DETERMINANTS OF LOW GROWTH IN ETHIOPIA: BEYOND THE TRADITIONAL FACTORS

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Abstract

Traditional growth models focus on modelling conventional factors such as labour, physical capital, and human capital. Determinants of economic growth in developing countries operate in different manner from that of developed countries as economic decisions are made under uncertainty and risk in developing countries.

In this paper, we tried to model growth in Ethiopia by including non-traditional factors such as rainfall and foreign exchange constraints along with conventional determinants of growth namely labour, capital, and index for human capital using the Johansen approach of co-integration analysis. It has been found that there is one co-integrating vector where in capital was not statistically significant in affecting long-term growth probably due to the fact that capital is conditional upon availability of rainfall; undercapacity utilization, and existence of a relatively meagre capital in the agricultural sector.

With a robust result using standard econometric techniques, the long-term path that has been estimated is a low level trajectory. The paper forwards questions on the deep fundamentals underlying the low level equilibrium of the Ethiopian economy such as culture, history, governance and the like which do not readily lend hand to the standard econometric techniques developed so far. Looking into such fundamentals is a future research agenda.

1. INTRODUCTION

Explaining the wealth and poverty of nations has been one of the central, but elusive quests of the economics profession. Especially for mainstream economics, the gap

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resources at the international level benefiting every one involved in the trading system. Whatever differences exist owing to differences in initial conditions or owing to distortions in the market mechanism will be eventually accommodated by the workings of the market resulting in the long run towards a convergence in the levels of development between rich and poor countries.

The policy implications for poor countries that emerge from this model are straightforward. Poor countries ought to liberalize their markets and open up to international competition by eliminating all kinds of barriers to trade and be guided by market forces to determine their comparative advantage. In this process the role of the government is rather modest. It ought to concentrate on providing the requisite atmosphere for markets to work effectively. It should create markets where they don't exist and strengthen them where they are weak. It also provides a solid institutional mechanism to allow markets and the private sector to do their job right. If and when it involves in productive activities, it should be in areas where there is a demonstrable market failure particularly in the provision of public goods and the existence of externalities.

It is this framework that dominated policy making in developing countries since the neoclassical counterrevolution in theory and policy making beginning at least in the late 70s. The dominance in policy making was reinforced by the full acceptance of this paradigm by the Bretton Woods Institutions (BWIs) that, owing to the balance of payment difficulties that plagued developing countries, were in a position to impose these policy prescriptions at will on poor countries.

Leaving aside the theoretical validity of the claims made by this paradigm, what is clear after at least two decades of implementing these policies is that the results achieved by these policy prescriptions were, at best, disappointing. The promised rapid growth, export diversification, high levels of capital inflows, significant reductions in poverty and the like failed to materialize in most of the countries that adopted these policies particularly in our continent. So much is now openly (albeit grudgingly) admitted even by researchers working in BWIs who were once strong advocates of these policies.[2]

What is interesting at least for this paper is the fact that these practical failures are bringing back to the fore the fundamental issues of development that development economics has been raising all along. What is new this time around, however, is that the sophistication in modelling and computational technology has opened the possibility of making more rigorous theorizing and empirical analysis including the fundamental issues that are known to affect the development process. In this respect, a good starting point is the various empirical growth models initially developed to

[2] For a detailed treatment of these failures, see Makandawire's paper submitted for this conference.

explain the growth process in developed countries and to explain the factors that have affected growth differentials between countries.

Taking these growth models as its point of departure, this paper tries to look at the degree to which traditional growth models that take labour, physical capital, and human capital as key explanatory variables can explain the growth experience in Ethiopia over the past four decades or so. Failing to get a good explanation for the Ethiopian growth process, the paper then includes other variables (particularly rainfall and exchange rate variability) that we deem are important to get a better fit for the Ethiopian experience. However, while this improved model proved to be a much better fit with all the right statistical properties than the traditional growth models, we found that its ability to explain this low level of growth does not provide a satisfactory explanation as to why the country is stuck at such a low level of development. We suggest in the paper that a proper understanding of the overall development process in the country requires a much more systematic theorizing about the development process by incorporating not only the various issues that were raised earlier by "high development theory" but even more fundamentally it would necessitate a rethink about the behaviour of economic agents and the cultural and social mores that more fundamentally influence these behaviours.

The rest of the paper proceeds as follows. The next section presents schematic survey of the literature on growth theories and models. Section three presents a detailed discussion on the determinants of growth in the Ethiopian context including a presentation of alternative econometric models. This is followed by a brief discussion on the "low level equilibrium" that is characterizing the Ethiopian economy by way of suggesting possible agenda for future research. The last section concludes.

2. THE LITERATURE ON ECONOMIC GROWTH

2.1. Economic Growth Theories and Models

In the age of information technology, it has become very easy to locate one's country rank in the world in terms of economic performance and the relative level of poverty accordingly. We usually evaluate our own poverty in comparison with richer countries. Then, the most obvious question is why the rich countries get rich and why we fail to be rich. In the economics discipline alone there is an immense literature that tries to explain such growth differences across countries and over time.

Growth theories have a long history in the history of economic thought beginning with mercantilists and physiocrats and of course in the works of the classical school (Lombardini 1996). More recently under the Keynesian framework, there had been demand-centered growth theories and models that influenced the discipline of

development economics. These include the Harrod-Domar model, the balanced growth theory of Nurkse, and the unbalanced growth theory of Hirischman. Particularly, the Harrod-Domar model has been used to calculate the financing gap required to achieve a targeted growth rate of GDP (Easterly 1998; Grabowski and Shields 1996).

Kalecki's model, which is more or less in the Keynesian framework, is relevant in explaining the growth mechanics in developing countries. Kalecki (1972) showed how growth of national income is affected by the decline in consumption demand in the agrarian economy, which is a result of the limited supply of necessities. The growth in national income is constrained by the shortage of food supply in the agrarian sector in less developed mixed economies.

The increase in production of necessities, particularly staple food, is limited by institutional factors. These factors keep the supply of necessities low over the given time horizon.[3] The implication is that the growth rate of supply of necessities, which is constrained by institutional factors in the development of agriculture, determines the growth rate of national income.

One of the major criticisms of the Harod-Domar model is the assumption of fixed coefficient of production, that is, it does not allow for factor substitution. Moreover, the Harrod-Domar model does not explain long-run growth. Capital accumulation per se does not explain long-term growth. For example, Zambia with investment rate of 35% could manage to achieve only 0.4% growth of per capita income in 1960-75 while South Korea with investment rate of 19% managed to register a per capita income growth of 6% over the same period (Easterly 1998:5). The other example is the case of the former Soviet Union's failure to sustain economic growth as the country had relied much on extensive use of capital (Krugman 1994). Its growth of GDP in 1980s was almost zero while its investment rate was 30% (Easterly 1998).

The starting point for most modern discussions on growth is the neoclassical growth model. Robert Solow introduced a neo-classical growth model to the literature replacing the capital-based Harrod-Domar model. His model was based on two

[3] For Kalecki, the institutional factors are feudal land ownership (a problem during his time), and domination of peasants by merchants and moneylenders. Moreover, the production of necessities is not equal to its supply as there are imports with further implications on the constraints to growth (Kalecki 1972:151).

fundamental equations namely the (Cobb-Douglas) production function with labour-augmenting technology and a capital accumulation equation[4].

The prediction of the model is that the level of per capita income is determined by the population growth rate and the investment rate. Accordingly, economic growth due to capital can happen only temporarily and lasts only until capital per capita reaches its steady-state level while sustained growth rate of per capita output over time is determined by technological change. Other temporary shocks such as policy changes can affect growth only temporarily just until a new steady-state level is reached (Jones 1998: 21-39; Romer 1996:7-25).

The other implication of the dynamic analysis of the model is that if initial capital stock is far below the steady-state rate, accumulation (until the new steady-state is restored) is fast and accordingly output grows rapidly although at a slower rate latter as it approaches steady-state level where growth ceases. This implies that poor economies with lower value of capital and output tend to catch up with the rich ones irrespective of gaps in initial conditions. The prediction hence is that poor economies grow faster than rich ones (Barro 1997a:397).

The neoclassical growth model accounted for level differences but failed to address one of the stylized facts, namely sustainable growth in per capita income. This model just assumes that the source of sustained per capita income growth is exogenously determined technology. The model fails to endogenously incorporate technology and hence sources of technological differences across countries remained unexplained.

In an attempt to address this issue, two strands of arguments in the generic name of endogenous growth theory are forwarded. The first strand argues that technology is just an accidental by-product or externality of other activities such as capital accumulation of firms in that capital is not only machineries but also blueprints and new ideas useful to produce goods. In this case, firms have constant returns to scale of labor and capital but take the aggregate capital as given. This was introduced by

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[4] The Cobb-Douglas production function with labour-augmenting technology is given by $Y_t = K_t^{\alpha}(A_tL_t)^{1-\alpha}$. Dividing it by A_tL_t, the output per unit of effective labour as a function of capital per unit of effective labour can be obtained as: $y_t = k_t^{\alpha}$. The capital accumulation equation in terms of capital-technology ratio is given by $\frac{d\tilde{k}}{dt} = s\tilde{y}_t - (n+\delta+g)\tilde{k}$, where s = investment rate, n = growth rate of population, and g is the growth rate in technology. Solving these two equations simultaneously, one gets the steady-state value of per capita income:

$$y_t^* = A_t\left(\frac{s}{n+\delta+g}\right)^{\frac{\alpha}{1-\alpha}}$$

Romer (1986). The other version under this strand which is introduced by Lucas (1988) redefined capital to include human capital (See Jones 1998; Rebelo 1998).

The strand falls under the generic name of "AK" models and maintains the assumption of perfect competition. The policy implication of this model is that policy interventions that affect human capital accumulation for example have a long-run effect on growth (Jones 1998).

Mankiw, Romer, and Weil (1992) conducted a research on large set of countries and found that saving rate and population growth rate determine income; and more than half of the cross-country income variations can be solely explained by these factors. This result, according to Mankiw, Romer, and Weil, validates the predictions of the Solow model. The magnitudes of the coefficients were not, however, intuitive as they were too large. The authors augmented the basic Solow model by introducing human capital (proxied by the rate of working age population in the high school level) and estimated their model using average values of each variables for the period 1960-1985 and they concluded that the per capita income variations are best explained by inclusion of the human capital aspect (Mankiw, Romer, and Weil 1992:424-33).

However, the redefinition of capital to include human capital is criticized for not having endogenizing technology. According to Krugman for example, the South East Asian miracle is not that a miracle in that it would be expected form such extensive use of human capital which cannot be sustained-it would be difficult for example to triple and quadruple the master or Ph.D. holders (Krugman 1994).

The basic improvement of the new growth theory or endogenous growth theory over the neoclassical model as a second strand of the endogenous model is that it explicitly tries to model technology rather than assuming it to be exogenous and it assumes that accumulation of knowledge is a result of intentional effort of researchers to get new ideas. In essence, it looks for determinants of technological progress, that is, factors that push the technology frontier upward continuously. In this theory, the central motive of profit maximization of business firms is considered to determine technological progress as these firms involve in research and development (R&D) seeking new and better 'mousetraps' (Jones 1998:89)

According to Paul Romer, the productivity term in the neoclassical models which was assumed to be exogenous represents the "stock of knowledge or the number of ideas that have been invented over the course of history up until (a) time..." in the new growth model. The new ideas produced can then be represented by the growth rate of the productivity term. This in turn is a function of the number of researchers engaged in finding new ideas (Jones 1998:71-101).

Under this strand, there is imperfect competition. It is justified by the fact that the perfectly competitive market does not reward the already sunk cost during the

research of the very idea before the production of the first unit of output. The policy implication of this strand is that patent and copyright have long-term effects while other government policy interventions do not (Jones 1998).

The extension of this model is a case where avenue for technological transfer is considered. The model starts with the basic assumption that countries produce output using labour and capital as inputs and the number of capital goods is limited by the level of skill of the workers. A small country far from the world technology frontier uses the advanced capital goods by learning how to use these new techniques (Jones, 1998). The extension of the model with technological transfer is consistent with the convergence theory in that developing countries can still grow faster than the developed countries as it would be easier to transfer and learn techniques developed elsewhere than inventing new ideas (Barro and Sala - i- Martin 1999).

Recent evidences "suggest that reliance on human and physical capital accumulation alone does not necessarily yield growth. Development economists should shift their emphasis from increasing human and physical capital investment to increasing technology adaptation, from improving investment to improving policies." (Easterly 1998:5).

This growth theory has an explanation for poor countries trapped in a low-level equilibrium trap. The poverty trap, which has long been in the development economics literature, can be thought of as a low level steady-state path of the economy- characterized by low levels of per capita output and capital stock. Under this scenario, economies which try to escape from the impasse tend to return to the low level equilibrium trap. Barro and Sala - i- Martin (1999) suggest that one possible explanation could be the decline and then the rise in the average product of capital where developing countries focusing on the agricultural sector face diminishing returns to scale. On the other hand, the gains in increasing returns to scale due to spillover effects and learning- by -doing efforts if they concentrate in industries and services lasts only temporarily (Barro and Sala-i-Martin 1999:49-51). The implication here is that developing countries can break the low-level equilibrium trap if they mange to secure a minimum initial capital probably in the form of grants, large saving rate, and low population growth rates.

The demonstrations for the above explanation are however mixed. The leading economies managed to grow through invention. We also recognize that countries have managed to grow faster through innovation, learning, and imitations. The success of South East Asian countries is more explained by the latter processes. But, there are countries with a considerable segment of the world population which failed to register sustainable growth and are still suffering from abject poverty.

There has been a wave of economic research on the African growth experience to see that there are other factors which are unique to Africa—factors other than the

traditional sources of growth such as labour and capital (physical and human) that explain the African economy in a different manner from the rest of the world. Some researchers came up with what they called the "African Dummy" which has a negative and significant coefficient the direction of which intuitively shows that the Sub-Saharan Africa economy is lower than the other countries by an amount that could not be explained by the traditional factors. This dummy is negative and significant in Barro and Lee and Easterly and Levine (Collier and Gunning (1998)). Barro and Lee conducted cross-country regressions for the period 1965 to 1985 where the dependent variable is growth rate of per capita GDP and the independent variables are investment rate, openness, fiscal stance, initial income, male and female schooling, life expectancy and social disturbance. The Easterly - Levine version used openness, financial depth, fiscal stance, schooling, and social disturbance for the period 1960-89. Latter works incorporate other variables and concluded that the African dummy is not significant. Sachs and Warner (1997) showed that there is no special explanation unique to Africa and that its low performance is explained by poor economic policies in particular Africa's lack of openness to international markets. They also showed that geographical factors such as being land-locked and the tropical climate have contributed to the poor performance of the African economy. The model included life expectancy as explanatory variable and is significant. Barro (1997b) on his part showed that the Sub-Saharan dummy is not significant (though its sign is negative). Unlike his previous study, he found such a result after including other variables such as life expectancy, inflation rate, schooling, democracy index, rule of law index, and terms of trade change. His result shows that inflation, has negative impact on growth, while rule of law index has positive coefficient. The democracy index is also positive and significant while the square of it has negative coefficient which he interpreted as moderate democracy is good for growth while the excessive one (intensification of it) is not. Collier and Gunning (1997) found that the African dummy is not significant. For Collier and Gunning (1998), openness to international trade, a high risk environment, a low level of social capital, and poor infrastructure are important factors characterizing the low performance of the African economy and concluded that "these problems are to a substantial extent attributable to government behaviour" (Collier and Gunning 1998:1).

In the above regression though the authors claim that there is no African dummy as such, it becomes insignificant only after exhaustively incorporating major variables somewhat unique to Africa. The point is that the traditional model alone could not explain the African low growth performance. In the following section we look at the Ethiopian growth experience and try to show what we believe are the key determinants of the low level path of the economy.

3. DETERMINANTS OF LOW GROWTH IN THE ETHIOPIAN ECONOMY

3.1. Growth Performance of the Ethiopian Economy

The Ethiopian economy has been growing at an average annual rate of 2.6 per cent for the last four decades (1960/61-2000/01). In the same period, population has been growing by almost the same rate at which the GDP has been growing nullifying the growth rate in per capita income. The agricultural sector has been the least performing in the period under consideration (see Tables 3.1). Though it is to be expected that the sector with the highest share usually grows slower than a sector with the smaller share, the nature and structure of the sector by itself contributes to its low contribution to the growth of GDP.

Agriculture accounts for about 50 per cent of GDP in recent years and about 90 per cent of the total foreign exchange earnings. Moreover, about 85 per cent of the population make their living on this sector. Such a large share in GDP and export earnings and its being the mainstay of the major segment of the society has an important implication on the overall economy. Basically, the growth of an economy depends on what happens to the sector with the largest share. The important factor that should be emphasized is the high dependence of agriculture on rainfall. The depression in 1984/85 with the decline of real value-added in the agricultural sector by more than 20% and real GDP by more than 9% (the deepest in four decades) are explained by the serious drought in that year. On the other hand, the high growth rates in GDP in 1986/87 and 1997/98 are achieved due to bumper harvest which in turn are results of good and timely rainfall. (See Seid (2000)). In 1999, because of the failure of the "B*elg*"[5] rains in "*Belg*" growing areas (about 10% of the total harvest), the Ethiopian Disaster Prevention and Preparedness Commission announced that more than 5 million Ethiopians were in urgent need of food aid due to "*Belg*" failure. Even in the subsequent year (2000), some 10 million people were in urgent need of food aid due to drought in some regions of the country. In the year 2002/03, some 14 million (about 22% of the population) is facing starvation. As it is evident from Figure 1-4, the growth rate of GDP systematically follows the trends of the growth rates of the value-added in the agricultural sector.

It is common to read that the uncertainty and risk associated with rainfall was 10% based on the presumption that there would be a drought once in ten years. Currently the frequency is increasing to once in three years. Hence, drought in the years to come will not be a matter of coincidence but a pattern that someone has to expect would happen with a reasonable level of confidence. Surprisingly, such dependence on rain-fed agriculture with its dire consequences is occurring in the presence of a

[5] In Ethiopia, there are two crop seasons. The main season is "*Meher*" when crops are harvested during November to January and the second season is "*Belg*" when crops are harvested from April to June.

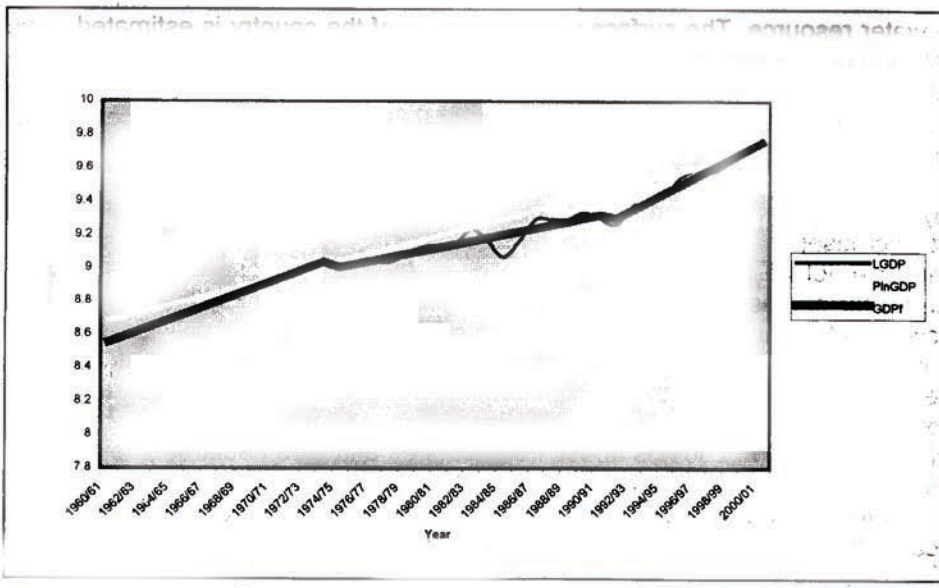

Figure 3-1

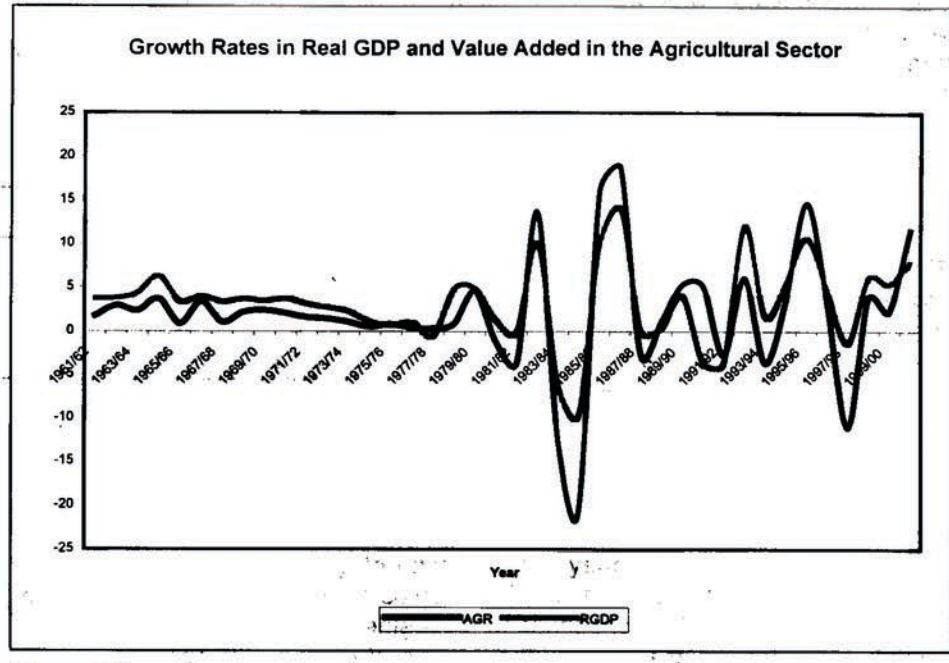

Figure 3-2

As stated earlier and as can be seen in the tables and graphs above, the performance of GDP closely follows the performance of the agricultural sector for reasons explained earlier.

Table 3.2: Sector Share in GDP

	Agriculture	Industry	Dist. Service	Other' Service
1960/61-1973/74	68	9.2	11.6	11.1
1974/75-1990/91	55.6	11.43	14.27	18.72
1991/92-2000/01	49.23	10.58	14.03	26.17
1960/61-2000/01	57.3	10.5	13.3	17.9

Source: Authors' calculations using data from MoFED.

After 1973/74, the growth rate of GDP experienced tremendous fluctuations. The peaks were usually recoveries from recessions rather than actual booms. Hence, the peaks and deep troughs offset each other giving a mere 2 per cent economic growth for the entire Derge period. This rate was not capable of catching up with population growth as a result of which per capita GDP declined by about 0.5 per cent per annum for the entire period. During this period, the agricultural sector had been the least performing where value-added grew by less than 1 per cent. The "other" services sector of which the administrative and defence sub-sectors account for the major share had the highest growth rate, that is 4.8 per cent. The industrial sector is second in contributing to growth as it grew by 3.6 per cent and the distributive service sector grew by about 2.5 per cent.

The period since the Ethiopian Peoples' Revolutionary Democratic Front (EPRDF) took power in 1991, that is 1991/92-2000/01, the growth rate in GDP has been positive. After the politically unstable year of 1991/92, it is only in the year 1997/98 that a negative growth (-1.4%) is recorded. On average, the economy has been growing at about 5.1 per cent for the period 1991/92-2000/01. This is in fact one of the "fast" growing economies of Africa for the decade. The gains in growth in per capita terms during the last decade were, however, just recoveries as it is witnessed by the fact that it is only in the year 2000/01 that the per capita GDP surpassed the maximum level of per capita GDP that had been achieved during the imperial regime. In fact the level of per capita real GDP did not repeat the highest level which had been achieved in 1982/83[6].

[6] The level of actual GDP, value-added in the various sectors and per capita GDP are compared to their respective "local potential values," which are in turn calculated as the sum of the fitted value and the highest residual in the period after regressing the logarithm of each actual value on time.

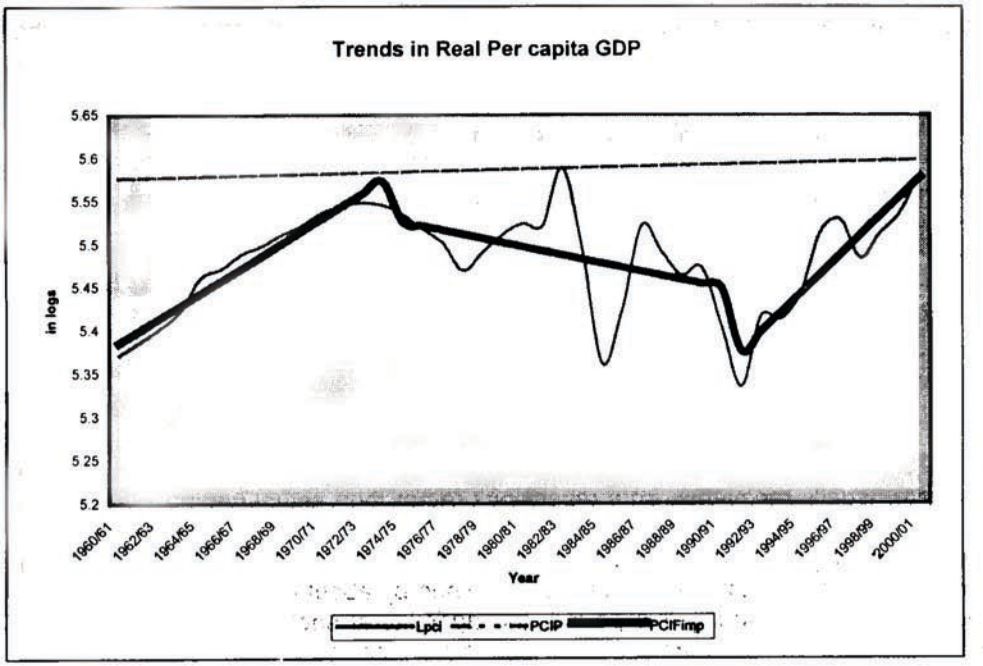

Figure 3-3: Trends in per capita GDP: LPCI = log of PCI, PCIP = minimum potential PCI, PCIF= fitted value

The 10 years effort of the ADLI strategy vigorously pursued by the government has contributed to the growth in value-added of the agricultural sector only by about 2.5% for the period 1991/92-2000/01. The level of value-added in the sector has surpassed the highest level achieved during the previous regime in 1982/83 after five years effort only in 1995/96. It shows that the agricultural sector is not leading the industrial sector through its linkages as it was supposed. Rather, the meagre gain in the sector is partly offset by the decline in the share of the value-added of the industrial sector in both the level of GDP and its growth. One clear indication of the adverse impact of the ADLI policy of the regime is that the industrial sector has been depressed compared to its level in the past regimes. Its contribution to growth has declined by about 40% over the Derge period. What has sustained growth during this period is the 'other' services sector as can be seen from the various graphs presented below.

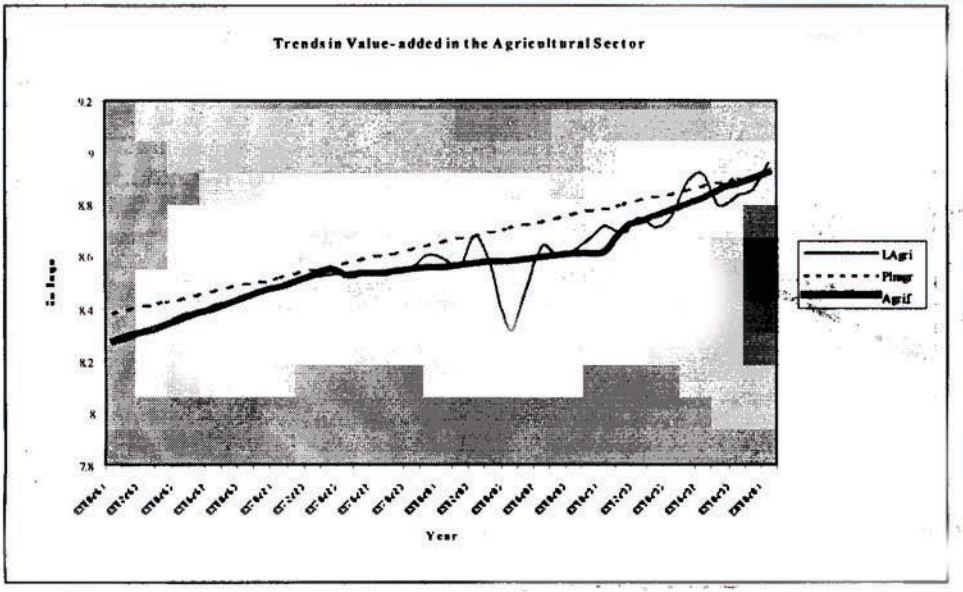

Figure 3-4

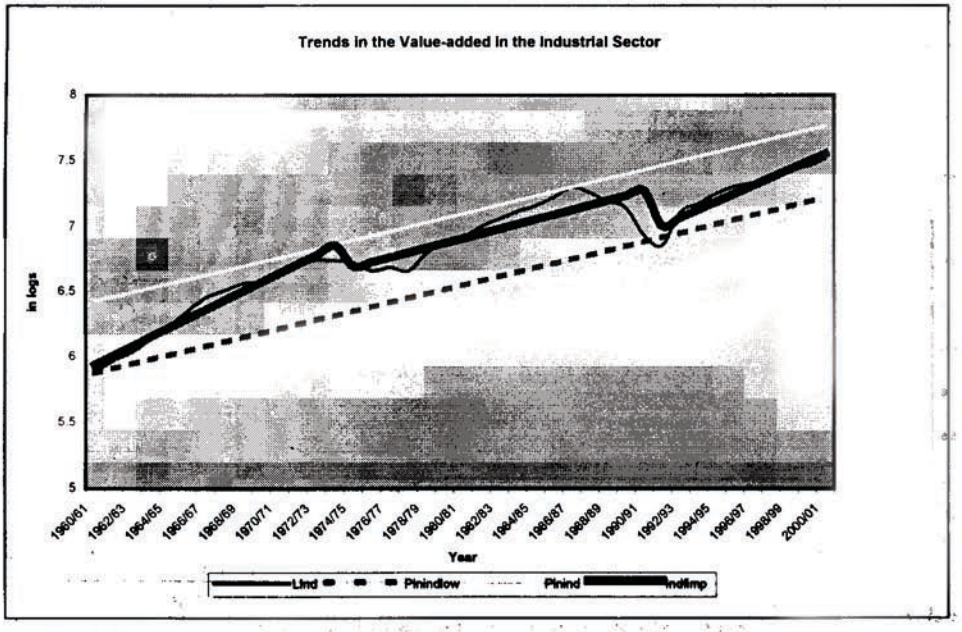

Figure 3-5

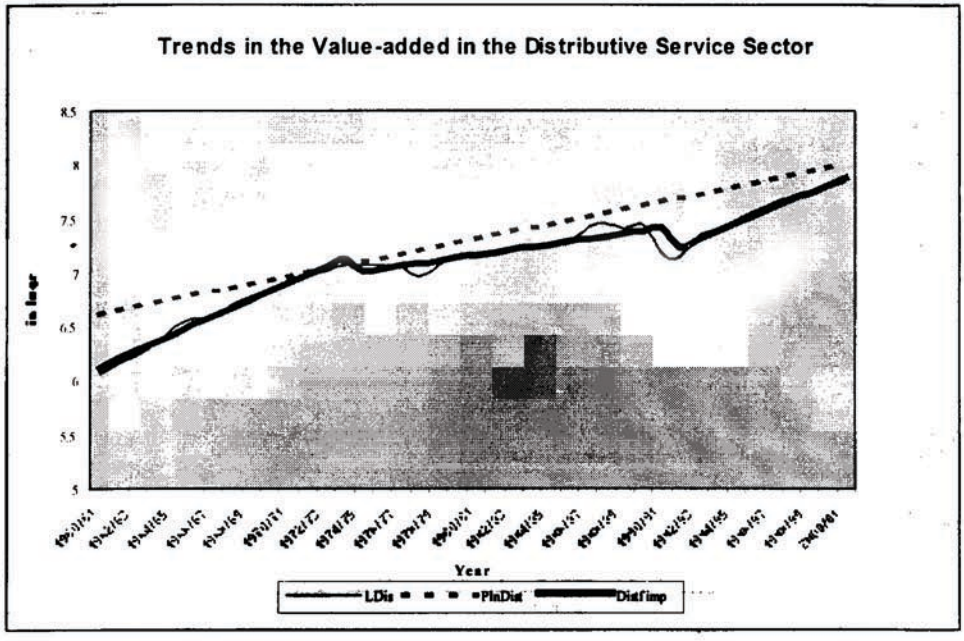

Figure 3-6

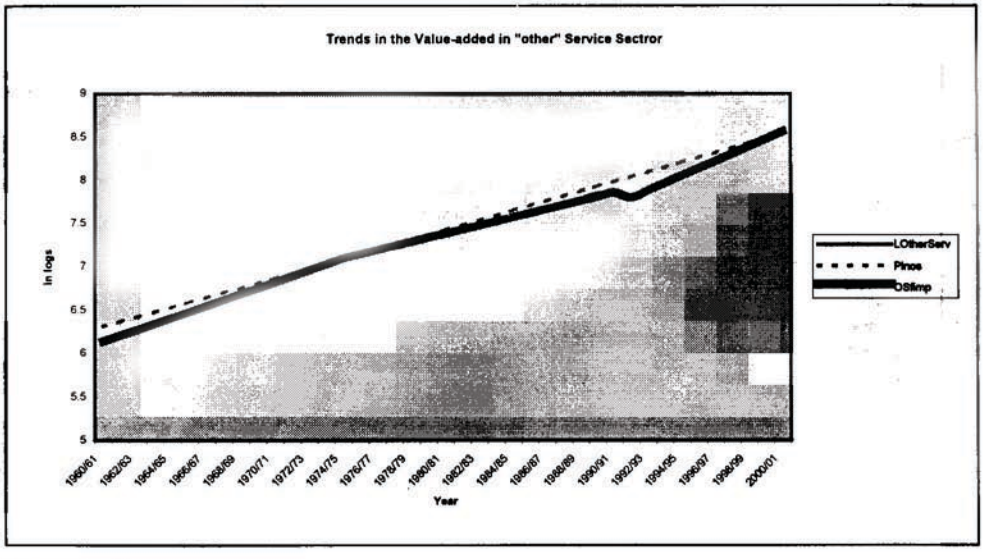

Figure 3-7

Quality of Growth

As shown in Table 3-2, the agricultural sector accounted for 68, 55.6, 49.2, and 57 per cent of GDP in the periods 1960/61-73/74, 1974/75-90/91, 1991/92-2000/01, and 1960/61-2000/01, respectively. Relying on the share of the value-added of a sector in the GDP alone to judge the role of the sector in the overall performance of GDP is misleading. It is rather useful to consider its contribution to the growth of GDP. In this connection, we tried to compute the contribution of each sector to the growth rate of GDP.

This growth decomposition exercise reveals that the agricultural sector grew by 2.1 per cent—half of the rate at which the GDP grew—and it accounted for 38.6 per cent of the growth of GDP for the period 1960/61-73/74. The fact that this sector is contributing to growth much less than its share to GDP is witnessed by the low relative contribution factor, which is 0.57. Other sectors have a relative contribution factor greater than unity for the imperial period implying that they contribute to growth more than their contribution to GDP.

Table 3.3: Sector Contribution to Growth

		Agriculture	Industry	Dist. Service	Other' Service	Sum
1960/61-1973/74	Value	1.43	0.65	0.90	0.76	**3.71**
	Percentage	38.6	17.5	24.4	20.5	**101.01**
	Factor	0.57	1.9	2.10	1.85	
1974/75-1990/91	Value	0.33	0.41	0.35	0.89	**1.98**
	Percentage	16.5	20.8	17.83	44.96	**100.009**
	Factor	0.30	1.82	1.25	2.40	
1991/92-2000/01	Value	1.20	0.64	0.99	2.22	**5.10**
	Percentage	23.84	12.7	19.6	44.04	**100.18**
	Factor	0.48	1.20	1.40	1.68	
1960/61-2000/01	Value	0.79	0.35	0.46	1.00	**2.56**
	Percentage	30.87	13.70	17.95	39.08	**101.6**
	Factor	0.53	1.31	1.35	2.18	

Source: Authors' calculations using data from MoFED.
Note that percentage shares do not sum up exactly to 100 due to rounding.

During the Derge period, the agricultural sector grew by only 0.6 per cent on average annually. The contribution of this sector to growth in GDP has significantly declined as only 17 per cent of the growth in real GDP came from this big sector. It was rather overtaken by the "other" services sector whose contribution increased from 21 per cent during the imperial era to 45 per cent during the Derge period. The relative

contribution factor for the "other" services sector by then was 2.4. In fact, the public administration and defence sub-sector had a share of about 36.9% in the other service sector and 7% in the GDP in this period. The share of the growth rates of the industrial and distributive service sectors in the growth rate of GDP have declined in that period as compared to the imperial era.

The last period under consideration (1991/92-2000/01) is the period of the EPRDF rule. During this period, the value-added in the agricultural, industrial, "other" services, and distributive service sectors grew by 2.5%, 6.1%, 7.1%, and 8.5%, respectively. However, the industrial sector, although it grew faster than what was achieved during the Derge period partly due to the increase in efficiency of most government-owned enterprises following liberalization, its share in the GDP has fallen by about 7.4 per cent over the previous regime. Despite its small share in GDP, this sector is still contributing to growth significantly. The contribution of agriculture to growth has increased significantly over that of the Derge regime, but did not catch up with what had been achieved during the imperial period. About 39% of the growth in GDP came from the agricultural sector during the imperial regime while this share in the EPRDF period was 24%. The last decade was in fact characterized by more frequent drought than before and this situation challenged the agricultural-led endeavours of the government. For example it has been difficult to sustain the boost in agricultural production recorded in 1995/96 as production in major crops fell back in 1997/98, and subsequent growth the following years were not significant.

To this end, researchers in the area called the growth performance impressive but with caution and some pessimism. Easterly wrote "Ethiopia has had fairly rapid growth since the current reformist regime took power. However, part of the growth consisted of recovery from the disasters of the previous government and the civil war. The permanent component of the per capita growth under the reformist government in the 1992 – 2001 period, is estimated at about 1.1 per cent per annum. That growth is explained by total factor productivity growth rather than by capital deepening" (Easterly 2002:2). Moreover, Alemayehu and Befekadu forwarded that "The economic growth during (the) period 1990/91-1999/00 is quite impressive where real total and per capita GDP on average grew at 3.7% and 0.7% per annum, respectively. This figure would have risen to 5.6% (and to 2.6% in per capita terms) if one excludes the abnormal year 1990-92. .... However, the performance has been fragile and growth uneven" (Alemayehu and Befekadu 2002:5).

The more interesting result appears when one looks at the source of growth in terms of sub-sector contribution. The major contributor to growth in the EPRDF era is the other services sector accounting for 43.3%. But the public administration and defence sub-sector accounts for 59.6% of the growth in the sector and 26.2% of the growth in the GDP. When one considers the second half of the regime's tenure (1997/98-2000/01), the share of the public administration and defence sub sector in the other services sector and the GDP growth rose to 73% and 46%, respectively. That is,

agriculture as a big sector contributed less than the public and administration sub-sector during the period. Agriculture grew by about 1.6 per cent in this period and its contribution to GDP growth was about 17%. The same sub- sector contributed 46% of the value-added in the 'other' services sector and 21% of that of GDP during the Derge period. During the imperial regime the share of this sub-sector to the growth of the other services sector and GDP were 32% and 6%, respectively.

Judged by the policy targets, the Derge's heavy industry strategy is manifested by the higher share of the sector in the overall growth (21%) unlike the preceding regime where the share of the Industrial sector in growth was 17%. In the EPRDF period, one naturally expects the major share of the growth to come from agriculture followed by (at least an upward shift in) industry as the policy has official bias towards agriculture – leading the industry sector. But, the share of the agricultural sector in growth in the period is 24 per cent, which is far below what has transpired during the imperial period (39%). Even worse, the industrial sector during this period contributed the least compared to the two previous regimes. There is a 40% decline in the contribution of the sector to growth over the Derge period. Thus, the significant part of growth came from the service sector. The contribution of defence and administration sub-sector to growth during the EPRDF era increased by 350% and 29% compared to the imperial and Derge periods, respectively.

The important conclusion that comes out of this discussion is that the agricultural sector, which accounts for the major part of GDP contributes less to the growth of GDP. The implication is that since this sector has been static for the past four decades, it made the overall economy static. On the other hand, the industrial sector with a significant growth rate is limited in its contribution to growth due to its low share in GDP. Efforts focusing on increasing agricultural output seem to have implications on food self-sufficiency and food security issues than triggering long-term growth by leading the other sectors as the government hopes.

The meagre capital the country has is also a problem to growth in Ethiopia. Savings and investment are considered to be the essential components of the capital accumulation process. Though it is usually recommended that developing countries need to mobilize a saving rate of more than 15% to achieve a sustainable economic growth, the 13% saving rate recorded in 1974/75 remained to be the highest in four decades. The highest record since 1992 is 9.9%, which is registered in 1996/97. The average for Sub-Saharan Africa is about 12%.

Similarly the investment rate is not that high although the record for 1998/99, for example is not significantly different from the average for Sub-Saharan Africa which is 18%. The average gross fixed investment for the past eight years was 15.6%. But, the rise in gross fixed capital formation is not paralleled by savings. This results in a widening resource gap, which is usually financed by foreign aid and loans.

The other essential component of the macro-economic variables that is supposed to support growth is export. The major export earnings for the country come from the agricultural sector. This sector accounts for about 90 per cent of the total foreign exchange earnings and coffee alone accounts for 60-70 per cent. Values of goods and services exported have shown an increasing trend after 1993 but imports have been increasing faster than exports, widening the trade gap.

3.2. Modelling the Ethiopian Growth: A Co-integration Analysis

When we consider the variables which most of the aforementioned authors used to explain the African growth performance it is clear that some of these variables are less important to explain Ethiopia's poor economic performance. Inflation which most of the international financing institutions (the WB and IMF) consider as the big enemy of growth has never been a serious problem. Ethiopia used to have access to the sea for decades and her growth problems certainly did not start after Eritrea's secession in 1991. The degree to which the country could be open to international markets, (measured by the proportion of imports and exports to GDP) largely depends on the foreign exchange earnings she secures through her meagre export and the domestic income level of her citizens. According to Rodrik (1998), "*...the effects of trade policy on economic growth seem to be indirect and much more modest*" The impact of life expectancy on growth is ambiguous as there could be a two-way causality. In fact it makes more sense that life expectancy depends on income. The other factor which is more relevant to explain the growth performance as it behaves is weather (rainfall). But the point here is that this factor is not that important for other countries to grow. The question must rather focus on why the country fails to develop without much reliance on it.

In the Ethiopian case, Alemayehu and Befekadu (2002) attempted to determine the factors which characterize the Ethiopian economy. The main conclusions that emerge from their analysis are that the Ethiopian economy is characterized by "*vagaries of nature, risk related to war and land security*". They also argued that thin and inflexible product market coupled with an unstable political environment is responsible for limiting growth in Ethiopia. In their analysis, they used a growth accounting exercise and claimed that capital has contributed to growth in Ethiopia while human capital (proxied by education) did not contribute significantly. This is in contrast to the finding by Easterly (2002) that capital is insignificant in contributing to growth in Ethiopia. One major problem is that the authors assumed the factor shares of human and physical capital (0.65 and 0.35, respectively) based on cross-country regression results as a benchmark instead of estimating them empirically. Easterly, too, used the growth accounting framework to arrive at his conclusion that capital is insignificant. Thus, the difference in the result could arise from data set differences. Seid (2000) using a co-integration analysis has found that gross fixed capital formation (the capital stock generated was not used because it was integrated of order 2) is statistically insignificant.

For Easterly (2002), a reform is required to address the poor initial conditions, such as the poor quality of institutions, the high illiteracy, the low level of openness to trade, and low degree of urbanization. He explained manifestations of poor institutions as "flawed democracy and human rights, lack of property rights in land, and excessive business regulation" (Easterly 2002:2).

In what follows, the paper tries to show that the traditional factors which characterize the developed economies are not enough to explain the growth pattern in Ethiopia. However, with the introduction of other non-traditional factors such as rainfall and foreign exchange constraints along with the traditional factors, long-term growth in Ethiopia could be reasonably explained. However, we argue that this model as it is well explained statistically is a low level steady-state path and hence there is a need to search for other exogenous factors which keep the equilibrium at such a low level.

The Model

The first attempt is to model growth using the textbook Solow model where output is a function of capital and labour.

$$Y_t = A_t L_t^{\alpha} K_t^{\beta}$$
$$\therefore Y_t = \theta + \alpha L_t + \beta K_t + \varepsilon_t \qquad [3\text{-}1]$$

One improvement in the model in the traditional line is to include the human capital aspect following Mankiw, Romer, and Weil (1994).

$$Y_t = A_t L_t^{\alpha} K_t^{\beta} H_t^{\gamma}$$
$$\Rightarrow \ln Y_t = \theta + \alpha \ln L_t + \beta \ln K_t + \gamma \ln H_t + \varepsilon_t \qquad [3\text{-}2]$$

Mankiw, Romer, and Weil (1992) estimated the above model using cross-country data and they proxied the human capital by secondary school enrolment ratio.

We believe that the above models which are considered as standard in the case of developed countries are incomplete in that there are other variables which characterize the Ethiopian economy in a different route of what is suggested by the traditional model. In the Ethiopian context, two variables, at least among those which can be quantified, have justifications to characterize the economy. These are rainfall and foreign exchange constraint.

To lay the theoretical ground for the discussion, it is presumed that transfer of new ideas and accumulation of knowledge have a tendency to sustain growth by disabling the operation of diminishing returns to capital while the uncertainties associated with

technological transfer, constraints of foreign exchange, and rainfall have the tendency of facilitating the operation of diminishing returns to capital.

A major part of accumulation of capital depends on factors affecting production in the agricultural sector, more importantly rainfall. The farmers' capital acquisition depends on the frequency of drought. A drought in a particular year forces agricultural households to sell their capital stock to bridge their consumption gap and possibly lose some of them, usually their oxen and other livestock. This leaves them with meager or no capital to work with after recovery from famine. Second, the capital accumulation process in the non-agricultural sectors is by and large a function of profit. Profits depend on the agricultural sector via input and demand linkages. These linkages in turn depend on the level of production of necessities in the agricultural sector. Obviously, production in this sector is highly dictated by the availability of rainfall. Hence, rainfall has both a direct effect (by reducing level of output in agriculture) and indirect effect (via level of capital accumulated). Accumulation of capital is also determined by capacity to import capital goods. This in turn depends on foreign exchange earnings.

Following Jone's framework, the rate of skill accumulation through technological transfer is given by:

$$= \mu^{\psi\upsilon}_{wt} \quad {}^{\gamma}_{t} \quad {}^{(1-\gamma)} \qquad [3\text{-}3]$$

where μ = degree of openness to world technology to account for degree of technology transfer; υ = number of years spent in learning new techniques; A_{wt} = world technology frontier; ψ and γ are parameters.

Assume that human capital grows at a constant rate, gh. Hence, the above equation can be re-arranged to give:

$$h_t = \left(\frac{\mu e^{\psi\upsilon}}{g_h} \right)^{\frac{1}{\gamma}} A_{wt} \qquad [3\text{-}4]$$

For empirical purpose, it can be weighted across the number of individuals. As g_h is constant, one can write:

$$h_t = \left(\mu \sum_{i=1}^{\upsilon} (E_{it} e^{\psi i \upsilon}) \right)^{\frac{1}{\gamma}} A_{wt} \qquad [3\text{-}5]$$

where, E_{it} is the number of individuals in the labour force with a particular level of education in year t.

As a result, the model can be written as:

$$Y_t = F\left(H_t, K_t(\rho_t, X_t), L_t\right) \qquad [3\text{-}6]$$

where Ht = human capital, ρt = rainfall, and Xt = foreign exchange earnings.

The estimable model thus is:

$$\ln Y_t = \phi + \alpha \ln K_t + \lambda L_t + \beta \ln H_t + \eta \ln X_t + \xi \ln \rho_t + \varepsilon_t \qquad [3\text{-}7]$$

where ε_t is the error term.

Sometimes, rainfall has a "twin hazard" effect in that excessive rainfall may have an adverse impact on output. It requires the re-specification of the above model by introducing the square of rainfall. But it can be safely ignored as the probability of the occurrence of excessive rainfall is low.

The Data

The data sources for this analysis are the national income accounts of Ethiopia as prepared and compiled by the Ministry of Finance and Economic Development (MoFED), the database of the summaries of the weather forecasts of the Ethiopian Meteorological Agency, the annual statistical bulletins of the Ministry of Education, quarterly and annual bulletins of the National Bank of Ethiopia, various survey reports and statistical abstracts of the Central Statistical Authority, the database of the Ethiopian Investment Authority, and the International Financial Statistics (IFS) of the International Monetary Fund (IMF), labour force survey of the Central Statistical Abstract.

Labour is represented by population adjusted for activity rate. Population above the age of ten that had been involved in economic activity is considered as part of the labour force for the given census or survey period while the gaps are filled by projections. The population data projected by CSA and used by MEDaC assumes almost constant growth rate. The other population data is the one projected by the

IMF and it has more or less a varying rate of growth over time. For these reasons, the population projected by the IMF is used in this analysis.

Capital stock is generated by accumulating net fixed investment over time based on the capital stock calculated for 1960/61 as a benchmark which in turn is calculated by using capital output ratio, and GDP in the non-agricultural sectors in that year. The other variable used in the analysis is human capital formation, which is usually difficult to measure. In general, gross school enrolments of the primary, secondary, and tertiary levels with the associated years of schooling, relative share of the individuals with certain level of education in the total labour force, and potential GDP of the US (to proxy world technology frontier) and the share of level of Ethiopian technology in the world level of technology (which in this case is approximated by the ratio of "local" potential per capita GDP of Ethiopia to that of USA) are used to calculate the index for human capital. The labour force survey result of CSA is used as a benchmark to determine each levels of schooling in the labour force. Lastly, the mean annual rainfall data (in millimetre) is calculated as an average for nine meteorological stations in the country.

Order of Integration

One important attribute of a time series variable is its order of integration. For this particular analysis, variables are required to be integrated of order one for reasons that the variables are not expected to be stationary (I(0)), and other orders of integration particularly when they are mixed and are difficult to analyse.

For the order of integration of the various variables, a test of unit root is conducted using the Dicky-Fuller (DF) and Augmented Dicky-Fuller (ADF) tests. Using these tests, variables entering the co-integration analysis in this paper are tested for their order of integration and all variables are integrated of order one.

Estimation Procedure

The estimation technique used in this co-integration analysis is the Johansen approach. In the Johansen procedure, there is no a priori categorization of variables as exogenous and endogenous. Hence, given the variables lnY_t, lnK_t, lnL_t, lnH_t, lnX_t, and $ln\rho_t$ in the extended model above, it is possible to represent these variables by a vector $\mathbf{Z_t}$ and model as an unrestricted autoregression (VAR) with k lags:

$$Z_t = B_1 Z_{t-1} + B_2 Z_{t-2} + B_3 Z_{t-3} + \ldots + B_k Z_{t-k} + U_t \qquad [3\text{-}8]$$

where Z_t is an $(n \times 1)$ matrix, B_i is an $(n \times n)$ matrix of parameters, and U_t is independently and normally distributed with mean of null vector 0 and vector of variances Ω, that is, $U_t \sim IN(0,\Omega)$.

The vector error correction model (VECM) counterpart of this equation can be specified as:

$$\Delta Z_t = \Gamma_i \Delta Z_t + ... + \Gamma_k \Delta Z_t + \Gamma_{k-1} \Delta Z_{t-k+1} + \Phi D_t + \Pi Z_{t-k} + U_t \qquad [3\text{-}9]$$

The estimates $\hat{\Gamma}_i$ represent short-run adjustments while $\hat{\Pi}$ contains long-run information. D_t represents vectors of dummies, intercepts and predetermined exogenous variables.

If there is reduced rank, that is, if the rank r is less than n, it is possible to represent Π as $\alpha\beta'$ where β is $(n \times r)$ vector of long-run parameters and the $(n \times r)$ α-matrix represents speed of adjustment to disequilibrium. Hence, ΠZ_{t-k} in Equation (3-9) is equivalent to $\alpha\beta' \mathbf{Z}_{t-k}$ and $\beta' \mathbf{Z}_{t-k}$ represents up to $(n-1)$ linear combinations (co-integrating vectors) that ensure the convergence of the vector $\mathbf{Z}_t$ to their long-run steady-state path (See Harris 1995; Charemza and Deadman 1997).

For this particular analysis, Equation (3-9) can be written out in full as:

$$\begin{bmatrix} \Delta \ln Y_t \\ \Delta \ln K_t \\ \Delta \ln L_t \\ \Delta \ln H_t \\ \Delta \ln X_t \\ \Delta \ln \rho_t \end{bmatrix} = \Gamma_i \begin{bmatrix} \Delta \ln Y_{t-i} \\ \Delta \ln K_{t-i} \\ \Delta \ln L_{t-i} \\ \Delta \ln H_{t-i} \\ \Delta \ln X_{t-i} \\ \Delta \ln \rho_{t-i} \end{bmatrix} + \begin{bmatrix} \alpha_{11} & \alpha_{12} & \alpha_{13} & \alpha_{14} & \alpha_{15} \\ \alpha_{21} & \alpha_{22} & \alpha_{23} & \alpha_{24} & \alpha_{25} \\ \alpha_{31} & \alpha_{32} & \alpha_{33} & \alpha_{34} & \alpha_{35} \\ \alpha_{41} & \alpha_{42} & \alpha_{43} & \alpha_{44} & \alpha_{45} \\ \alpha_{51} & \alpha_{52} & \alpha_{53} & \alpha_{54} & \alpha_{55} \\ \alpha_{61} & \alpha_{62} & \alpha_{63} & \alpha_{64} & \alpha_{65} \end{bmatrix} \begin{bmatrix} \beta_{11} & \beta_{21} & \beta_{31} & \beta_{41} & \beta_{51} & \beta_{61} \\ \beta_{12} & \beta_{22} & \beta_{32} & \beta_{42} & \beta_{52} & \beta_{62} \\ \beta_{13} & \beta_{23} & \beta_{33} & \beta_{43} & \beta_{53} & \beta_{63} \\ \beta_{14} & \beta_{24} & \beta_{34} & \beta_{44} & \beta_{54} & \beta_{64} \\ \beta_{15} & \beta_{25} & \beta_{35} & \beta_{45} & \beta_{55} & \beta_{65} \end{bmatrix} \begin{bmatrix} \ln Y_{t-1} \\ \ln K_{t-1} \\ \ln L_{t-1} \\ \ln H_{t-1} \\ \ln X_{t-1} \\ \ln \rho_{t-1} \end{bmatrix} \qquad [3\text{-}10]$$

Once the model assumes the form in Equation [3-10], the first task is to determine the number of co-integrating vectors and get estimates of α and β. Testing that there is n-1 co-integrating vectors is equivalent to testing that the first r (= n-1) eigenvalues are non-zero while the remaining $(n-r)$ eigenvalues are zero. This is the same as testing that the last $(n-r)$ columns of the α-matrix are effectively zero (see Harris 1995).

Estimation Results

In estimating the first two traditional models (the Solow textbook model and the Mankiw, Romer, and Weil augmented Solow model using the Johansen maximum likelihood procedure for the period 1960/61-2000/01), we could not find a sensible co-integrating vector implying that there are other factors which constitute a stable steady state path (long-run equilibrium).

In estimating the model represented by Equation [3-7] for the same period, we found that the null for no co-integration is rejected while a case of one co-integrating vector is supported by both the maximal- λ (λ_{max}) and the λ_{trace} statistics. Result summaries are given in Tables [3-5] to [3-7]. Here, the dummy for war entered the estimation unrestricted.

Table 3.5: Tests for Number of Co-integrating Vectors

H_0: $Rank = r$	$n-r$	$\hat{\lambda}_i$	$-T\ln(1-$	λ_{max}(95%	$-T\sum \ln(1-$	λ_{trace}(95%
r = 0	6	693.379	39.96*	39.4	105.8**	94.2
r ≤ 1	5	713.359	29.54	33.5	65.83	68.5
r ≤ 2	4	728.129	17.07	27.1	36.29	47.2
r ≤ 3	3	736.665	10.42	21	19.22	29.7
r ≤ 4	2	741.876	8.28	14.1	8.79	15.4
r ≤ 5	1	746.018	0.51	3.8	0.51	3.8

**Rejection at 1% level of significance.

Table 3.6: Results of Co-integration Analysis (PCFIML output)

(a) Standardized β' Eigenvectors

lnYt	lnLt	lnKt	lnHt	lnXt	$ln\rho_t$
1.000	-0.193	-0.0197	-0.133	-0.125	-0.479
-0.252	1.000	0.235	-0.512	-0.095	0.656
-1.278	-0.0738	1.000	-0.155	0.146	-0.060
-4 249	-3.628	4.666	1.000	-1.849	7.362
4.635	-4.581	-2.367	0.521	1.000	0.619
0.395	-2.746	16.719	-0.147	0.395	1.000

(b) Standardized α-coefficients

lnY_t	-0.253	0.048	0.237	0.0024	-0.0126
lnK_t	0.303	0.086	0.188	0.006	0.0096
lnL_t	-0.0338	0.025	-0.0362	-0.0033	-0.0021
lnH_t	-0.794	0.755	1.206	0.032	-0.0243
lnX_t	2.266	0.520	-0.181	0.041	-0.056
$ln\rho_t$	1.393	-0.175	0.251	-0.031	-0.0269

Number of lags used: 2.
Variables entering unrestricted: *Constant, Dummy for War (DWAR).*

Once it is statistically supported that there is one co-integrating vector, then, what is relevant is the first column of the α-matrix (and hence the first row of the β'-matrix).

The long-run coefficients of the respective variables should be tested for 'significance' to determine which variables are uniquely constituting the co-integrating vector. Here a zero-restriction is imposed on each coefficient and the results for the LR-statistics are summarized in Table [3-7].

Table 3.7: Tests for Zero Restrictions on the Long-run Parameters

	lnYt	lnLt	lnKt	lnHt	lnXt	$\ln\rho_t$
β-coefficient	1.000	-0.193	-0.0197	-0.133	-0.125	-0.479
LR-test:$\chi^2(\approx 1)$	10.345	0.0227	3.863	5.537	9.818	9.374
p-value	0.0013**	0.8802	0.0494*	0.0186*	0.0017**	0.0022**

**Rejection at 1% level of significance.

Thus, the single equation model with the estimates of the long-run coefficients (elasticities) can be written as:

$$lnYt = 0.193lnLt + 0.0197lnKt + 0.133lnHt + 0.125lnXt + 0.478ln\rho t$$

According to the results, capital is found to be statistically insignificant. One possible reason is that capital had little to explain the GDP growth in Ethiopia probably because the economy is highly dependent on the agricultural sector with a relatively meager capital. Moreover, government investment particularly during the Derge regime has a major share in gross capital formation. It has been empirically shown that government investment is not robust in explaining growth in Sub-Saharan Africa (Calamitsis *et al.*, 1999:10). In Ethiopia, most of the government enterprises have been performing much below their capacity. The other related explanation could be that there is a minimum threshold level of capital that is required to trigger growth. A more appealing explanation could also be that there are factors which limit the use of capital in a manner it would contribute to growth. That is the systematic causation of capital and output is weak in that increase in capital may not necessarily be accompanied by increase in output or output may increase while capital did not grow substantially.

We showed that there is one co-integrating vector which characterizes the long-run growth pattern in Ethiopia. The important results which lead us to a further search for explanatory variables are: first, that capital is insignificant among the variables in the co-integrating vector. Secondly, the co-integration is established only after accounting for non-controllable variables such as rainfall where in particular rainfall has only a downward effect in the sense that where there is a decline in mean annul rainfall

below the 'optimal' average, output declines while increase in rainfall does not necessarily increase output (excessive rainfall is also bad). Third, the vector is a low level steady-state path.

It is thus important to put some conjunctures on factors which limit the steady state path at a low level. A more rigorous empirical exercise on each item that we schematically discuss below as important factors to consider and other factors that are not considered here are subjects for future research.

To indicate the direction of our thinking about why we believe that there are more fundamental factors that need to be considered in explaining the reasons behind the "low level equilibrium" position of the Ethiopian economy, consider the growth path of Ethiopia in comparison with the growth path of a developed country such as the U.S. What we expect is that not only is the gap in per capita income is very wide, but that it is getting wider through time. The figure below shows the comparison of trends of per capita GDP between USA and Ethiopia. It is apparent from the figure that there is not a tendency of convergence between the two economies. US per capita income is not only on a higher trajectory level than Ethiopia (as one naturally imagines), but also rising in sustainable way while that of Ethiopia is stagnated.

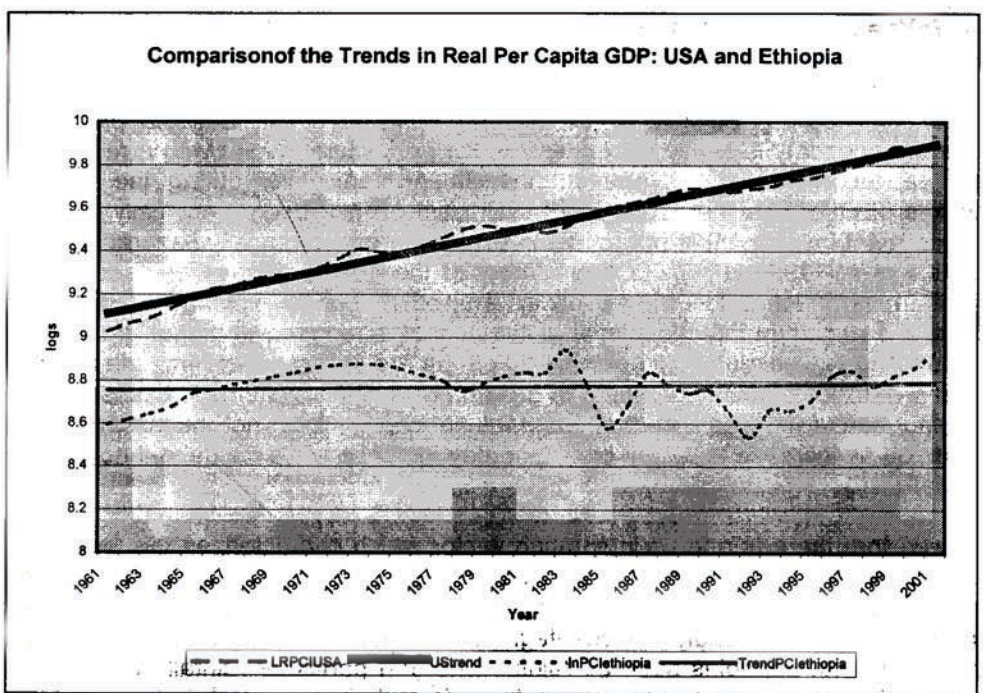

Figure 3-8

Note that the Ethiopian per capita income (in logs) and its trend are scaled up by a constant factor for trend comparison purposes. It is also assumed that Birr and USD have the same purchasing power.

4. POSSIBLE (EXOGENOUS) FACTORS CHARACTERIZING THE LOW LEVEL EQUILIBRIUM

So, what are these factors that we need to consider? As can be seen from our model, one of the most important exogenous factors we managed to quantify is the rainfall and as can be expected, it has a significant bearing on economic growth in economies dominated by rain-fed agriculture. But we know that countries have managed to register sustainable growth irrespective of rainfall conditions. Our model explained the economy as it behaves. But, the economy as it is well explained is at a low-level equilibrium. Increasing any one of these factors may not necessarily bring higher growth. We cannot, for example, increase output by increasing rainfall; probably it would induce output to decline as it has a twin hazard effect.

One of the interesting results of the empirical analysis so far is the insignificance of capital. The implication is that capital fails to contribute to growth as output changes with no systematic relation to capital or at best there are strong factors, which facilitate the operation of decreasing returns to capital. The most important question is why we failed to strengthen the factors that operate in facilitating the operation of the increasing returns of capital such as technological transfer and education (ideas), and reduce the adverse impact of those factors which facilitate the operation of diminishing returns to capital. That is why we need to dig deeper and look at more fundamental factors both in the structure of the economy and the behaviour of economic agents to find plausible explanations for such a low level of economic performance and the measures we need to take as a society to get out of it.

The Agricultural (Peasant) Sector

High Dependency on Rainfall

The essential capital in the agricultural sector as it is currently organized is the oxen. Farmers' capital acquisition depends on the frequency of drought. A drought in a particular year forces agricultural households to sell their capital stock, including their oxen to bridge their consumption gap. This leaves them with meagre or no capital to work with after recovery from famine. This leads to lower output for the following years. The drought being more frequent than before (nowadays it is possible to assume it to happen almost every three years) the blow comes for the other round still reducing capital and output. The insignificant contribution to capital is also justified in that in the presence of drought, capital and other inputs are simply wasted. Consider a farmer who spent the required labour hour, land, capital, and fertilizer to

saw sorghum in April with fairly sufficient rainfall in the main season (*meher*). Notice that all required inputs are already used and almost all major costs are incurred. If there is no rain during the months of June to August, for sure, there will be no output. What the statistics shows for that year is probably considerable labour hour but output per labour is nil; considerable capital but output per unit of capital is nil; considerable fertilizer but something no useful; considerable plots of land tilled but output per unit of land is nil. Conversely, even under meagre level of capital output may increase compared to the previous year if there is timely and good rainfall. Hence, output need not keep pace with capital under such circumstances. Notice further that more than 50% of the GDP is explained by this sector. This phenomenon raises the issue of structural transformation of agriculture as an important factor to effect growth and enhance the development process.

Inelastic Demand for Agricultural Products

The economy can enjoy surplus from the agricultural sector if the farmers can sell to the urban centre what they have produced over and above their home consumption. For one thing, the urban population is quite low (below 15%) of the total population. Even worse, the purchasing power of the majority of the urban population is limited. Most importantly, however, there is a limit in the demand for agricultural products, in particular cereals. It does not make sense for example to assume that a person doubles his/her weekly consumption of tomato or maize if the prices declined by half. Thus, the farmer fails to sell the produce even at lower prices and it would be rational from his/her point of view to reduce production for the coming season. This is what has happened in 2000/01 in the southern and south-western part of the country owing to demand shortage. This problem poses the issue of urbanization as an important variable in the growth process.

Fragmented Land Size and Lack of Security

In the agricultural sector, not only capital is meagre but also there are factors which make the appropriate use of capital difficult. That is, risk and uncertainties associated with rainfall, policy issues, and the price mechanism reduce the return on increased capital. We argue, therefore, that when output is explained more by rainfall than capital, it is difficult to increase output because it does not make sense to do so by increasing rainfall!

Obsolete Technology

The technological factor is the one which is supposed to ensure sustainable growth in output in the sector by avoiding the operation of the diminishing returns to capital. Unfortunately, this element is missing as the farmers are using old techniques which our forefathers used to apply at least a century ago. This issue further reinforces the issue of structural transformation

Low Level of Human Capital and Poor Quality of Education

Kim and Lee (2001) argued that "the higher stock of the width of human capital relative to the level of the depth leads one country to the higher growth path...(and) depending on the initial structure of human capital and the uncertainty about the nature of new technologies, an economy can have multiple paths...New technologies with more uncertain characteristics may adversely affect human capital accumulation and income growth, leading the economy to a low growth trap" (Kim and Lee 2001).

Education is not of minor importance in sustaining growth as discoveries of new ideas and transferring technologies are functions of quality education. According to Solow (1957), 87.5% of the growth of the US economy for the period 1909-1949 is attributable to technical change. Per capita income in South Korea in 1990 would have been only USD 2041 if the country had relied only on capital lower than the actual per capita level of USD 6665 (Stiglitz 2001). This difference is partly attributable to technological change. But technological transfer and high level of learning are meaningfully possible at a tertiary level. One cannot expect transfer of ideas in a country where the majority is at a primary level and the majority of the small number of tertiary level students graduate with skills that prepare them for unproductive civil service jobs. The South East Asian countries managed to narrow the gap with the industrialized countries by training scientists and engineers (Stiglitz, 2001).

In Ethiopia, the possibility of sustaining per capita income growth through the augmentation of human capital seems to be missed, as enrolment in general is low, technical schools were not emphasized; education policies had been more equity driven than growth targeted.

Simple growth decomposition of the education sub sector shows that education in the imperial period used to contribute to GDP growth three times its share in the GDP. This figure declined to a factor of two during the Derge period and less than one (about 0.9) during the EPRDF regime. But more importantly the share is still very small: 3.7% for the imperial and Derge periods and 2.2% during the last decade. The current education policy undergoing may reverse the trend but it should be accompanied by quality to trigger sustainable growth.

The Government Sector

It is the sector where misuse of capital is more pronounced. Capital projects are implemented usually with significant delays. Most of the government-owned enterprises operate at much below capacity. It has become nowadays common to watch idle machineries and equipment on the Ethiopian Television. This is too much wastage for a poor nation like ours. Even the performance of the government in utilizing capital projects is not healthy. For the last decade, 46% of the capital budget,

and 38% of the total government budget have been expended in the fourth quarter. The share of the capital budget expenditure in the last quarter reaches as high as 55%. This creates loopholes for corruption and waste.

The other disappointing performance of the government is its failure to facilitate the transfer of technology. The private sector is risk averse to introduce new techniques of production for reasons which we will discuss later. The government has the ability to induce the private sector to facilitate technological transfer through different incentive schemes and even through joint venture operation as in the South East Asian case. It could have also filled the gap by investing in the strategic sectors in terms of technological transfer. Unfortunately this option seems to be out in the Ethiopian case

The Private Sector

It is true that the domestic saving rate is low even by Sub-Saharan standards. The figure, however, indicates the residual of GDP and total consumption including non-monetized items. But when we look at the liquidity problem of our banks in the monetized sector, we recognize that the problem is not capital per se but the way we use it. We find ourselves in the strange position of a capital-starved private sector in the presence of a highly liquid banking sector. CBE does not pay interest on the deposit of hundreds of millions of Birr to public enterprises. Government banks refuse to open saving accounts to businesses to avoid paying interest on deposits. Something has clearly gone wrong in the incentive structure operating in the economy.

Our business community is clearly risk averse preferring short-term mercantile engagements with quick returns over long-term productive investments with a potential to contribute towards a more sustainable growth. The confidence level of the business community is seriously shaken. Capital flight to safer heavens abroad is no more a marvel for Ethiopian businesses. As the recent survey of business leaders conducted by EEA/EEPRI for the African Competitiveness Report clearly shows, the overall business environment is deteriorating.

The discussions made so far reveal that it is not the lack of capital per se which retards growth in Ethiopia but the failure to properly use the already available capital. To this end, it would be important to quote the statement De Soto (2000) made on dead capital due to institutional failures to secure property rights.

> "The total value of the real estate held but not legally owned by the poor of the Third World and former communist nations is at least $9.3 trillion. "(It is equivalent to twice the total US money supply circulating.)

> "...In the years after the American civil war, a lecturer named Russell Conwell crisscrossed America delivering a message that stirred millions of people. He told the story of an Indian merchant who had been promised by a prophet that he would surely become rich beyond all imagining if only he would seek his treasure. The merchant travelled the world only to return home old, sad, and defeated. As he re-entered his abandoned house, he needed a drink of water. But the well on his property had silted up. Wearily, he took out his spade and dug a new one—and instantly struck the Goloconda, the world's greatest diamond mine....
>
> ..... Leaders of the Third World and former communist nations need not wander the world's foreign ministries and international financial institutions seeking their fortune. In the midst of their own poorest neighbourhoods and shantytowns, there are - if not acres of diamonds - trillions of dollars, all ready to be put to use if only the mystery of how assets are transformed into live capital can be unraveled" (De Soto 2000: 37).

All the issues we highlighted above require us to ask a series of questions about problems in the deep structures of the economy. Why so much dependence on rainfall agriculture for so long? Why so much dependence on agriculture with inelastic demand and decreasing prices that fail to lift the majority of our peasants out of poverty? Why so much lag in technology and dependence on obsolete methods of production? Why the inability to reform an incompetent and corrupt government bureaucracy? Why such poor and wasteful performance in the government sector in a country where most of the capital budget is secured by aid and loan? Why is the private sector unable to compete even in areas that are supposedly in the country's comparative advantage? Why are our businessmen (nay our whole population) risk averse in terms of innovation and introduction of new technology? Why banks fail to lend? Why in general we fail as a nation to exploit our capital, and our resources effectively? How can we fail to resolve the mystery of converting the available assets into "live capital" as De Soto inquired? Why have we so miserably failed to build our social capital or even to emaciate what we had?

Our tentative answer is that the "mystery" lies in the deep fundamentals. It lies in the issues that economic theorizing has hitherto assumed away because these fundamentals are in place in the more developed societies or are very difficult to model or quantify. These issues are partially raised in the economic history literature. What is needed is to take stock of the wisdoms that are accumulated in this literature and in other social science disciplines and use it to develop a more coherent theory about the multifaceted nature of the development problem that countries such as ours are facing. To close this discussion, it is worth quoting at length David Landes' recent findings from economic history about the determinants of development:

"This ideal growth-and-development society would be one that

1. knows how to operate manage, and build the instruments of production and to create, adapt, and master new techniques on the technological frontier.
2. was able to impart this knowledge and know-how to the young, whether by formal education or apprenticeship training.
3. Chooses people for jobs by competence and relative merit; promoted and demoted on the basis of performance.
4. Affords opportunity to individual or collective enterprise; encouraged initiative, competition, and emulation.
5. Allowed people to enjoy and employ the fruits of their labour and enterprise.

These standards imply corollaries; gender equality (thereby doubling the pool of talent); no discrimination on the basis of irrelevant criteria (race, sex, religion, (ethnicity) etc.); also performance for scientific (means end) rationality over magic and superstition (irrationality).

Such a society would also possess the kind of social and political institutions that favour the achievement of these large goals; that would, for example,

1. Secure rights of private property, the better to encourage saving and investment,
2. Secure rights of personal liberty – secure them against both the abuses of tyranny and private disorder (crime and corruption).
3. Enforce rights of contract, explicit and implicit.
4. Provide stable government, not necessarily democratic, but itself governed by publicly known rule (a government of laws rather than men). If democratic, that is based on periodic elections, the majority wins but does not violate the rights of the losers; while the losers accept their loss and look forward to another turn at the polls.
5. Provide responsive government, one that will hear complaint and make redress.
6. Provide honest government, such that economic actors are not moved to seek advantage and privilege inside or outside the market place. In economic jargon, there should be no rents to favour any position.
7. Provide moderate, efficient, unready government. The effect should be to hold taxes down, reduce the government's claim on the social surplus, and avoid privilege.

This ideal society would also be honest. Such honesty would be enforced by law, but ideally, the law would not be needed. People would believe that honesty is right (also that it pays) and would live and act accordingly.

More corollaries: This society would be marked by geographical and social mobility. People would move about as they sought opportunity, and would rise and fall as they

made something or nothing of themselves. This society would value new as against old, youth as against experience, change and risk as against safety. It would not be a society of equal shares, because talents are not equal; but it would tend to a more even distribution of income than is found with privilege and favour. It would have a reality large middle class. This greater equality would show in more homogenous dress and easier manners across class lines.

No society on earth has ever matched this ideal. Leaving ignorance aside (how does one know who is better or meritorious?), this is the machine of 100 per cent efficiency, designed without regard to the vagaries of history and fate and the passions of human nature. The most efficient, development –oriented societies of today, say those of East Asia and the industrial nations of the West, are marred by all manner of corruption, failure of government, private rent-seeking. This paradigm nevertheless highlights the direction of history. These are the virtues that have promoted economic and material progress. They represent a marked deviation from earlier social and political arrangements; and it is not a coincidence that the first industrial nation came closest earliest to this new kind of social order" Landes 1999: 217-219).

5. CONCLUSION

After years of stagnation, the Ethiopian economy rebounded a bit immediately following the change in government in 1991 mostly owing to a change associated with a regime change and the lifting of some of the restrictive policies of the previous regime. However, the rather rapid growth achieved in the first five years of the new regime slowly petered in the second half after 1996/97. This is despite the fact that a number of second generation reform measures have been taken in this period. Attempts to explain the growth process in the country over a long period using standard growth models were found to be wanting. A more modified model that takes into account variables that are important for the Ethiopian economy improved the explanatory power of the model significantly. However, such models are unable to capture the deep structural factors that are known to affect the development process. It is our considered opinion that to understand the problems of development facing our country, we need to look for mechanisms to develop a broad theory of development that encompasses the variables that are known to influence the behaviour of economic agents in a more fundamental way and accordingly broaden the development agenda. As a prelude to generating a more coherent discussion on the broad issues of development, this paper raised some of the important candidates for inclusion in such a broadened development agenda. We hope future discussions and research in this line could lift the mask that covered our understanding of the development problems facing our country and devise appropriate strategies that could help us achieve the economic and social development that eluded us for so long.

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MoWR: Ministry of Water Resource, Water resources Sector Profile.
MoF: Ministry of Finance, Data Base.
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Annexes

GROWTH DECOMPOSITION

GROWTH RATES	1960/61-1973/74	1974/75-1990/91	1991/92-2000/01	1960/61-2000/01
AGRICULTURE & ALLIED ACTIVITIES	2.0991	0.58557	2.445	1.3522
Agriculture	1.9145	0.26269	1.3115	na
Forestry	4.1613	2.9867	1.0404	na
Fishing	0.63976	2.6621	5.4581	na
INDUSTRY	7.0441	3.5955	6.0573	3.3462
Mining & Quarrying	8.6532	5.4136	8.3852	4.9913
Large & Medium Scale Manufacturing	11.194	4.3174	7.7359	4.7806
Small Scale Industry & Handicrafts	5.9696	1.6367	4.3322	2.5538
Electricity & Water	11.104	4.7543	2.4798	5.1609
Construction	3.9009	3.0712	6.7432	1.6556
DISTRIBUTIVE SERVICES	7.7784	2.4714	7.0546	3.448
Trade, Hotels & Restaurants	7.2518	1.3752	7.8774	2.5142
Transport & Communications	9.4977	4.7855	6.0455	5.4539
OTHER SERVICES	6.8637	4.7475	8.4964	5.5716
Banking, Insurance & Real Estate	5.4673	4.1009	7.3014	4.861
Public Administration & Defence	6.9907	5.8683	11.73	6.715
Education	11.498	3.4749	4.8601	5.2309
Health	5.4712	3.7326	7.1967	4.6324
Domestic & Other Services	6.8571	4.5321	4.6359	4.852
TOTAL	3.7104	1.977	5.0483	2.5548

SHARE IN A SECTOR

	1960/61-1973/74	1974/75-1990/91	1991/92-2000/01	1960/61-2000/01
AGRICULTURE & ALLIED ACTIVITIES	100	100	100	100
Agriculture	91.70475473	87.90222912	na	na
Forestry	8.228192285	12.03145974	na	na
Fishing	0.067052984	0.066311135	na	na
INDUSTRY	100	100	100	100
Mining & Quarrying	2.31686411	1.721002732	4.200582525	2.529243152
Large & Medium Scale Manufacturing	27.22828199	38.02251838	38.82283298	34.53188025
Small Scale Industry & Handicrafts	22.06063307	19.27960707	18.29424471	19.98889342
Electricity & Water	8.803083654	11.79651742	14.93167213	11.53904119
Construction	39.59113718	29.1803544	23.75066766	31.410942
DISTRIBUTIVE SERVICES	100	100	100	100
Trade, Hotels & Restaurants	76.54068882	68.57204871	57.35287454	68.55666383
Transport & Communications	23.45931118	31.42795129	238.5597402	31.44333617
OTHER SERVICES	100	100	100	100
Banking, Insurance & Real Estate	30.85498554	29.86091781	24.92858441	28.99734743
Public Administration & Defence	30.81936887	36.92047504	43.29211695	36.39122949
Education	10.63402348	11.24956255	8.985948214	10.48727742
Health	5.418448372	4.082716449	4.290823436	4.589577834
Domestic & Other Services	22.27317375	17.88632815	18.50252698	19.53456783
TOTAL	3.7104	1.977	5.0483	2.5548

SHARE IN GDP

	1960/61-1973/74	1974/75-1990/91	1991/92-2000/01	1960/61-2000/01
AGRICULTURE & ALLIED ACTIVITIES	68.13666396	55.57976937	49.22518212	58.31759015
Agriculture	62.51426445	48.93466843	na	na
Forestry	5.576540022	6.608607302	na	na
Fishing	0.045859485	0.036493647	na	na
INDUSTRY	9.195540267	11.43273595	10.58304371	10.46157346
Mining & Quarrying	0.215372429	0.192805508	0.444172483	0.261820304
Large & Medium Scale Manufacturing	2.556846929	4.364346153	4.120980366	3.687793787
Small Scale Industry & Handicrafts	2.012854345	2.167884938	1.930458102	2.057038678
Electricity & Water	0.826162113	1.336214705	1.572055143	1.219572463
Construction	3.584304451	3.371484649	2.515377618	3.235348232
DISTRIBUTIVE SERVICES	11.61626328	14.26572237	14.02455721	13.30220825
Trade, Hotels & Restaurants	8.861074893	9.778620176	8.05861166	9.045797758
Transport & Communications	2.755188391	4.487102195	5.965945545	4.256410494
OTHER SERVICES	11.05153249	18.72177217723 96		17.91862814
Banking, Insurance & Real Estate	3.385476278	5.562547172	6.494338584	5.046423309
Public Administration & Defence	3.408840426	6.967188309	11.44442173	6.844150841
Education	1.201768059	2.08838994	2.325717435	1.84352576
Health	0.594466768	0.759305007	1.117885191	0.79047736
Domestic & Other Services	2.460980961	3.344341874	4.784854024	3.394050867
TOTAL	100	100	100	100

SHARE IN SECTOR GROWTH (VALUE)

	1960/61-1973/74	1974/75-1990/91	1991/92-2000/01	1960/61-2000/01
AGRICULTURE & ALLIED ACTIVITIES	2.0991	0.58557	2.445	1.3522
Agriculture	1.755687529	0.230910366	na	na
Forestry	0.342399766	0.359343608	na	na
Fishing	0.000428978	0.001765269	na	na
INDUSTRY	7.0441	3.5955	6.0573	3.3462
Mining & Quarrying	0.200482885	0.093168204	0.352227246	0.126242113
Large & Medium Scale Manufacturing	3.047933886	1.641584208	3.003295536	1.650831067
Small Scale Industry & Handicrafts	1.316931551	0.315549329	0.792543269	0.51047636
Electricity & Water	0.977494409	0.560841828	0.370275605	0.595518377
Construction	1.54441067	0.896187044	1.601555021	0.520039556
DISTRIBUTIVE SERVICES	7.7784	2.4714	7.0546	3.448
Trade, Hotels & Restaurants	5.550577672	0.943002814	4.517915339	1.723651642
Transport & Communications	2.228094998	1.503984609	14.42212909	1.714888112
OTHER SERVICES	6.8637	4.7475	8.4964	5.5716
Banking, Insurance & Real Estate	1.686934624	1.224566378	1.820135662	1.409561058
Public Administration & Defence	2.154489619	2.166604237	5.078165319	2.443671061
Education	1.222700019	0.390911049	0.436726069	0.548578994
Health	0.296454147	0.152391474	0.30879769	0.212607604
Domestic & Other Services	1.527293797	0.810626278	0.857758648	0.947817231
TOTAL				

SHARE IN GDPR GROWTH (VALUE)

	1960/61-1973/74	1974/75-1990/91	1991/92-2000/01	1960/61-2000/01
AGRICULTURE & ALLIED ACTIVITIES	1.430256713	0.325458456	1.203555703	0.788570454
Agriculture	1.196835593	0.12854648	na	na
Forestry	0.23205656	0.197379274	na	na
Fishing	0.000293391	0.000971497	na	na
INDUSTRY	0.647743052	0.411064021	0.641046707	0.350065171
Mining & Quarrying	0.018636607	0.010437719	0.037244751	0.013068237
Large & Medium Scale Manufacturing	0.286213445	0.188426281	0.31879492	0.17629867
Small Scale Industry & Handicrafts	0.120159353	0.035481773	0.083631306	0.052532654
Electricity & Water	0.091737041	0.063527656	0.038983823	0.062940915
Construction	0.139820132	0.103545037	0.169616944	0.053564425
DISTRIBUTIVE SERVICES	0.903559423	0.352563063	0.989376413	0.458660141
Trade, Hotels & Restaurants	0.642587429	0.134475585	0.634809075	0.227429447
Transport & Communications	0.261679528	0.214730276	0.360671238	0.232140372
OTHER SERVICES	0.758544036	0.88881614	2.223271422	0.998354285
Banking, Insurance & Real Estate	0.185094145	0.228114497	0.474177637	0.245306637
Public Administration & Defence	0.238301808	0.408855512	1.342430668	0.459584729
Education	0.138179291	0.072569462	0.113032193	0.096432989
Health	0.032524466	0.028341819	0.080450844	0.036618073
Domestic & Other Services	0.168751925	0.151568918	0.221821048	0.164679348
TOTAL	3.7104	1.977	5.0483	2.5548

SHARE IN SECTOR GROWTH (%)

	1960/61-1973/74	1974/75-1990/91	1991/92-2000/01	1960/61-2000/01
AGRICULTURE & ALLIED ACTIVITIES	38.54723785	16.46223852	23.84081182	30.86623039
Agriculture	32.25624172	6.502098153	na	na
Forestry	6.254219489	9.983777151	na	na
Fishing	0.007907251	0.049139979	na	na
INDUSTRY	17.45749924	20.79231265	12.69826886	13.70225346
Mining & Quarrying	0.502280267	0.527957459	0.73776818	0.511517021
Large & Medium Scale Manufacturing	7.713816442	9.530919616	6.314896502	6.900683803
Small Scale Industry & Handicrafts	3.238447417	1.794728011	1.656623138	2.056233511
Electricity & Water	2.472429953	3.213336152	0.772216854	2.463633758
Construction	3.768330432	5.237482879	3.359882407	2.096619122
DISTRIBUTIVE SERVICES	24.35207587	17.83323534	19.59820955	17.95287852
Trade, Hotels & Restaurants	17.31854865	6.802002259	12.5747098	8.902045062
Transport & Communications	7.052596156	10.86142011	7.14440976	9.086440109
OTHER SERVICES	20.4437267	44.95782196	44.04000201	39.07759062
Banking, Insurance & Real Estate	4.988522654	11.53841664	9.392818124	9.601794153
Public Administration & Defence	6.42253686	20.68060251	26.59173719	17.98906877
Education	3.724107681	3.670685989	2.239014976	3.774580748
Health	0.876575728	1.433577071	1.593622478	1.433304887
Domestic & Other Services	4.548079061	7.666611942	4.393975154	6.445880229
TOTAL	100	100	100	100

FACTOR/WITHIN SECTOR

	1960/61-1973/74	1974/75-1990/91	1991/92-2000/01	1960/61-2000/01
AGRICULTURE & ALLIED ACTIVITIES	1		1	
Agriculture	0.912057548	0.4485826	n.a.	n.a.
Forestry	1.982421038	5.10023907	n.a.	n.a.
Fishing	0.304778238	4.54593579	n.a.	n.a.
INDUSTRY	1		1	1
Mining & Quarrying	1.228432305	1.50565985	1.384313143	1.491632299
Large & Medium Scale Manufacturing	1.58913133	1.20077875	1.277120169	1.428665352
Small Scale Industry & Handicrafts	0.847460996	0.45520789	0.715203143	0.763194071
Electricity & Water	1.57635468	1.32229175	0.409390322	1.542316658
Construction	0.553782598	0.85417883	1.11323527	0.494770187
DISTRIBUTIVE SERVICES	1		1	1
Trade, Hotels & Restaurants	0.932299702	0.55644573	1.116633119	0.729176334
Transport & Communications	1.221035174	1.93635186	0.85695858	1.581757541
OTHER SERVICES	1		1	1
Banking, Insurance & Real Estate	0.79655288	0.86380200	0.859352196	0.872460335
Public Administration & Defence	1.01850314	1.23608214	1.380584718	1.205219327
Education	1.675189766	0.73194312	0.572018737	0.938850599
Health	0.797121086	0.78622432	0.84702933	0.831430828
Domestic & Other Services	0.99903842	0.95462875	0.545631091	0.870845
TOTAL				

FACTOR/IN GDP	1960/61-1973/74	1974/75-1990/91	1991/92-2000/01	1960/61-2000/01
AGRICULTURE & ALLIED ACTIVITIES	0.565734153	0.296191199	0.484321455	0.529278221
Agriculture	0.515982104	0.13287304	na	na
Forestry	1.121523286	1.510723318	na	na
Fishing	0.172423458	1.346535154	na	na
INDUSTRY	1.898474558	1.818664643	1.199869263	1.309769845
Mining & Quarrying	2.332147477	2.738290339	1.66099479	1.953695005
Large & Medium Scale Manufacturing	3.016925399	2.183813859	1.532377236	1.871222796
Small Scale Industry & Handicrafts	1.608883139	0.827870511	0.858150268	0.99960858
Electricity & Water	2.992669254	2.40480526	0.491214864	2.02007985
Construction	1.051342173	1.553464846	1.335736783	0.648035071
DISTRIBUTIVE SERVICES	2.096377749	1.250075873	1.397420914	1.349616408
Trade, Hotels & Restaurants	1.95445235	0.695599393	1.560406473	0.984108345
Transport & Communications	2.55975097	2.420586748	1.197531842	2.134765931
OTHER SERVICES	1.849854463	2.401365706	1.683022007	2.180836073
Banking, Insurance & Real Estate	1.4735069	2.074304502	1.446308658	1.90269297
Public Administration & Defence	1.884082579	2.968285281	2.323554464	2.628385784
Education	3.098857266	1.757663126	0.962720124	2.047479255
Health	1.474557999	1.88801214	1.425569003	1.813214342
Domestic & Other Services	1.848075679	2.292412747	0.918309134	1.899170189
TOTAL	1	1	1	1