasingly that education is positively associated with economic growth and has some other positive externalities.

A well-organized study by Norman Gemmell (1996) found out that there is significant positive effect of human capital on growth.[41] He added that primary level human capital seems to be relevant for the poorest least developed countries, secondary human capital for intermediate least developed countries, while tertiary human capital for the advanced countries. It is the relative size of initial human capital stocks that appears to be important according to N. Gemmell (1996).

A study by Ruth Judson (1998) has further policy implications. She reveals that more than the level of educational investment, it is its allocation that matters for economic growth: the correlation between human capital accumulation and growth is lower for those countries, which have been identified as allocating their educational resources inefficiently. These countries gain little from their investments in human capital.[42]

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[41] Norman Gemmell (1996), showed that there is no evidence on the endogeneity of human capital on growth.

[42] R. Judson, 1998, showed that compared to countries with more efficient allocations, the effect of human capital growth on GDP growth is significantly lower and not significantly different from zero for countries which allocated their educational resources inefficiently. This is in some ways in line with Lant Pritchett's (1996) argument.

While there is strong theoretical support for a key role of human capital in growth, Sala-i-Martin (2002), Easterly (2001) and in particularly Pritchett (2001) argue that the empirical relationship between education and growth is weak. Lant Pritchet (1996) showed that (especially for developing countries) the growth of educational capital per worker has had a mildly negative or no impact on the growth of these economies. He forwarded three reasons for this contradiction:

1st Due to its quality, schooling may not actually raise cognitive schools or productivity.

2nd Expanding the supply of education in the presence of stagnant demand for educated labor causes the economic return to education to fall rapidly. 3rd Due to the institutional set up in these countries, the improved cognitive skills acquired through education engage in privately remunerative but socially dysfunctional or wasteful activities so that aggregate output stagnates or even falls. A study by Nazrul Islam (1995) also attests to these unexpected outcomes.[43]

However, more specifically, Temple (2001) points out that fragile correlation in cross-country data may be due to measurement error and influential exceptions. Also, some kinds of relationships are more robust that others.

Research on the topic has mainly relied on cross-country regression analysis. Cross-section regression studies of growth have numerous methodological drawbacks and much more testing on better quality educational data, and data consistency particularly for education, is required before firm conclusions can be drawn on the direct effect of education on economic growth. The cross-section focus may be inadequate if rates of return to education or the quality of education differ substantially across countries.

[43] Using panel data, N. Islam (1995) found revealed that the human capital variable is negatively signed and statistically significant in the non-oil producing countries sample, and negatively signed, though statistically insignificant, in the intermediate and OECD countries samples.

Unfortunately, with respect to human capital, there are very few studies that analyze a single country over a certain time period. However, the original motivation of studying economic growth must focus on the time-series dynamics of macroeconomic variables. Evidence from the annual time-series of individual countries is potentially more reliable in identifying the sources of countries' growth performances not least because it avoids questionable assumptions implicit in much cross-country work.

One of the most interesting time series studies is by Jenkins (1995), who explores the links between education and economic performance for the United Kingdom (1971-92). The limited time period suggests the need for caution in interpreting results. Testing the effects of different educational qualifications (together with measures of physical capital investment on output) Jenkins finds positive effects of both intermediate and higher educational qualifications. The study concludes by suggesting that highly qualified workers can be up to twice as productive as those with no qualifications.

Empirical results often do not allow for a clear-cut conclusion of the macroeconomic role of education on growth, and theory seems to be much ahead of empirics. Results that come close to a priori expectation of the magnitude of human capital on growth seem to share three properties. First, a specification of the underlying regression that is based on a production function; Second, in particular regarding human capital, empirical data of reasonable quality; And finally, a functional form of the regression equation that tends to reduce econometric problems.

Following the theoretical construct, attempts to measure empirically the impact of education on growth are also divided into two categories. In fact, the evidence on the neo-classical *vs.* endogenous growth models is still inconclusive. The available macro evidence does not allow us

in general to distinguish between theories, since most of them (although hypothesizing different ways in which human capital might enhance growth) are observationally equivalent. They yield similar predictions relating to the impact of some human capital variable on growth.

Despite these new developments, however, the fact remains that 'accounting is no explanation' (Griliches, 1997). Even if productivity growth has been allocated in detail to the various components the existence of such a positive correlation tells us nothing about causal relationships, about the mechanisms, the processes through which human capital accumulation affects economic growth.

Macroeconomic literature related to Africa has been scarce in the topic. A paper by Kwabena Gyimah-Brempong (2005) investigated the difference in growth effects of human capital in African countries and the rest of the world. Using a dynamic panel estimator he found out that the effect of human capital on the growth rate of per capita GDP in Africa does not differ significantly from the growth impact of human capital in the rest of the world.

Another study by Simon Appleton and Francis Teal (1998) suggests that the role of human capital in Africa's economic development is complex. Inadequate investment in education and health are clearly not the only cause of Africa's economic difficulties. However, the poor health and education of Africa's workers is one factor explaining her low income. Another study by Teshome (1981) systematically surveys the literature related to the problem of "educated unemployment" in Africa and puts out three lines of arguments to explain this phenomena. 1st- Education is considered ill suited to the needs of the continent and the world of work. 2nd- Most African nations exhibit unsatisfactory growth rates in employment determining factors such as

output, investment, aggregate saving, etc. 3rd- The malfunctioning behavior of the labor market contributes to this adverse phenomenon of educated unemployment.

In contrast to the macroeconomic studies, microeconomic studies in the African continent with respect to the returns of education are immense. The private returns to education are substantial and even more important in sub-Saharan Africa than in other regions of the world (Psacharopoulos, 1994). Across different levels of education, returns to primary education generally appear to be the highest, because foregone earnings for smaller children are lower than for older ones. [44]

The Ethiopian literature on the topic is very scarce. Most of the studies engage in calculating the microeconomic returns to education in some selected urban centers. Studies by Verwimp (1994), Zinash (2001), Wolday (1997) and Mengistae (1998) measured the return for an additional year of education to be significantly positive.[45]

Using school enrollment as a proxy for human capital, Netsanet (1997) found out that human capital has a significant impact on the level of output while Seid (2000) found out that the human capital variable has an insignificant impact in the dynamic model using a similar proxy.

A study which accorded due role to education and economic growth through the school labor market linkage is by Teshome (1995). Teshome (1995) finds out that high levels and rates of unemployment growth and the continued rise in labor supply in the wake of stagnation or relative low growth of the demand for labor force wage levels down even to the minimum value of the reservation wage.

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[44] Psacharopoulos (1994) finds out that the African country average private rate of returns is 41.3%, 26.6% and 27.8% for primary, secondary and tertiary level of education respectively.

[45] The private returns ranged between a low of 5% and a high of 15% in the studies indicated.

Abosetegne (2000) shows that the main causes of unemployment for tertiary level graduates are the absence of relationship between higher education and the labor market, the non-existence of national policy of employment for graduates, stagnation of the economy and language barrier. There was also a serious mismatch between what the educational institutions are producing and what the employers need (Abosetegne, 2000). In this respect Alemu (2000) finds out that the major factors that determine the employability of the graduates from vocational schools were linkages between schools and companies, working facilities and curriculum, which were found to be poorly developed especially in the government schools.

CHAPTER FIVE

MODEL SPECIFICATION AND METHODOLOGY

5.1 Model Specification

Concerning the second objective of the study, the existing literature contains a number of distinct conceptual rationales for the inclusion of human capital in models of economic growth. According to Sianesi and van Reenen (2003), the two main macro approaches are the Augmented Solow Model and the New Growth Theories. The Augmented version extends the basic framework to allow human capital as an extra input to enter the production function. In particular Mankiw, Romer and Weil (1992) showed that traditional growth theory can accommodate human capital and provide a reasonable approximation for empirical analysis. At the economy- wide level, it may also take into account human capital externalities.

The empirical methodology is based on the human capital augmented growth model of Mankiw, Romer and Weil (1992) with essential modifications for time series data. This model considers human capital as an independent factor of production. According to Griliches (1997), the main and possibly only approach to testing the productivity of schooling directly is to include it as a separate variable in an estimated production function. Jonathan Temple (2001) also notes that the key attraction of growth regressions is that they provide a way of testing directly the productivity effects of education. It is represented in a Cobb-Douglas production function with constant returns to scale:

$$Y = K_t^{\alpha} HK_t^{\beta} (A_t L_t)^{1-\alpha-\beta} \quad (1)$$

Where Y represents output, A is the level of technology. K, H and L are physical capital, human capital and labor respectively.

The predominant empirical literature on growth generally employs the cross sectional data. Though it is believed that differences may actually exist across countries, these studies assumed the existence of identical aggregate production function for all the countries. So the application of time series framework helps to better understand the specific historical development in perspective.

5.1.1 Model Outline

The human capital augmented production function is given by:

$$Y = K_t^{\alpha} HK_t^{\beta} (A_t L_t)^{1-\alpha-\beta} \qquad (1')$$

Where Y_t – aggregate level of output (GDP) at 1980/81 constant prices.

K_t – is physical capital.

HK_t – human capital stock

L_t – the labor force.

A_t – the technological progress that is exogenous.

And $\alpha + \beta \prec 1.$

This is transformed in to an empirically estimable specification following Mankiw, Romer and Weil (1992) as follows.[46]

$$\ln Y_t = a + \theta_1 \ln K_t + \theta_2 \ln L_t + \theta_3 \ln HK_t + \varepsilon_t \qquad (2)$$

[46] The theoretical derivation of the empirically estimable model following Mankiw, Romer and Weil (1992) is shown in Appendix I.

5.1.1.1 The Static Long Run Model

Growth theory suggests the variables to be included in the production function equation as follows.

$$Y = f(L, K, HK, TOT, F) \quad (3)$$

Where Y_t, K_t, HK_t, Lt and At are as given in equation (1') and TOT and F are term of trade and official development assistance respectively.

Economic theory requires that labor; capital; both physical and human, and other factors basically determine the growth of an economy. Foreign aid has become an essential component of the growth process especially in a developing country like Ethiopia since it tends to boost consumption both government and private. It is also a common practice in the literature to consider the natural logarithm of the original equation.

Following Mankiw, Romer and Weil (1992), the structural long run formulation of the model for this study could be represented as:

$$\ln Y_t = a + \theta_1 \ln K_t + \theta_2 \ln L_t + \theta_3 \ln HK_t + \theta_4 \ln EX_t + \theta_5 \ln F_t + \varepsilon_t \quad (4)$$

Where,

$\ln Y_t$ - the natural logarithm of total output.

$\ln K_t$ - the natural logarithm of gross capital formation.

$\ln H_t$ - the natural logarithm of average human capital.

$\ln TOT_t$ - the natural logarithm of gross exports.

$\ln L_t$ - the natural logarithm of labor force.

$\ln F_t$ - the natural logarithm of official development assistance.

ε_t - the error term that is white noise.

Apriori, economic theory postulates that the explanatory variables of output satisfy certain conditions. Labor, capital; both physical and human, official development assistance and terms of trade are expected to have a significant positive impact on the gross domestic product of a nation.

5.1.1.2 The Error Correction Model

The formulation given in (4) is not suitable for a time series data since problems might arise because of the fact that most macroeconomic time series contain unit roots and the regression of one non-stationary series on another is likely to yield spurious results. The macroeconomic data for Ethiopia is not an exception.

Transforming the time series to stationarity by differencing could remove the estimation bias. Still, this has significant implication since it tends to forgo information on the long run properties of the variables. Besides, economic theories are also generally formulated for levels of variables rather than for differences. One approach to dealing with this problem is to employ a method that combines long run information with a short run adjustment mechanism.

Engel and Granger (1987) show that if a vector of variables is cointegrated then there exists a valid error correction representation of the data which is not liable to the problems of spurious regression. This procedure is shown to give coefficient estimates which converge on the true parameter values.[47] Furthermore, these estimates converge even faster to the true value than the standard econometric estimates.[48] This method employs the error correction methodology, which has successfully been used in alternative growth studies ((Nehru and Dareshwar, (1994), Morales (1998) and Bassanini and Scarpetta (2001)).

[47] S. G. Hall, 1986.
[48] Engel and Granger, 1987.

The ECM is a transformation of the general autoregressive distributed lag /ADL/ model:

$$\ln Y_t = a + \sum_{i=1}^{m} \theta_{0i} \ln Y_{t-i} + \sum_{i=0}^{m} \theta_{1i} \ln K_{t-i} + \sum_{i=0}^{m} \theta_{2i} \ln L_{t-i} + \sum_{i=0}^{m} \theta_{3i} \ln HK_{t-i} + \sum_{i=0}^{m} \theta_{4i} \ln TOT_{t-i} + \sum_{i=0}^{m} \theta_{5i} F_{t-i} + \varepsilon_{0t} \quad (5)$$

This ADL model expresses the level of output as a function of its own past values and current and past values of the other variables in the model. The Error Correction Model (ECM) is derived from the ADL model by imposing certain restrictions on the parameters.[49]

The ECM is represented as:

$$\Delta Y_t = a_0 + \sum_{i=1}^{m} \theta_{0i} \Delta \ln Y_{t-i} + \sum_{i=0}^{m} \theta_{1i} \Delta \ln K_{t-i} + \sum_{i=0}^{m} \theta_{2i} \Delta \ln L_{t-i} + \sum_{i=0}^{m} \theta_{3i} \Delta \ln HK_{t-i} + \sum_{i=0}^{m} \theta_{4i} \Delta \ln TOT_{t-i} + \sum_{i=0}^{m} \theta_{5i} \Delta \ln F_{t-i} + \theta_6 ECM_{t-1} + \varepsilon \quad (6)$$

Where ECM_{t-1} is the error correction term lagged on period. It is derived from the lagged residuals ε t of the levels in the regression in levels using the Engel Granger method.

Error correction is essentially a necessary and sufficient model form and it is this property which explains the considerable practical success of error correction formulations in encompassing and

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[49] The ECM is derived as follows:
Given a model as: $y_t = \alpha + \beta x_t + \gamma x_{t-1} + \delta y_{t-1} + e_t$
And subtracting y_{t-1} from both sides, we obtain:

$$\Delta y_t = \alpha + \beta x_t + \gamma x_{t-1} - [1 - \delta] y_{t-1}$$

If we now add and subtract βx_{t-1} to and from both sides we obtain:

$$\Delta y_t = \alpha + \beta \Delta x_t + [\beta + \gamma] x_{t-1} - [1 - \delta] y_{t-1}$$

If we now impose the unit restriction $\beta + \gamma = 1 - \delta$ we obtain:

$$\Delta y_t = \alpha + \beta \Delta x_t + [1 - \delta] x_{t-1} - [1 - \delta] y_{t-1}$$

And re-arranging:

$$\Delta y_t = \alpha + \beta \Delta x_t - [1 - \delta][y - x]_{t-1}$$

$$\Delta y_t = \alpha + \beta \Delta x_t - [1 - \delta] ECM_{t-1}$$

$$\Delta y_t = \alpha + \beta \Delta x_t - \phi ECM_{t-1}$$ which is the Error Correction Model representation.

reconciling diverse empirical estimates in many subject areas (ed. Z. Griliches and M. D. Intriligator, 2001).

The choice of the number of lags is a difficult task. This is partly determined by the frequency of the data but also by the structure of serial correlation that characterizes the regression model. It is also useful to choose lag lengths on the basis of the Akaike Information Criterion (AIC) and Schwartz Criterion and lags structural analysis is used to determine the number of lags to be used.

Following Hendry's (1995) 'general-to-specific' approach, where the least significant variables are successfully eliminated, the error correction model of the human capital augmented production equation for Ethiopia would be specified as follows:

$$\Delta \ln Y_t = \ln A + \theta_1 \Delta \ln K_t + \theta_2 \Delta \ln L_t + \theta_3 \Delta \ln HK_t + \theta_4 \Delta \ln TOT_t + \theta_5 \Delta \ln F_t + \phi(\ln Y_{t-1} - \ln A - \beta_1 \ln K_{t-1} - \beta_2 \ln L_{t-1} - \beta_3 \ln H_{t-1} - \beta_4 \ln TOT_{t-1} - \beta_5 \ln F_{t-1}) + \theta_{12} Dummy_t + \varepsilon_t \quad (7)$$

As it stands this equation cannot be estimated by Ordinary Least Squares since the variables in parenthesis cannot be formed without knowledge of α and β's. However one can estimate the reparameterized form:

$$\Delta \ln Y_t = \ln A + \theta_1 \Delta \ln K_t + \theta_2 \Delta \ln L_t + \theta_3 \Delta \ln HK_t + \theta_4 \Delta \ln TOT_t + \theta_5 \Delta \ln F_t + \theta_6 \ln Y_{t-1} + \theta_7 \ln K_{t-1} + \theta_8 \ln L_{t-1} + \theta_9 \ln HK_{t-1} + \theta_{10} \ln EX_{t-1} + \theta_{11} \ln F_{t-1} + \theta_{12} Dummy_t + \varepsilon_t \quad (8)$$

Equation (8) can now be reformulated in order to incorporate an Error Correction term. The Engel and Granger Two step Procedure in which the Error correction term, ECM_{t-1} is derived

from the lagged residuals, ε_t of the levels in regression in equation (4) (long term) is employed to estimate the final structural error correction model representation:

$$\Delta \ln Y_t = \ln A + \theta_1 \Delta \ln K_t + \theta_2 \Delta \ln L_t + \theta_3 \Delta \ln HK_t + \theta_4 \Delta \ln TOT_t + \theta_5 \Delta \ln F_t + \phi ECM_{t-1} + \theta_{12} Dummy_t + \varepsilon_t \quad (9)$$

Equation (8) and (9) should in principle produce similar results, because one can be taken as a transformation of the other. They may therefore yield information about the robustness of the estimated coefficients. In the case of Ethiopia, it would be useful to include a dummy variable into the error-correction model in order to test and eventually correct for the deviations of the long-run trend on output arising from drought and government change.

The Error correction representation of equation (9) shows the short run and long run dynamics. The long run dynamic is contained in the error correction term. The coefficient of the error correction term is apriori expected to be negative. And the magnitude of this coefficient shows the speed of adjustment towards the long run equilibrium.

5.2 Time Series Properties

5.2.1 Testing for Stationary[50]

The essence of regression analysis is in part to estimate meaningful economic relationship in order to test existing theoretical hypothesis and guide further policy direction. However, estimating regression parameters and carrying out various hypotheses testing without the

[50] In order to make any kind of statistical inference from a single realization of a random process, stationarity of the process is often assumed. Intuitively, a process $\{X_t\}$ is stationary if its statistical properties do not change over time. More precisely, the probability distributions of the process are time-invariant. A time series is said to be weakly stationary if its mean, variance, and auto-covariances are independent of time as defined by $\mu(t) = E(X_t)$, $\delta^2(t) = Var(X_t) = E(X_t - \mu(t))^2$ and $\gamma(s,r) = Cov(X_s, X_r) = E(X_s - \mu(s))(X_r - \mu(r))$, respectively.

appropriate investigation of data generating processes underlying the variables at work may lead to false conclusions as to the existence and significance of meaningful economic relationships. The important cause of such a dilemma is the existence of spurious correlation (Granger and Newbold, 1974) between variables in a regression equation, where what actually exists is correlated time trends rather than a meaningful economic relationship (Granger and Newbold, 1986). A combination of variables that contains time trend or are non-stationary may therefore lead to spurious correlation.

So, various stationary tests need be undertaken to safeguard the study from such "seemingly impressive spurious" regressions.

5.2.1.1 The Dickey Fuller Test

If a time series is generated by the following first-order autoregressive process:

$$y_t = \mu + \rho y_{t-1} + e_t \qquad e_t \sim iid(0,\sigma^2)^{51} \qquad (5.2.1)$$

Then the process can be taken to describe a random walk with drift. We could re-express this equation as:[52]

$$\Delta_1 y_t = \mu + \gamma y_{t-1} + e_t \qquad \text{where} \qquad \gamma = \rho - 1 \qquad (5.2.2)$$

And the set of hypotheses is defined as:

H_o: $\gamma = 0$ [$\rho = 1$, i.e. y_t series is integrated of order one or non-stationary]

H_a: $\gamma < 0$ [$\rho < 1$, i.e. y_t series is integrated of order zero or stationary]

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[51] This means that the errors are identically and independently distributed with a mean of zero and a constant variance.

[52] Given the original data generating process:

$$y_t = \mu + \rho y_{t-1} + e_t \qquad e_t \sim iid(0,\sigma^2)$$

Subtracting y_{t-1} from both sides of the equation, we obtain

$$y_t - y_{t-1} = \mu + \rho y_{t-1} - y_{t-1} + e_t \qquad \text{which can be re-written as:}$$

$$\Delta_1 y_t = \mu + (\rho - 1)\, y_{t-1} + e_t$$

$$\Delta_1 y_t = \mu + \gamma y_{t-1} + e_t \qquad \text{where} \quad \gamma = \rho - 1$$

The null implies that there is a unit root present in the data. Thus, if $\rho=1$ then the series is said to have a unit root. And if $\rho=1$ this implies that $\gamma=0$. Under such circumstances the series is said to be integrated of order one or I (1)[53] and requires differencing once to achieve stationarity.

5.2.1.2 The Dickey-Fuller Test with Trend

In order to allow for a deterministic trend in the data, the regression model just introduced is usually modified and expressed as:

$$\Delta_1 y_t = \mu + \gamma y_{t-1} + \beta t + e_t \qquad (5.2.3)$$

Where t is a time trend introduced to capture any deterministic trends in the data. The hypotheses specified above are still valid.

5.2.1.3 The Augmented Dickey Fuller Test

The Augmented Dickey-Fuller (ADF) test is a modification of the DF test and involves augmenting the Dickey-Fuller equation by lagged values of the dependent variable. This is done to ensure that the error process in the estimating equation is residually uncorrelated but also captures the possibility that y_t is characterized by a higher order autoregressive process. A failure to introduce variables designed to capture omitted dynamics leads to a biased standard errors – hence the importance of introducing the lagged terms.

The following specifies the type of equation used to compute an ADF

$$\Delta y_t = \mu + \gamma y_{t-1} + \gamma t + \sum_{j=1}^{k} \delta_j \Delta y_{t-j} + e_t \qquad (5.2.4)$$

[53] A non-stationary series is integrated of order d, denoted I(d) if it becomes stationary after being differenced d times (Greene, 2003).

The lag length is determined mainly by the structure of serial correlation that characterizes the regression model. The conventional set of hypotheses in the context of the augmented Dickey-Fuller (ADF) test is the same as above.

5.2.2 Co integration and Testing for Co integration

In the face of non-stationary series with a unit root (e.g., a random walk series), first differencing appears to provide the appropriate solution to ensuring series are weakly stationary. First differencing, however, does possess a major limitation in that it tends to ignore the long run properties of the data. Besides, economic theories are also generally formulated for levels of variables rather than for differences.

If two time series y_t and x_t are both integrated of order *d* (i.e. I (*d*)), then, in general, any linear combination of the two series will also be I (*d*); that is, the residuals obtained on regressing Y_t on x_t are I (*d*). If, however, there exists a vector *b*, such that the disturbance term from the regression ($e_t = y_t - bx_t$) is of a lower order of integration I (*d-b*), where $b>0$, then Engle and Granger (1987) define y_t and x_t as cointegrated of order (*d,b*).

5.2.2.1 Test for Co integration

The procedure that is employed to explore the relationship between ECM models and co integration was due to Engle and Granger in the mid-1980s. The Johansen co integration analysis is also employed to check the robustness of the outcome /See Annex I/.

5.2.2.2 The Engle-Granger Two-Step Procedure

Engle and Granger show that two or more variables are co integrated of order I (1, 1) if and only if an ECM exists.

There are essentially three steps to this procedure.

1) Establish the order of integration of the variables

Pre-test the variables for their order of integration using DF and ADF tests.

2) Estimate the econometric relationship between the levels variables

Estimate the following equation using OLS.

$$y_t = \alpha + \beta x_t + u_t \tag{5.2.5}$$

The following estimates are obtained:

$$y_t = \hat{\alpha} + \hat{\beta} x_t + \hat{u}_t \tag{5.2.6}$$

This is called the co integrating regression and represents a long-run relationship between the levels variables y_t and x_t. It has been shown that the application of OLS to I (1) series yields what are called 'super-consistent' estimates.

Retrieve the estimated residuals, which we will define as $\hat{u}_t$.

$$\hat{u}_t = y_t - \hat{\alpha} - \hat{\beta} x_t \tag{5.2.7}$$

Establish whether the residuals are stationary using DF/ADF tests. If the tests indicate that the residuals are stationary, proceed to the next step. This suggests that y_t and x_t are co integrated. In any event it is always desirable to proceed to the next stage, as this offers an additional framework for co integration testing.

3) Formulate the final error correction model (ECM)

The residuals from step two can be used to formulate the dynamic ECM.[54]

$$\Delta y_t = \alpha + \beta \Delta x_t - \phi [y - \hat{\alpha} - \hat{\beta} x]_{t-1} + v_t \quad (5.2.8)$$

Where v_t is an error term that satisfies the standard properties.

The ECM could be re-written as:

$$\Delta y_t = \alpha + \beta \Delta x_t - \phi \hat{u}_{t-1} \quad (5.2.9)$$

In this equation, all the variables are integrated of the same order (assumed to be I (0) in this case) and the application of OLS is valid. In addition, the use of standard t-tests and F-test is also permitted.

A test of the significance of the estimated ϕ parameter provides an additional test for co integration. The competing hypotheses are:

Ho: $\phi = 0$ [non-co integration]

Ha: $\phi < 0$ [co integration]

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[54] The ECM is derived as follows:
Given a model as: $y_t = \alpha + \beta x_t + \gamma x_{t-1} + \delta y_{t-1} + e_t$
And subtracting y_{t-1} from both sides, we obtain:
$\Delta y_t = \alpha + \beta x_t + \gamma x_{t-1} - [1 - \delta] y_{t-1}$
If we now add and subtract βx_{t-1} to and from both sides we obtain:
$\Delta y_t = \alpha + \beta \Delta x_t + [\beta + \gamma] x_{t-1} - [1 - \delta] y_{t-1}$
If we now impose the unit restriction $\beta + \gamma = 1 - \delta$ we obtain:
$\Delta y_t = \alpha + \beta \Delta x_t + [1 - \delta] x_{t-1} - [1 - \delta] y_{t-1}$
And re-arranging:
$\Delta y_t = \alpha + \beta \Delta x_t - [1 - \delta][y - x]_{t-1}$
$\Delta y_t = \alpha + \beta \Delta x_t - [1 - \delta] ECM_{t-1}$
$\Delta y_t = \alpha + \beta \Delta x_t - \phi ECM_{t-1}$ which is the error correction representation.

This test provides a complement to the DF and ADF tests for co integration already discussed. The presence of co integration implies that the equation with non stationary variables is best estimated by the error correction method for the long run equilibrium and short run dynamics. In the Engel Granger representation theorem if a set of variables are co integrated of order 1, 1 (i.e., CI (1, 1), then there exists a valid error correction representation of the data.[55] It is also important to ensure that the estimated ECM model satisfies the conventional properties in regard to OLS (e.g., serial independence, homoscedasticity, correct functional form and normality of the residuals).

5.3 Specification of Variables and Source of Data

The empirical analysis employs data sets for the period 1971-2005 for all the variables. The time series are mainly from Ministry of Finance and Economic Development/ MOFED/, The National Bank of Ethiopia /NBE/, The Central Statistical Office /CSA/, from the Ministry of Education /MOE/ and the United Nations educational, Scientific and Cultural Organization /UNESCO/ publications and resources.

The dependent variable is *GDP* level of the country at 1980/81 constant prices. The level forms are preferred to the growth rates in a time series framework mainly due to the stationary nature of growth rate time series.

The labor force is measured by the economically active population.

The physical capital stock will be proxied by gross capital formation at 1980/81 constant prices.

[55] Engel and Granger, 1987.

5.3.1 Human Capital Specification

Because human capital is multifaceted and includes a complex set of human attributes, the stock of human capital held by individuals is hard to measure with precision in a quantitative form (Barro and Lee, 2000)

In order to quantify the relationship between human capital and economic outcome variables, there have been a number of attempts. The early contributions to the literature specified the stock of human capital in the labor force by proxies such as *adult literacy rates* and *school enrollment ratios*. In most studies, this choice of specification reflects ease of data availability and a broad coverage of countries by the available data rather than suitability for the theoretical concept at hand.[56]

Studies such as Azariadis and Drazen (1990) and Romer (1990) use the adult literacy rate as a human capital proxy. Literacy is commonly defined as the ability to read and write, with understanding a simple statement related to one's daily life. The adult literacy rate then measures the number of adult literates (e.g., in the population aged 15 years and over) as a percentage of the population in the corresponding age group. This proxy misses out most of the investments made in human capital because it only reflects the very first part of these investments. Any educational investment which occurs on top of the acquisition of basic literacy; e.g., the acquisition of numeracy, of logical and analytical reasoning, and of scientific and technical knowledge is neglected in this measure. Hence using adult literacy rates as a proxy for the stock of human capital implies the assumption that none of these additional investments directly adds

[56] Ludger Wößmann, 2002.

to the productivity of the labor force. Therefore, adult literacy rates can only be a poor proxy for human capital stock.

Another predominantly used human capital proxy used in the literature is the school enrollment ratios which measure the number of students enrolled at a grade level relative to the total population of the corresponding age group. Barro (1991), Mankiw (1992) and Levine and Renelt (1992) have used this proxy in their study among many others. Even if it is the most popular proxy used enrollment ratio may be a poor measure of the stock of human capital for various reasons. Enrollment ratios are flow variables, and the children currently enrolled in schools are by definition not yet a part of the labor force, so that the education they are currently acquiring cannot yet be used in production (Ludger Wößmann, 2002)

First, they do not measure the human capital embodied in the entrants of the labor force this year, but the human capital acquired by current students who might enter the labor force at some time in the future. In sum, enrollment ratios may not even accurately
represent changes in the human capital stock, especially during periods of rapid educational and demographic transition (Hanushek and Kimko 2000).

Both adult literacy rates and school enrollment ratios seem to have major deficiencies as proxies for the concept of human capital highlighted in theoretical models. The inadequacies of these proxies have motivated improvements in the specification of the human capital stock.

When looking for a measure of the stock of human capital that is currently used in production, it seems sensible to quantify the accumulated educational investment embodied in the current labor

force.[57] Therefore, several studies have tried to construct data on the level of educational attainment of the labor force to quantify the average years of schooling in the labor force. Educational attainment is clearly a stock variable, and it takes into account the total amount of formal education received by the labor force (Ludger Wößmann, 2002).

So average years of schooling of the labor force have recently become the more popular and commonly used specification of the stock of human capital in the literature, including studies such as Barro and Sala-i-Martin (1995), Barro (1997, 1999), Benhabib and Spiegel (1994), Gundlach (1995), Islam (1995), Krueger and Lindahl (2000), O'Neill (1995), and Temple (1999).

In this specific paper the method use by Barro and Lee (2000) for the generation of human capital will be used. The formulas for the various levels of schooling for the population aged 15 and over are put as follows:

$$H_{0,t} = H_{0,t-1}(1-\delta_t) + L15_t(1-PRI_{t-1}) \quad (5.3.1.1)$$

$$H_{1,t} = H_{1,t-1}(1-\delta_t) + L15_t(PRI_{t-1} - SEC_t) \quad (5.3.1.2)$$

$$H_{2,t} = H_{2,t-1}(1-\delta_t) + L15_t SEC_t - L20_t HIGH_t \quad (5.3.1.3)$$

$$H_{3,t} = H_{3,t-1}(1-\delta_t) + L20_t HIGH_t \quad (5.3.1.4)$$

Where

$H_{j,t}$ = Number of the economically active population for whom j is the highest level of schooling attained (j=0 for no school, j=1 for Primary, j=2 for Secondary and j=3 for Higher education) at time t.

[57] Barro (1997, 1999), Barro and Lee (2000), Barro and Sala-i-Martin (1995), Benhabib and Spiegel (1994), Islam (1995), Krueger and Lindahl (2000), O'Neill (1995), and Temple (1999).

PRI = enrollment ratio for primary school.

SEC = enrollment ratio for secondary school.

TER = enrollment ratio for tertiary education.

L = number of the economically active population.

L15 = number of persons aged 15-19.

L20 = number of persons aged 20 and over.

δ_t = mortality rate of the human capital stock.

The variable δ_t is the mortality rate for persons aged 15 and over which is proxied by the mortality rate for the population.

The formula that we use to calculate the attainment ratios for each level of education is:

$$h_{j,t} = H_{j,t} / L_t \qquad (5.3.1.5)$$

Where $h_{j,t}$ is the attainment ratios for each level of education for each level of education. The application of equations (5.3.1.5) generates our data set on educational attainment for the population aged 15 and over from 1971 to 2005 at the four broad levels of schooling: no school, some primary, some secondary, and some higher.

Finally, the formula to construct the measure for the human capital stock combines the estimated attainment data with the information on the duration of each schooling level and is given as:

$$h_t = \sum_{j=1}^{3} h_{j,t}.d_{j,t} \qquad (5.3.1.6)$$

Where ht stands for the average years of schooling (the human capital variable), h_j is the estimated attainment ratio of the labor force and d_j is the average number of years of education

received in the respective schooling level j. This generates the average years of schooling of the labor force, which is used as a proxy for the human capital stock.

CHAPTER SIX

Empirical Analysis

The staring point of the empirical investigation is given by the univariate analysis of time series.

5.1 Stationarity Tests

ADF (DF) test results for all the variables considered in this study using:

$$\Delta y_t = \mu + \gamma y_{t-1} + \gamma t + \sum_{j=1}^{k} \delta_j \Delta y_{t-j} + e_t \qquad (5.2.4')$$

are presented in Table 5.1. When the ADF statistic is smaller than the critical value, the null of non-stationarity is rejected. In every case, the number of lags included in the regression was chosen using the Akaike Information Criterion (AIC).

The upper part of the table depicts the results for the time series in level forms. Nonstationarity was never rejected implying that all the time series variables in levels have unit root and are integrated of order one; I (1). The lower part of the table shows results for the first differenced series. The hypothesis of nonstationarity (unitroot) is rejected at 1% for all the variables in their first differences. All the first differenced series are thus found to be without unit roots so being stationary.

Evidence from table 5.1 and the considerations above lead us to consider all series as I(1), non stationary variables, while their differences are stationary and I (0).

Table 5.1 Stationarity Tests

Variable	DF test statistic without trend	DF test statistic with trend	ADF test statistic	K^+	Result
LnY	0.5689	-1.994	-1.239385	2	Has a unit root
lnK	0.4940	-2.601	-3.031794	2	Has a unit root
lnHK	1.003	-1.252	-2.455782	2	Has a unit root
lnL	-1.243	-1.716	-2.689132	0	Has a unit root
lnF	-2.028	-1.913	-1.913	0	Has a unit root
lnTOT	-1.210	-3.111	-1.209643	0	Has a unit root
ΔlnY	-5.0119752***	-5.136***	-6.971948***	1	Stationary
ΔlnK	-6.992***	-7.276***	-7.276031***	3	Stationary
ΔlnHK	-8.884***	-9.928***	-9.927752***	0	Stationary
ΔlnL	-6.001***	-6.114***	-6.193723***	0	Stationary
ΔlnF	-7.095***	-7.580***	-7.095192***	0	Stationary
ΔlnTOT	-6.994***	-6.877***	-6.877216***	0	Stationary

**Critical values used in ADF test: 10%=-3.2056, 5%=-3.556, 1%=-4.271. * (**) (***) rejects the hypothesis of unit root at 10% (5 %) (1%) significance level respectively. $^+$ K, the number of lags, is chosen using the Akaike Information Criterion (AIC).*

5.2. Co integration

Since all the variables in levels are of the same order; I (1), there is a possibility that these variables are co integrated. The existence of a co integrating relationship implies the existence of long-term relationship in the variables. The Engel Granger Two step procedure is employed to test for co integration.

5.2.1. The Engel Granger Two Step Procedure

Given that all the variables are I (1), the next step is to generate the residuals from the regression in levels and test for their stationarity. The result is shown in the table below. The test result suggests that the variables are co integrated. This provides an additional framework for the Error Correction Mechanism modeling.

Table 5.2 Co integration Test

Variable	DF test statistic without trend	DF test statistic with trend	ADF test statistic	K^+	Result
Residual	-3.966***	-3.900***	-3.294**	2	Stationary

**Critical values used in ADF test: 10%=1.6214, 5%=1.952, 1%=-2.639. ** (***) rejects the hypothesis of unit root at 5 % and 1% significance level. $^+$ K is chosen using the AIC.*

The Johansen co integration analysis also confirms this fact and establishes that there is only one co integrating vector as shown in Annex I.

5.3. Granger Causality Test

In a causality test as first proposed by Granger (1969), we consider the null hypothesis that lnY does not granger cause lnHK and vise versa. These tests confirm the application of a single dynamic model rather than a simultaneous equation model. It helps to test whether economic growth has got an impact on the human capital level in the country and vise versa. Our result shows that there is no feedback effect of economic growth on the level of human capital. The null hypothesis lnHK does not Granger cause lnY is rejected at 10% significance level. Whereas the

causality from lnHK to lnY is not rejected so justifying the fact that the human capital variable enters as the independent variable while the income variable enters as the dependent variable.

Table 5.3 Granger Causality Test

Null Hypothesis	F-Statistic	Probability
lnHK does not Granger Cause LNY	4.12349	0.02694*
lnY does not Granger Cause LNHK	2.75432	0.08091

** Shows rejection of the null hypothesis at 10% significance level.*

5.4. Static Log run Analysis

The structural long run model given by:

$$\ln Y_t = a + \theta_1 \ln K_t + \theta_2 \ln L_t + \theta_3 \ln HK_t + \theta_4 \ln TOT_t + \theta_5 \ln F_t + \varepsilon_t \qquad (4')$$

is estimated using OLS and the result is tabulated as shown below.

Table 5.4.1 Long run Static Model Output

Explanatory Variable	Dependent Variable is lnY
Constant	16.8201 (0.9824)***
lnL	0.0951610 (0.1274)
lnK	0.246318 (0.05708)***
lnHK	0.0811919 (0.03692)*
lnTOT	0.109049 (0.05758)*
lnF	0.0412552 (0.04353)
F-Statistic	149.3 (0.000)***
R^2	0.962613
Log likelihood	51.3608
Normality test	4.2789 (0.1177)
Hetro test	1.5230 (0.2100)
DW	1.31
RESET test	1.7630 (0.1950)
RSS	0.10888861

(*), (**), (***) show that the null hypothesis is rejected at 10%, 5% and 1% significance levels respectively. The figures in parenthesis are standard errors and probabilities in the coefficients and diagnostic tests respectively.

The static long run regression displays the long run relationship in the variables. Since the variables are co integrated, OLS could make sense in depicting the long run relationship present in the variables.

The most striking result is that the human capital variable depicts a significant positive impact at 10% level. The physical capital variable shows a significant positive impact at 1% level. The terms of trade had a significant positive impact at 10% level of significance.

Jointly all the variables are significant at 1% as indicated by the F- statistic. The R^2 is higher as is expected showing a good fit in the model. The diagnostic tests show normality of the residuals, homoscedasticity and correct functional specification as seen by the normality test, the hetro test and the RESET test respectively. But there is a serial autocorrelation problem as can be inferred from the Durbin Watson statistic. Since this could affect the validity of our inference from the model, we resort to the dynamic analysis.

5.5. Dynamic Analysis

Next we will proceed with the Error correction model specified as:

$$\Delta \ln Y_t = \ln A + \theta_1 \Delta \ln K_t + \theta_2 \Delta \ln L_t + \theta_3 \Delta \ln H_t + \theta_4 \Delta \ln TOT + \theta_5 \Delta \ln F_t + \theta_6 ECM_{t-1} + \theta_7 Dummy_t + \varepsilon_t \quad (9')$$

the findings of which are tabulated below along with the diagnostic tests. According to Engel and Granger (1987), the significance of the error correction term, as shown in the output table shows that the variables are co integrated and the error correction model is the correct representational

form for this model. This result confirms our assertion that there is co integration in our time series justifying the error correction formulation. This is because the error correction term has the expected negative sign and is also significant at 5% level.

Table 5.5.1 The Error Correction Model Output.

Explanatory Variable	Dependent Variable is Δ lnY
CONSTANT	0.0336405 (0.01366)**
Δ lnL	0.221516 (0.1402)
Δ lnK	0.156670 (0.05293)**
Δ lnHK	0.0153471 (0.04063)
Δ lnTOT	0.100252 (0.05122)
ΔlnF	0.0527628 (0.03913)
Dummy	-0.0545305 (0.02520) *
ECM_{t-1}	-0.465780 (0.1885)**
F-Statistic	5.498 (0.001)***
Normality	7.7652 (0.2006)
Hetro test	0.94057 (0.5453)
RESET	0.011972 (0.9137)
R^2	0.73506
Log likelihood	57.4047
DW	1.99
RSS	0.0679989071

(**) (***) show that the null hypothesis is rejected at 10%, 5% and 1% significance levels respectively. The figures in parenthesis are standard errors and probabilities in the coefficients and diagnostic tests respectively.

In the error correction representation human capital is insignificant indicating the fact that the impact of human capital is very weak. The impact of physical capital is again seen to be significant and positive at 5% level. The terms of trade variable is positive and significant at slightly more than 10% level of significance. Jointly all the variables are significant at 1% as indicated by the F-statistic.

The fit of the regression as shown by the R^2 (73.506%) is a good one. The diagnostic tests show a good specification for the model. These tests as shown in the table depict that there is no problem of hetroscedasticity since the null of homosedasticity is accepted. The residuals are also normally distributed as is required. And there is correct specification of the model as shown by the acceptance of the null hypothesis of correct specification in the RESET test. The Durbin Watson statistic also confirms that there is no problem of serial autocorrelation.

Given the absence of a clear empirical conclusion in the field, the outcome of the study is not surprising. Most studies undertaken in the developed countries show that education has a significant positive contribution to the level of output. This also holds the case for some developing countries. Babatunde, M. A. and Adefabi (2005) found out that for Nigeria, the human capital variable has a significant positive impact on economic growth. Leoning (2004) shows that for Guatemala, the average years of schooling appear to be strongly and positively associated with economic growth. Young (1995), Barro and Salai-Martin (1995) found a significant positive coefficient for the human capital variable. But other studies including Pritchett (1997), Islam (1995) and Benhabib and Spiegel (1994) found a significant negative impact. The latter impact is usually the case for the least developed countries. The result of this specific study however shows that human capital has an insignificant impact on economic growth

over the period under study. So the output of this particular study is different from the above studies observed. It, above all, illuminates the poor contribution education has made to the Ethiopian economy over the last three decades.

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATIONS

Human capital occupies a central role in modern thinking about growth. Despite a large literature on the matter, there is a lot to be learned: there is no consensus of its role in growth and development, presumably because this role varies across different institutional settings and national environments. This study was undertaken in the hope of uncovering the situation for Ethiopia.

After constructing the required time-series, this paper investigated the impact of human capital on economic growth in Ethiopia through the application of an Error-correction methodology. The average level of human capital appears to have no significant impact on the evolution of total level of output.

Therefore, one reason for the low performance of the economy in terms of output growth may be attributed to Ethiopia's poorly developed human capital base lagging far behind the Sub-Sahara African average. The empirical results in this study have some policy implications. In particular, they underscore the need for further efforts in Ethiopia to increase its level of human capital.

Different factors are considered to explain the unexpected outcome /seen from a theoretical perspective/ from the study. The structure of the labor market is critical for the quantity and quality of human capital that is generated and for the uses to which it is put. The structure of the labor market will determine, for example, how much human capital is put into growth-enhancing activities and how much into other activities. It will also determine what types of human capital will be demanded. Krishnan’s (1998) finding that the labor market in Ethiopia is rigid and

unresponsive to either the pressure from the reform or the growing queues of educated unemployment attests to this case. Another problem very closely related to the rational and efficient utilization of educated labor force derives from brain drain; emigration of high level manpower which has become widespread and directly imposes on the contribution that would have been made from education. Very little is known about the way educated manpower is utilized in Ethiopia.

Given the large size of the public sector in Ethiopia, the total public sector wage bill is especially burdensome. In relation to the results of the study one could also doubt the contribution of the huge public sector employment to growth.

The deteriorating quality of education in the wake of significant expansion in the sector is another element that puts into question the basic framework that education provides students with growth enhancing skills. This is also reinforced by the observation that the curriculum has been too academic, politically motivated and alien to the largest segment of the population. The policy direction of the education sector has also been top down usually following the donor's perspective and is politically motivated.

Human capital is just one aspect of the economy that enters into the determination of growth. Simply providing more schooling may yield little or nothing in the way of economic growth in the absence of other elements such as the appropriate market, legal and governmental institutions and suitable policy environment in other sectors of the economy to support a functioning modern economy. Schooling by itself is not a sufficient engine of growth. In this direction the study also questions the economic policy directions, which could have been perverting the contribution to economic growth that would have been made from an expansion in educational investment.

Major initiatives toward reforming education could have substantial success in the economy. Addressing the issue of relevance and quality of education; the institutional workings of the labor market and employment conditions; and having a comprehensive database (information) related to the workings and relationships of education, labor and the economy would essentially help tap the contributions that could be made from education. The institutional framework that regulates the employment relationship including the legal framework for standards at work, pay scheme bases and related issues must be comprehensively analyzed and dealt with. The study ultimately points towards the importance of an institutional and political environment conducive to growth.

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ANNEX I

A. The Production Equation

The Cobb-Douglas production function with constant returns to scale is given by:

$$Y = K_t^{\alpha} H_t^{\beta} (A_t L_t)^{1-\alpha-\beta} \quad (1)$$

Where Y represents output, A is the level of technology. K, H and L are physical capital, human capital and labor respectively.

Labor and technology are assumed to grow at the rates

$$L_t = L_0 e^{nt} \quad (2)$$

$$A_0 = A_0 e^{nt} \quad (3)$$

The number of effective units of labor, $A_t L_t$ grows at the rate n + g.

Physical and human capital accumulations are expected to follow:

$$\frac{dK_t}{d_t} = I_t - \delta K_t \quad (4)$$

$$\frac{dH_t}{d_t} = Z_t = \delta K \quad (5)$$

Where I_t and Z_t are investments in physical capital and human capital respectively and δ is the rate of depreciation (assumed to be common to both physical capital and human capital).

Given S_k and S_h as the saving rates (rate of accumulation) for both physical and human capital respectively we can write:

$$I_t = S_k Y_t \quad (6)$$

$$Z_t = S_h Y_t \tag{7}$$

The evolution of the economy is determined by the following differential equations.

$$k_t^{*} = s_k y_t - (n + g + \delta)k \tag{8}$$

$$h_t^{*} = s_h y_t - (n + g + \delta)h_t \tag{9}$$

Where $y = Y/AL, k = K/AL, h = H/AL$ are quantities per effective units of labor, physical capital and human capital respectively. The asterisks (*) represent differentiation with respect to time.

Equation (5) implies that the economy converges to the steady state values of k and h defined by:

$$k_t^{*} = \left(\frac{s_k^{1-\beta} s_h^{\beta}}{n + g + \delta}\right)^{(1/1-\alpha-\beta)} \tag{10}$$

$$h_t^{*} = \left(\frac{s_k^{\alpha} s_h^{1-\alpha}}{n + g + \delta}\right)^{(1/1-\alpha-\beta)} \tag{11}$$

Substituting equation (10) and (11) in to the original production function and taking logs gives an equation for income per capita given by:

$$\ln\left(\frac{Y_t}{L_t}\right) = \ln A_0 + gt - \frac{\alpha+\beta}{1-\alpha-\beta}\ln(n + g + \delta) + \frac{\alpha}{1-\alpha-\beta}\ln s_k + \frac{\beta}{1-\alpha-\beta}\ln s_h \tag{12}$$

Combining (12) with the equation for the steady state level of human capital given in (10) and (11) yields an equation for income as a function of the rate of investment in physical capital, the labor force growth and the level of human capital:

$$\ln\left(\frac{Y_t}{L_t}\right) = \ln A_0 + gt - \frac{\alpha}{1-\alpha}\ln(n + g + \delta) + \frac{\alpha}{1-\alpha}\ln s_k + \frac{\beta}{1-\alpha}\ln h^{*} \tag{13}$$

B. Granger causality test

The test runs regressions of the form:

$$y_t = \alpha_0 + \alpha_1 + ... + \alpha_l y_{t-l} + \beta_1 x_{t-1} + ... + \beta_l x_{t-l} \quad (1)$$

$$x_t = \alpha_0 + \alpha_1 + ... + \alpha_l x_{t-l} + \beta_1 y_{t-1} + ... + \beta_l y_{t-l} \quad (2)$$

for all possible pairs of (x,y) series in the group. The reported F-statistics are the Wald statistics for the joint hypothesis:

$$\beta_0 = \beta_1 = ... = \beta_l = 0$$

for each equation. The null hypothesis is therefore that x does not Granger-cause y in the first regression and that y does not Granger-cause x in the second regression. This regression helps to find out if there is any feedback effect between the two variables x and y.

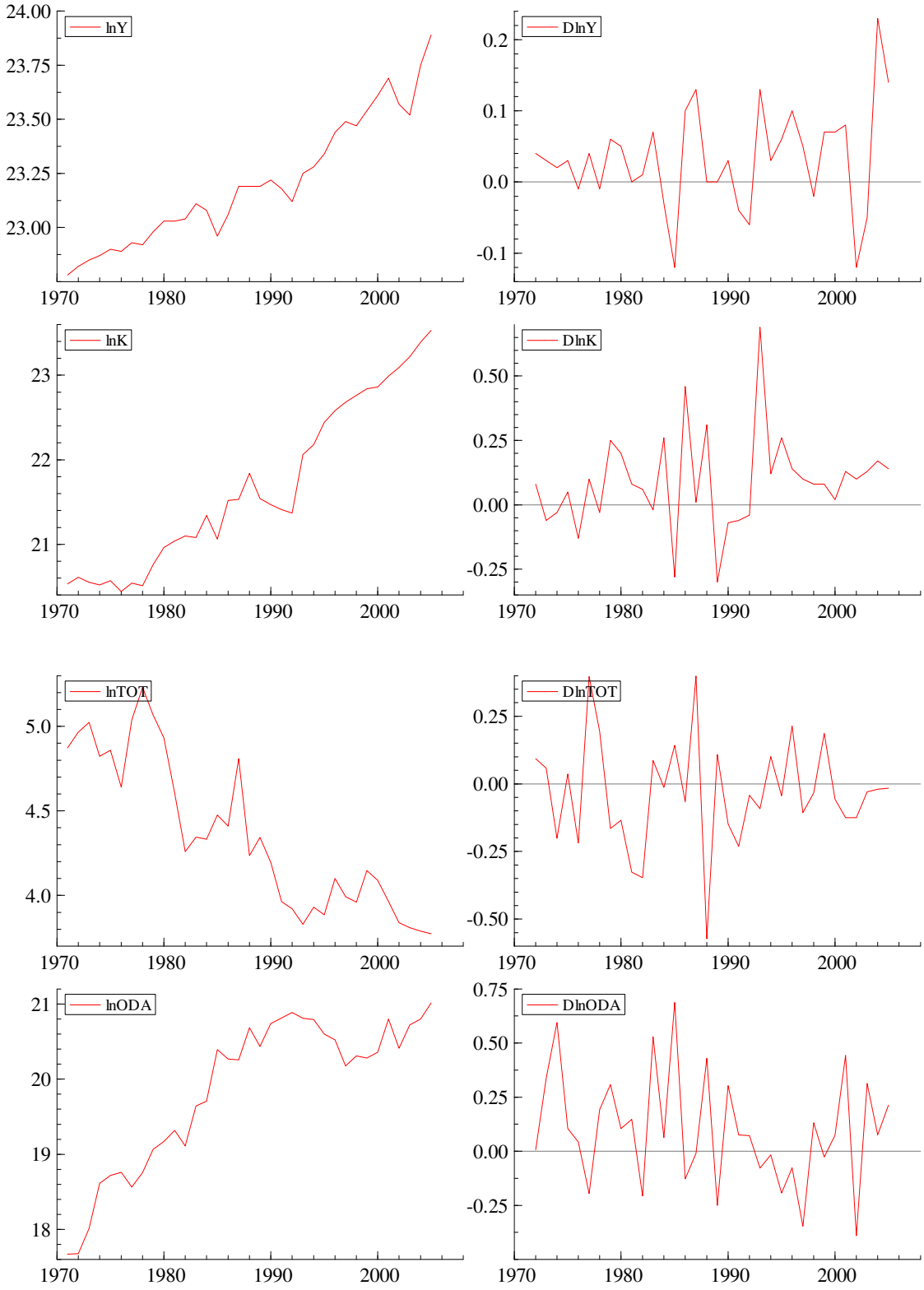
C. The Johansen Co integration Analysis

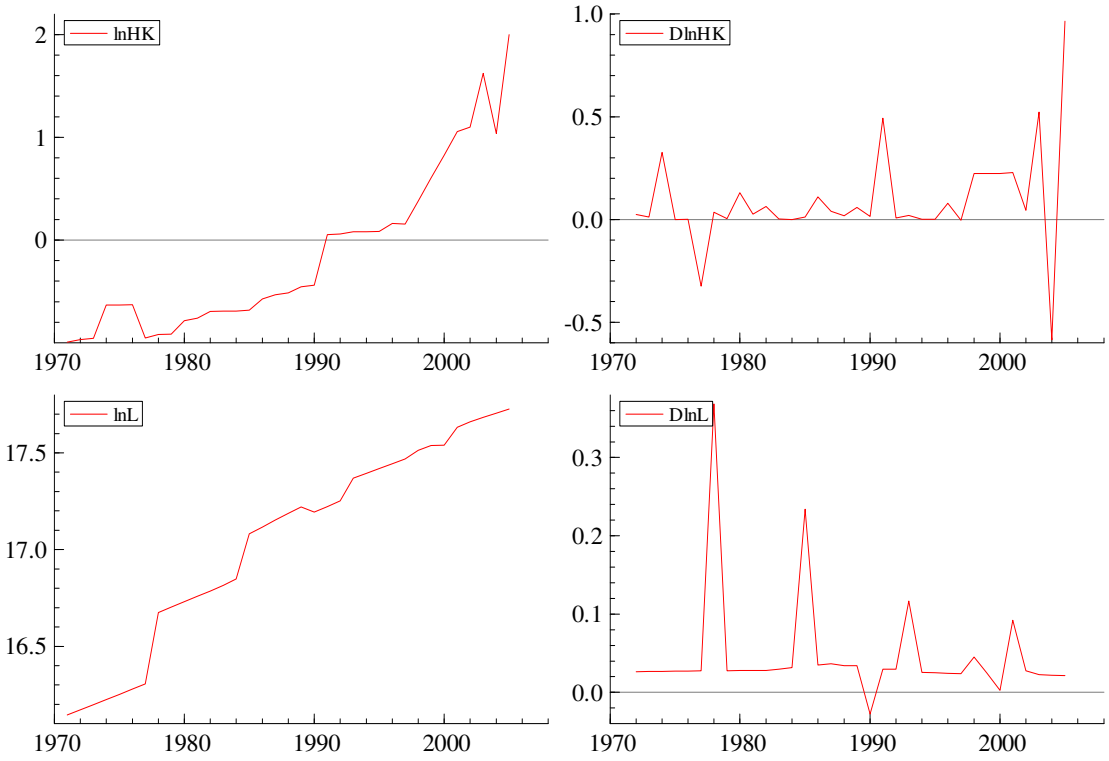
The Johansen test for co integration using the trace test provides the following output.

H0: rank ≤	Trace Test	p-value
0	99.909	(0.023) *
1	61.400	(0.195)
2	31.656	(0.634)
3	15.749	(0.735)
4	6.4336	(0.649)
5	0.035192	(0.851)

ANNEX II

Graphical Analysis




lnHK
2
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1970
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DlnHK
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-0.5
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lnL
17.5
17.0
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1970
1980
1990
2000
DlnL
0.3
0.2
0.1
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1970
1980
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