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ADDIS ABABA UNIVERSITY
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THE GROWTH OF INDUSTRIAL MANUFACTURING IN ETHIOPIA AND ITS CONTRIBUTION TO GDP

BY

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Dedication

This thesis is dedicated to Dr. Taddese Biru who really made me unforgettable influence to love the quantitative part of Economics, especially Econometrics.

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LIST OF ACRONYMS (ABBREVIATIONS)

BoPs: Balance of Payments

ECMs: error correction models

FIML: Full Information Maximum Likelihood

GDP: Gross Domestic Products

ln: natural logarithms

log: logarithm to base ten.

MEDaC: Ministry Economic Development and Cooperation

MVA: Manufacturing Value Added

R&D: Research and Development

LR: Likelihood Ratio

HASSIDA: Handcraft and small scale industries development agency

SSA: Sub Sahara Africans

ISD: industrial sustainable development

UNIDO: United Nations Industrial Development Organization

Abstract

This paper analyses growth of Industrial Manufacturing in Ethiopia and its contribution to GDP over the past 4 and 3/10th decades. In general, industrialization plays an important role in economic development. In this regard, the manufacturing sector plays the key role in growth process. Despite the importance of industrialization in Sustainable Economic Growth, the sector has encountered with a serous growth problem that leads to insignificant contribution to GDP, due to financial constraint, shortage of supply raw materials and lack of skilled manpower.

The general objective of this study is to examine the growth of the sector and its contribution to GDP, using Secondary data from the NBE and C.S.A, which covers 43 years. The study employs the methodology of Johansen cointegration analysis of Econometric Time- series models. To identify the effect of various factors determining the growth of the sector, the FIML procedures are employed instead of OLS or 2SLS regressions, because it provides a worthwhile measure to generate more efficient and effective estimates that explain the relationships. These techniques are used to validate the theoretical assertion that there is one cointegrating relations in this study.

The analysis indicates that the long-term growth rate of investment is positively related to the weight placed on growth of the sector and is playing significant role in expanding its activities. While that of labor engaged in production, is the short-run effect and hence, the sector is characterized as labor intensive. In the meantime, the sector growth is negatively influenced by total factors of production that represent the obsolete uses technological level in manufacturing activities accounts for the sector's stagnant growth. That is why the overall growth rate of sector is negligible, only about 0.24 percent per annum. In terms of contribution, the share of the sector accounts about 6 percent to GDP. That is, almost about 1/11th of Agriculture and 1/6th of Service sector, on average since 1962.

From these analyses, therefore, it would be probably drawn that the growth and the role of industrial sector in Ethiopian economy is insignificant, implies, the level of industrialization is very low. Thus, the policymakers would focus on the implications of this paper to mitigate the problem and achieve the designed goal of Sustainable Economic Growth.

Keyword: ***Manufacturing growth, contribution to GDP and cointegration analysis.***

CHAPTER ONE

INTRODUCTION

1.1. Background

Industrialization is seen as a motor behind many of the processes usually termed "social transformation" and " modernization ", [UNIDO, 2003]. From this definition, the following features can be isolated as the important characteristics of industrializations: first, it is not a one-time or sudden occurrence but rather a sustained process; second, it brings about structural changes or transformations of national economy, especially, in the composition of output and the pattern of employment; and third, it requires the application of modern science and technology to the production process. It is, therefore, an inescapable part of the process of change for the improvement of the per capita income of a nation. It leads to change in the traditional structure of an economy. The key and dynamic role of this process is played by the manufacturing sector.

In general, it has significant role in the economic development. The essential role of industrialization in an economy is as to (i) Raise income: -industrial development alone can provide a secure basis for a rapid growth of income; (ii) Meet the demands for the industrial products. Beyond certain limits, the demand for people are usually of industrial goods;(iii) Raise productivity per-head (physical output per man): with a higher productivity industry compared to agriculture, a rise in share of industry in total output raises, the average productivity of the economy as a whole.(iv) Develop economies that become nationally integrated, flexible and capable of self-generated and self-sustained growth as a source of dynamism, and it brings about flexibility in economic structure, (v) Remove disparity in export-import: the income elasticity of export is very low due to only agriculture products while that of import is very high;(vi)Absorb surplus labor: industrial alone can generate employment opportunities on accelerated rate; railway, dams etc. The establishment of industries in parities elasticity to the economic system; (viii) Security considerations. The national objective of self-reliance in defense materials can be achieved only through industrial development ;(ix) Heavy - industry- based industrialization. This approach is not only raises the capital stock, but also makes it strong enough to produce many things require by the country and also reduces depends of foreign sources, and (x) Use of modern technology in agriculture: adoption of modern techniques in agriculture leads to increased production of food [S.K.Jain, 1997, pp 85].

More specifically, there seem to be at least three ways in which industry helps to achieve the goals of social development. In first place, industry's substantial contribution to economic growth helps to create a large portion of the resources needed to fund social development programmes. Second, creation of employment and hence generation of income take place in the industrial sector directly and are indirectly fostered in other sectors - like agriculture or services -through their linkages to industry. And finally, industry promotes various aspects of social integration through its general thrust towards modernization and makes a specific contribution to the national economic integration.

When it comes to measuring contributions to sustainable development, the sector specificity needs to be reflected in the attendant measures. This is particularly true for the industrial manufacturing sector. Hence, every system of indicators of sustainable development must contain several indicators that feature developments in (or are closely related to) industry, [UNIDO, 1996].One of the key indicators of the degree of industrialization of an economy is its production structure as reflected by the relative contribution of the economic sectors to the overall GDP. For instance, the share of the manufacturing sector in total employment and per capita manufacturing value added are rough indicators of industry's contributions in the social, economic and environmental dimensions. The economic role of industry in sustainable development presents per capita manufacturing value added as a general indicator of industrial development in the economic perspective. One important contribution of industry to the social component in sustainable development is creation of employment.

The Overview of Ethiopian Industrial Manufacturing Sector is as summarized as follows. "Although industries in the modern sense of the term were first established in Ethiopia at early 19^{th} century, it was not until the 1950s that industrialization gathered pace. At that time, generous tax incentives, high level of tariff protection and the provision of credit by Ethiopia banks on favorable terms encourage an inflow of foreign capital into the industrial sector. Most of these foreign owned enterprises were in the field of import-substitution. Food, beverages and textiles accounted for nearly 75 percent of MVA in 1965; industry was capital intensive and had few backward linkages into other sectors of the economy. Instead, it depended heavily on imported inputs" (UNIDO, 2000). The government's preference for large-scale projects using modern, capital intensive production strategies has make worse industry's dependence on imported technology and handicapped the development of a domestic engineering capability. New large-scale capital-intensive projects have taken the higher up of the investment funds allocated to industry. Such projects are costly in terms of foreign exchange, both in the short –term as virtually all the machinery has to be imported and over the long-term owing to continued imports of spare-parts and intermediate goods and debt servicing obligation. Despite industry's orientation towards the domestic market, it draws heavily on imports for inputs.

Over the last few decades, there has been very little change in industrial structure, despite the government's plans to broaden the industrial base through the establishment of basic industries. Some progress has been made towards the establishment of basic industries in the non-metallic minerals, though this sector is dominated by the cement production. On the other hand, others such as the chemicals sector continue to be oriented towards the production of final goods. However, the weakest link of Ethiopia's industrial structure is the engineering sector. It was only in 1988 that the first large-scale engineering plant, the Akaki Spare Parts factory, was established in the 1980s, number of assembly plants was commissioned with the intention of phased development of manufacturing operations but progress on this front has been slow [UNIDO, 2004]. Consequently, Ethiopia is almost entirely dependent on imports for its machinery and for a large proportion of its spare parts.

How industrial manufacturing contributes to GDP and what is the problem in Ethiopian context? Currently, the single dominant industry, Sugar and Sugar Confectionary, with a total value added generated, accounts, on average is about 20%. It is also the largest industry in terms of its share in fixed capital assets. In addition, Textile is the most employment generating industry, accounting for more than 27% of the total manufacturing employment. The overall contribution of Ethiopian Industrial Manufacturing to the national GDP is, about 7%, which is seven times less than the share of agriculture and is 12% that of total industry to GDP, EEA [2003/04, PP.154-59].

The large difference in per-capita incomes of the developed and the developing countries is mainly due to the disparity in the structure of their economies. The developed countries largely have industrial economies while the developing countries are mainly confined to agricultural economies because the variation in capital formation and economic policies they have. Issues related to Ethiopian industrial sector, "Orthodox structural adjustment program, which mainly focuses on macroeconomic policies, has limited short-term benefits. It is also devoid of any noticeable impact on the real sector of an economy, since in a backward such as Ethiopia, where markets are not fully least integrated and its linkage with economic sectors and individual economic agents at the micro level is weak.

Thus, with little impact of the adjustment program to generate supply side response to kick-start growth in the economy, and the crisis in the agricultural sector, the current strategy followed by the government to achieve long term development seems to be less meaningful" EEA ,[2003/04,PP.234]. In this regard, it needs a successful policy strategy that requires the promotion of an investment-friendly environment through the development of public infrastructure, human capital and research and development (R&D) to increase the efficiency of production in the sector. Therefore, these would contribute to enhance capital formation and achieve the sustainable economic growth amid at country wide through promoting the backward and forward linkages of manufacturing with agriculture and other sectors.

In recent years, export promotion has been given priority and the public sector has made considerable efforts to identify suitable export products and penetrate new markets. This policy has borne fruit as the value of manufactured exports increased in the few years and the range of export products has broadened slightly. Moreover, manufactures as a share of total exports have also increased over the same period. The prospects for further expansion of manufactured exports seem bright. Along side the development of export markets for products originally complete for the domestic market, the government is investigating a proposal to establish an export processing zone to attract export-oriented industries financed by foreign capital. [MEDaC, 1999].

However, the least developed, traditional Ethiopian economy, the contribution of industry, particularly manufacturing to the overall GDP of the country is one of the lowest in the world, assign post of its least industrialized economic structure overall. In this regard, Ethiopian Industrial Manufacturing growth has virtually stagnant per capita level of manufacturing value added relative to population growth. As for the future, much depends on the successful implementation of the reform packages such as managerial reform and the provision of a policy environment conductive to private investment will accessible, then the rate of industrialization is closely linked to the performance of the economy as a whole.

1.2. Statement of the Problem

The structure of industrialized economies reveals strong and balanced internal linkages between the manufacturing and the rest of the sectors including; agriculture, mining, construction, transport and communication. This shows the capacity of manufacturing sector to produce and supply capital, intermediate and consumption goods demanded by all other sectors of the economy. But non industrialized economies are characterized by internally looses as well as unbalanced forward and backward linkages between economic sectors. This leads to structural dependency on external economy. The least industrialized Ethiopian economy is a manifestation of this problem. The Ethiopian economy is one of the least industrialized and its manufacturing sector is least developed in many respects; in terms of volume and quality products, technology status, labor skills and export capabilities. Primarily, this is because manufacturing is not only least developed but also structurally distorted. Thus, concerning industrial manufacturing's backward linkage to other sectors has structural weaknesses.

Developing technological capability requires adequate and continuous investment not only on equipment and related assets, but also on information, labor educations and technological know-how. However, investment level in Ethiopian manufacturing is extremely low. Thus, the undeveloped nature of manufacturing is more noticeable when observed from the investment point of view.

The role of Ethiopian Industrial Manufacturing in supporting the transformation of other sectors of the economy, particularly, agriculture, is negligible. As such, the development of other sectors is victimized by lack of modernization in manufacturing; it needs to be transformed, not just for its own sake but for the development of the economy as a whole. In this view, the sector, thus, has a problem of sustainable growth because Ethiopians' individual livelihoods and aggregate economic wellbeing depend almost entirely on external economy and the subsistence agrarian economy, which absorbs more than 80% of economically active population whereas industry in general, manufacturing sector in particular, holds very few number.

For any economy, sustained industrial manufacturing growth rate has a great role in international competing. With out growth, industrial expansion in general and competitiveness in international markets in particular will not be possible. Thus, investigating the level and rate of growth of industrial manufacturing and its contribution to GDP are of paramount importance for an assessment of its potentiality. Therefore, this research is intended to bridge this gap and the previous works done by Getachew [1997], Daniel [2005] and Zinabu [2006] as well as to indicate the effect of growth in manufacturing on sustainable economic development.

1.3. Objectives of the Paper

The general objective of this study is to examine the growth of Ethiopian Industrial Manufacturing and its contribution to GDP. The specific objectives are:

(1) To carry out an assessment of contribution of manufacturing sector to GDP and its potential for absorbing employment;

(2) To reveal how economic development comes through industrialization since the profit share is expected to be high in the industrial sector that leads to huge amount of savings and easy to collect tax revenue than any other sectors;

(3) To develop the interrelated the sector with others in the economy as backward and forward that become integrated, flexible and capable of self-generated income.

1.4. Research Questions

To identify the major causes of the stagnated growth in Ethiopian Industrial Manufacturing activity and insignificant contribution to GDP of the country, the following research questions should be answered:

- What are the macroeconomic variables that determine the growth of manufacturing sector?
- Why not manufacturing in particular, industrial sector in general, become self-independent from foreign provision of raw materials in the country?
- How Sustainable Economic Growth and / or Development goals will be achieved, is it by carrying out R&D to create strong structural backward and forward linkages with the rest of the sectors and within manufacturing industries, or by other means? These and other related questions must be answered after the hypothetical analysis will takes place.

1.5. Hypothesis of the Paper

This paper is aimed to prove or disprove the main causes of stagnated growth in Ethiopia Industrial Manufacturing and its negligible contribution to GDP. The low growth of the sector leads to insignificant contribution to GDP is mainly resulted from low level of technology, capital constraint, lack of skilled manpower, highly depending on imported high cost of raw materials and very low investment activities that carried out in the sector.

Therefore, the paper investigates whether total factor productivity, labor engaged in production, fixed capital assets, level of investment, cost of raw materials, including fuel have positively or negatively significant impact on Ethiopian manufacturing value added.

1.6. Significance of the Study

Basically, this study could be used as a policy suggestion for the concerned policymakers to examine the impact of manufacturing activities on economic growth. In understanding the reason why countries differ substantially in living standards, one should first try to reason out why countries experiences sharply divergences in the long-run industrial growth rate, for instance, the Ethiopians versus Canadians or Americans. That is why the differential in growth of an industrial economy can have much greater consequences for development promotion. In this regard, policy options that can have even small effects in the long-run, growth in manufacturing sector is one of the contributions to development. Hence, macroeconomic policies formulation aimed at rapidly achieving economic growth in the country, especially, the empirical investigation would help policymakers in designing an appropriate growth-oriented adjustment programs and setting priorities in their implementation process. Such empirical examinations would provide the required ideas and perquisites for the development implementation. In addition to this, it could also be used to other interested researchers for the reference.

1.7. Data and Methodology

The presence of adequate and current statistical data are considered as essential for economic analysis and policy formulation aimed at promoting sustainable economic development. In this regard, GDP is obtained from National Bank of Ethiopia, NBE; the relevant data on Ethiopian Industrial Manufacturing from the Annual Bulletins of the Central Statistical Agency. Among the industrial sector, Manufacturing is selected for the availability and relative reliability of its data as contrast to Electricity or Construction. The data used in this study is a secondary data that covers 43-years, starting from 1961/62 up to 2004/05.

However, the potential capability of researchers to measure the growth of industrial manufacturing sector and its contribution to GDP has been hampered by inappropriate gathered data from its sources. This leads the researcher to ideally want to measure growth as they are provided. This would be taken as limitations.

In this study, data on value added at constant factor cost, persons engaged in production, fixed capital assets, cost of materials, including fuel, capital expenditure (investment) are, used to assess the growth of Ethiopian Industrial Manufacturing sector and its contribution to GDP. With these data, therefore, one can estimate the parameters that measure the growth of industrial manufacturing sector in Ethiopia.

Data are tabulated and classified as interactive analytical process with a discrete number of stages and use the computerized Econometric Software packages such as Stata, Statistical Package of Social Science (SPSS) and others written programs. The procedures, at the end of each stage, allow decision alternatives to be used to prepare data for a subsequent run or for refinements of the results.

With regard to the methodology, the study employs the Johansen cointegration analysis of Econometric Time- series models. The empirical research in macroeconomics is largely confined to time series. It has been standard to view economic time series as realizations of stochastic processes. This approach allows the model builder to use statistical inference in constructing and testing equations that characterize relationships among economic variables. Particularly, emphasis will be given to modeling macroeconomic time series data to be tested. The reason for concentrating on macro-econometric time series data is due to the fact that recent theoretical developments in this area, most importantly the concept of co-integration, have increasingly drawn attention to modeling of macro-econometric relationships and their dynamics, [Johanse,1995].

It has become common practice to use frequency data, usually yearly series, which affect the properties of commonly used estimators, particularly the size and the power of unit root tests, co-integration tests and convergence rates to their asymptotic distributions. Some others include; consist of non-systematic error or pure measurement error and most problematically, systematically miss-measured variables, i.e. systematic measurement errors must be checked. The long-run as well as the short-run relationships are subject to change. Consequently, the class of the models applied for such an unstable world must allow for changes in parameters defining the equilibrium. Structural breaks or regime shifts present valuable information that should be taken into account in order to attain better forecasts or achieve better policy analyses. Therefore, the standard econometric techniques, specifically, the cointegration analysis is required for the analysis of such a time series data in order to perform better analysis.

1.8. Paper Organization

The remaining parts of the paper are organized as follows: chapter two presents the theoretical and empirical reviews insight regarding the sector. Chapter three focuses on model specifications. Chapter four and five reveal the discussions and empirical findings as well as the conclusions and some policy implications, respectively.

CHAPTER TWO
LITERATURE REVIEW

Recognizing its important, this study focuses on manufacturing sector and attempts to make-up the analytical framework for the industrialization of the country. Specifically, some theories and concepts related to the sector have to be described briefly as theoretical review, on the one side, economic condition of Ethiopian today, due attention to the importance of industrialization is even more profound than what could be observed from the experience of many countries through empirical investigation, on the other hand.

A.Theoretical Literature Review

Many researchers have written various literatures on industries.Some of them are identified as follows:

2.1. The Role of Sustainable Industrial Development in Economic Growth

In the 1980s a new concept, sustainable development, entered the debate on development. It can be said that the concept not only helped to enhance a compromise between the demands for economic growth on the one hand, but also stimulated the exchange of views on development in general on another hand. The Sustainable Industrial Development has four main goals. The first goal is to outline what sustainable development has come to mean to analysts, decision-makers and the public at large. The second is to sketch an approach to the measurement and monitoring of sustainable development. The third goal is to reassess industrial development in light of sustainability. The fourth is to describe the role of capacity building for sustainable industrial development, [UNIDO, 2000]. Thus the Sustainable Industrial Development in Economic Growth has economic, environmental and social dimensions.

Economic Dimension-the growth of economies and their structural transformation have always been recognized as being at the core of development. They still are the most important preconditions for the fulfillment of human needs and for any lasting improvements in living conditions. In addition to the quantitative economic aspects of development, an increasing number of qualitative aspects have come to be recognized too. The main argument is that neither economic growth in the aggregate nor growth of income at the personal level is sufficient to guarantee progress of an entire society. Accompanying qualitative changes are needed as well.

Environmental Dimension-The natural-environmental constraint to human development is the main reason for any concern about sustainability. More precisely, the economic processes of production and consumption draw to a greater or lesser extent on services provided by resources of the natural-physical environment. These resources are of two broad types: natural resources and environmental resources.

Natural resources of the conventional type - recognized by economists as crucial inputs to most production processes - include non-renewable like minerals, renewals such as forests, and all forms of energy. They have been studied for a long time, so that policies dealing with them can build on a whole body of theoretical and empirical knowledge.

Environmental resources have come under the purview of analysts more recently. Nevertheless, fairly well-developed tools are now available for their analysis. In general, environmental resources provide services not only for immediate human consumption but also for use in connection with production as well as consumption processes. The former services sustain the biological basis of human life and wellbeing as well as provide for enjoyment of natural resources by people. The latter services derive mainly from the absorptive capacities of the physical environment and as such contribute to human well-being.

Social Dimension-It can be seen from a broad angle, development encompasses the strengthening of the material income base as well as the enhancement of capabilities and the enlargement of choices. Such a view of development clearly transcends the narrow concept of development-as-economic-growth and also emphasizes the importance of social development in the context of sustainable development.

There is one more argument for including social issues under the concept of sustainable development. This argument is part of the general discussion on sustainability and can be described in the following way: equity considerations are vital to the notion of sustainable development. More precisely, inter-generational or inter-temporal equity forms one of the cornerstones of the concept. As a consequence, the issue of intra-generational equity cannot be excluded from a comprehensive notion of sustainable development, because doing so would destroy the symmetry of the equity-argument on which the term 'sustainable' is built. Hence intra-generational equity - covering the whole range of social issues in development, such as regional and gender distribution – is rightly considered as an integral part of sustainable development.

2. 2. A Simple Savings Rule in Quantifying Sustainable Development

Sustainable development is most of the time described in terms of the goal of maintaining the well-being of the individual and of entire societies. Per capita well-being in turn appears to be fundamentally related to the underlying stock of capital per person. In order to achieve at least constant levels of per capita (real) consumption over time, the stock of total capital at least has to be kept 'intact' or, in other words, must not decline relative to any increase in population.

To make the above rule operational, the term 'stock of total capital' needs to be specified. Here a consensus among analysts has emerged regarding the distinction between three different types of capital assets. These types of capital correspond in a broad fashion to the three dimensions of sustainable development described earlier.

(i) **Man-made capital (or reproducible capital) -** is the conventional form of capital assets which is treated in standard economic analysis. It comprises machines, buildings and various portions of infrastructure, like roads etc., and may be regarded as having its greatest impact on the economic dimension of sustainable development.

(ii) **Human capital-** can be defined as the stock of knowledge and skills; this form of 'capital' has received considerable attention in more recent developments of the economic theories of production and growth. For the purposes of the present discussion, the impact of human capital on the social dimension of sustainability needs to be stressed.

(iii) **Natural capital-** has traditionally been conceived of as 'natural resources'. Today, however, it is seen from a broader angle as embracing not only energy and mineral assets, but all renewable resources and some quasi-renewable resources, like tropical forests, the ozone layer or the atmospheric carbon cycle. In abstract terms, natural capital can be defined as the stock of all natural assets that over time yield a flow of ecological services (including, for example, the absorption of pollutants or waste) to which economic value can be assigned.

If it is assumed: (i) that the value of each of the three component parts of the stock of total capital can in principle be determined, so that aggregation becomes possible, and, (ii) in principle, there are limited possibilities of substitution between each pair of the different kinds of capital assets, then the sustainability requirement can be stated as an operational savings rule. Sustainable development requires as a minimum condition that the per capita value of the stock of total capital should not decrease over time. However, the composition of the stock of total capital in terms of its three broad components may change: in particular, the portion of natural capital is likely to decrease over time.

2.3. A Crucial Role of Technology in Industrial Manufacturing

The savings rule for sustainability assigns a unique role to technological progress. The relationship between the per capita stock of capital and levels of human well-being is in all likelihood not stable over time; as productivity of all three components of the capital stock will most probably raise, higher levels of production, and therefore consumption and well-being, could be achieved even with a constant stock of total capital. From the latter observation, the crucial role of technology in sustainable development becomes evident, since technological progress represents the main source of rising levels of factor productivity [UNIDO, 2004].

2.4. The Role of Industry in Specifying Sustainable Development

Industry provides a typical kind of a sectoral aspect of sustainable development: industrial issues - cutting across the environmental, economic and social dimensions.

Environmental constraints to development are acutely felt in the industrial sector in relation to both production and consumption of manufactured goods. While most problems arising from the consequences for the environment of the consumption of industrial products is an economy-wide concern, environmental effects of industrial production fall within the purview of the industrial sector alone. Here the key to solving many of the problems lies in technology. Since environmental problems caused by industrial production are due to so-called external effects - outside the realm of the market mechanism - corrective policy measures are needed to reduce or eliminate such effects. The response of industry to such policies is in almost all cases of a technological nature. Hence industrial technology and its continuous innovative change - if properly shaped by market and policy incentives - makes an important contribution to solving the environmental sustainability problem [UNIDO, 2004].

Economic development is crucially dependent on industrial development, both with respect to the industrial sector's pivotal contribution to economic growth and – even more conspicuously - with regard to the structural transformation of an economy. The importance of the latter is underlined by the fact that economic development is largely thought of as being synonymous with industrialization. Although social development appears to be less closely linked to industry; it too is strongly impacted by industrial development [UNIDO, 2003].

According to UNIDO, 2000, Industrialization is seen as a motor behind many of the processes usually termed "social transformation" and " modernization ". More specifically, there seem to be at least three ways in which industry helps to achieve the goals of social development: (i) Industry's substantial contribution to economic growth helps to create a large portion of the resources needed to fund social development programmes. (ii) Creation of employment and hence generation of income take place in the industrial sector directly and are indirectly fostered in other sectors - like agriculture or services -through their linkages to industry. (iii) Industry promotes various aspects of social integration through its general thrust towards modernization and makes a specific contribution to the integration of women by way of productive employment. When it comes to measuring contributions to sustainable development, their sector specificity needs to be reflected in the attendant measures. This is particularly true for the industrial sector. Hence, every system of indicators of sustainable development must contain several indicators that feature developments in (or are closely related to) industry.

Each industry-specific indicator can be assigned to one of the three dimensions of sustainable development and characterized as a driving force, state or response. In this connection the social, economic and environmental dimensions are usually dealt with in that order which bears out a human-centered account of sustainable development. The following presentation of examples of indicators from the field of industry adopts this approach, referring in many cases to the ISD framework. A number of social aspects of sustainable development invite industry-specific measurement. Three examples, all related to employment, can illustrate this point. One of the driving-force variables in the ISD framework, the economy-wide rate of unemployment, could usefully be supplemented by a measure of industry's contribution to employment, such as the share of the manufacturing sector in total employment.

Likewise, the female-male ratio in industrial employment can serve as an industry version of a gender-related state indicator. Still other examples of socially relevant indicators would be proxy measures of industry's expenditure on human-capital formation and on worker health and safety, reflecting a response to sustainability demands.

Among the economic indicators representing driving forces, three are of particular interest from the viewpoint of industry. First, economy-wide net investment includes industrial capital formation which is an important driving force behind the accumulation of man-made capital. Second, the degree of openness of an economy - measured by the ratio of trade volume to GDP - is of particular importance to the manufacturing sector and its potential for export growth. Third, capital goods imports (which are part of trade in manufactures) provide some indication of a country's potential to build the man-made capital base needed for sustainability. Some of the economic indicators describing a state are even more closely related to industrial issues than driving-force indicators. Here the central variable is the share of manufacturing value added in GDP which is best interpreted as a structural measure of industrial advancement and its implications for sustainability. The share simply indicates the extent to which an economy has succeeded in building the industrial production base for sustainable development. Similar interpretations can be invoked for per capita manufacturing value added and for the share of manufactured goods in total merchandise exports.

Among the environment-oriented indicators of industrial sustainability, the driving-force type is represented by the shares of natural resource-intensive industries, of energy intensive industries and of pollution-intensive industries in manufacturing production. (Although there may be problems with defining such industry groups in a general fashion, even approximate versions of the corresponding indicators are important for an assessment of the links between economic processes and their environmental consequences.) Another facet of the industry-environment is mainly technological and can be quantified by means of industry-specific state indicators of a technical/ technological nature. Examples of such indicators are numerous, comprising the industrial components of energy and water consumption; emissions of greenhouse gases, sulphur dioxide and nitrogen oxides; the discharge of critical pollutants into water; and the generation of waste (including that of a hazardous nature). Finally, a whole set of industrial environmental indicators involves government policies as well as industry's response to such policies or to other incentives. Examples are indications of the existence of sustainable industrial development strategies or of more specific environmental policy measures with an industrial focus. In addition, the industry component in environmental protection expenditure and in environmentally motivated expenditure in industrial research and development can be counted among such response indicators.

2.5. The Role of Technical Cooperation in Sustainable Industrial Development

Sustainable industrial development is defined as a pattern of development that balance a country's concerns for competitiveness, social development and environmental soundness. Either absolutely or comparatively, such development accomplishes three things: I. It encourages a competitive economy, with industry producing for export as well as the domestic market. II. It creates productive employment, with industry bringing long-term employment and increased prosperity. III. It protects the environment, with industry efficiently utilizing non- renewable resources, conserving renewable resources and remaining within the functional limits of the ecosystem.

To achieve sustainable development in today's context of market and private sector driven development, the developing countries, in particular the least developed countries require support from the industrialized countries to build up basic capacities [UNIDO, 2004]. In practice, UNIDO technical cooperation programmes that foster sustainable industrial development are those that target at least one of the three dimensions of sustainable industrial development while at the same time considering the implications for the other two dimensions. These dimensions are defined as follows:

I. **Competitive Economy**-A competitive industrial economy is the key long-term driving force for economic and social development. While the process of industrialization is increasingly market-driven, countries still need support to build up a number of capacities: They must be able to formulate and implement industrial policies that provide an enabling framework within which the private industrial sector can operate with full efficiency and competitiveness. They must be able to promote innovative and appropriate technologies for commercial applications in specific manufacturing branches. They must also be able to advise entrepreneurs on the overall operation and management of enterprises. They must be able to encourage the formation of industrial clusters that provide cost-effective access to highly specialized economic inputs. They must be able to assist enterprises in identifying adequate financial resources.

II. **Productive Employment**-At the core of industrial competitiveness are managers and technicians with the resource fullness to absorb and adapt a continuous flow of information turning it into innovative, demand-oriented production is needed. To possess this core, countries must have various capacities, such as: They must be able to identify the managerial and technical skills needed to expand specific industrial sub sectors. They must offer training programmes that expand the availability of technical, managerial and entrepreneurial skills. They must encourage women entrepreneurs in industry, with a combination of training and consultancy services.

2.6. The Factors Growth of Economy from Industrial Side

The central core of economic growth of any nation is influenced by the growth rate of the industrial sector specially manufacturing industries. The major components of this activity involve labor productivity, capital formation, improvements in technology and the market environment (UNIDO, 1996).

Labor productivity: - output per worker. Labor productivity in economic growth refers to how much output per hour, week and so on, results from labor-input. Infarct, output per worker per time as a direct measure of labor productivity. Labor productivity depends upon a number of factors including the population size (quantity) and degree of education and skills (quality) of labor supply, the capital stock other resources; each laborer has to work with and the technology available for production. Educational development and on the-job-training of laborers, growth in human capital is a rather obvious requirement for the productivity increases, but productivity increases are also closely linked to capital formation and technology.

Capital formation: the promise to invest capital on the activity, as initial stage is the accumulation of money either through savings domestically or borrowing from financial institution. Capital formation is one of the ingredients of growth in size and quality of capital – stock-the quantity of fixed assets consisting of buildings, machineries, inventories and equipment use in production. Labor productivity is enhanced when capital stock available to labor growth faster than the labor supply. This capital is said to be deepening capital. Increases in capital-stocks are costly. Resources including time must be scarified to produce capital goods that are not directly consumable, so capital growth requires selling or abstention from current consumption. For new investment on machineries, buildings and equipment to grow, society ability have knowledge to make savings. The reword for selling is greater future development in either consumable goods or in more capital goods. In the later sense economic growth is cumulative if feeds on itself by using capital to produce more capital.

Improvements in technology: technological growth and invention, improvements in methods by which goods and services are produced and sold is another key to economic growth. The industrial revolution of the 17th c- 19th c in western countries ushered in the age of mechanization, increasing the productivity of labor standard of living for the greatest number of people in the recorded history of humanity. Such living standards could be unthinkable without the invention of items such as steam engine, assembly – line production and etc. Technology and invention have been responsible for nothing less than the modern world.

The market environment: most western economists believe that the market environment surrounding the growth in natural resources, labor productivity, capital formation and so on, are a large contributing factors to economic growth. A competitive market system may believe encourage invention and rapid innovation. All private and public restraints on competition, including excessive or unnecessary regulation or tariffs or quotas on goods exchanged in an international and trade, will trend to reduce the rate of growth in real per capital GNP. It is recognized that the economic growth resulting from industrialization can promote social progress by creating the means to meet socio – economic needs, including education, nutrition, health, housing and communications. On the other hand, socio – economic development can serve as an input into the industrialization process, and therefore can be a mechanism for fostering industrial development.

Industrial Policy: Industrial policy concerns with the effective and coherent implementation of all policies, which enhance the structural adjustment of industry to promote competitiveness. Then after, the infant industries (like Ethiopian manufacturing case) can develop and prosper by remedying the structural deficiencies and addressing areas where the market mechanism alone fails to prove the necessary condition for success through industrial policy. Though industrialization in Ethiopia was initiated three -quarters of a century ago, manufacturing sector is still in an incipient stage characterized by unbalanced and distorted internal and external structural linkage, backward technology and lack of technological capability [Kibre and Worku, 2003/04].

In programming and planning its industrial development, policy makers in Ethiopia must combine a number of separate elements into a coherent and consistent whole, the precise share of which is determined by, among other factors, the nature of resource endowment of the country, the size of its domestic market, the degree of ideological commitment to a specific system, the level of development of the economy and society and the specific culture, tradition and objectives of the society. since, the ultimate objective of industrial policy is development in the much wider socio-economic sense, the attainments of a country in industrial development must then be made both in terms of the degree of success in generating industrial development as to, its contribution to enhancing socio-economic development.

It is widely agreed that industrialization by itself is not adequate to generate development as understood in its broadness sense, and it is also generally believed that development, broadly conceived, is by its very nature a synergistic process that evolves through the long-term interaction of a wide range of factors including predominantly economic and social influences. Even though the economic and industrial strategies that have been pursued have not always been such that socio- economic and industrial strategies that have been pursued have not always been such that socio-economic development necessarily progressed in parallel with the economic and industrial development, the very objective of industrialization is development in a wide socio-economic sense, it is therefore necessary that a fuller investigation be made of the degree of socio-economic development in developing countries with the efforts made. Based on era, the Ethiopian industrial policy can be categorized into three- namely; the Imperial, the socialist Derg strategy and the current regime in power.

2.7. Economic Growth and Living Standards

Although the wealthy industrialized countries such as: the united states, Canada, Japan, and the countries of western Europe are certainly not free from poverty, huggers, homelessness. the typical person in those countries enjoys standard of living better than at any pervious time or place in history- by standard of living we mean the degree to which people have access to good and services that make their lives easier, healthier, and more enjoyable.

Americans sometimes take their standard of living for granted, or even as a "right". as a Paul Simon lyric proclaims, "god bless our standard of living –let's keep it that way!" current standard of living in the united states is the result of several centuries of sustained economic growth, a process of steady increase in the quantity and quality of the goods and services the economy can produce and the living standard in this country is not only much higher than in the past but also much higher in many other nations today. Why have many of the world's countries, including both the developing notions of Africa, Asia and Latin America and some formerly communist countries of Eastern Europe not enjoyed the same rates of economic growth as the industrialized countries? How can the rate of economic growth be improved in these countries? Once again, these are questions of keen interest to macro economists. The key to rising living standard is a continuing increase in average labor productivity, which depends on several factors, from the skills and motivations workers bring to their jobs to the legal and social environment in which they work,(R. Frank & B. Bernank, 2001,pp. 435-36,514).

2.8. Industrial Concentration and Specialization

Theory indicates that the process of economic integration is likely to affect an industrial concentration and production specialization patterns. Haaland and et al. (1999) show that between 1985 and 1992 the pattern of industrial concentration changed substantially. They find that on average, the relative concentration index (a modified version of the Hoover-Balassa index) increased by 11.4% during this period, and only very few industries have seen a reduction in relative concentration. This index provides information about the level of industry concentration across countries. The authors use another index that indicates whether the core of some industrial activity takes place in only a limited number of countries. A comparison of the two indices allows identifying the type of country in which a given industry tends to be concentrated. Textiles and railroad equipment tend to be concentrated in small countries. Other industries like motor vehicles, electrical apparatus and machinery are more likely to be found in larger countries. Midelfart-Knarvick and al. (1999) identify comparative advantage as the driving force behind the concentration/specialization pattern (the small country case), home market effects or agglomeration forces (the large country case). Some econometric analysis in cross-section confirms these findings. In particular, the most important explanatory variable for relative and absolute concentration is demand side concentration. Further, there is also evidence of demand linkage effects, that is concentration on the demand side and concentration on the production side are mutually influential.

In a similar spirit, Midelfart-Knarvick and al. (2000) compare the industrial structures of EU countries. They find that industrial structures within the EU have become increasingly diverse during the period 1980-1990. The industrial structures of the four largest EU economies (UK, Germany, France, and Italy) are found to be relatively similar. However, similarities are disappearing at an increasing rate. The four Cohesion States (Greece, Ireland, Portugal, and Spain) also show increasingly diverging industrial structures. The authors also find that Spain has become more similar to the main industrial economies. Ireland is more similar to Belgium, Denmark, and the Netherlands. Finland and Sweden have remained similar but are becoming increasingly different from other European countries. In addition, the increasing sectoral specialization of EU countries has followed an uneven pace. They find little change in specialization during the 1970s. However, there is a phase of rising specialization, particularly acute since the early 1980s for the 1980s entrants and since the mid-1990s for entrants in 1995. These studies suggest that economic integration among EU member states has led to regional concentration of economic activity and specialization of production, pinpointing the risk of observing a trade-off between efficiency and equity - both at EU and country level.

2.9. The Importance of Productivity and Manufacturing Competitiveness strategies

Rising Economic growth, lowering unemployment, and is of using abundant optimism by driven strong growth in productivity in the manufacturing sector, the economy is generating prosperity at rates hardly ever seen.

Productivity represents a pathway along which technology; human skills, capital assets, and management techniques combine to influence the performance of individual plants, workers, and firms and then whole industries, regions and finally the nation. From the firm's perspective, high productivity increases output without increasing costs, which allows it to pay higher wages without jeopardizing profitability. Resources are used more efficiently, product quality improves, and the company's market share expands. At the national level, a highly productive economy has lower interest rates, increasing standards of living, and low unemployment [Ginta, 2005]. Over time, compensation and productivity growth rates are closely linked. Together, these factors mean higher growth rates and expanding prosperity for the nation. Productivity Growth can be enhanced through Investment and Workforce Skills:

A. Investment-Technology is a key factor behind productivity growth. Future discoveries and development of new applications depends on investments in basic and applied research today. Public and private leaders, nationally and regionally, must focus diligently on preserving and strengthening the infrastructure on which future prosperity depends. Success will depend on whether the public and private sector can work cooperatively. A "Smart Prosperity" strategy is dynamic, evolving as the economic and political environment changes. However, two basic points are critical :(1) The Infrastructure is Key. A strong and vital infrastructure provides the research and technical resources needed to generate new products and processes, workers with education and skills they need to be productive and prosperous, and opportunities for businesses of any size to compete for a share of the market. (2) Responsibility is shared. No single organization can maintain the productivity infrastructure. Individual firms, workers, associations, universities, community colleges, and federal, state, and local governments all make important contributions. The challenge for each is to recognize and pursue their role. In many areas, cooperation and partnerships are needed to prepare the infrastructure for the future. A "Smart Prosperity" strategy recognizes the relationship between infrastructure and the transformation of manufacturing from a factory-centric enterprise to an extended, distributed system. Robust policies at multiple levels are needed to preserve and expand the core components of this infrastructure. Additionally, public investment in manufacturing related R&D is less than 5 percent of all federal R&D and, since the early 1980s, federal support for the fields most directly related to productivity improvement have fallen sharply while the economy has expanded, [Ginta, 2005].

B. Workforce Skills-The new production enterprise requires multi-skilled production technicians who are capable of dealing with an expanding set of advanced technologies. Yet, reliable information about skills requirements and related education needs and career ladders are difficult to find and there is no clear system for skills documentation. To help meet this need, manufacturers should clarify with greater precision the skills and knowledge, and related standards, required by their workforce. When integrated into curriculum and learning systems, industry-led skill standards help close the gap between the needs of the manufacturing Community, the skills and knowledge imparted by the education and training communities.

Expanding productivity growth in the U.S. economy requires more workers with higher levels of skills and knowledge needed to keep pace with rapid technological change. According to a Bureau of the Census study, investments in workforce education and training have the highest correlation to corporate productivity growth.

Manufacturing Competitiveness Strategies-setting up of Manufacturing Competitiveness strategy is an important initiative of an interdisciplinary and autonomous body -set up to provide a continuing forum for policy dialogue, to energize and sustain the growth of manufacturing industry by identifying priority sectors.

Identification of manufacturing sectors having potential for global competitiveness and their problems/constraints such as Evolve sector specific strategies, Recommending measures to create common infrastructure & facilities, Coordinate monitoring and implementation of the strategy are par excellence for the upgrading of products of manufacturing in the world competitiveness. Well specified of the sector's potential and constrains can be made through Examine industry & sector specific issues. The enterprise level initiatives, Innovation and technology development (R&D), Entrepreneurship promotion, Infrastructure and enabling facilities, Trade and Employment generation and taking up sub-sectors are having immediate potential for gains in terms of growth and market share.

Manufacturing is crucial for the robust growth of the economy, for exports and for generating substantial relevant employment and Manufacturing is a force multiplier –investment in manufacturing yields four times the effect on GDP growth,[NMCC,India ,2004].

B. Empirical Literature Reviews

Craig S. Marxsen [1998], productivity growth in the manufacturing sector of U.S.A. The empirical results he obtained, indicating that the American economy has slowed considerably since 1973. Multifactor productivity measures the annual growth rate in output in the economy, and the annual growth rate of its component sectors that would have occurred if the size of the labor force and capital stock had remained constant. From 1949 to 1973, multifactor productivity grew at an average rate of 1.8 percent per year. The paper conclude that means that if the capital and labor employed in manufacturing had remained constant, output would have increased 1.8 percent per year solely as a result of the 1.8 percent productivity growth. In contrast from 1973 to 1992, manufacturing multifactor productivity grew at just 0.8 percent per year, a decrease of one percentage point per year.

Lyuba Zarsky and Kevin P. Gallagher [2004], Mexico's ten-year transformation from one of the most closed to one of the most open economies in the world. The hope was that economic integration would stimulate large inflows of foreign direct investment (FDI) in manufacturing, especially by North American corporations looking for a low-wage export platform according to these authors. By expanding exports, FDI would alleviate Mexico's debt overhang, create high-productivity manufacturing jobs, and fuel economic growth.

FDI was also expected to cure environmental and social problems. New manufacturing jobs would absorb the urban poor and farmers displaced by NAFTA, allowing Mexico, in the words of President Carlos Salinas to "export goods, not people." Moreover, transnational corporations would transfer "clean technology" and state-of-the-art environmental management systems, reducing the pollution and health risks associated with rapid industrial growth, especially in developing countries with poor regulatory systems. Ten years after the passage of NAFTA, it is clear that the operation was successful--FDI inflows and exports boomed. They concluded that beyond its poor performance in terms of economic growth, jobs and industrial pollution, the neo-liberal integration strategy has undermined, rather than nurtured, Mexico's endogenous productive capacities, in terms of long-term prospects for sustainable industrial development.

Bishwanath Goldar and Anita Kumari [2003], Econometric analysis presented in their paper indicated that the lowering of effective protection to industries favorably affected productivity growth. The results suggested that gestation lags in investment projects and slower agricultural growth in the 1990s had an adverse effect on productivity growth.

They came to the analysis revealed that underutilization of industrial capacity was an important cause of the productivity slowdown. With corrections for capacity utilization, the estimated productivity growth in the 1990s was found to be about the same as in the 1980s.The paper concluded that examining trends in TFP of Indian manufacturing in the 1980s and 1990s.The estimates obtained indicated that during the 1990s, a decade of major industrial and trade reforms, was a deceleration in TFP growth in manufacturing. However, a closer examination revealed that capacity utilization was a significant factor influencing productivity growth in industries; and (b) there was an increase in capacity utilization in manufacturing in the 1980s and a fall in the 1990s. After making corrections for changes in capacity utilization, the TFP growth estimated for the 1990s were found to be about the same as in the previous decade.

They used Multiple Regression in their analysis that was carried out to study the factors influencing TFP growth in manufacturing industries. The final results of these scholars showed a significant favorable effect of tariff reforms on industrial productivity. The results also indicated that slower growth of agriculture in the 1990s and gestation lags in investment project may have had an adverse effect on TFP growth of Indian manufacturing in that period.

Alan Harding, Mans Soderbom and Francis Teal [2004], recent reforms in most African economies of their trading and exchange rate regimes have eliminated much of the protection which previously limited competition. Despite these reforms, in the authors' views, African manufacturing firms remained unsuccessful, particularly in international export markets. In their study, the roles of learning, competition and market imperfections in determining three aspects of firm performance, namely firm exit, firm growth and productivity growth. They used a pooled panel data set of firms in Ghana, Kenya and Tanzania that spans a period of five years. They found that the main determinant of exit was firm size, with small firms having much higher exit rates than large ones.

They concluded that both Ghana and Tanzania have had introduced substantial reforms since the 1980s. Both had undertaken a number of policy and regulatory changes to liberalize a previously highly protected and public sector dominated economy. Measures which had particularly impacted upon the industrial sector included the introduction of a market-based foreign exchange system, liberalization of trade policy, privatization of state-owned enterprises and fiscal policy reform.

In general, however, they found a negative and highly significant interaction term between size and productivity, indicating that selection on efficiency occurs among the relatively large firms. They also found no evidence that larger firms grow faster and neither size nor firm age affect underlying efficiency. The most significant and potentially interesting relationship for them was that from competitive pressure to productivity growth. Given the objectives of the reform programmes implemented in all three countries was to stimulate higher efficiency levels and the eventual achievement of international competitiveness among African manufacturing firms, the finding that competitive pressure was positively associated with productivity growth showed that one aspect of the reform programme had been successful, according to these researchers.

Javier D. Nkurunziza [2004], the paper explored how firms coped with the challenging economic environment that prevailed in the 1990s particularly the effect of the dramatic increase in interest rates. The key finding was that the burden of past loans precipitated firm failure in the 1990s but the overdrafts did not seem to have had a significant impact on firm failure. Furthermore, older firms appeared to have had resisted better than younger ones, but there was no evidence that large firms had higher survival rates. These results were robust to different specifications, namely probit models, Cox proportional hazard models and exponential. The paper concluded that the role of credit in explaining firm failure in a shock prone developing economy and the key factors explaining firm survival in developed economies, namely size and age, were not necessarily the most relevant determinants of firm survival in developing economies. According to this research paper, results from a range of models confirmed that past loans tended to precipitate firm failure and the magnitude of the negative impact of credit use on survival was similar across all the models. The odds of failure of firms using loans were 92 percent higher than for firms not using loans. Because firms that were indebted in the early 1990s became unable to pay their debts following the increased in interest rates and other macroeconomic shocks that occurred around 1993.

Janvier D. Nkurunziza [2005], although analyzed issues relating to credit in African manufacturing, not directly tested for the effect of credit on firm growth. For Nkurunziza, the use of bank credit could affect firm growth in two opposite ways. The effect might be positive if credit allowed a firm to address its liquidity constraint and increase profitability. However, if macroeconomic shocks such as increases in interest rates made firm debts unsustainable as experienced in Kenya in the 1990s, indebted firms might be shrunk or even collapsed. The researcher used microeconomic data on the Kenyan manufacturing sector; the study found that conditional on survival, the firms that used credit grew faster than those did not. The result was robust to alternative estimation procedures, controlling for both endogeneity of the credit variable and selection bias. Convergence in firm size was significant in all the models except the GMM estimation that controlled for several forms of endogeneity.

Alberto Behar and Lawrence Edwards [2004], elasticities of demand and supply for South African manufactured exports were estimated using a vector error correction model in order to address simultaneity and non-stationarity issues. According to their results, demand was highly price-elastic, with elasticities ranging from –3 to –6. The price elasticity of supply was generally about but some estimates were as low as 0.35. Competitors' prices and world income were important determinants of demand, but domestic capacity utilization was not an important determinant of export supply.

They used VECMs in their study, to provide an integrated way of estimating systems of simultaneous equations using non-stationary data. The Johansen Technique was used to validate the theoretical assertion that there were two cointegrating relations in that study. Estimating the coefficients entailed finding combinations of the variables that were cointegrated. By imposing theoretically motive restrictions, separated demand and supply equations were identified. That allowed the coefficients to be interpreted as long run elasticities.

They concentrated on finding the coefficients of the long run cointegrating relationships, by using a relatively large data set, and by introducing some new variables, notably competitors' export prices, to the standard specification. They concluded that the price elasticity of demand was –3 to –6, suggesting lower export prices would result in increased export revenue, but not dismissing the possibility of perfectly elastic demand. The income elasticity of demand depended on whether income was measured in US Dollars or in terms of purchasing power parities, ranging from 2 to 3.5. In their conclusion they indicated that while world income was relevant, active competitiveness measures could materially affect export performance. They affirmed by the positive coefficients on foreign prices and competitors' prices. Cross elasticities ranging from 1 to 4.5 suggested absolute competitiveness improvements might not be enough to improve exports.

Finally for them, the price elasticity of supply was about 1, with a mode of 1.2 and some estimates as low as 0.35. The coefficient on domestic prices was about –1. Production potential was positively related to exports, having a coefficient of 2.6 to 3.9, but capacity utilization did not seem to be important; the relationship between domestic output and exports was expressed fully through potential GDP.

Rashmi Banga and Bishwanath Goldar [2004], as an input to the production process, services were playing an increasingly important role in Indian manufacturing industries, world over. The production function and productivity studies for manufacturing industries had commonly applied the value-added function or the KLEM (capital-labor-energy-materials) production function as the basic framework of the analysis in which the contribution of services to production and productivity did not get an explicit recognition. The analysis of the contribution of services to output growth and productivity in Indian manufacturing was carried out using the KLEMS (capital-labor-energy-materials-services) production function framework, explicitly recognizing services as an input to the production process. Panel data for 148 three-digit level industries for 18 years, 1980-81 to 1997-98, were used for estimating the production function, using which the analysis of sources of growth was undertaken.

The paper concluded that the results of the analysis brought out that the growing use of services had a significant favorable effect on growth of output of Indian manufacturing in the 1990s, when major trade and industrial reforms were carried out. The contribution of services input to output growth in manufacturing was about one per cent in the 1980s, and it increased to about 25 per cent in the 1990s. According to this study the impact of services input on manufacturing productivity, a multilateral total factor productivity index was constructed for 41 major industry groups for the period 1980-81 to 1999-00, with and without services. It was found that the productivity growth estimate for the post-reforms period was over-stated when services were not taken into account. The total factor productivity index on a set of explanatory variables including the ratio of services input to employment, a positive relationship was found between services input and industrial productivity. For the researcher, it seemed from his /her results that the increasing use of services in manufacturing in the 1990s has had favorably affected productivity. The multiple regression analysis undertaken to explain inter-industrial and inter-temporal variations in the intensity of use of services in Indian industries, using data for 41 major industry groups for the period 1980-81 to 1999-00, indicated that trade reforms were responsible in a significant measure for the rapid growth in use of services in manufacturing in the 1990s.

The paper concluded that examined the contribution of services to output growth and productivity in Indian manufacturing in the pre and post reform period. For this purpose, a KLEMS (Capital, Labor, Energy, Material and Services) production function was estimated, explicitly recognizing services as an input to production. Panel data for 148 industrial groups for the period 1980-81 to 1997-98 were used to estimate the production function. The results brought out that the importance of services as an input to production in the manufacturing sector increased considerably in the 1990s as compared to 1980s. Use of services in manufacturing grew at an accelerated pace in the 1990s. The growth rate was about 16 per cent per annum. The contribution of services to growth of manufacturing output went up considerably, from about one per cent in the 1980s to about 25 per cent in the 1990s. The trade liberalization undertaken in the 1990s, which increased competition in the domestic market, were found to be responsible to a certain extent for the increase in the intensity of use of services in the manufacturing sector. It appears from the empirical results that the increasing use of services in manufacturing in the post-reforms period had a favorable effect on industrial productivity.

S/ he had researched on the final conclusion that the acceleration in the growth of services sector in the Indian economy in 1990s, ahead of industry and agriculture, raised the question of sustainability of India's overall growth rate. However, the findings of the paper suggested that the use of services was growing rapidly in the industrial sector and the increased use of services was contributing to both output and productivity growth in the industrial sector. These points to the possibility that the Indian services sector might not only succeed in sustaining its own growth but might also helped in improving the growth rate of industrial sector in the near future.

Eric J. Bartelsman [2000], this paper reviewed the research that used longitudinal micro-data to document productivity movements and to examine factors behind productivity growth. The research explored the dispersion of productivity across firms and establishments, the persistence of productivity differentials, the consequences of entry and exit, and the contribution of resource reallocation across firms to aggregate productivity growth. He concluded that the research revealed important factors correlated with productivity growth, such as managerial ability, technology use, human capital, and regulation. For him, the more advanced literature in the field has begun to address the more difficult questions of the causality between these factors and productivity growth.

Marcus Noland [2004], this paper attempted to determine whether conditions amenable to successful selective interventions to capture cross-industry externalities were likely to be fulfilled in practice in the Korean. Three criteria were proposed for good candidates for industrial promotion: that they had strong inter industry linked to the rest of the economy, that they leaded the rest of the economy in a causal sense, and that they were characterized by a high share of industry-specific innovations in output growth. According to these criteria, likely candidates for successful intervention were identified in the Korean data. It was found that, with one exception, none of the sectors promoted by the heavy and chemical industry that policy fulfills all three criteria. It had been attempted to employ data-investigated methods to determine if conditions amenable to successful selective interventions to capture cross-industry externalities. He did the analysis by examining historical data for Korea, a country whose experience was invoked in discussions of this subject. Noland concluded that the transport machinery industry was the single "unqualified success" of the heavy industry. He did not consider, however, the issue of inter-industry linkages. He said if the criterion is ignored, transport machinery was one possible successful candidate identified in the study at hand. These some worldwide empirical reviews mentioned the above, were selected as clues about the sector. However,a few studies were carried out on Ethiopian Manufacturing Industries.those were as follows:

Daniel [2005], measurement and sourecs of technical inefficiency in Ethiopian manufacturing industries. He found that for the period 1998-2002,using a panel data of 361 firms, technical efficiency of the firms was decreasing for most sub-sector,except textile and chemical industries. Based on his study results, he recommended that the existing levels technical efficiencies and the level of production of the sector could be enhanced and emproved through provision of credit, better marketing strategies,workers training,accelerating the slow pace of privatization and designing effective incentive payment strategies.

Getachew [1997], focusing on idustrial expansion and investment in various regions of Ethiopia. He used the OLS regression for short-run model estimations for the period 1970/71-1994/95, to understand the partial effects of different factors determining private industrial investment in Ethiopia, The regression results indicated that while GDP,Credit availabilty.Government capital expenditure and the real interstrate had insignificant contribution,the retained earnings had a significant role in private manufacturing investment.

Zinabu [2006], analyzed that African countries in general have not achieved any substantial level of industrialization to date. In response to the dismal performance of the economies in the continent, the Orthodoxy dictates that African governments must follow the path of minimal intervention and free trade. Under such a context, his paper restated and analyzed the infant industry theory and presented historical evidence which demonstrated that no major county has succeeded in modernization and industrialization without deliberate and intensive infant industry protection and promotion by the government. Accordingly, the paper argued that selective, dynamic, and predictable and performance based protection and promotion of infant industries under the context where the government has the willingness and the ability to withdraw the protection and support was the only tried and tested path for modernization and industrialization in Africa. In his conclusion, therefore, Ethiopian economic policymakers can have this kind of information to adopt since Ethiopia is one of African countries.

From both the theoretical and the empirical literature reviews presented above, the following key vital lessons are drawn: regard to the theoretical literature review, it is possible to construct the similar model and obtain some ideas for the growth of Ethiopian Industrial Manufacturing Sector. The empirical literature review, on the one hand, gives clue on the estimation of production function; the productivity growth rate; some technical operations; the criticize that researchers made in their study papers and other related issues all over the world , including Ethiopia, have geared to the direction towards scientific research analysis. Particularly, I due attention to the productivity growth in manufacturing sector of the U.S.A; foreign direct investment in manufacturing sector of Mexico; the effective protection to industries, the contribution of the service to output growth and productivity of Indian manufacturing in the pre- and post- reform. In addition, issues related to Credit of the Kenyan Manufacturing and the Recent Reforms in most African economies of their trading and exchange rate regimes are the most important considerations.

CHAPTER THREE

THE GROWTH MODEL SPECIFICATIONS

The growth model describes the basic models to estimate growth of Ethiopian Industrial Manufacturing, based on the Standard Neoclassical Growth Model and the New Growth theory. According to the neoclassical model, "exogenous growth theory" sees rising output per capita as resulting from externally given increases in the quantities of labor and capital. This in outline is the constant-returns-to-scale approach modeled by Jorgenson [1996]. In his growth model, as if there were no technological or organizational change, no economies of scale, but only constant returns in an environment altered solely by investment and labor-force growth. According to this model, economic growth results in adding more labor to get more goods. However, as resources are limited, labor suffers diminishing returns and the additional amount of food decreases, as population grows despite the increase in labor.

The role of investment in this framework can be summarized as :(1) $\Delta K_t = I_t - d.K_t - \Delta$, where Δ represents a discrete change, d is depreciation. I_t can either be determined endogenously by profit-maximizing firms, assumed to be some fixed proportion of output, say sY_t, where s and Y_t represent the saving rate output, respectively. Under the neoclassical assumptions of competitive factor markets and constant returns to scale where all inputs are paid their marginal products, the standard growth accounting decomposition relates output growth to the share-weighted growth rates of primary inputs and total factor productivity, i.e. the famous "Solow residual," $\Delta \ln A$. (2) $\Delta \ln Y = vK\ \Delta \ln K + vL\ \Delta \ln L + \Delta \ln A$, where vK is capital's share of national income, vL is labor's share of national income, and the neoclassical assumptions imply $vK + vL = 1$.Equations (1) and

(2) show the direct link between investment in tangible assets and economic growth as the accumulation of capital contributes to growth in proportion to capital's share of national income.

One can then derive the neoclassical relationship between investment and, Productivity, and Growth, labor productivity growths by transforming Equation (2) as: (3) $\Delta lny = vK\Delta lnk + vL (\Delta lnL - \Delta lnH) + \Delta lnA$, where lower-case letters are per hour worked. Growth in average labor productivity given by Δlny, depends directly on the rate of per hour capital accumulation (capital deepening), Δlnk, growth in labor quality, measured as the difference between the growth of labor input and the growth of hours worked, $(\Delta lnL - \Delta lnH)$, and the growth in total factor productivity (TFP), ΔlnA,[Jorgenson,1999].

Expanding the Investment Concept-The neoclassical model described above can easily be extended beyond investment in tangible assets to account for any accumulated input that contributes to production. This includes investment-driven substitution between heterogeneous tangible assets, investment in human capital through education and worker training, research and development efforts, and public infrastructure expenditure.

In contrast, Solow (1957) originally used a simpler measure of aggregate capital stock as in Equation (1). A constant quality index of capital input is estimated using an asset-specific "user cost of capital" to aggregate heterogeneous capital stocks, rather than acquisition prices. By weighting assets by their user cost, which equals the marginal product in equilibrium, the index of capital input incorporates important differences in the productive contribution of heterogeneous investments as the composition of investment and capital changes. It should be emphasized that "quality" change in this framework represents changes in the composition of assets and not higher productivity from any particular asset. Quality change of that type, e.g. the improved performance of more recent computers, is handled by the investment deflator.

Brown (1997) evaluate patterns of U.S. tangible investment from 1960 to 1996 and conclude that relative price changes, particularly for information technology investments, have led real business investment as a share of GDP. Jorgenson and Stiroh (1995, 1999, and 2000) apply this capital service methodology to the U.S. economy and conclude that investment in tangible assets was the dominant source of growth in the post-war period. These results showed that output grew 3.6 percent per year from 1959 to 1998, with capital inputs, including consumers' durables, accounting for 48 percent of the total growth, while labor inputs accounted for 34 percent and the TFP residual held the remaining 18 percent. Thus, to correctly estimate the contribution of capital to growth, one must utilize a capital services concept and incorporate substitution between heterogeneous assets.

Human Capital-Some intellectuals argue that the importance of investments in human beings is vital for sustainable economic growth. For instance, expenditures on education, job-training and health care that increase the quality of human labor, enhance productivity, and are rightly called investments. Similar to the measurement of capital, this approach incorporates substitution between different types of labor and results in a constant quality index of labor input that is suitable for the production function analysis of Equation (1). Accumulation of human capital is an important source of growth and is now routinely included in growth analyses.

In an important paper supporting the broad neoclassical model, Mankiw, Romer, and Weil (1992) formally include investment in human capital in an augmented Solow growth model. Employing a Cobb-Douglas specification for aggregate output, they explicitly model human capital as a determinant of output: (4) $Y = K^{\alpha} H^{\beta} (AL)^{1-\alpha-\beta}$, Where H is the stock of human capital and A is labor-augmenting technical change. They use a measure of education attainment as a proxy for human capital accumulation and conclude that the model fits the data well in terms of the growth convergence predictions and the estimated output elasticities. They conclude that the augmented Solow model is consistent with the international evidence.

More recently, Hall and Jones (1999) use a similar model to compare levels of output across a wide range of countries and find that human capital differences explain some, but by no means all, of the wide variation in per capita output levels. From a microeconomic perspective, Black and Lynch (1996) find that human capital is an important determinant of cross-sectional differences in establishment productivity,(e.g. a 10 percent increase in average education leads to an 8.5 percent increase in manufacturing productivity and a 12.7 percent increase in non-manufacturing productivity). Again, this research supports the neoclassical view as investment in human capital leads to benefits for the economic agent that makes the investment.

Research and Development- Another type of investment that can be incorporated into the neoclassical model is investment in research and development (R&D), defined broadly as expenditures on new knowledge that improves the production process. The growth impact of R&D has received considerable attention, particularly within the context of spillovers, but the primary impact of R&D investment is internal Griliches, [1973, 1979]. Aghion and Howitt, [1998, p.26] important contributors to the new growth theory, recognize this by noting that Growth "technological knowledge is itself a kind of capital good and it can be accumulated through R&D. Since firms presumably undertake R&D investment to improve their own production process and raise profits, many endogenous growth models explicitly treats spillover effects as secondary, unintended consequences. It is precisely this distinction between internal and external benefits that delineates the role of R&D in the neoclassical and the new growth theories.

Griliches (1995) presents a "skeletal model" of R&D that is a straightforward extension of Equation (1): (5) $\ln Y = a(t) + \Delta \ln X + \Delta \ln R + u$, where X is a vector of standard inputs, e.g. capital and labor, and R is a measure of the cumulative research effort. Alternatively, Equation (5) can be rewritten in terms of growth rates. A consensus has emerged around the fact that R&D capital contributes significantly to cross-sectional variation in productivity. It is important to note, however, that Equation (5) depicts the relationship between an industry's productivity and its own R&D stock.

Public Infrastructure-The neoclassical view describes above focuses on private investment by optimizing firms and individuals as the primary source of growth. In a series of influential and controversial papers, however, Aschauer (1989, p.177) argues that core infrastructure was an important source of productivity growth and that the productivity slowdown observed after 1973 can be largely attributed to a slowdown in public investment. In the model specification, Aschauer includes a flow of productive services from government capital, G, into the neoclassical model as: (6) $Y = A^*f(K, L, G)$, and concludes that "a core infrastructure of streets, highways, airports, mass transit, water systems, etc. has most explanatory power for productivity". These claims lead to a wide-ranging debate that addressed the policy implications and pointed out important econometric issues including potential biases from common trends, omitted variables, and potential reverse causality.

Even if one ignores the econometric and methodological criticism, this does not necessarily mean that economy-wide productivity and growth can be easily improved through public investment because the issue of crowding out of private investment by public investment. Moreover, most empirical estimates of the productivity impact of infrastructure investment are inconclusive.

Gamble [1997] compares three alternative econometric approaches - a production function, a cost function, and a profit function - that are all based on an augmented production function similar to Equation (6). He finds that highway investment contributes to productivity and output growth at both the sectoral and the aggregate level in the United States, although the output elasticity of private capital is four times as large as that of highway capital in all industries. Finally, Cassou [1998] presents a general equilibrium model with an optimizing government and conclude that even if public investment is not optimal, as in the United States, there is little impact on the long-run growth of labor productivity.

The obvious difference between private and public investment is the financing mechanism. As emphasized above, private investment provides returns to private agents that can be internalized and thus there is no role for government intervention. The argument for government-financed infrastructure, however, is a traditional public good argument that prevents all of the returns from being recouped by a private investor, which can lead to under provision of the good.

In an international comparison, Hulten, [1996] utilizes a similar framework to examine the productivity impact of both the quantity and the quality of public investment for 42 countries from 1970 to 1990. Cross-sectional regressions that control for private tangible and human capital suggest that "infrastructure effectiveness" has an impact on growth more than seven times greater than the impact of public investment. Sanchez- Robles,[1998] also focuses on alternative measures of public infrastructure, i.e. an index of "physical units of infrastructure," and finds a significant correlation with output growth. This suggests that there is no simple way for a government to improve productivity through infrastructure investment. Considerable care must be taken to determine the most effective type of investment and its social costs cannot be ignored.

The common theme in all of the preceding studies is that investment is the important determinant of both long-run growth and cross-sectional variation in industrial manufacturing. An important notice, however, is that many of these studies examining only a subset of these investment variables and there is so much variation in growth to explain. For example, the well-known growth slowdown has been attributed by various authors to shortfalls of public infrastructure investment, R&D investment, and equipment investment. All cannot be responsible for the entire slowdown.

To correctly identify the productivity impact of any single input, one must include all the relevant factors of production. As an example, Morrison and Siegel (1997) include R&D investment, high-tech capital investment, and human capital investment in a single analysis, and find all to be significant determinants of productivity growth in U.S. manufacturing, with R&D having the strongest impact. Future empirical research work must include many broad types of investment and capital in any productivity analysis. Only by accounting for the quantity and quality of all inputs can one correctly estimate the marginal importance of each type of investment.

The appealing simplicity and intuition of this neoclassical framework has made its short comings of applied and theoretical work on growth. These are: First, TFP growth is entirely exogenous to the model, i.e. several technologies are typically described by some functions such as $At = A_0e^{gt}$, where g is an unexplained parameter of the economy. Since capital accumulation is subject to diminishing returns, without exogenous technical progress, there could be no steady growth in per capita income. Finally, the international data do not seem to fit with the basic neoclassical model in terms of capital shares and convergence properties. These shortcomings set the stage for several lines of subsequent research on the relationship between investment and growth. Jorgenson summarized (1990, 1996), remained firmly embedded in the neoclassical tradition and sought to develop better measures of investment, capital, labor, and other omitted inputs in order to reduce the importance of the unexplained residual. That is, if all inputs are correctly measured, then exogenous technical progress will be a less important source of growth. That is why I refer to the new growth theory, in addition to the neoclassical model as follows.

An important motivation for the new or endogenous growth literature is the desire to avoid the neoclassical implication that diminishing returns to capital make exogenous technical progress, the only source of long-run growth in per capita income. The endogenous growth models try to explain how private economic agents make decisions that drive long-run growth through spillovers, increasing returns, and other non-traditional effects.

Aghion and Howitt,[1998] provide a detailed summary of the endogenous growth theory. That is, they use past gross investment to index experience and their learning-by-doing model can be written in simplified form as (7) $Y_i = A.(K)*f(K_i,L_i)$, where the i subscript represents firm-specific variables and K is the aggregate capital stock.

The earlier theory is revisited in important research by Romer [1986, p.1003], essentially made a function of the stock of R&D, he emphasizes investment in knowledge suggests a natural externality. The creation of new knowledge by one firm is assumed to have a positive external effect on the production possibilities of other firms. Because knowledge cannot be perfectly patented or kept secret, and Lucas [1988] models as dependent on the stock of human capital. In addition, Coe and Helpman, [1995, p.862] argue that this function also depends on the R&D stock of international trading partners. They state "when a country has free access to all inputs available in the world economy, its productivity depends on the world's R&D experience". This has a natural interpretation as a production spillover since gains do not depend on own resource expenditures. Barro [1990] presents an alternative specification of endogenous growth in a model with constant returns to scale for capital and government services, but diminishing returns to capital alone. This type of investment spillover, whether from tangible capital, human capital, or R&D expenditures, is the fundamental distinction between the neoclassical model and the new growth theory. Simply including additional inputs, e.g. public infrastructure or human capital, is not enough to generate endogenous growth if these other assets are accumulated like traditional tangible assets, if all returns are internalized, and individual firms face diminishing or constant returns. Basu (1996, p.79), commenting on Jorgenson (1996) and describing the neoclassical framework, concludes: In his (Jorgenson's) framework, "technology" is just knowledge shorthand for R&D) and other forms of human capital. On the other hand, the New Growth theory, which also treats knowledge as a form of capital, believes that knowledge is special, in the sense that investors cannot fully internalize the benefits from accumulating knowledge. The New Growth theory thus has large spillovers to knowledge accumulation.

The existence of spillovers is a significant empirical question that has generated a vast literature for obvious reasons. If investment of any type - tangible assets, human capital, or R&D - generates benefits to the economy that cannot be internalized by private agents, then it means that there are different growth paths and policy implications. Since investment may be too low from society's point of view, spillovers open a role for government intervention. By exploring how a certain creativity and innovation diffuses through the economy, this research provides an important theoretical framework for the empirical search of production spillovers. This interesting explanation for well-known phenomena like the computer manufacturing revolution deserves continued attention and further research.

In summary, the "endogenous" growth theory, economic growth can be understood as a process of learning-by-doing, within a firm, and within an industry area as well (Arrow 1962, Romer 1986, 1993 and Lucas 1988). That is, growth over time entails increasing returns to scale for a national economy. A proportionate increase in labor and capital gives rise to more than proportionate gains in output. The explanation lies in better "recipes," as Romer terms innovations, and in spillovers that operate over time, enhancing skill and productivity levels throughout the economy. It also emphasizes that economic growth results from the increasing returns associated with new knowledge. The ability to grow the economy by increasing knowledge rather than labor or capital creates opportunities for nearly boundless growth. Because knowledge can be infinitely reused at zero marginal cost, firms who use knowledge in production can earn quasi-monopoly profits. All forms of knowledge, from big science to better ways exhibiting these properties and contribute to growth. Economies with widespread increasing returns are unlikely to develop along a unique equilibrium path.

The New Growth Theory, and the increasing returns associated with knowledge have many implications for economic development policy. The theory underscores the importance of investing in new knowledge creation to sustain growth. Policy makers will need to pay careful attention to all of the factors that provide incentives for knowledge creation (research and development, the education system, entrepreneurship and the tolerance for diversity, macroeconomic expectations, and openness to trade). Because it undermines the notion of a single, optimal general equilibrium, that implies economics will be less capable of predicting future outcomes.(J. Cortright,2001].

For this theory, Mankind is better defined by its mind power than by its physical strength. Then, mind power must come in first before the physical labor in the hierarchy of production factors. In Economics, creativity is the expression of mind power: It is the capacity to produce new ideas such as inventions and innovations. An invention is a discovery while an innovation is the application of the invention to produce new goods and services. Creativity is, today the most important factor of production because it integrates ideas in labor and capital as well as extends resources. As a result, ideas increase the amount of goods produced through labor and capital. It the main resource because it creates an artificial resource base and tends to abundance because it benefits of the law of increasing returns. As creativity is a by-product of free thought, the limits of growth can only come from a backward step of freedom. Creativity is the main driver for economic development. It is Technical Progress for Development.

As a final point to improve clarity, it should be noted that the term" endogenous" is used by both neoclassical and new growth advocates, but its interpretation is subtly different. Jorgenson (1996) and Jorgenson (1999), for example, use the word "endogenous" to refer to all growth that can be attributed to the accumulation of measurable inputs, i.e. all growth except the unexplained Solow residual. New growth theorists, on the other hand, use "endogenous" when explaining the evolution of the residual. That is, Jorgenson, Griliches, etc. develop sophisticated measurement tools to reduce the magnitude of the residual, while Romer, Lucas and others develop sophisticated growth models to explain the creation of the standard residual because of specific actions of economic agents. Thus, there are important explanatory roles for both. The neoclassical and new growth views can be combined by using neoclassical explanations to focus on broadly defined capital accumulation, conditional on the level of technology, while the new growth explanations can provide insight into the evolution of technology and the source of the residual. That is, in relation to growth, the two views have par amount importance for following main reasons. First, a well-known economic growth has been achieved through managerial efforts in accordance with a proposed policy goal. Second, a high growth of any sector in the economy that leads to prosperity resulted in Sustainable Economic Growth and /or development, then a high living standard of the society as well.

Therefore, from the Cobb-Douglas Production Function of the neoclassical growth model, on the one hand, it is easy to make data transformation into logarithm or the differences change of logarithm forms, so as to capture non-linearity; avoid the problems of outliers and normality in the estimated model. The new growth theory, on the other hand, brings new concepts for me, especially, the ability to enhance factor of production through creativity that indicates the right solutions to the sustainable development problems for the concerned bodies. That is why I incorporate them in the study.

Learning-by-doing within a firm means that current unit costs are a function of experience (as measured by the firm's total cumulative past output). Given the learning curve for a single firm, then imitation of successful firms on the part of other firms in the industry spreads the "learning" around, such that the industry can benefit from falling-forward supply curves. The process links unit costs to cumulative industry output within a country. The ease of imitation and learning then increases within spatial agglomerations.

In this regard, the Cobb-Douglas Production Function over time t is the basic foundation for the dynamic model of Johansen procedures cointegration analysis, given as a form:

$$Q_t = e^{\phi} T_t . L_t^{\alpha 1} . C_t^{\alpha 2} . e^{Ut}, \qquad (3.1)$$

By taking logarithm, in both sides of equation (1), we obtain desired value added of manufacturing as

$$\ln Q_t^* = \phi + \ln T_t + (\alpha_1)\ln L_t + (\alpha_2)\ln C_t + U_t \qquad (3.2)$$

By rearranging (3.2), and setting U_t equals zero, we arrive at

$$T_t = \ln Q^*_t - [(\alpha_1)\ln L_t + (\alpha_2)\ln C_t] \qquad (3.3)$$

, where Q_t, T_t, L_t, C_t, Q^*_t, ϕ, α_1, α_2 and U_t refer to the actual output or value added at constant factor cost of industrial manufacturing, total factor productivity, labor engaged in production, the sum of fixed capital assets and capital expenditure, the desired value added at constant factor cost of industrial manufacturing, the constant term, the elasticities of labor and capital as well as the error terms, respectively.

If $\alpha_1 + \alpha_2 = 1$, then there is constant returns to scale; if $\alpha_1 + \alpha_2 < 1$, then there are decreasing returns to scale and increasing returns to scale if $\alpha_1 + \alpha_2 > 1$that competing in the world market. For detail information, see [Chandan, et.al, 1995, pp. 230].

Partially Differentiating Equation (3.1) w.r.to L_t and C_t, other things being constant, obtain:

$$\partial Q_t / \partial L_t = MPL_t \quad \alpha_1 (Q_t / L_t) \qquad (3.4.1)$$

$$\partial Q_t / \partial C_t = MPC_t = \alpha_2 (Q_t / C_t) \qquad (3.4.2)$$

By definition of production theory, we can solve for α_1 and α_2 from equation (3.4.1) and (3.4.2), we get

$$\alpha_1 = (w_t L_t) / Q_t \qquad (3.4.3)$$

$$\text{and } \alpha_2 = (r_t C_t) / Q_t \qquad (3.4.4)$$

Sum up equations (3.4.3) and (3.4.4), becomes

$$\alpha_1 + \alpha_2 = (w_t L_t) + (r_t C_t) / Q_t \qquad (3.5)$$

Equation (3.5) assumes that if $\alpha_1 + \alpha_2 > 1$,then there is increasing return to scale and the sector becomes competing in the world market, providing that whether α_1 exceeds α_2 , then it is labor intensive, otherwise capital intensive. We can relate competitive prices with elastcities as

$$w = MPL_t (1+1/\alpha_1) \text{ and } r = MPC_t (1+1/ \alpha_2)$$

, where MPL_t, MPC_t, w_t and r_t are marginal product of labor, marginal product of capital, real wage rate and interest rate, respectively.

The change in factors of production that cause to change in output over time in (3.2) above, thus, making the growth rate of desired value added of industrial manufacturing of Ethiopia as

$$\Delta \ln Q^*_t=\phi+\Delta \ln T_t+\alpha_1 \Delta \ln L_t+\alpha_2 \Delta \ln C_t+U_t \qquad (3.6)$$

The growth rate of actual the value- added at constant factor cost of manufacturing industries in Ethiopia (Q_t), is adjusted by the following mechanism:

$$\Delta \ln Q_t= \theta(\Delta \ln Q^*_t - \Delta \ln Q_{t-1})) \qquad 0<\theta<1 \qquad (3.7)$$

This model is called the partial adjustment. Substituting for $\ln Q_t^*$ from (3.6) into (3.7) and rearranging terms, we obtain the following estimable growth model:

$$\Delta \ln Q_t= \theta[\phi+\Delta \ln T_t+\alpha_1 \Delta \ln L_t+\alpha_2 \Delta \ln C_t-\Delta \ln Q_{t-1}+U_t]$$

$$= \theta\phi+\theta\Delta \ln T_t+\theta\alpha_1 \Delta \ln L_t+ \theta\alpha_2 \Delta \ln C_t - \theta\Delta \ln Q_{t-1}+\theta U_t \qquad (3.8)$$

The term,($-\ \theta\Delta \ln Q_{t-1}$) refers to the error correction term for the actual growth value added at constant cost of manufactured industries. For the detailed information, see [Ramanathan, 1995, pp.257-61]. We assume that the parameters in (3.8), $\theta\phi$, θ, $\theta\alpha_1$, $\theta\alpha_2$, and the error correction term, ($-\ \theta\Delta \ln Q_{t-1}$) as well as the error terms with associated their coefficients,θU_t can be fixed as the parameters, β_i (i= 0,1,2,...n), $ECT_{(\Delta \ln Qt)}$ and a vector of stochastic error terms, u_t ,respectively. Thus, we get:

$$\Delta \ln Q_t= \beta_0 +\beta_1 \Delta \ln T_t+\beta_2 \Delta \ln L_t+ \omega\Delta \ln C_t +ECT_{(\Delta \ln Qt)} + u_t \qquad (3.9)$$

We again assume that capital resources mentioned above, as C_t in aggregated form, has to be separated in the form of fixed capital assets, K_t and investment (capital expenditure),I_t, explicitly.

In addition, other factor of production, namely, the growth of change in material costs, including fuel, ΔlnM_t, the factor affecting the actual growth value added of industrial manufacturing at constant value. Therefore, the extension of (3.9) is reformulated as

$$\Delta lnQ_t = \beta_0 + \beta t1\ \Delta lnT_t + \beta_2\ \Delta lnL_t + \beta_3\ \Delta lnK_t + \beta_4\ \Delta lnI_t + \beta_5\ \Delta lnM_t + ECT_{(\Delta lnQt)} + u_t \quad (3.10)$$

In the same manner, it is possible to set the error correction terms for the remaining variables. The terms ΔlnK_t, ΔlnI_t and ΔlnM_t are defined as the change in growth of capital, investment and material costs, including fuel, respectively, and the lower, t, is the series trend over time. Other variables have been already mentioned. By adding on equation (3.10), the lagged period values of all the variables; the dummy variable and the time trend, we get the following augmented dynamic model:

$$\Delta lnQ_t = \pi_0 + \sum \pi_1 \Delta lnQ_{t-i} + \sum \pi_2 \Delta lnT_t + \sum \pi_3 \Delta lnL_t + \sum \pi_4 \Delta lnK_t + \sum \pi_5 \Delta lnI_t + \sum \pi_6\ \Delta lnM_t + \lambda_1\ lnQ_{t-i} + \lambda_2\ lnT_{t-i} + \lambda_3 lnL_{t-i} + \lambda_4\ lnK_{t-i} + \lambda_5 lnI_{t-i} + \lambda_6\ lnM_{t-i} + Ds_t + trend + e_t \quad (3.11)^*$$

, where $\sum$, summation with i runs from 1,2,3,...,k, lagged periods; Ds_t the dummy variable represents the structural break in MVA_t which takes the value of 0 until 1990 and 1 from 1991 onwards; and trend shows the time trend that captures the growth over the sample period. In equations (3.11), the terms with the summation signs represent the error correction dynamics while the second part (terms with λ_i) correspond to the long run relationship.

Because of 'friction' in the real market, the gap between the actual and desired levels cannot be closed or narrowed instantaneously but only with some lag and random walks [Ramanathan, 1995]. The coefficients π_i except π_0 are the weight attached to total factor productions which are defined as (for example $\Delta \ln Q_t / \Delta \ln I_t$, the average increase in Q_t, when I_t is increased by one unit. π_i are also known as **the impact multipliers**, i.e., the marginal effect of I_t on Q_t in the same time period (where i =2, 3... 8)).

The principle behind these models is that it is the potentiality reasonable to resolve the existence of a long-run equilibrium relationship among economic variables. In the short –run, there may be disequilibrium. With the error correction mechanism, a proportion of the disequilibrium in one period is corrected in the next period. The error correction process is, thus, a means to reconcile short-run and long-run behavior. This approach provides a very efficient way of obtaining long-run information, short-run information, and the speed of adjustment. It also provides the framework for testing the cointegration analysis.

The main reason to apply the cointegration analysis in dynamics model is that it can be applied to irrespective of whether the variables are I(0) or I(1) (Pesaran 1997, pp.303). Another advantage is, the model takes sufficient numbers of lags to capture the data generating process from a general-to-specific modeling framework (Laurenceson, 2003, p.28). Moreover, a dynamic error correction model (ECM) can be derived from autoregressive distributing lagged model through a simple linear transformation (Banerjee *et al.* 1993, p.51). The ECM integrates the short-run dynamics with the long-run equilibrium without losing long-run information.

Notes that the first difference of $\ln_{X_i}$. $\Delta \ln x_t = [\ln X_{it} - \ln X_{i(t-1)}] = \ln(X_{it} / X_{i(t-1)}) = \ln(1+g_{Xi}) = [X_{it} - X_{i(t-1)}] / [X_{i(t-1)}]$.Second difference of $\ln xi = [\ln X_{it} - \ln X_{i(t-1)}] - [\ln X_{it-1} - \ln X_{i(t-2)}]$ and $\Delta \ln xt\text{-}1 = [\ln_{Xi-1} - \ln_{Xi-2}]$,where i =1,2,3,.....,n. According to lagged differences and growth rates rules, for small values of X_{it} $\ln(1+X_{it}) = X_{it}$ that follows $\ln(1+g_{Xit}) = g_{Xit}$. The first difference of the log of X_{it} is approximately equal to the growth rate X_{it}, see [Chandan, et.al, 1995, pp. 361].The main use of logarithm is to capture non-linearity and avoid the problems of outliers and normality.

CHAPTER FOUR

EMPIRICAL RESULTS AND DISCSSIONS

This chapter analyses the growth of Ethiopian Industrial Manufacturing and its Contribution to GDP, using the annual data from 1961/62 to 2004/05. Prior to conducting the time series for stationarity that is the unit root and cointegration tests, it is essential to fix the appropriate lag length by using certain criteria. Thus, the choice is based on the minimum absolute values of Akaike Information (AIC), Hannan Statistics and Shawart Bayesian criteria. It has been argued that the high value of lag length is not a solution in the presence of statistical problems such as endogenous, autocorrelation, etc, because the higher lag length, the little impact on the analysis [Harris, 1995]. Accordingly, the selected appropriate lag length in this study is two, which is reported in Table A (see Annex II).

4.1. Test for Unit Roots

It is argued that most macroeconomic time series variables are non-stationary in the sense that their mean and variance are function of time. The applications of unit root testes have proved this fact. On the other hand, the standard classical estimation models are based on the assumption that the mean and variance of time series data are constant and independent of time. Therefore, this assumption is violated as far as the time series are stationary. Because of this, the classical estimation methods to estimate the relationship between variables with stationary data give misleading inference which is inferred to as 'Spurious Regression Problem'. Therefore, estimating an economic model using time series data should start by examining the stationarity of the variables included in the model by assessing their order of integration, [Hendry, D., 1986].

Table 4.1 presents the results of Augmented Dickey-Fuller (ADF) tests for a unit root. The results indicate that all data series appear to have one unit root after a deterministic trend. together with augmentation of two lag lengths in the level are accounted for but not in the differences. That is, they have an integrated order of one. Thus, it has been proved that these data are non-stationary in the level. Figure-1 [in Annex II] also proves this fact, indicating the structural breaks in Ethiopian Manufacturing Value Added. Thus, the unit root results show that the regressand $\ln Q_t$ undergoes a structural break in 1991.

Table 4.1: ADF tests of unit roots with trend lag lengths of two in the level & in the differences

The null hypothesis: $Ho = \delta^* = (\rho-1) = 0$; against $Ha = \delta^* = (\rho-1) < 0$.		
variable	Level	First difference
$\ln Q_t$	-2.762	-4.999**
$\ln T_t$	-3.506	-7.169**
$\ln L_t$	-1.603	-3.828*
$\ln K_t$	-1.009	-7.273**
$\ln I_t$	-1.592	-8.705**
$\ln M_t$	-1.670	-4.019*

The * and ** indicate that reject the null hypothesis of unit roots at the 5% and 1% respectively.

4.2. Test for Unit Roots in the Presence of Structural Breaks using the Innovational Outlier model

To test for non-stuationarity of r where the break changes the mean of the series, we follow Perron (1992), who identifies two general classes of models dealing with series which shifting mean. The first class, the adaptive outlier model, assumes that the effect of the break on the level of the series, whether stationary or not. The second, whom I focus on, is the **innovational outlier model**, with changing mean and slope, assumes that the effect of the break on the level of the series is gradual and smooth rather than sudden. This is due to the dependence of the mean of the series on the dynamic structure of the disturbance term. The test for the unit root in series Y_t, where the change in mean is sensitive to dynamic of noise function, can be achieved by running the following regression:

$$\Delta Y_t = \mu + \beta Y_{t-1} + \Sigma\lambda i\ \Delta Y_{t-1} + \theta DS_t + \gamma Dt_t + \alpha D\ (T_B) + U_t$$

Where μ is constant; i = 1, 2, k and k is lag length, DS_t is a post – break intercept dummy such that $DS_t = 1$ if $t > T_B$ and 0 otherwise, and T_B is the time of break, θ, γ and α represent the post – break intercept, slope and coefficient on the time break respectively and $Dt_t = t$ if $t > T_B$ and 0 otherwise (Perron 1989).[a]

By testing the null hypothesis β=0 in the regression equation above against the alternative hypothesis β <0 series Y_t is stationary if the null hypothesis β =0 is rejected in favor of alternative hypothesis of stationary using appropriate critical values. Results for unit root tests for r are reported in Table 4.2 as shown below.

Table 4.2: unit root tests results in the presence of structural breaks using innovational outlier

k		ADF	t_μ	t_θ	t_γ	t_α
r	1	-3.081	-0.33 (.740)	0.72 (.479)	0.45 (.653)	0.00 (0.00)

---

[a]The test model for the unit root in a series that subject to a break that only alters the slope of the trend function can be undergone using a model similar to the above one. Critical values for unit roots of r are obtained using Stata Econometric Software. These values are -4.242,-3.54 and -3.204 at 1%, 5% and 10% respectively. Figures in the Table are t –values with their respective probabilities p-values in parentheses

Table 4.2 reveals the Innovational Outlier Model gives a result that clearly supports the non-stationary of r since the null hypothesis of the existence of unit root in r cannot be rejected even at 5% or 10% level of significance. The ADF t-statistic is a value of -3.081, which is less that the critical values and hence the value of β = -1.26, which is less than zero. Here, we may conclude that r is non-stationary.

4.3. Test for Cointegration: Test for number of cointegration vectors

In this section, cointegration tests will be applied to Ethiopian Manufacturing data in order to examine the existence of a long run relationship between the growth of the sector and its determinants, using Johansen's (1991) maximum likelihood cointegration method. From a statistical point of view, cointegration of two economic variables implies that they move together over time so that deviations from their long-term trend will be corrected over time [Engle and Granger, 1987]. Each variable may have its own trend, but the difference between the variables remains constant in the long run. On the other hand, lack of cointegration between variables would suggest that there exists no long-run relationship between them.

Cointegration would not have become useful in practice without a statistical theory for testing and estimating parameters of linear systems. It has become a common econometric tool for empirical analysis in numerous areas, where long-run relationships affect currently observed values (e.g., current consumption is restricted by expected future income). In such areas, potential cointegrating relationships can be derived from economic theory and tested.

More recently, it has become possible to test the null hypothesis that the estimated linear relationship between the I (1) variables is a cointegrating relationship (errors in the regression are stationary) against the alternative of no cointegration (errors are non-stationary).

Limitations of Cointegration Tests-The tests are sensitive to which way the cointegrating equation is inverted (i.e., whether x is regressed on y or vice-versa). Second, if there are more than two variables, these tests will not allow discrimination between different cointegrating vectors. There may be more than one cointegrating relationship present in the data as we increase the number of variables in the set, [Gujarati, 1995].

The tabulated λ_{max} and λ_{trace} values provide their respective tests. If $\lambda_{max} > \lambda_{max}$ (95%) and $\lambda_{trace} > \lambda_{trace}$ (95%) critical values, we reject the null and conclude that there exists a long-run relationship between the variables in question. Otherwise, a long-run relationship does not appear to exist between the variables.

In general, if Y is I (d) and X is also I (d), where d is the same value, these two series can be cointegrated. In this case, the regression on the levels of the two variables is meaningful, or non-spurious; and we do not lose any variable long-term information,[Gujarati, 1995]. The Multivariate Cointegration Tests using Johansen approach, by considering the three variables Y_t, X_t, and Z_t, Johansen approach not only examines if Y_t, X_t, and Z_t cointegrated but also if Y_t cointegrates with X_t on its own and Y_t cointegrates with Z_t on its own. Similar procedures are also applied to more than three variables.

The main advantage of this testing procedure is that it does not require any pre-testing of the series to determine their order of integration and can be undertaken irrespective of whether the underlying variables are I (0) or I(1) or fractionally integrated processes [Greene, W.H.,2003].

Table 4.3: Johansen Tests for the Cointegrating Relations

Null	alternative	Test statistics	5 percent critical value
		λ_{max}	
r = 0	r = 1	61.34*	42.47
r = 1	r = 2	29.53	30.44
r =2	r =3	21.74	25.05
r = 3	r = 4	16.32	18.30
r= 4	r = 5	10.88	12.53
r =5	r = 6	7.72	9.34
		λ_{trace}	
r = 0	r > 0	147.50*	114.90
$r \leq 1$	r>1	86.19	87.30
$r \leq 2$	r>2	56.66	63.00
$r \leq 3$	r>3	34.91	42.40
$r \leq 4$	r>4	18.60	25.30
$r \leq 5$	r>5	7.72	12.31

- r indicates the number of cointegrating relationships.* indicates rejection the null hypothesis, Ho, of no cointegration at the 5% critical level of significance. The test for the significance of both the maximal and trace eigenvalues, λ_i make use of the likelihood ratio tests
- They are computed as λ_{max} = LR = -Tlog (1-λi) and λ_{trace} =LR = - T $\sum$log (1-λi), where λi is the eigenvalues, T is the number of available observations and i = r +1…k, r is rank and n is number variables entering cointegrating system. The null hypothesis in (4.13) is λ_0 =. λ_1 = … = λ_7 = 0, against the unrestricted alternative that r = n, compared with a test statistic of asymptotic distribution tabulated by Johansen (1988) and Osterwald-Lenum (1992) cited in [Harris, pp165, 1995], which means the non-existence of the long run relationship. Note the maximal and trace statistics are based on a VAR model with two lagged values.

Table 4.3 shows the null for no cointegration is rejected at 5% level of significance by both the maximal and the trace statistics. The alternative hypothesis indicates at least one cointegrating vector is not rejected. It is suggested that there exist precisely one cointegrating vector in the estimated model. Here, it can be concluded that there is a long-run relationship among the variables which is explained by a linear combinations of I (1).

4.4. The estimation of Long-run and Short-run Models

As the existence of a unique cointegrating vector is statistically supported, the relevant analysis rely on the first column of the standardized α- matrix and the first row of β-matrix, which is reported in Table B (see Annex II). Having these matrices, we have to impose zero restrictions on α- and β- coefficients to test the entries of these coefficients in which the relevant vectors are statistically zero. The zero restriction on α is statistically used a test for weak exogeniety, which insists to identify the endogenous and exogenous variables in the model.

Table 4.4: Test for zero- restrictions on α-coefficients (the Weak Exogeniety Test)

variable	coefficients of α_{11}	LR –test, $\chi^2_{(1)}$	P-value
$\ln Q_t$	-0.0952	4.5306	0.0333*
$\ln T_t$	-32.723	1.5554	0.2123
$\ln L_t$	0.0036	0.3024	0.5824
$\ln K_t$	0.2416	0.6889	0.4066
$\ln I_t$	0.7891	3.2748	0.0704
$\ln M_t$	-0.7202	4.8793	0.0272*

* indicates the rejection.

The rejection of weak exogeniety hypothesis implies that $\ln Q_t$ is endogenous variable, however, the variable, $\ln M_t$ has endogeniety problem.

4.4.1 The estimation of Long-run Model

In determining the variables which are uniquely constitute the cointegrating vectors, the significance of the long-run variables must be tested by imposing a zero restrictions on each respective coefficient. The results of test for zero restrictions on β- coefficients are reported in Table 4.5.

Table 4.5: Test for zero- restrictions on β –coefficients (the long-run parameters)

variable	coefficients of β_{11}	LR –test, $\chi^2_{(1)}$	P-value
$\ln Q_t$	1.0000	7.8339	0.0051**
$\ln T_t$	0.0023	7.0367	0.0080**
$\ln L_t$	-3.5185	3.5732	0.0587
$\ln K_t$	-0.3689	0.44929	0.5027
$\ln I_t$	-0.6298	7.1509	0.0075**
$\ln M_t$	0.9261	2.5156	0.1127

** indicates the rejection.

In this analysis, as the test of weak exogeniety hypothesis proves, the most important endogenous variable in production process of Input-Output relationship is lnQ_t. Therefore, conditionally, it can be normalized on the rest variables in order to explain the long-run behavior, from Table 4.5. Thus, the relevant linearly dependent equation models with the estimates of the long-run coefficients can be obtained as:

$$lnQ_t = -0.0023lnT_t + 3.5185lnL_t + 0.3689\ lnK_t + 0.6298lnI_t - 0.9261lnM_t$$

In this equation, lnQ_t, lnT_t and lnI_t are statistically significant variables in explaining the long-run growth of Ethiopian Industrial Manufacturing while the rest are not. Figure-3 (in the Annex II) also proves the fact. The coefficients of the independent variables are referring to the dynamic analysis of long-run multipliers. Similar fashion is also applied to generate the equations for the rest of the variables like the above one. These are available in the Annex II, under Table B.

4.4.2. The estimation of Short-run Model

So far, the existences of long-run relationships are statistically assured and the associated long-run parameters are determined, now the coefficients of short-run in the Johansen framework are estimated using the Full Information Maximum Likelihood, FIML. The reason why the Full Information Maximum Likelihood, FIML, is used in stead of Ordinary Least Squares (OSL) or Two Stage Least Squares (2SLS) and Three Stage Least Squares (3SLS) is that the FIML estimator is based on the entire system of equations that treats all equations and all parameters as well as forming the joint distribution of the random variables jointly. In addition, though 2SLS and 3SLS are applicable in the presence endogeniety problem, FIML is superior. The estimates obtained by this technique, therefore, are more efficient than any other techniques in the analysis

[Greene, 1997, pp.754-57]. Thus, the Parsimonious Vector Error Correction Model can be applied in Ethiopian Industrial Manufacturing, using the general to specific modeling approach of David Hendry, from (3.11)* in the matrix form as:

$$\begin{pmatrix} \Delta \ln Q_t \\ \Delta \ln T_t \\ \Delta \ln L_t \\ \Delta \ln K_t \\ \Delta \ln I_t \\ \Delta \ln M_t \end{pmatrix} = \Gamma_i \begin{pmatrix} \Delta \ln Q_{t-i} \\ \Delta \ln T_{t-i} \\ \Delta \ln L_{t-i} \\ \Delta \ln K_{t-i} \\ \Delta \ln I_{t-i} \\ \Delta \ln M_{t-i} \end{pmatrix} + \alpha\beta \begin{pmatrix} \ln Q_{t-i} \\ \ln T_{t-i} \\ \ln L_{t-I} \\ \ln K_{t-i} \\ \ln I_{t-i} \\ \ln M_{t-i} \end{pmatrix} + u_t \qquad [***]$$

In this model, the $\alpha\beta$ represents the coefficient of error terms. Therefore, equation [***] can be estimated, using this technique. In order to improve the precision of the estimates, the insignificant variables are omitted; the dummy variable, the trend, the constant and the error correction term are incorporated in the estimation model and the ultimate results are reported in Table 4.6.

Table 4.6: Parameter Estimates in the VECM by FIML methods (dependent variable is ΔlnQ_t)

Independent variables	Coefficients	T-ratios
ΔlnQ_{t-2}	-0.3529	-2.434**
ΔlnT_t	-0.0002	-3.026**
ΔlnT_{t-1}	-0.0003	-4.275**
ΔlnT_{t-2}	-0.0004	-5.186 **
ΔlnT_{t-3}	-0.0005	-5.186**
ΔlnL_t	0.4894	1.787*
ΔlnL_{t-2}	0.0357	0.695
ΔlnK_{t-1}	0.0357	0.998
ΔlnI_{t-3}	0.0325	1.477
ΔlnM_{t-3}	-0.1056	-2.158*
Ds	-0.0681	-1.214
Trend	0.0024	0.880
Constant	0.0693	1.092
ECT_{-1}	-0.457	-1. 825*

The * and ** indicate level of significance at 5% and 1% respectively. The lags are included in the model as explanatory variables because the disturbance of the current period determines the direction of the dependent variable in the next period [Banerjee. et al. 1993].

Diagnostic tests:

Optimization result: weak convergence and effective observations; T = 38. Testing for vector error autocorrelation from lags 1 to 2, Vector AR 1-2 $F(2, 22) = 0.66362$ [0.5250], Vector normality test for residuals: $Chi^{2}(2) = 1.0638$ [0.5875]; ARCH 1 $F(1, 22) = 0.1923$ [0.6653] and F-form $(2, 22) = 0.67322$ [0.5203]. All variables have passed the diagnostics tests. The detail information, for these figures, some important notes, procedures and formulas are available in the annex, (you can see Annex I for detail information).

Given the error correction term [$ECT_{-1} = -0.457$] that measures the adjustment of manufacturing value added at constant cost, $\ln Q_t$, towards the long-run steady-state path in the production process with statistically significant. The expected negative sign indicates convergence toward the long-run equilibrium according to the assumption of Endogenous Model, which is elaborated in the literature review. However, the magnitude of this error correction term is very low; hence, the speed of adjustment is weak.

4.4.3. Empirical Interpretations for both the Short-run and Long-run Models

The growth of Ethiopian Industrial Manufacturing in the short-run and long-run are estimated using the Johansen cointegration framework in order to address non-stationarity issues. The Johansen Technique is used to validate the theoretical assertion that there is one cointegrating relations in this study. Estimating the coefficients entails finding combinations of the variables that are cointegrated. That allows the coefficients to be interpreted as long run and short-run growth impacts of factors of production on Ethiopian manufactured value added.

The level of investment, $\ln I_t$ is highly positive significant impact variable on production development outcomes of growth in MVA. Specifically, as the growth rate of investment increases by one unit, the growth of Ethiopian Industrial Manufacturing increases by 0.6298 units in the long-run; while in the short-run it becomes insignificant. In the meantime, the growth rate of total factor productivity, $\Delta \ln T_t$, has a negative influence on the sector growth, both in the short-run and long-run because without bringing new technology into the production, simply investing money is resource wastage. This implies that it is unproductive and unable to bring the structural transformation of the sector, specifically, its growth, unless, the modern and updated technology is employed in the production system. With regard to labor engaged in production, its short-run effect is highly significant on the sector growth; hence, labor input is productive factor and the sector is characterized as labor intensive. Whereas the positive insignificant growth rate of $\ln K_t$ and the negative insignificant of $\ln M_t$ influence the growth of MVA in such away that their shares to the MVA has less robust to explain the growth.

The coefficients –0.0003 and – 0.0004 are the interim multipliers of order one and two which reveal, for a unit increases in $\ln T_{t-1}$ and $\ln T_{t-2}$ in each, on average, there is decreases in $\ln Q_t$. This implies that the obsolete level of technology employed deteriorates the activity of manufacturing industry.

The coefficient -0.457 of error correction term, ECT_{-1}, of MVA measures the speed of adjustment, which approximates the number of periods that takes place in adjustment process. It is worth discussing in the production process. This value which suggests a slow adjustment process, the short-run of the previous period shock adjusts back to the long run equilibrium in the current year. This figure is statistically insignificant and its sign is an expected, indicating that an adjustment would be probably towards the long-run steady –state path after a certain shocks, from actual growth to the equilibrium growth rate during the production takes place in Ethiopian manufacturing activity. It is a lower speed of adjustment process, i.e., it takes many years for all deviations to be corrected. The negative sign shows that any shocks in the system will return back to its long-run path.

The dummy variable, Ds, has a negative significant, showing the structural break that harmed the activity the in the year 1991. The time trend included in the model, shows the relative manufacturing value added at constant factor cost has been growing over time because of technical progress. Graphically, the growth trend of the Ethiopian MVA is shown in Figure-3 (see in the Annex II). This trend reveals the overall growth of the sector is 0.24 percent per annum, for the past 43- years.

The final analysis which relates to the sectoral contribution to the GDP of the country also employs the same data, with different techniques. Thus, the share of manufacturing industry contributes about 6 percent, out of 11 percent of the total industry to GDP. That is almost $1/11^{th}$ of Agriculture and $1/6^{th}$ of Service sector, on average since 1962. This implies. the level of industrialization is very low and agricultural sector dominates the economy, which proves the hypothesis of the paper, (see Table C and Table D, in the Annex II).

CHAPTER FIVE

CONCLUSIONS AND POLICY IMPLICATIONS

In conclusion, industrialization is seen as a motor behind many of the processes usually termed as "social transformation" and "modernization " in terms of at least three ways in which industry helps to achieve the goals of social development. First, manufacturing industry's substantial contribution to economic growth that helps to create a large portion of the resources needed to fund social development programmes. In addition, creation of employment and hence generation of income take place in the sector directly and are indirectly fostered in other sectors - like agriculture or services -through their linkages to industry. Finally, it promotes various aspects of social integration through its general thrust towards modernization.

5.1. Concluding Remarks

Generally, the paper is concentrated on the growth of Ethiopian Industrial Manufacturing Sector and its contribution to the economy. The study is only confined to the industrial manufacture for its availability of data rather than mining, quarrying, construction and electricity. It attempts to covers all publicly and privately owned enterprises across the country.

The statistical problems associated with endogeniety, underlying data permits to offer estimates obtained by FIML procedures provide a worthwhile measure of Manufacturing Industry growth in Ethiopia. In order to assess the growth rate, the FIML is employed to generate more efficient and effective parameters that explain the relationship between dependent and independent variables over the 43- annual observations. In this connection, the short-run and long-run growth for Ethiopian Manufactured Value Added is estimated using the Johansen cointegration framework in order to address non-stationarity issues. The Johansen Techniques are used to validate the theoretical assertion that there is one cointegrating relations in this study.

The analysis indicates that the long-term growth rate of investment is positively related to the weight placed on growth of Ethiopian Industrial Manufacturing and is playing significant role in expanding and enhancing its activities. While that of labor engaged in production, is the short-run effect and hence, the sector is characterized as labor intensive. In the meantime, the sector growth is negatively influenced by total factors of production that represent the obsolete uses of technological level in the manufacturing activities accounts for the sector's stagnant growth. That is why the overall growth rate of sector is negligible, only about 0.24 percent per annum. It can also be suggested that both values of the current and the past time variables have substantial influence on growth. In terms of share contribution, Industrial Manufacturing accounts about 6 percent, out of 11 percent of the total industry to GDP. That is almost $1/11^{th}$ of Agriculture and $1/6^{th}$ of Service sector, on average since 1962.

From these analyses, therefore, it would be probably drawn that the growth and role of Industrial Manufacturing in Ethiopian Economy is insignificant, implies the level of industrialization is very low. The research might fruitfully investigate the relation between shifts in the growth rate of the sector's output and its consequences on changing the whole economy which in turn, enhances sustainable economic growth for the future. Thus, the policymakers would focus on the implications of this paper to mitigate the problem and achieve the designed goal of Sustainable Economic Growth.

5.2. Policy Implications

Based on the findings, the following possible policy implications are made:

It is extremely important due attention for the selected skilled manpower in providing some kinds of incentives so as to achieve sustainable growth in industrial manufacturing. In addition, the manufacturers have to give pre-employment technical skill training for the school leavers and job training on workplaces using actual work machines and equipment to directly enhance relevant skills in improving volume and quality of products. These are done through direct support industries by the government in terms of finance and professions.

Encourage foreign investors to invest on industrial sector, especially, on manufacturing activities, because they do not only invest their capital but also new technology. As new technology comes to the country, it is easy to transfer from one firm to another so that possible way of expansion of new technology, without incurring high costs. This technological level is developed either by carried out of R&D by firms or research institutions then after high productive, providing on-the –job learning (doing and using), which is referred as 'endogenous growth' in the literature [Romer, 1986, Barro, 1990 and Jorgenson, 1996].

A high rate of capital accumulation is a necessary condition for bringing about structural transformation and increased level of productivity to give rise faster industrialization, through largely resources channeled into productive investment. Because the faster manufacturing output increases, the greater the rate of productivity growth; and the industrial sector provides capital goods such as machinery and equipment for other sectors increases productivity that can reduce costs elsewhere in the economy, thus contributing to the development of other sectors

Public infrastructure-networks are essential criteria for expanding manufacturing industry and upgrading its growth rate, thereby enhancing its contribution to GDP, since the scarcity of these services hinder the manufacturing growth in turns industrialization. So, in order to mitigate this kind of problem, infrastructural investment has to be given priority. Thus, to achieve sustainable development in today's context of market and private sector driven development, Ethiopia, requires support from the industrialized countries to build up basic capacities in order to increase capacity utilization through investment expansion activity.

Developing technological capability requires adequate and continuous investment not only on equipment, machinery and related assets, but also on information, labor educations and technological know-how. As continuous investment is made in Ethiopian manufacturing, its share to GDP is increased per annum, extremely. Thus, the corresponding share in total fixed capital formation is enhanced in volume and the undeveloped nature of manufacturing, in particular, industrial, in general, will be changed in economic stracture.

The expansion of manufacturing industry in Ethiopia could not be seen away from the general economic development. Hence, industrial strategy has to be designed along with other development sectors, particularly, agriculture. If equal attentions do not give to all the sectors, the inter-linkage among them cannot be so strong that the goal of Sustainable Economic Growth may not be easily achieved. Because manufacturing industries producing modern technical inputs to agriculture; those producing intermediate and capital goods, with relatively high potential linkages for the development of promotion export earnings. These exports promoting industrial manufacturing have to be encouraged

The last but not least, is related to the Ethiopian economy. The economy is one of the least industrialized and its manufacturing sector is least developed in many respects; in terms of volume and quality products, technology status, labor skills and export capabilities. To overcome these problems, the appropriate combinations use of skilled manpower, modern and suitable technological level and investment on both public infrastructures and manufacturing activities have to be made.

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ANNEXES

Annex I: Some Important Notes and Formulas

(A) Ramsey's Regression for Model Specification Error Test, RESET

The steps for the RESET test:

a. estimate the model by the OLS procedures and save the fitted value $e(Y_t)$;

$$Y_t = \beta_0+\beta_1 X_{t1}+\beta_2 X_{2t}+\beta_3 X_{3t}+\beta_4 X_t +\beta_5 X_{t5}$$

$$+\beta_6 X_{t6} +\beta_7 X_t+u_t$$

b. add the variables $e\ (Y_t^2)$, $e\ (Y_t^3)$, and $e\ (Y_t^4)$, to the model in step 1 and estimate the new model,

$$Y_t = \beta_0+\beta_1 X_{t1}+\beta_2 X_{2t}+\beta_3 X_{3t}+\beta_4 X_t +\beta_5 X_{t5}$$

$$+\beta_6 X_{t6} +\beta_7 X_t +\beta_8\, ey_t^2 +\beta_9\, ey_t^3+\beta_{10}\, e\, y_t^{4} + u_t$$

c. carry out a Wald F-test for the omission of the three new variables in step 2.Wald F-statistic,

$$F\,[K_O, (n-K_D)] = \frac{(R^2_D - R^2_O)/K_O}{(1-R^2_D)\,/\,(n-K_D)}$$

, Where K_O, $(n-K_D)$ refer to degrees of freedom for the numerator and denominator respectively.

(B) White's test for heteroscedasticity

The test does not depend on the normality assumption and its steps for carrying out are described as follows. Given the model:

$$Y_t = \beta_1 + \beta_i X_i+u_t \qquad (1)$$

$$\sigma_t^2=\alpha_0+\alpha_1 X_i+\alpha_i X^2_i+\omega_a X_1 X_a+\phi_b X_2 X_b$$

$$+\lambda_c X_3 X_c+\delta_d X_4 X_d+\pi_e X_5 X_e+\Omega X_6 X_7+v_t \qquad (2)$$

vhere i=1,2,…,7 ; a = 2,4,…,7 ; b = 3,4,…,7; c = 4,5,6,7 ; d =5, 6,7 and e =6,7.

. Estimate (1) by the OLS procedures and obtain β_1 and β_i.

. Compute the residuals $u_t = Y_t - \beta_1 - \beta_i X_i$ and square it.

. Regress the squared residual u_t^2 against all the variables in the 1st step plus the squares all he independent variables and the cross products of every pair of regressors. This is the uxiliary regression corresponding to equation (2).

. Compute the statistic n. R^2 from the auxiliary regression of step 3.

. Reject the null hypothesis that $\alpha_i = \omega_a = \phi_b = \lambda_c = \delta_d = \pi_e = \Omega = 0$ if n. $R^2 > \chi^2_{d.f(a)}$.

Test for Autoregressive (serial correlation), AR (1): (i) Using Likelihood ratio (LR)

g the data in the period 1961/62 to 2005/06 of Ethiopian manufacturing industries, the wing model is estimated by OLS.

$\beta_2 Y_{t-1} + \beta_3 X_t + \beta_4 X_{t-1} + u_t$

likelihood ratio test is conducted the test statistic being:

LR= -n.ln (ESS/ TSS) =-n.ln $(1-R^2)$, where ESS and TSS refer to the explained of square and total sum of square in the model respectively.

sing Wald statistic test

ollowing model is estimated by OLS.

$$y_t = \beta_1 + \beta_2 y_{t-1} + \beta_3 x_t + \beta_4 x_{t-1} + u_t$$

Vith regard to the restriction $\beta_3=0$ and $\beta_4=0$, using Wald statistic test for the presence utoregressive, if the Wald statistic is insignificant as compared to the critical value then, we annot reject the restriction. Note that:

Heteroscedasticity - the residuals do not have a constant variance.

Autocorrelation – the residuals are independent.

- Multicollinearity- the independent variables are uncorrelated.

(iii) Using Lagrange multiplier (LM) test for even higher –order autocorrelation

The LM test is useful in identifying serial correlation not only of the 1st - order but also higher orders as well. Consider the following multiple regression models:

$$Y_t = \beta_1 + \beta_2 X_{t2} + \beta_3 X_{t3} + \ldots + \beta_k X_{tk} + \rho u_{t-1} + \varepsilon_t$$

$$\text{and} \quad u_t = \rho U_{t-1} + \varepsilon_t \qquad -1 < \rho < 1.$$

The test for $\rho = 0$ can therefore be treated as LM test for the addition of the variable u_{t-1} (which is unknown). The steps for carrying out LM are as follows:

a. estimate the model by OLS and compute the residuals $e(u_t)$ as

$$e(u_t) = Y_t - \beta_1 - \beta_2 X_{t2} - \beta_3 X_{t3} - \ldots - \beta_k X_{tk}$$

b. regress $e(u_t)$ against a constant, $X_{t2}, \ldots, X_{tk}$ and u_{t-1}, using the n-i , observations through n and where i= 1,2,...n. This is the auxiliary regression and n-i is used hence. it is effective number of observations [Ramanathan, 1995, pp.456-57].

c. .If (n-i) $R^2 > \chi_i^2$ (a), then rejects the null hypothesis of zero autocorrelation in favor of alternative $\rho \neq 0$ that follows the chi- square distribution with i d.f. such that the area to the tail probability take into account. (Note that LM test is a large – sample test and would need at least 30 d.f. to be meaningful).

(D) Test for Autoregressive Conditional Heteroscedasticity, ARCH

The simplest approach is to examine the squares of the least squares residuals. The autocorrelation of the squares of the residuals provides evidence about ARCH effects. An

Lagrange multiplier(LM) test of ARCH (ρ) against the hypothesis of no ARCH effects or ARCH(0), the classical model can be carried out by computing $\chi^2 = (n-\rho)R^2$ in the regression. The statistic has a limiting chi-squared distribution .Values larger than critical, give evidence of the presence of ARCH or GRCH effects [Greene, pp.575]. The process by which the variances are generated is assumed to be as follows:

$\sigma_t^2 = \delta_0 + \delta_1 \sigma^2_{t-1} + \ldots + \delta_\rho \sigma^2_{t-\rho} + v_t$. This equation is known as the ρ^{th} order ARCH process. The term autoregressive at time t is assumed to depend on previous error variances and the variance at time t is conditional on those in previous periods and hence the term conditional hetroskedasticity [Ramanathan, 1995]. The ARCH test is on null hypothesis: H_0: $\delta_1 = \delta_2 = \ldots = \delta_\rho = 0$, do not reject non- autocorrelation in the error variance; against Ha: $\delta_1 \neq \delta_2 \neq \ldots \neq \delta_\rho \neq 0$, reject non- autocorrelation.

Steps:

1. Estimate, $Y_t = \alpha_1 + \alpha_2 X_{t2} + \alpha_{3X\,t3} + \ldots + \alpha_k X_{tk} + U_t$, where $U_t = \rho_1 U_{t-1} + \rho_2 U_{t-2} + \rho_3 U_{t-3} + \ldots + \rho U_{t-\rho} + \varepsilon_t$ by OLS.

2. Compute the residuals $\acute{\upsilon}_t = Y_t - \acute{\alpha}_1 - \acute{\alpha}_2 X_{t2} - \acute{\alpha}_{3X\,t3} - \ldots - \acute{\alpha}_k X_{tk}$, square it and generate $\acute{\upsilon}^2_{t-1}$, $\acute{\upsilon}^2_{t-2} \ldots \acute{\upsilon}^2_{t-\rho}$.

3. Regress ύ2t against a constant, $\acute{\upsilon}^2_{t-1}$, $\acute{\upsilon}^2_{t-2}$ and $\acute{\upsilon}^2_{t-\rho}$. This is auxiliary regression. Compute $(n-\rho) R^2$. Under the null hypothesis H_0, $(n-\rho) R^2$ has the chi- square distribution with ρ d.f. Reject H_0 if $(n-\rho) R^2 > \chi^2_\rho$ (a), the point on χ^2_ρ with an area 'a' to the right of tail.

(E) Lagrange multiplier (LM) test for serial correlation in lagged dependent variables

Steps: 1.The model is assumed to be

$Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \alpha_2 Y_{t-2} + \ldots + \beta_{p+1} Y_{t-\rho} + \gamma_{p+1} X_{ti} + \ldots + u_t$

and $u_t = \rho_1 U_{t-1} + \rho_2 U_{t-2} + \ldots + \rho_m U_{t-m} + \varepsilon_t$. i=1,2...,7,Where ρ is the order of the lagged dependent variable and m is the order of autoregressive error term .

2. Estimate the model by OLS and obtain the residuals (u_t).

3. Regress u_t on U_{t-1}, U_{t-2} ,..., U_{t-m} and all the auxiliary variables in the model, including the lagged dependent variables $Y_{t-1}, Y_{t-2}, \ldots, Y_{t-\rho}$ and obtain the unadjusted R^2.

4. Compute (n- ρ) R^2 and reject H_o: all ρi = 0 against H_a: not all ρ`s are zero if it exceeds $\chi^2_{m(a)}$, the point on χ^2_m such that the area to the right tail 'a'.(n- ρ) is used because the number of observations actually used[Ramanthan.1995].

(F) Test for serial correlation in lagged dependent variable

We do not reject H_0: all $\rho_i = 0$, because the calculated values of (n- ρ) R^2 shown in the 4th column of Table 4.2 that follows $\chi^2_{\rho\,(a)}$ are less than their corresponding critical values. Therefore, no evidence has been provided to indicate the presence of autocorrelation in lagged dependent variable according to LM test.

Cointegration in multivariate system analysis using Johansen approach

There is no a prior categorization of variables as exogenous and endogenous in Johansen procedures. However, using the identified manufacturing variables in equation (4.13), we can represent these variables by a vector Z_t as unrestricted Vector Autoregressive (VAR) with K lags:

$$Z_t = AZ_{t-1} + AZ_{t-2} + \ldots + A_k Z_{t-k} + Ut \qquad (1)$$

Where Z_t is an (nx1) matrix, A is an (nxn) matrix of parameters, and U_t is independent and normally distributed with mean of null vectors and vector of variance that is $U_t \sim (0, \sigma_t^2$,variance).

Equation (1) can be reformulated into the Vector Error Correction Model (VECM) in the form of:

$$\Delta Z_t = A_i \Delta Z_{t-1} + \ldots + A_k \Delta Z + A_{k-1} \Delta k Z_{t-k+1} + \alpha D_t + ¢ Z_{t-k} + U_t \quad (2)$$

Where Ai represents short-run adjustment, ¢ contains long-run information, D_t represents vectors of dummies: intercepts and predetermined exogenous variables.

In determining the rank, r of a matrix, if there is full rank (n=r), implies that each variable is cointegrated itself and hence each variable is I(0) or stationary. In the case of reduced rank(r<n),it is possible to represent up to (n-1) linear combination or cointegrating vectors that ensue the convergence of the vector Zt to their long-run steady-state path, where n denotes number of variables entering the cointegration space. If there is a rank of zero, then there is no cointegration, hence no long-run relationship among the variables involved and estimation by differences would be appropriate [Harris, 1995].

Annex II: TABLES AND FIGURES

A. TABLES

Table A: Determination of Optimum Lag Length on Ethiopian MVA

Progress to date:Lag,1,2,3,4 compared with system:4,3,2,1 respectively.

System	T	p	log-likelihood	SC	HQ	AIC
4	39	48	193.58340	-5.4184	-6.7312	-7.9274
3	39	84	232.08491	-4.0110	-6.3085	-7.9018
2	39	120	309.64757	-4.6069	-7.8890	-9.8794
1	39	156	377.39202	-4.6992	-8.9660	-11.353

Tests of system reduction

System 3 --> System 4: F (36, 90) = 1.4286 [0.0896]

System 2 --> System 4: F (72, 81) = 2.2613 [0.0002] **

System 1 --> System 4: F (108, 53) = 2.0521 [0.0022] **

System 2 --> System 3: F (36, 64) = 2.6300 [0.0004] **

System 1 --> System 3: F (72, 49) = 2.0101 [0.0053] **

System 1 --> System 2: F (36, 37) = 1.2692 [0.2369]

Therefore, Proper lag length = 2

Table B: Results of Cointegration Analysis (using PC-FIML, Econometric Software)

(i) standardized β' eigenvectors

lnQt	lnTt	lnLt	lnKt	lnIt	lnMt
1.0000	0.0023188	-3.5185	-0.36891	-0.36891	0.92606
679.75	1.0000	288.08	28.652	19.095	-175.20
2.4085	-0.00097659	1.0000	-0.27634	0.44476	-0.45828
-0.92666	-0.00099103	3.0094	1.0000	-1.0018	-0.86445
-2.3279	-0.00017993	0.17086	-1.3632	1.0000	0.33583
-2.2019	0.00052607	0.45733	0.89668	0.43134	1.0000

(ii) standardized α- coefficients

Variable						
lnQ_t	-0.095168	-0.00021795	-0.14910	0.024108	0.042762	0.00036699
lnT_t	-32.723	-1.0540	79.782	-21.817	-77.857	-65.507
lnL_t	0.0036111	-0.00010193	-0.040780	-0.045277	-0.031389	-0.019312
lnK_t	0.24156	0.00057337	0.0069409	-0.010372	0.18605	-0.19858
lnI_t	0.78912	-0.00030536	-0.37610	0.25708	0.044307	-0.18749
lnM_t	-0.72029	0.00053306	-0.085433	0.16552	-0.11914	-0.083575

Number of lags used in the analysis: 2: Variables entered unrestricted is Constant and Restricted is Trend.

$$\ln T_t = -679.75\ln Q_t - 288.08\ln L_t - 28.652\ln K_t - 19.095\ln I_t + 175.20\ln M_t$$

$$\ln L_t = -2.4085\ln Q_t + 0.00097659\ln T_t + 0.27634\ln K_t - 0.44476\ln I_t + 0.458281\ln M_t$$

$$\ln K_t = 0.92666\ln Q_t + 0.00099103\ln T_t - 3.0094\ln L_t + 1.0018\ln I_t + 0.86445\ln M_t$$

$$\ln I_t = 2.3279\ln Q_t + 0.00017993\ln T_t - 0.17086\ln L_t + 1.3632\ln K_t - 0.33583\ln M_t$$

$$\ln M_t = 2.2019\ln Q_t - 0.00052607\ln T_t - 0.45733\ln L_t - 0.89668\ln K_t - 0.431341\ln I_t$$

Table C: Shares of Industry, Sub-industry sector and other Sectors to GDP over the period of 1962/63-2004/05

Sector	Mean	Std. Dev.	Minimum	Maximum
1.Industry:	0.1060	0.0157	0.074	0.148
.Manufacturing	0.0584	0.0111	0.033	0.078
.Mining	0.0029	0.0016	0.001	0.006
.Electricity	0.0126	0.0033	0.005	0.018
.Construction	0.0318	0.0069	0.021	0.054
2.Agriculture	0.5683	0.0918	0.396	0.743
3.Services	0.3257	0.0823	0.183	0.489

Source: own calculation.

Table D: the Components shares to the industrial Sector over the period of 1962/63-2004/05

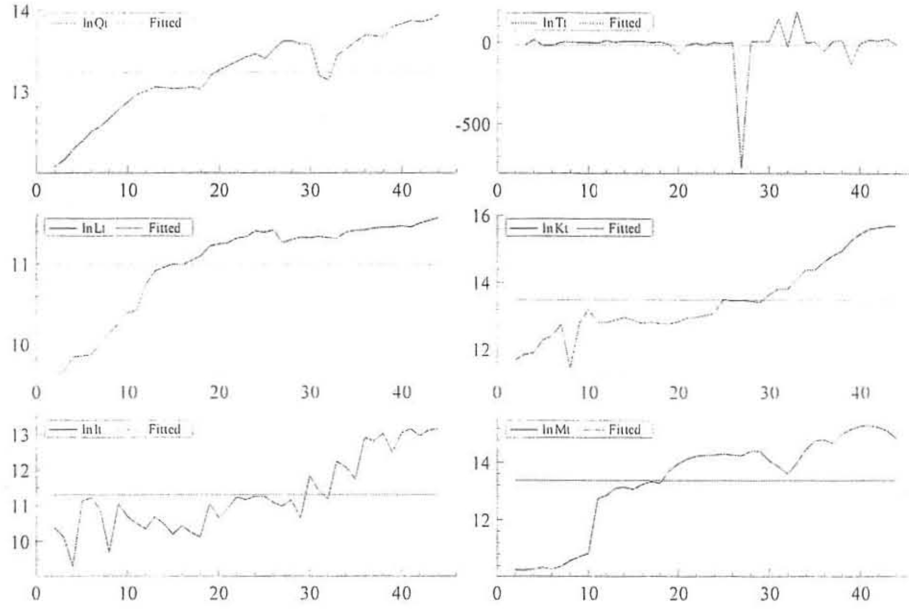
Sub- sector	Mean	Std. Dev.	Minimum	Maximum
Manufacturing	0.5477	0.0455	0.4470	0.6240
Mining	0.0273	0.0136	0.0118	0.0526
Electricity	0.1184	0.0272	0.0667	0.1964
Construction	0.3019	0.0611	0.2228	0.4497

Source: own calculation.

B.FIGURES

Figure-1: The Graphic Analysis for Unit Roots

i.At Levels



ii. At First Differences

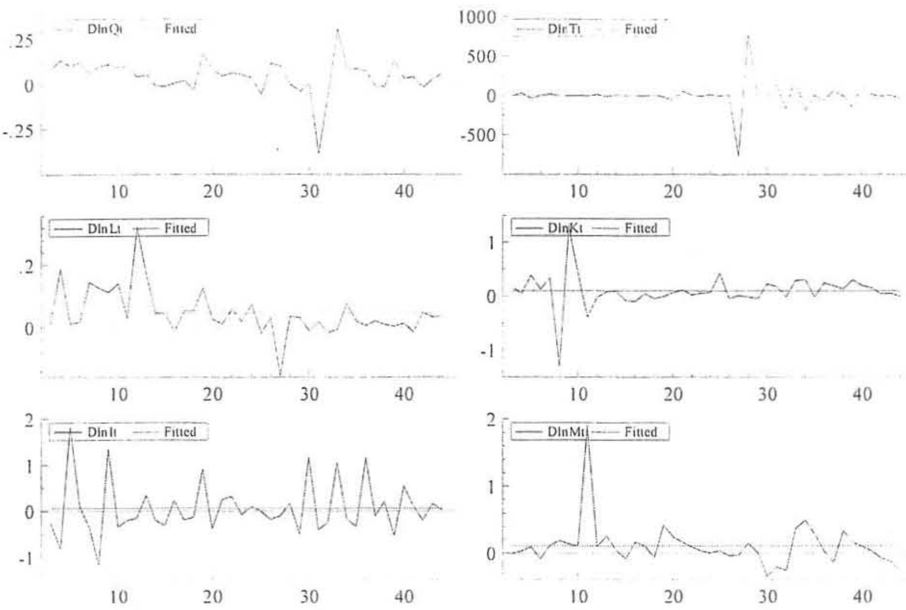


Figure-2: The Graphic Analysis of MVA in the Short-Run

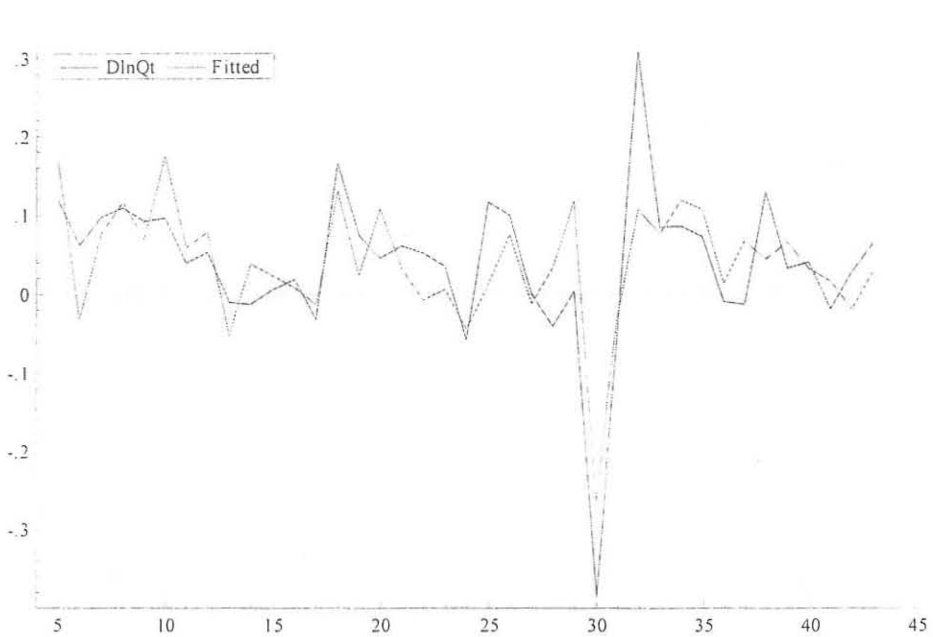
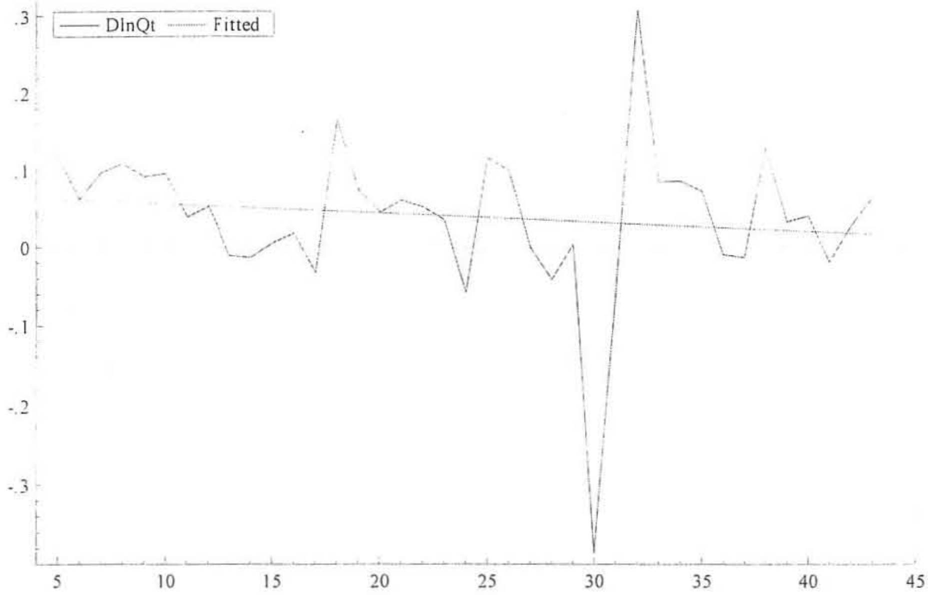


Figure-3: The Growth Trend of Ethiopian MVA over the Period of 1962-2005



GLOSSARY

Basic Definitions according to Central Statistical Agency (CSA) and other institutions:

(i) Number Engaged: - includes paid employees and working proprietors. Active partners and unpaid family workers are also included here.

(ii)Wages and Salaries: - includes all payments in cash or in kind made to employees during the reference year in connection with the work done for the establishments.

(iii) Gross Value of Production: - includes the sales value of all products of the establishment, the net change of stocks between the beginning and end of the reference period in the value of finished goods and the value of semi finished goods, the value of industrial services rendered to others, the value of goods bought and resold without any transformation or processing, and other receipts. The valuation of Gross Value of Production is in terms of producers' values where indirect taxes are included in the value of sales of the establishment and the value of subsidies received is excluded.

(iv) Raw Materials: - include all raw and auxiliary materials, parts and containers which are consumed during the reference year. The value of local raw materials is the value of locally produced raw materials and is the cost at the factory which includes the purchase price, transport charges, taxes and other incidental costs. The value of imported raw materials is the value of raw materials produced in other countries and obtained directly.

(v) Industrial Cost: - Includes the cost of raw materials, fuels, and other supplies consumed, cost of industrial services rendered by others, cost of goods bought and resold without any transformation or processing and cost of electricity consumed.

(vi) Value Added in the National Account Concept (at Market Price):- is defined as the difference between the gross value of production and industrial and non-industrial costs.

(vii) Value Added in the National Account Concept (at Factor Cost):- is the gross income from operating activities after adjusting for operating subsidies and indirect taxes.

(viii) Fixed Capital Assets: - are those with a productive life of one year or more which are intended for the use of the establishment including fixed assets made by the establishment's own labor force for its own use. They are valued in this report at book value at the end of the reference year that is the net book value at the beginning, plus new capital expenditure minus those sold and disposed and depreciation during the reference year.

(x) Manufacturing is defined here according to International Standard Industrial Classification (ISIC Revision-3) as "the physical or chemical transformation of materials or components into new products, whether the work is performed by power-driven machines or by hand, whether it is done in a factory or in the worker's home, and whether the products are sold at wholesale or retail. The assembly of the component parts of manufactured products is also considered as manufacturing activities."

(xii)Productivity: a measure of economic efficiency that shows how effectively economic inputs are converted into output. It is measured by comparing the amount of goods and services with the inputs that were used in production.

(xiii)Growth: refers to major goods and services available in the economy, the wealth and improvement in welfare, and then reduction in social tension further leads to employment of more people and finally political strength

(xv)Development: represents a transformation of society, a movement from traditional relations, traditional ways of thinking, dealing with health and education, traditional methods of productions to 'modern' ways. For instance, a characteristic of traditional societies is the acceptance of the world as it is, the modern perspective recognizes change, and it recognizes that we, as individuals and societies can take actions Stiglitz,1998 (2000).

DECLARATION

I, the undersigned, declared that this thesis is my original work and it has never been presented in any university. All sources of materials used for this thesis have been duly acknowledged.

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Place and Date of Submission: Addis Ababa University, March, 2007.