DETERMINANTS OF EXPORT GROWTH RATE IN ETHIOPIA 1980-2010: CO INTEGRATION AND ERROR CORRECTION MODEL ANALYSIS

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This is to certify that the project prepared by Kiros Hailu, entitled: Determinants of Export Growth Rate in Ethiopia 1980-2010:Co-integration and Error Correction model analysis and submitted in partial fulfillment of the requirements for the degree of master in economics specifically in Applied Trade Policy Analysis (ATPA) complies with the regulations of the university and meet the accepted standards with respect to originality and quality.

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ABSTRACT

Determinants of Export of Growth Rate in Ethiopia 1980-2010: Co-cointegration and Error Correction model Analysis

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The study aimed at identifying the major determinants of export growth rate which have been a matter of argument in Ethiopia and Africa as a whole for a long period of time. The paper empirically examined the export growth rate and its major factors in the Ethiopian context using time series data for the period 1980-2010 collected from ERCA, NBE, UNCTAD, and WEO by employing co integration and error correction model which is previous used by Musinguzi et al (2000) was adopted for this study.

Estimation result of the model shows that the relationship between the foreign price level, and terms of trade with the export growth rate are positive and negative which are statistically significant respectively. The gross domestic product also positive and significant but it is not strong.

So the foreign price level, Terms of trade and gross domestic product appear to be major determinants, whereas the real exchange rate and FDI have no statistically significant effect on Ethiopia's export growth rate.

Therefore to promote the export growth rate understanding and revising of the country's export structure, situations and other policies related to the sector is necessary.

Keywords:

Ethiopia; export; growth rate; determinants; error correction model.

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ACRONYMS

ADLI=Agricultural Development Lead Industry

AGOA =African Growth and Opportunity Acts

BMWs=Bonded Manufacturing Warehouses

CPI=Commodity Price Index

EBA= Everything But Arms

ECM= Error Correction Model

EGR=Export Growth Rate

EPRDF= Ethiopian People's Revolutionary Democratic Front

ETB =Ethiopian Birr

EU=European Unions

FDI= Foreign Direct Investment

FPL=Foreign Price Level

GATT= General Agreement on Tariffs and Trade

GDP =Gross Domestic Product

IMF =International Monetary Fund

LDC =Least Developed Country

MEDaC=Ministry of Economic Development and Cooperation

MoFED=Ministry of Finance and Development

MOTI =Ministry of Trade and Industry

NTB =Non Tariff Barrier

OLS =Ordinary least squares

RER=Real Exchange Rate

SAP=Structural Adjustment Programme

TGE=Transitional Government of Ethiopia

UNCTAD= United Nations Conference for Trade and Development

USD = United States Dollar

WTO= World Trade Organization

1. INTRODUCTION

1.1Back ground of the study

Developing countries like Asia have increased continuously their share in global trade over the past two decades and the largest change of global trade share is in China through export diversification. The share of manufactures in total merchandise exports of developing countries has increased from 35.1 percent in 1985 to 65.8 percent in 2004 while the share of developing countries in world exports of manufactures increased from 14.5 percent in 1985 to 30.3 percent in 2005 and chain's export per capita is 888 billion (in USD) in 2010 (IMF Country Reports, 2010).

Developing countries have also diversified their export markets. The share of developing country markets in total developing country exports increased from 27.8 percent in 1990 to 39.4 percent in 2004, but these figures hide important regional differences. The developing Asia's share in total world exports increased from 11.7% in 1985 to 21.5% in 2005, whereas Africa's share decreased from 4.3% to 2.9% over the same period Similarly, while the share of manufactures in Chinese exports increased from 42.2 percent in 1985 to 71.4 percent in 1990 and 90.6 percent in 2004, their share in African exports increased from 19.9 percent in 1990 to 28.6 percent in 2002 only to fall back to 21.2 percent in 2005 due to the raise in the value of oil exports (Bacchetta, 2007).

The basic reasons for Africa's poor export growth rate and its failures to integrate in world trade are associated with the poor economic performance and lagging development, deep rooted structural problems, weak policy frameworks and institutions, protection at home and abroad (IMF and World Bank, 2001).

In addition to the above reason the structure of African exports, which is characterized by dependence on a few primary commodities is also considered as one reason (Alemayehu, 2006; Biggs, 2007; UNCTAD, 2008).

Similar to other African countries, Ethiopia has faced these problems for a long time. For instance, in 1983 the Provisional Government of Socialist Ethiopia noted that the basic constraints for Ethiopian exports include the low volume of exportable products, the limited degree of diversification of exports, which are made up mainly of unprocessed primary products, frequent economic crisis which substantially reduce the demand for and prices of primary products, artificial trade barriers by trading partners etc. Moreover,

after the downfall of the Derg regime, the Transitional Government of Ethiopia stated that "it is essential to increase and diversify exports" (Abay and Zewdu 1999: 33 as cited in Yisak, 2009).

In response to the problem, Ethiopia has taken different measures such as export financing incentive schemes, export trade duty incentive scheme and duty free importation scheme to those wholly engaged in supplying their products to foreign markets. When compared to the pre-1991

period, the trade policy regime has become more liberal (Alemayehu, 1999). Owing to this policy shift some improvements in export growth have been registered.

According to the Ministry of Trade and Industry (MOTI) and Ethiopia revenue and custom authority (ERCA), the real value of export earnings increased from ETB 5 billion during the first six year period of the Derg regime (1973-1978) to ETB 30.8 billion in the last eight years of the EPRDF regime (2000/1-2009/10).

Regarding the composition of exports, until the 1990s the Ethiopian export sector could be characterized as a 'three-commodity sector' consisting of coffee, hides and skins, and oilseeds and pulses. Between 1966 and 1996, on average 59% of the country's export earnings came solely from coffee and similarly in 1997/98 the share of coffee is 70% but in 2009/10 it shows a significant decrease to 20% while the share of non coffee agricultural exports and major manufacturing export commodities (leather and leather products; textile; and agro processing products) are 30% in 1997/98 and has increased remarkably and reached 80% in 2009/10.

However, when we see the export of goods and services as percentage of GDP is 11.5%, 23.5%, 23.6%, 48.7%, and 34.2% for Ethiopia, Kenya, Uganda, Ghana, and Nigeria in 2010, respectively. This shows the export percentage of GDP is very low comparing with Sub-

Saharan African countries (Own calculation data from ERCA and WEO; 2010)

Similarly, when we see Ethiopia's share in total world exports is still very low, which is around 0.03% in 2006 (WTO, 2010). In this regard, Alemayehu (1999) argue that Ethiopia's external trade has major problems both on the supply side – its dependency on

few primary products, characterized by large fluctuations in volume; and a very high degree of concentration of exports on few commodities – and on the demand side – a low income elasticity for the type of commodities that Ethiopia exports, declining prices for its exports, and limited destinations for Ethiopian exports. Both supply and demand side problems are typical African problems: For example, more than 50% of African countries' export earnings are derived from only three principal commodities such as coffee, tropical beverages and cocoa (Alemayehu, 2006).

In general, having the above mention problems for the low growth rate of Ethiopia's export and the controversial issues on the determinants of export growth rate initiating the researcher to conduct a research on this area.

Identifying and examining the factors that significantly affects Ethiopia's export growth rate should facilitate the design of policies to improve the growth rate and ultimately to see and improve overall economic growth. The objective of this paper is thus to look at the factors behind poor export growth rate of Ethiopia and come up with reliable and recent information to inform for the policy makers regarding the problem. The paper identifies the major determinants of export growth rate and examines how much these factors affect the country's export growth.

1.2 Statement of the problem

Ethiopia's export sector is dominated by export of few primary commodities which include agricultural products mainly coffee, oilseeds, gold, chat, flower, pulses, live animals, and hide skins.

Ethiopia's Export Performance has reached remarkable in the recent few years that is it reached a never-before-seen level of $2 billion in the year of 2010. This export level is an impressive 38 percent increase from the $1.5 billion in exports registered in the previous year, and nearly three times the average annual export level of the prior decade (2000-2009).

In terms of growth rates, the fastest growing commodities (focusing on those with at least $10 million in annual sales) were gold (188 percent growth), live animals (72 percent

growth), and textiles and clothing (67 percent growth) (own calculation from the raw data of ERCA's annual report, 2010).

Of course, the recent improvement in exports should not be exaggerated given the still modest scale of Ethiopia's exports when seen in a broader context. Exports of goods in Ethiopia are only about 11 percent of GDP, compared to an average of near 30 percent of GDP in Sub-Saharan Africa. Export levels still fall short of what is registered by other African countries with much smaller populations (Uganda and Tanzania both export more than $3 billion per year), and exports per person remain very low: only $24 in Ethiopia compared to $200 in Sub-Saharan Africa and $580 in developing Asia. Growth rates are also very modest if one makes a comparison with Asian countries over a decades-long time frame. For example, Ethiopia's total exports were higher than that of Vietnam in the 1980s but are now just a tiny fraction: $2 billion in Ethiopia versus $65 billion in Vietnam (ERCA annual report and IMF International Financial Statistics Report of; (2010)).

Different studies have been conducting on the same topic using different methods during different time and their result shows that there is a big contradiction on the determinants of export growth rate for developing countries as well as country specific results[1] as a result policy makers' encountered problem in formulation of policy regarding the sector. In addition to this a lot of changes are occurred in the overall the economy in the recent years that prompting need for further research to identify plausible determinants of export growth rate so that information is provided to the concerned authorities hence leading to the formulation of corrective policies to address the problem.

Having the above information , Even though there is a remarkable increase in the export sector it is not as intended and data shows that the export growth rate of Ethiopia is low as compared to African countries with similar features of economic structure and other features. So in considering those gaps, this paper tries to identify the key determinants of export growth rate in Ethiopia from 1980-2010 to come up with recent and reliable

[1] For detail information on the contradictions results on the determinants of export growth rate: GDP, TOT, RER ,FPL and FDI see the studies for both developing country and country specific studies that are reviewed on the literature part (for example: Fugzza(2004), Ngeno(1990), Yisak(2009), Sisay Menji(2010), etc).

information that informs for responsible bodies and for deciding correct decision in policy making.

1.3 Objectives of the study

The overall objective of this study is to identify the key determinants of export growth rate in Ethiopia with the purpose of establishing the relationship between the export growth rate and its determinant factors.

The study has the following specific objectives:

- Examining the relationship between export growth rate and its determinants.
- Examine the structure and performance of the Ethiopian export sector during the three regimes starting from the imperial regimes up to now.
- Suggest a possible recommendation for decision makers regarding how to promote export growth rate and informs other concerned bodies.

1.4 Significance of the study

Export growth rate of Ethiopia is low compared to African countries and this leads to export instability that affects the general performance of the economy as whole.

Therefore, identifying the determinants of export growth rate will help to provide information to the policy makers to enable them to come up with the appropriate policies formulation regarding how to promote the growth of the sector and the economy as a whole. It broadens the understanding of determinants of export growth rate and this will aid policy makers. Finally the paper used as reference for further research conducting on these topics and related issues.

1.5 Organization of the study

The study is divided into six main sections. Following the introduction, chapter two and three is about review of literature and overview of the structure and growth of export during different regimes starting from imperial up to now respectively. In chapter four, methodology and model specification was revealed. Chapter five deals the analysis of empirical findings. In the last section, conclusions and policy recommendations was forwarded.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Export growth and its importance

Export growth, defined as the expansion of exports in volume and value, is recognized since the mercantilist era, as critical for any country for a variety of macro and microeconomic reasons including the:

i. Need to generate foreign exchange vital to finance imports;
ii. Need to exploit larger scale economies that can be achieved by producing for export markets, given the small size of many developing countries and their negligible purchasing power; and
iii. Potential contribution to employment and growth of national product.

Increasing exports is therefore a key concern for development economists and policy makers in all developing countries, and integration to global markets brings with it exposure to new technologies, new designs and new products while enhancing production efficiency and competitiveness.

Export development entails promoting export growth accompanied with improved quality and structural transformations (e.g. increasing the share of a country‘s exports in dynamic rather than stagnant products in world trade, expanding shares of exports sectors or employment associated with raising living standards and country‘s overall competitive position, enhancing country performance in a particular export category, and structure and improving the quality of jobs generated in the export sector). Higher export growth without structural transformation of export patterns (e. g. higher export concentration in some products subject to major price and volume fluctuations), may not be conducive to development. Hence, what a country exports matters (Cashin and Mc. Dermott (2002)).

At the micro-level, export competitiveness can be defined as the ―ability of a firm to compete on domestic and international markets‖. A firm will be said to be competitive if it can produce products and services of superior quality, at lower costs than its domestic and international competitors (Buckley, Pass, and Prescott; (1988)).

2.1.2 Determinants of export growth rate

The factories that affect the export growth vary from one country to country. Many scholars have grouped the determinants of a country's export growth rate into two major factors: internal supply and external market conditions (Love and Turner, 2001; Redding and Venables, 2004a; Fugazza, 2004; UNCTAD, 2005 and 2007; Bacchetta, 2007). Some of the key internal supply and external market condition factories considered in this study the following:

Gross Domestic Product (GDP)

GDP generally is defined as the market value of the goods and services produced by a country. One way to calculate a nation's GDP is to sum all expenditures in the country. The gross domestic product (GDP) is one the primary indicators used to gauge the health of a country's economy. It represents the total dollar value of all goods and services produced over a specific time period. The reason for including GDP is to see the effect of the size of the economy to its export growth rate. As the size of the economy is large which implies the production of that country is excessive than the domestic demand and this leads export the excess (Kumar (1998)).

Kumar (1998) conducted a study on the determinants of export growth in developing countries and confirmed that GDP has a significant positive impact on volume of exports. He further said that higher level of production is the main cause of export expansion since surplus output can be exhausted in the international markets. Ngeno (1990) carried out a study on determinants of exports and one of his findings was that export growth is positively related to output level since higher production leads to increased export volumes.

Fugzza(2004),examines the export performance and its determinants using the quintile regression techniques by taking a sample of 149 countries to check robustness of the results for the period of 1988-1999 and result shows that gross domestic product has positively affect the export growth rate for the developing countries . A similar study by Ngeno (1990) in neighboring country Kenya, using export growth as a function of gross domestic product and real exchange rate found that both are significantly affect export growth.

Ahmad (2005) estimated the determinants of exports in developing countries using panel data of 75 countries for the period 1970-2004. He found that GDP has positively affects exports in developing countries.

Sisay Menji(2010) carry out a study export performance and determinants in both the merchandise and manufacturing export supply. Results of this estimation shows that the manufacturing export supply are positively and significantly affected by gross capital formation and share of trade in GDP.

In similar manner Yshak (2009) examines the determinants of export performance of Ethiopia by employing a gravity model for a panel data of 30 Ethiopia's trading partners for the period 1995–2007 and the model is estimated with the Generalized Two Stages Least Squares (G2SLS) method**.** Estimation result indicates that the growth of domestic product (GDP) affects Ethiopian exports positively. In general, as reviewed in the above paragraph GDP has positive effect on the export growth of a country.

Real exchange rate

The exchange rate can be a potent driver of export growth and diversification. Undervaluation (overvaluation) of the currency can bolster (undermine) export competitiveness, as it raises (lowers) returns to entrepreneurial activity, especially in the area of discovering new, high-productivity exports. What matters for incentives is the real exchange rate, the level of which is often rendered uncompetitive in low- income countries by poor macroeconomic management and turbulence in financial markets. Volatility of the real exchange rate is also very high for the same reasons, creating a risky climate for new export investment, as it makes future returns and payments uncertain and as well as leads to the unstable export growth.(Aghion et al 2004).

The real exchange rate can be an important element in determining export growth, diversification and international competitiveness of goods produced in a country (UNCTAD, 2005). It is a key variable that requires close government supervision in any programme to expand and diversify exports (Biggs, 2007) since its management can influence export performance over a large number of different product groups (Mouna and Reza, 2001).

A stable real exchange rate is conducive to export expansion (Mouna and Reza, 2001). The real exchange rate is often rendered uncompetitive in low income countries by poor economic management and turbulence in financial markets (Biggs, 2007). Ensuring that the real exchange rate adjusts to more realistic levels is a means of enhancing the economy's incentives for exporting and can lead to an increase in the production of export products (De Rosa and Green, 1991; Oyejide, 2007). While an overvalued currency can undermine export competitiveness through a direct loss of price competitiveness for exporting firms undervaluation of the currency can bolster export competitiveness (Biggs, 2007), enhance the incentives for export activities (Oyejide, 2007) and lead to diversification of exports and leads to increase the growth of export (Sorsa, 1999; Mouna and Reza, 2001).

In summary, policy prescriptions assume that exchange rate depreciation would stimulate export and curtail imports, on the other hand appreciation of exchange rate leads to detrimental to exports and encourage imports. It is also commonly argued that exchange rate risk depresses international trade; however, the large literature on this subject has not yet clear provided conclusive evidence (klaassen, 1999).

In empirical literature for example, Sharma (2001) conducted a study on determinants and diversifications of export in India and results show that the demand for Indian exports increased when its export prices fell as well as the appreciation of the Indian rupee at one time adversely affected Indian exports. Ahmad (2005) estimated the determinants of exports in developing countries using panel data of 75 countries for the period 1970-2004. He found that RER are positively affects exports.

In Uganda, an investigation of the impact of trade libe realization on export volumes by Kasekende and Atingi-Ego (1999) found no significant relationship between real exchange rate and export volumes and in the same way Kihangrie D, PottsDJ and Cameron S(2005) have been estimated the effect of exchange rate variability on Uganda's flowers exports during 1999-2001 and results suggest that although the Uganda's flowers exports are negatively correlated with exchange rate variability, the measured effects are insignificant. It is further argued that a competitive exchange rate is associated with export growth. In Tanzania, a time series study on Non Traditional Exports (NTE) found a statistically significant relationship between real devaluation and

export growth of NTEs. A similar study by Ngeno(1990) in neighboring country Kenya, using export growth as a function of gross domestic product and real exchange rate found that both are significantly affect export growth.

Frank Klaassen(1999) carry out a study on the exchange rate risk on trade using data on bilateral aggregate export and result shows that export decisions are mostly affected by the exchange rate about one year later, and conclude that its effect is ambiguous.

The real exchange rate has a significant effect on a country's export performance proved empirically through a different study conducted by (Sekkat and Vaoudakis, 1999; Mouna and Reza, 2001). While appreciation of the real exchange rate affects exports negatively (Sharma, 2000; Love and Turner, 2001; Edwards and Alves, 2005; Morrissey and Mold, 2007). depreciation affects exports positively (Asmerom, 1999; Achy and Sekkat, 2001; Mouna and Reza, 2001; Edwards and Alves, 2005). On the other hand, some studies indicate that the effect of exchange rate variability on exports is ambiguous (Hooper and Kohlhagen, 1978; Klaassen, 1999; Du and Zhu, 2001; Kihangire, Potts and Cameron, 2005).

Some country wise study indicates that the impact of real exchange rate on export has insignificant results for example, (Yisak; 2009) carry out a country specific on the determinants of export performance of Ethiopia and he found that real exchange rate has no statistically significant effect on Ethiopia's export performance. In the same way Sisay Menji(2010) also estimated export performance and its determinants and the estimated model depicted that real exchange rate has insignificant effect for both merchandise and manufacturing export.

The effect of the exchange rate on exports depends on the price elasticity of export supply because the real exchange rate should incorporate the price effect on exports. Thus, the higher the price elasticity, the more competition face exports of a particular country on the world market. In general, industrial products have a higher price elasticity than primary products, which causes industrial exports to respond perfectly to changes in the exchange rate (Roshan, 2007) and similarly, the low response to price changes of demand for primary products, which are the main exports of LDCs, implies that LDC

exports respond imperfectly to changes in the real exchange rates, i.e. the effect of exchange rate changes on LDCs exports is ambiguous.

Foreign Direct Investment (FDI)

For many countries, FDI is an important component in determining the supply side of export (UNCTAD 210) reports. Foreign direct investment (FDI) is another important factor affecting the export supply capacity of a country. There is consensus among development economists that FDI inflows are likely to play an important role in explaining growth of recipient countries (De Mello, 1997, 1999; Buckley et al., 2002; Akinlo, 2004; Seetanah and Khadaroo, 2007). By increasing capital stock, FDI can contribute to a more efficient use of existing resources and absorb unemployed resources and thus increase a country's output and productivity (De Gregorio, 1992; Seetanah and Khadaroo, 2007). However, the World Bank (1993) notes that the role of FDI in export promotion depends crucially on the motive for such investment: If the motive behind FDI is to capture the domestic market (tariff-jumping type of investment), it may not contribute to export growth. On the other hand, if the motive is to tap export markets by taking advantage of a country's comparative advantage, then FDI may contribute to export growth. Thus, whether FDI contributes to export growth or not depends on the nature of the policy regime (Sharma, 2000).

Different studies show that in empirical the effects of FDI on exports are controversial. Many studies (e.g.Pfaffermayr (1996)) find positive impact of FDI on exports.

According the argument and illustration in UNCTAD (1995, 2002b), FDI can be expected to contribute to the enhancing of a country's competitiveness on international markets by increasing the technological content of exports.[2] FDI could be directed towards either higher-value-added activities in newly targeted industries or higher-productivity, higher-technology and knowledge-based activities within already targeted industries.

Fugzza (2004), also conduct a study the export performance and its determinants using the quintile regression techniques by taking a sample of 149 countries to check

[2] See for more detail UNCTAD (2002c) for the role of FDI in a sustained development context.

robustness of the results for the period of 1988-1999 and result shows that foreign direct investment are positively affects the export growth rate for the developing countries.

Ahmad (2005) estimated the determinants of exports in developing countries using panel data of 75 countries for the period 1970-2004. He found that FDI has positive effect but insignificant because of the structural problems vary across the countries.

The main reason underlying is the export oriented MNCs, since government provides facilities for export promotion. Such facilities also attract foreign investors, FDI in order to promote exports government can adopt FDI led export growth strategies with twin objectives of capturing the benefits of both FDI inflow and exports growth.

On the other hand, many studies find insignificant or weaker impact of FDI on exports (see Hoekman and Djankov (1997), Nimrod Agasha (2009)). Such studies point out that the role of FDI in export promotion in developing countries remains controversial and depends crucially on the motive for such investment. If the motive behind FDI is to capture domestic market (tariff-jumping type investment),it may not contribute to export growth. On the other hand, if the motive is top tap exports markets by taking advantage of the country's comparative advantage, then FDI may contributes to export growth.

Some country specific study shows that foreign direct investment has insignificant effect on export growth of Ethiopia according to((Yisak; 2009,and Sisay Menji(2010)).

In general, the empirical review some studies depicted that foreign direct investment (FDI) have significant effect on the export growth(Fugazza, 2004; UNCTAD, 2005; Morrissey and Mold, 2007; Gu, Awokuse and Yuan, 2008)), On the other hand some studies evidenced there is negative relationship between foreign direct investment and growth of export((Horst, 1972; Jeon, 1992; Ancharaz, 2003; Gu, Awokuse and Yuan, 2008), and finally, Yisak,2009; Sisay Menji, Lall and Mohammad (1983) and Sharma (2000) they do not found any statistically significant impact of FDI on exports so it can be conclude that there is contradictions of result among the different studies that needs further investigation.

Terms of Trade

A term of trade is also one of the determinants of export performance in both developed and developing countries. Favorable terms of trade are associated with increased export growth rates and unfavorable terms with low export growth rates. Svedberg (1990) argued that in the 1990s.

In empirical review, according to Sisay Menji(2010) export performance and its determinants in Ethiopia using the co integration analysis for the period of 1981 -2004 specifically on the manufacturing and merchandise exports only and the estimated model depicted that terms of trade (TOT) has insignificant effect for both merchandise and manufacturing export.

Nimrod Agasha (2009); conduct a study on the determinants of export growth rate in Uganda from 1987-2006 using the co integration and error correction model and result indicates that terms of trade have positive and significant effect for the growth of the country.

Foreign Price Level

The price of exports on the international market is one of the major determinants of export growth especially for countries which depend on exportation of agricultural products whose prices fluctuate from time to time.

A study in South Africa by Edwards and Golub (2004) found that foreign prices have a strong impact on manufacturing sector's export growth. They used time series data and got a significant positive coefficient of foreign prices. A similar study on Sub Saharan African countries by Rafik and Svedberg (1990) also revealed that protection in form of export quotas and price decline of primary commodities accounted for one third of the total world market share loss by Sub Saharan Africa. In the same way Ndulu and Lipumba (1990) who while studying opportunities and constraints to trade and their influence on growth and development of African economies, discovered that foreign prices of primary commodities significantly affect the export performance of country's involved in their production.

In summary, when we see the empirical review of different studies conduct on different times in developing countries there have been glaring contradictions on the determinants of export growth rate and in addition to this a lot of changes are occurred in the overall the economy in the recent years so this initiated the researcher to conduct a further research to identify plausible determinants of export growth rate so that information is provided to the concerned authorities hence leading to the formulation of corrective policies to address the problem.

CHAPTE THREE

3. OVERVIEW OF ETHIOPIA'S EXPORT STRUCTURE AND GROWTH PERFORMANCE DURING THE THREE REGIMES[3]

The previous trade strategies and policies employed by the regimes largely determined the export structure and the overall economic development of the country.

For the last four decades, the export sector was largely characterized by high dependency on few primary export commodities. Among these commodities, coffee alone constituted for about 54.9%, 60.5% and 47.75% of the total export earnings in 1966/67- 1973/74 (Imperial), 1974/75- 1990/91 (Dergue) and 1991/91- 2009/10 (EPRDF) regimes respectively.

Due to the instability and transition (revolution) of 1974/75 the share of the coffee in the total export declined to 27 percent and the maximum share was 70 percent in 1997/98 because of government's campaign efforts.

Ethiopia is one of the emerging countries, its economic growth and development is highly linked with the development of agricultural sector.

The sector contributes about 44.1 percent of the Gross Domestic Product (DGP) and it provides income and employment to about 82% of the population. The industry and the service sector account for 13.0 % and 42.9 respectively in 2008/09(NBE, 2007/08; CSA, 2007/08)

The objective of the overview is to review and analyze trade strategies with special emphasis on efforts of export diversification and, structure and performance of exports during the three successive regimes. These are categorized into three periods based on the life span of each regime. The Imperial (pre 1973/74), the Dergue (1974/75–1991/92) and the EPRDF (post 1991/92).

[3] This chapter heavily relies on MEDAc (1999), "Survey of the Ethiopian Economy", Addis Ababa and Imperial Government of Ethiopia, The First Five-Year Development Plan, 1957-1961,Addis Ababa--(1962), The Second Five-Year Development Plan 1962-1967, Addis Ababa----(1968), The Third Five –Year Development Plan 1968-1973, Addis Ababa.

Traditionally, there are two trade strategies, i.e. import substitution or inward looking and export promotion or outward-looking strategy. If the incentives are provided to import substitution rather than to export promotion, then the strategy is regarded as IS. It is characterized by protection, control of imports and anti-export bias. Otherwise, it is an export promotion strategy, i.e. public policy measure that actually enhances export activities (Chanthunya and Murinde, 1998).

In line with these trade regime frameworks, Ethiopia's trade strategies and efforts in diversifying exports are analyzed by particularly focusing on selective policies for export promotion and diversification. The selective export policies can be divided into two groups. The first one is ‘’permissive’’ policies. These involve removing overvalued exchange rates or high rates of domestic protection, policy volatility and uncertainty, inflation and high interest rates, price ceilings, cumbersome or biased procedures on new entry of exporters (Lall, 2002:23).

The second one is "positive policies". These policies intend to tackle the costs and deficiencies in stimulating new areas of competitive export activities, to help smaller and larger enterprises to enter into world markets. Besides, they help to enhance the domestic content of exports, to lower the information costs on new markets and to create a good image of a country's products in international markets, etc (Sanjaya, 2002:24). These positive policies can be subdivided into functional and selective interventions. Functional interventions remedy market failures without influencing resource allocation between specific activities. This includes like improving the physical infrastructure, capital markets or general human capital, to provide information and technical support to potential exporters (Ibid).

The second type of positive polices is the so called selective policies which aim to influence resource allocation by providing export subsidies, directing credit, creating specific skills or technologies, promoting small and large firms and attracting specific investors (Ibid).

Both the Imperial and Dergue had been adopting inward oriented trade strategy, which used high level of protection, overvalued foreign exchange rate and control of import goods through high tariff imposition. These policies had detrimental impact on the profitability and competitiveness of the export sector.

The Imperial Regime (1960/61-1973/74)

The Ethiopian government had been trying to enhance and accelerate economic growth through national development plans. However, the expected achievement had been so poor or limited that it remained unsatisfactory. The Imperial regime had designed three consecutive development plans starting 1958. The first five-year plan (1957-1961), which emphasized on industrialization and construction of infrastructure, was in favor of the export sector. The plan gave due attention to export diversification to reduce export (economic) instabilities and to finance the country's deficit. Measures were also taken to promote export diversification such as expansion of infrastructure, especially road, improvement of the quality of export products and the exploitation of the country's agricultural potential in diversifying and increasing exports. During this plan, export was projected to increase on average by 7% per annum. However, the actual growth rate of export was 3.5% per year.

The second five-year plan was initiated and further strengthened the objective of the first five-year plan. The second five-year development plan (1963-1967) envisaged a structural transformation of the economy and export diversification. The plan intended to reduce the share of agricultural export commodities by increase the share of manufactured goods whose market prices are relatively stable and competitive and exports were expected to increase on average by 11 % per annum. The plan also gave equal motivation for both the public and private sectors and recognized their role in the process of diversification. The implementation of this plan was accompanied by incentives like income tax holidays, simplification of export licensing. Furthermore, Embassies also carried out trade missions for trade partners and provided information about potential markets to business community. Although the second five-year plan was projected to increase by 11 % per annum, the registered actual growth rate was only 5%(Second Five Year Plan).

The third five-year development plan (1968-1973) similar to the previous two development plans, also acknowledged the importance of the export sector especially the role of the nontraditional export items. And hence, export was projected to raise on average 10.7% annually. During this period agricultural export products represented almost 75%. From this, coffee constituted about 55% of the total exports but it was

intended to reduce the share of coffee to 40% through processing of hides and skins, canning fruits, vegetables and meat products, minerals including potash and gold, textiles and chemicals. To achieve this goal, export diversification, fiscal and monitory policies were revised and other packages of incentives were also provided including simplification of licensing, credit, subsidy, reduction of transport tariffs, etc. In addition to this, the route of Ethiopian Air and shipping lines were expected to provide market opportunity and rapid growth for the export sector.

The Structure and Performance of Exports during the Imperial (1960/61 -1973/74)

The main export articles during this regime were coffee, hides and skins, oilseeds, pulses and "chat" which comprised 87 percent of the total exports. Coffee alone accounts 56.2 % from 1960/61- 1966/67 and 53.5 % in 1967/68 – 1973/74. Between 1960/61 and 1973/74 on average the share of coffee was 54.9 percent. Next to coffee, the other important export item was hides and skins that accounts 10.9 percent for the period of 1960/61 and 1973/1974. Oilseeds and pulses also constituted 9.5 and 8.3% respectively in the same year (see table 2.1)

During the Imperial period the country's external trade strategy was oriented to import substitution strategy.

Even though the regime has tried to employ partial part of permissive and positive policies such as income tax holidays, subsidies, credit, improving infrastructure, improving quality of the export product and tried to revise tariff rates. But these improvements could not promote exporters.

The structure and Performance of Exports during the Dergue Regime (1974/75-1990/91)

During the period of the Dergue regime, the country's export commodities also mainly depend on few traditional items. Between 1974/75- 1982/83 the share of coffee to the total exports was averaged 61.3 percent and 59.8 percent for the period of 1983/84-1990/91. On average for the whole period of the regime it constituted 60.5 percent. Hides and skins accounts about 10.6 and 11.o percent in 1974/75-1982/83, and 1983/83-

1990/91 respectively. On average between 1974/75 and 1990/91 its share was 10.8 percent. The share of oilseeds dropped from 9.5 percent in 1960/61-1973/74 to 3.2 percent between 1974/75-1990/91. Similarly pulses also declined from 8.3 percent to 4 percent in the same year. Generally during this regime the export sector shown declining trends and export diversification had been worsening (see table 2.1)

The EPRDF Regime (1991/92-2009/10)

The Ethiopian People Revolutionary Democratic Front (EPRDF) ousted the Military Regime, and established Transitional Government of Ethiopia (TGE) in May 1991. The TGE in collaboration with the World Bank and IMF under free market economy has undertaken structural adjustment program (SAP) and trade liberalization. Both aimed at stabilizing the country's economic condition especially the trade reform that was taken to ensure and promote the export sector through diversifying the narrow base of the nation's exports.

To implement these, some of the policy packages include:

The Ethiopian Birr was devaluated from 2.07 Birr per USD to 5.00 per USD in October 1992. This measure was taken to raise the profitability of export production and to make exports competitive thereby promoting exporters and redirect from unofficial to official channel market, in addition a biweekly foreign exchange auction market introduced since may 1993 which was open for licensed importers. The marginal rate that is the lowest exchange rate at the auction was used as a secondary rate applicable to all current and capital account transactions until the next auction with the exception of a limited number of payments for which foreign exchange was made available at the official rate. On July 25, 1995 the two rates have been unified and a weekly foreign exchange auction was introduced. Since August 1998, the government has replaced the retail auction market by the wholesale auctioning whereby commercial banks, foreign exchange bureaus and investors in need of large amounts of foreign exchange (above 500, 000 USD) per auction participate (MEDaC 1999, 58). In relation to the foreign trade, the policy aimed to eliminate state monopoly, reduce excessive control over external trade and promote exporters. Creating state exporting enterprises with their own autonomy but not having monopoly power and create conducive environment for private exporters which in turn enhancing competitiveness and hence improves export performance. With respect to

import trade liberalization, the government has been introducing the tariff rates step-by-step. For instance, the maximum import duties or rate lowered from 230 percent to 80 percent during the first move of important liberalization and currently stood at 50 percent. Similarly the state removed a 2 percent transaction tax on on-coffee export and abandoned the direct financial subsidy on export (Ibid). Such rationalization encourages exporters by enhancing profitability.

The other main external reform measure was the suspension of taxes and duties lived on export goods except on coffee, which was introduced in January 1993. This provides strong incentive to exporters together to devaluation that allows them to receive the equivalent prices of world prices from exportable. The government's subsidy to exporters was also terminated when export taxes were lifted. In addition to this the government introduced a duty drawback scheme in August 1993 to encourage the investment in the production of export products. The duty drawback scheme was introduced to refund duties and other indirect taxes paid on imported raw materials used for manufacturing of export goods. There are two version embedded in the drawback scheme. The first, to get a refund on the duty paid on raw materials either locally produced or imported that used for the production of exportable, the duty drawback scheme had two terms of conditions. The first one is, when the raw materials or commodity on which duty to be drawn back is re - exported in the same condition, 95 percent of the duty will be refunded. The second term stated duty to be drawn back is exported after being processed or if used for other purpose like packing, 100 percent of the duty will refunded. The second version is duty free importation, this stipulates that enterprises and organizations that engaged in supply their products to world market to import or locally purchase raw materials that used in production of exportable free of duty. These schemes will be applicable if the commodity produced is exported within one year from the date on which raw material has been imported or locally purchased (MEDaC 1999: 59). The schemes are believed to promote export diversification.

In 1997 the National Bank of Ethiopia (NBE) issued a directive that allow private nonguaranteed foreign commercial loans in kind and cash for exporters. This kind of loan is expected to promote exports on both traditional and new ones to the export basket. A preferential interest rate scheme is also introduced for exporters, which is less by 3.5

percent compared to the interest rate changed on non-export activities. Such a low preferential interest rate scheme has strengthened the country's export diversification efforts.

A foreign exchange retention scheme has been introduced to entitle exporters to retain 10 % of their earnings to hold in hard currency in their account and to sell 40 % at competitive rate to one or more commercial banks, while submitting the remaining percent directly to the National Bank of Ethiopia. This envisaged to the exporters to increase demand for foreign exchange to finance imported input for their exporting activities.

In 1998, EPRDF designed export development strategy for the development of export sector. The main objective of the strategy was to maintain the country's long-term economic growth and to attain the growth rate as well as to maintain macroeconomic stability (export development strategy, 1998); the overall strategies are summarized as follows:

The strategy for export development is conceived along four lines in parallel.

A. Surplus venting through a small investment in agriculture.
B. Exporting high value agricultural products
C. Exports of manufactures
D. Discovering exportable minerals and fuel deposits.

The Structure and Performance of Exports during EPRDF Regime (1991/92-2009/10)

The structure of the Ethiopian export is not different from the other regimes. It is dominated by primary products. Coffee continues its domination over the other export items. The share of coffee was about 63.1%, 47.0%, and 33.15% for the periods of 1991/92-1996/96, 1997/98-2003/04, and 2004/05-2009/10 respectively. On average for the period of 1991/92- 2009/10 it accounts 47.75 percent. Hides and skins constituted a share of 12.2%, 11.3%, and 6.13% for the same periods and on average for the period of 1991/92-2009/10 it accounts 9.88 which is less compared with the Imperial and Dergu regime.

The share of oilseeds was 10.9 percent from 1960/61-1973/74. However, from 1974/75-1990/91 it dropped to 3.2 percent. Even now the share of this item was only 8.16 percent, which is less compared to the Imperial period.

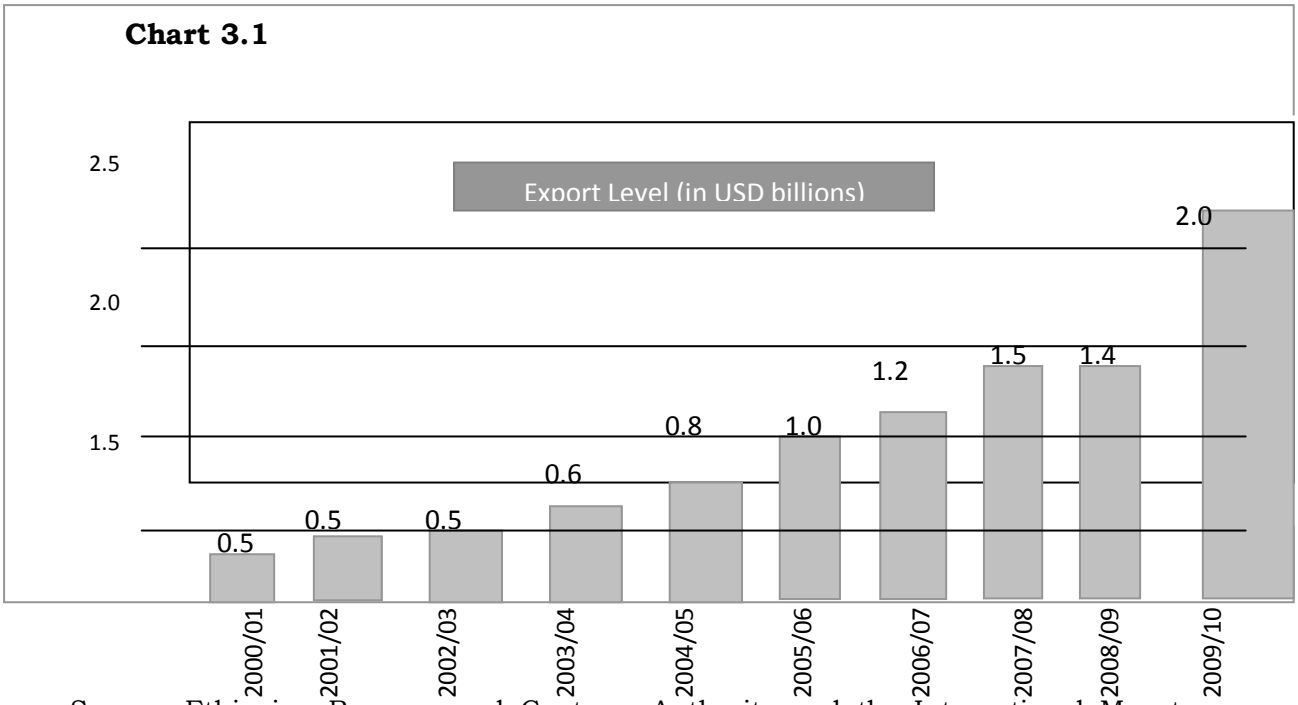
During the Imperial era the share of pulses was 8.3 percent. But it declined to 4.0 and 3.85 percent in the Dergue and the current government respectively. Between 1991/92-2009/10 on average the share of chat was 9.27 percent. According to this study during the current government hide and skin can be ranked as the second export item as it shares is 10.9%, 10.80% and 9.88 % in the Imperial , Dergue and EPRDF respectively (see table 2.1).

Table 3.1 Share and structure of major exports (% of to total)

Product	Imperial Regime			Dergue Regime				EPRDF Regime		
	1960/61-1966/67	1967/68-1973/74	1960/61-1973/74	1974/75-1983/84	1983/84-1990/91	1974/75-1990/91	1991/92-1996/97	1997/98-2003/04	2004/05-2009/10	1991/92-2009/10
Coffee	56.2	53.5	54.91	61.3	59.8	60.5	63.1	47.0	33.15	47.75
Hides& Skins	11.3	10.6	10.9	10.6	11.0	10.8	12.2	11.3	6.13	9.88
Oil Seeds	8.9	10.1	9.5	4.7	1.6	3.2	1.7	4.5	18.28	8.16
Pulses	7.9	8.6	8.3	6.1	1.9	4.0	1.6	3.9	6.05	3.85
Chat	3.5	1.1	2.3	1.9	2.7	2.3	6.3	12.2	9.32	9.27
Others	11.6	16.1	13.8	15.4	25	20.2	13.9	19.9	27.07	21.09
Total	100	100	100	100	100	100	100	100	100	100

Source: Computed based on row data obtained from Ethiopian Revenue and Custom Authority (ERCA)

Chart 3.1



Source: Ethiopian Revenue and Customs Authority and the International Monetary Fund report of 2010.

Ethiopia also exports manufactured commodities including sugar, meat products and gold that account about 1.2, 1.4 and 1.6 percent from 1966/67-2003/04. Though in a very smaller amount, Ethiopia also exports textiles, tantalum, tea etc.

Using the commodity concentration index (Hirschman concentration index) for major commodities (coffee, hides and skins, oilseeds, pulses, fruit and vegetables and chat) for the period of 1960/61 – 2003/04 averaged 60.2 percent or 0.602 that indicating the export sector is concentrated on few products (Teshale Nega;2005).

In terms of relative comparison to other similar countries the concentration index of Kenya, Mauritius, Uganda, Togo and Zimbabwe were averaged 0.297, 0.295, 0.326, 0.334 and 0.289(UNCTAD, 2002).

This shows that Ethiopian export is least diversified and have less growth rate even compared with some other Sub- Saharan developing countries.

The performance of export sector suffered from stagnation and also observed a declined trend especially during the Dergue regime. The share of non-coffee exports was still limited and this impedes the profitability and competitiveness of the export sector. The constraints of exports growth are directly or indirectly hampered the overall the country's economic development and growth.

The major constraints in the Ethiopian export sector can be seen from internal (supply) and external (demand) sides.

The Internal (Supply) Side Constraints

Irrelevant policy of governments specially during the pre reform including overvalued exchange rate, bureaucratic procedure of licensing, high tariffs on exports and imports together with shortage of foreign exchange rate which has important contribution in the process of production for raw materials, intermediate and capital goods have essentially lowered the profitability and competitiveness of the export sector.

One of the problems to export growth is, the type and nature of the exported items are mainly agricultural products which have less income elasticity. These products are unprocessed, low quality standard and there is high reliance on few commodities.

Scarcity of investment, inadequacy of infrastructure, high cost on world market information and less technical assistance to exporters has been significantly inhibited the production capacity of exportable goods.

Restrictions and discriminations of the private sector, in production and export process, lack of supportive institutions, lack of credit access to all exporters and, skill and technological improvements that can help to improve the quality of exportable commodities.

The current government recognized policy towards export promotion, such as services and established export promotion agency 1998 with wide range of mandate including market research, trade information, training export facilitation, product development, advisory services, facilitating trade fairs, exhibition, and trade missions. But because of financial and skilled personnel restricted the function of the agency to promote the export sector and provision of the service.

External Constraints (Demand Side)

The external constraints are usually occurred from the nature of the products and the level of technology that employed in the process of production of the country's exports.

These problems summarized as follow:

- Almost all of the export items are agricultural with low quality standard which have low income elasticity of world demand and their demand also decreased as the income of the people increases / they are subject to large price fluctuations.
- Production of synthetic products by industrialized countries reduces the demand for natural products.
- The low level of population growth rate of the developed countries affects the demand for agricultural products.
- Different trade barriers and policies adopted by developed countries including protecting and subsidizing their domestic agricultural sector, discourage the demand of agriculture etc.

The above constraints are the main problems that essentially inhibit and lower the growth in the profitability of the export sector.

Prospects of Export Diversification to its Growth

Ethiopia has a potential in the areas of producing and processing agricultural products including coffee, t4ea, spices, pulses, oilseeds, cereals, hides and skins, live animals, floriculture and fruits and vegetables, etc. Taking these in to consideration, the current

government designed development strategy, known as Agricultural Development Led Industrialization (ADLI) strategy which is aimed to bring structural transformation of the economy and industrialization is the other goal of ADLI, that envisaged to raise the share of the industry and social service sector. Agricultural development is viewed as important benchmark for industrialization by providing a market base and as a source of raw material and capital accumulation. The strategy of ADLI gives recognition to the role of exports in terms of growth of income and foreign exchange and the importance of export is reflected in the country's export strategy in 1998.

The other conducive environment is that, there is no export tax in whatever form, on products destined for export markets. There is an export tax incentive scheme, comprising voucher, bonded manufacturing warehouses (BMWs) and duty drawback schemes, which allows exporters to access inputs (import input) at world market prices.

As distinct from other country duty exemption schemes, the voucher scheme provides access to input without what so ever requirement in the form of insurance bond guarantee and exclusive sales requirement to export. Exporters are required only to submit their export business plans to benefit from the scheme even if they export only one percent of their total annual production value (Ethiopian Export Trade Strategy b1998).

With regard to Export Finance, the export credit guarantee scheme provides for those non-coffee exporters access to pre-shipment and post-shipment finance equivalent to the total value of the previous year export proceeds without any collateral requirement for the existing exporters and with 20 percent and 30 percent for new producer exporters and new exporters respectively for both pre and post shipment guarantees are provided to a maximum of 180 days. Exporters are also provided with external loan and suppliers or foreign partners' credit and Franco valuta schemes that allow access to foreign short, medium and long-term financing means. This helps acquire capital goods, raw materials, semi-finished goods, and enable them to working on international subcontracting basis, technical and marketing arrangement. The foreign exchange retention incentive encourage exporters to retain the foreign exchange themselves in two types of foreign exchange accounts to transact business related to current payment for the import of goods, export promotion payment of advertising and marketing expenses, training fee etc. (Ibid)

Institutional supports are also expected to promote exporters; there are two export product based institute known as Coffee and Tea Authority and Livestock Products Marketing Authority and there is one cross sectoral export support institute namely, Ethiopian Export Promotion Agency. These institutions are engaged in the provision of market information, export promotion, training on export marketing and export procedures, product development and in tackling and resolving problems faced by exporters. The government is under a great effort to improve infrastructure including transportation, power and telecommunication. Authorities also consider making land available with electric power for immediate occupancy by exporters. This can also strengthen the country's export diversification effort.

Ethiopia has quota and duty free preferential market access for garment exports to the Unite State under Africa growth and opportunity Acts (AGOA) and EU under all but arms (EBA) initiatives. The establishment of COMESA free trade area will create duty and quota free access to domestic as well as foreign investors operating in the country to benefit from this opportunity.

CHAPTER FOUR

4. METHODOLOGY AND MODEL SPECIFICATION

4.1 Methodology

Many of macroeconomics time series data are exposed to the problem of non-stationary in the process of econometric analysis. Regression on such data (non-stationary variables) led to spurious regression as mean and variance are time variant and hence the basic assumption of OLS will be violated. Therefore, it is important to test the variables using the co-integrated and error correction model to solve the problems encountered with OLS regression and to see the long-run and short-run relationship impacts of the variables to be estimated. A macroeconomics time series data are stationary, if its mean and variance are constant over time and the value of covariance between the two-time periods depends on distance or lag. when the mean, variance, and auto covariance of individual time series are not time invariant, these time series data are not stationary (Gujerati, (1991) Harris, (1995)).

The use of the error correction model in applied econometrics goes back to Sargan (1964). However, its integration into modern time series econometrics began with the publication of two important papers in the mid 1970s. These were the analysis of the UK consumption function by Davidson, Hendry, Srba and Yeo – DHSY - (1978) and that of the UK demand for broad money by Hendry and Mizon (1978). These papers were important because they emphasized the potential importance of levels terms within a time series regression framework as a means of capturing the equilibrium interactions between variables. As a result of the publication of these articles understanding of the theoretical and empirical properties of co integrating relationships has increased enormously. Testing procedures have been developed by Engle and Granger (1987) and Kremers et al (1992) for single equation models and Johansen (1988) for multiple equation systems. The Engle-Granger procedure is to apply the Augmented Dickey-Fuller test to the residuals from a least squares regression between the levels of the variables. Appropriate critical values for this test have been computed by MacKinnon (1991). Kremers et al estimate an error correction model and use the t-ratio for the error correction term as their test statistic.

In general, the advantages of using the ECM determining the export growth lie in its ability to capture the short-run dynamic characteristics of export demand given the long-run co-integration (equilibrium) relationship. In other words, the ECM reflects a dynamic self-correcting process of export demand behavior towards its long-run steady sate (Song, Witt, and Li 2003). In addition, ECM can avoid the occurrence of spurious regression and multicolinearity problems, which may otherwise affect the reliability and accuracy of the econometric analyses. Therefore, the above reasons answered why this model is selected for this study and finally using this model will give reliable and accurate results.

4.2 Data Source and Definition of main Variables

4.2.1 Data source and type

Time series secondary data is used in the study; the data was collected from National Bank of Ethiopia (NBE), Ethiopian Revenue and Custom Authority (ERCA) and International Institution like World Economic Outlook Report (WEO), and UNCTAD. For the purpose of analyzing the country's determinants of export growth rate, the data covers the period from 1980 - 2010.

4.2.2 Definition of main Variables

The major determinants of export growth rate which are taken as variables in the model are explained as follows:

1. Export Growth Rate (EGR)

The annual values (in USD million) of Ethiopian exports of goods and services collected from IMF report and National Bank of Ethiopia (NBE), World Economic Outlook Report. And the export growth rate is calculated as the current export value minus base year export value divided by the base year and then multiplying by 100%.

2. Gross Domestic Product (GDP)

The reason for including GDP is to see the effect of the size of the economy to its export growth rate. As the size of the economy is large which implies the production of that

country is excessive than the domestic demand and this leads export the excess (Kumar (1998)). Therefore the expected overall effect of domestic income on exports is positive.

3. Foreign Direct Investment (FDI)

FDI could represent a measure of production development in the export sector. It can be expected to contribute to the enhancing of a country's competitiveness on international markets by increasing the technological content of exports. FDI is included in this study as stock since FDI stock measures its productive capacity. As it is believed that transformation of the composition of exports increases with FDI, then the sign of this variable is expected to be positive.

4. Real Exchange Rate (RER)

The calculation of the average real exchange rate is based on the IMF definition of the real exchange rate that is real exchange rate as price of domestic currency against foreign currency:

RER = E. P*/ P

Where **E** is the nominal exchange rate, **P*** is the consumer price index of the foreign country and **P** is the domestic consumer price index (Ethiopia in this case).

Depreciation of the real exchange rate enhances the competitiveness of the domestic goods and for the foreign goods. On the other hand, an appreciation in real exchange rate will decrease competitiveness of home goods in international markets. Therefore, there is a positive relation between exchange rate and export growth rate.

5. Terms of Trade(TOT)

Terms of trade is defined as the ratio of the price of imports to price of exports (both in domestic currency) and favorable terms of trade are associated with increased export growth rates, so its effect is expected to be positive.

6. Foreign price level (FPL)

The average of current prices across the entire spectrum of goods and services produced in the economy. In a more general sense, price level refers to any static picture of the price of a given good, service or tradable security. The most common price level index is the Consumer Price Index(CPI).

The price of exports on the international market is one of the major determinants of export growth especially for countries which depend on exportation of agricultural products whose prices fluctuate from time to time. As a result of it assume that it affects positively for the growth of country's export.

4.3 Model Specification

The empirical analysis was carried out using the econometric technique that is annual time series data. In this study, a co integration and error-correction model was used. Foreign price level and Foreign Direct Investment was added to Gross Domestic Product, Terms of Trade and Real Exchange Rate, which were are the most explanatory variables of Export Growth Rate.

More specifically, the following model is fitted to identify the impact of determinants of export growth rate.

$$XGR_t = f\left(\overset{+}{GDP_t}, \overset{+}{TOT_t}, \overset{+}{RER}, \overset{+}{FPL_t}, \overset{+}{FDI_t}\right) \quad \text{.....1}$$

OR

$$XGR_t = {}_0 + {}_1GDP_t + {}_2TOT_t + {}_3RER_t + {}_4FPL_t + {}_5FDI_t + U_t \quad \text{.....2}$$

The signs above the variables suggest the anticipated relationship between each explanatory variable with the dependent variable (XGR_t).

Where:

EGR_t= is export growth rate in percentage;

FDIt= is the foreign direct investment;

GDP_t= is gross domestic product;

PFL_t= is foreign price level;

RER_t= is real exchange rate;

TOT_t= is terms of trade;

a_0 = is constant or intercept term;

U_t = error term; and b_1, b_2, b_3, b_4 and b_5 are the coefficients to be estimated.

The export growth rate of a country is affected by several determinants, but we take in this study some of the basic factors by assuming the others are constant.

CHAPTER FIVE

5. MODEL ESTIMATION AND DISCUSSION OF FINDINGS

5.1 Framework of Analysis

The econometric technique employed in this study is a co-integration and error correction procedure with the hypothesis that export growth rate is a function of the major determinants. These are real gross domestic product (GDP), terms of trade (TOT), real exchange rate (RER), foreign price level (FPL) and foreign direct investment, which are depicted in equation one in the above.

Introducing logarithm to the variables for equation (1) yields:

$$LXGR_t = {}_0 + {}_1LGDP_t + {}_2LTOT_t + {}_3LRER_t + {}_4LFPL_t + {}_5LFDI_t + U_t \ldots\ldots\ldots\ldots 3$$

Where LXGRt, $LGDP_t$, $LTOT_t$, $LRER_t$, $LFPL_t$, and $LFDI_t$ are the logs of export growth rate, gross domestic product (GDP), terms of trade (TOT), real exchange rate (RER), foreign price level (FPL) and foreign direct investment (FDI) variables respectively. The coefficients β1….β5 are parameters and U_t is the random disturbance term. Equation (3) was form the basis of estimations in this study.

5.2 Tests for Order of Integration (Unit Root Test)

Before we go to the estimation part the first step is testing whether variables share a common trend in such a way that they can be considered a long run equilibrium relationship is to find out whether each series contains a stochastic trend or not.

Estimating regressions using non-stationary variables based on ordinary least square leads to spurious and inconsistent results (Gujerati, 1995, Enders, 1995). It is also difficult to conduct hypothesis testing in non-stationary variables as the classical assumption on the property of the disturbance term is violated. So to avoid such problem the popular test were used for detecting stationary of variables or not in time series econometrics is the unit root test. One could achieve stationary by applying appropriate differencing called order of integration and this can be tested by the Dicky Fuller (DF)

test for autoregressive order one process and the Augmented Dickey - Fuller (ADF) technique is used to test for the several autoregressive orders.

The basic hypothesis tested is the presence of non-stationary (or unit root) in the series. The results of the estimated DF test statistics shows that we fail to reject the null hypothesis of unit root for all variable given the critical values (Reported on appendix A:Table A1.1) except the lnXGR and lnTOT so variables have not similar trend at levels.

In addition to the above tests, the dependent variable is checked for unit root test using different test mechanisms like graphical representation to see its dependency on time, sample autocorrelation function(ACF) and partial autocorrelation function(PACF) which indicates the series of the data, and testing by the portmanteau(Q) statistics on the ordinary least square estimation of several lags of the dependent variable to observe the dependency of the dependent variable on its lags and conclusion based on those results are inconclusive (appendix B:figureB1-B3).

A test for a single unit root in higher order AR processes can easily be obtained by extending the Dickey–Fuller test procedure and as a result the standard Dickey-Fuller test is conducted by estimating the following regression equation:

$$\Delta Y_t = \quad + \quad_t + \Delta Y_{t-1} + U_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4a$$

Where Δ is the differencing operator, Y_t represents the variables to be estimated (i.e. $LXGR_t$, $LRGDP_t$, $LTOT_t$, $LRER_t$, $LFPL_t$, $LFDI_t$), is constant, is the trend coefficient of the variables, U_t is the white noise residual of zero mean and constant variance and t is the time or trend variable. The null and alternative hypotheses formulation may be written as follows:

$$H_0 : \Delta = 0$$
$$Ha: \Delta \prec 0 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4b$$

In the above formulation of hypothesis accepting the null implies there is a unit root (the series is non-stationary) and rejecting the null implies Y_t is a stationary time series. The problem associated with the simple Dicky-Fuller unit root could be avoided by running the ADF test, which is derived from the regression equation:

$$\Delta Y_t = \quad + \quad t + \Delta Y_{t-1} + \sum_{i=1}^{m} \quad _i \Delta Y_{t-i} + U_t \ldots\ldots\ldots \ldots\ldots\ldots \ldots\ldots\ldots 4c.$$

Where ΔY_{t-1} is equal to $(Y_{t-1} - Y_{t-2})$, ΔY_{t-2} is equal to $(Y_{t-2} - Y_{t-3})$, etc. and m is the maximum lag length on the dependent variable to ensure that U_t is the stationary random error. Based on the regression result of the above equation, the null hypothesis of a unit root is rejected if the t-statistic associated with the estimated coefficients exceeds the critical values of the test and the ADF specification accounts for possible autocorrelation in the error process U_t through the lagged dependent variable on the right hand side.

The result of the ADF test at levels shows that we fail to reject the null hypothesis for one up to six lags of each variables implies that the existence of unit root (Appendix A :Table A1.1).

The Dickey Fuller(DF) and extended Augmented Dickey Fuller(ADF) test for first difference result shows we reject the null hypothesis indicates that all variables have no unit root comparing the test statistics given all level of significance implies that the variables are stationary (Appendix A: Table A1.1 **).** So the variables are integrated order one process.

5.3 Test of Co integration

After testing the unit root the next step is to find out whether the variables share a common stochastic trend, i.e. to test whether two or more variables are co integrated or not.

Co integration can be regarded as the empirical counterpart of the theoretical notion of a long-run relationship among the variables. In other words, a co integration of two or more variables suggests that there is a long run, or equilibrium relationship between the

variables (Rao, 1994) and Co integration technique provides a means of identifying and hence avoiding spurious regressions generated by non-stationary series. When variables are co integrated, the OLS estimates from the co integrating regression will be super-consistent. This test is checked for both jointly and individual estimation to check whether the variables are co integrated for both tests to be sure that there is co-integration between the dependent and independent variables separately. The results of joint estimation of the variables are reported in Table 5.3.1.

Table 5.3.1 Estimation of long run relationship of the model

Dependent variable: XGR

lnxgr	coefficient	std. error	t-statistics	probability
lngdp	*-4.255755*	*3.181503*	*-1.34*	*0.193*
lntot	*-4.371982*	*2.475595*	*-1.77*	*0.090*
lnrer	*1.924964*	*1.768412*	*1.09*	*0.287*
lnfpl	*5.141259*	*2.337337*	*2.20*	*0.037*
lnfdi	*-.11291*	*.65964*	*-0.17*	*0.865*
cons	*27.12264*	*17.21636*	*1.58*	*0.128*

$R^2 = 0.43$ Prob = 0.0053

DW t-statistics=2.50 F-statistics = 12.40

The result of joint test in Table 5.3.1 shows that we reject the null hypothesis of no co-integration since the Durbin-Watson d-statistic is greater than R-squared which implies that there is co-integration in the long run among the variables. In similar way the joint test through the residuals after predicted the residual from the ordinary least square regression by the DF and ADF test shows that the same result for lag one up to lag four (Appendix C:Table C1.1) and the individual test of co integration of each variables with

the dependent variable shows the existence of co integration indicates that the variables are stationary (Appendix C:Table C2.1 - C2.7), so that all variables are include in the estimation of model since they have a long run relationship and integrated order one process.

5.4 Findings and Discussion

After confirming that the variables are co integrated, and then the next step is the estimation of the error correction model which is constructed by including in the model, the lagged terms of the variables and the correction terms was constructed. Estimation of Error Correction Model combines both the short run dynamics and long run properties and at the same time avoids the spurious regression problem.

The ECM can be expressed as follows:

$$\begin{aligned}\mathrm{DlnXGR}_t = \alpha_0 &+ {}_1\mathrm{DlnXGR}_{t-1} + {}_2\mathrm{DlnXGR}_{t-2} + {}_3\mathrm{DlnXGR}_{t-3} + {}_4\mathrm{DlnGDP}_t \\ &+ {}_5\mathrm{DlnGDP}_{t-1} + {}_6D\ln GDP_{t-2} + {}_7D\ln TOT_t + {}_8D\ln TOT_{t-1} + {}_9D\ln TOT_{t-2} \\ &+ {}_{10}D\ln RER_t + {}_{11}D\ln RER_{t-1} + {}_{12}D\ln FPL_t + {}_{13}D\ln FPL_{t-1} + {}_{14}D\ln FPL_{t-2} \\ &+ {}_{15}D\ln FDI_t + {}_{16}D\ln FDI_{t-1} + zy_{t-3} + V_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 6\end{aligned}$$

Where, zyt-3 represents the error terms lagged by three periods for the export growth rate. The coefficient measures the long run equilibrium relationship while $\beta_1 \ldots \beta_{16}$ measure the short run causal relation. The result of the error correction model is reported in Table 5.4.1 and discussed as follows:

Table 5.4.1 Results of short run relationship of the model

Dependent variable: dlnXGR

dlnxgr	coefficient	std. error	t-statistics	probability
dlnxgr1	.592	.110	5.37	0.001***
dlnxgr2	.375	.142	2.64	0.030**
dlnxgr3	-.122	.108	-1.13	0.291
dlngdp	4.279	2.086	2.05	0.074*
dlngdp1	3.794	2.030	1.87	0.099*
dlngdp2	.399	2.402	0.17	0.872
dlntot	7.597	2.035	3.73	0.006*
dlntot1	3.975	1.655	2.40	0.043**
dlntot2	5.518	2.111	2.61	0.031 **
dlnrer	1.768	1.240	1.43	0.192
dlnrer1	2.846	1.378	2.06	0.073 *
dlnfpl	4.224	1.353	3.12	0.014***
dlnfpl1	3.057	1.423	2.15	0.064*
dlnfpl2	1.234	1.170	1.05	0.322
dlnfdi	.978	1.095	0.89	0.398
dlnfdi1	-.490	1.139	-0.43	0.678
dlnfdi2	.797	.826	0.97	0.363
v1	-1.232	.130	-9.47	0.000* **
_cons	-.096	.302	-0.32	0.759

DW. stat = 2.314

Akaieke information criterion (AIC)=59.79

Basiean information criterion (BIC)=84.42

R^2 =0.8774

F-statistic=19.25

Adjusted R^2 =0.8266

Prob (F-statistics)=0.001

Notes: ***, ** and* denotes significance at the one, five and ten percent levels of significance respectively.

Following the test of co integration and confirming that the variables are co integrated, an error correction model which is constructed by including in the model, the lagged terms of the variables and the correction terms was constructed and results in table 5.4.1 show that approximately 88 % of the variation in Export Growth Rate is explained by the Gross Domestic Product, Foreign Direct Investment, Foreign price Level, Real Exchange Rate and Terms of Trade. The probability of the F- statistic is significant which implies that the model is well specified.

The Export Growth Rate of the previous quarter significantly impacts on the current quarter's export growth rate. The growth rate of the previous two quarters also has a

significant effect on the current quarter's export growth rate. This finding is consistent with that of Musinfuzi, Obwona and Stryker (2000) who found out that lagged export growth rate has a statistically significant impact on current year's growth rate.

The Gross Domestic Product of the current quarter and the previous quarter has a positive and significant relationship with current quarter's export growth rate but not strong result. The three lagged values of GDP statistically insignificantly impact on Export Growth Rate of a given period.

Even though this finding is not strong, it is consistent with that of Ngeno (1990) who while studying the determinants of exports in the neighboring country Kenya, found that an increase in domestic output increases export growth implies GDP has strong significant effect. Kumar (1998) conducted a study on determinants of export performance in developing countries and found out that Gross Domestic Product has a positive relationship with export volumes since increased production leads to surplus output in an open economy being exhausted in international markets. This finding also similar with the findings of Fugazza (2004). While studying export performance and its determinants in developing countries by taking a sample of 149 countries to check robustness of the results for the period of 1988-1999, he found out that lagged Gross Domestic Product has a positive significant relationship with Export Growth rate.

The result also consistent with some studies conducted on the determinant of export performance in Ethiopia for example, Yisak(2009); while studding export performance and its determinants using 30 Ethiopia's trading partners for the period 1995–2007 and estimation result indicates that the growth of domestic product (GDP) affects Ethiopian exports positively. Similarly Sisay Menji(2010) also estimated export performance and determinants in both the merchandise and manufacturing export supply and he found that results of estimation shows that the manufacturing export supply are positively and significantly affected by gross capital formation and share of trade in GDP.

Terms of trade have a negative statistically significant effect on export growth rate and it is consistent with the theory. Terms of trade up to 2^{nd} lags significantly affects the current quarter's export growth rate. This is consistent with Jayant Parimal's finding on Burundi.

He discovered that deteriorating terms of trade leads to a contraction of export earnings and instability. A number of other studies reviewed suggest the same. Musinguzi, Obwona and Stryker (2000) found out that Terms of Trade has a significant positive relationship with Export Growth Rate but though an increase in Terms of Trade marginally increases export growth. Kasekende and Atingi-Ego while studying the impact of trade liberalization key markets in Sub Saharan Africa, found out that export volumes are significantly correlated with terms of Trade. Svedberg (1990) did a similar study on Sub Saharan Africa countries between1980-1985 and attributed the sluggish export performance in Africa at the time to unfavorable terms of Trade.

While this study is contradict with other studies for example, Sisay Menji(2010) examine the export performance and its determinants in Ethiopia using the co integration analysis for the period of 1981-2004 and estimated result depicted that terms of trade has insignificant effect for both merchandise and manufacturing export.

Nimrod Agasha (2009); conduct a study on the determinants of export growth rate in Uganda from 1987-2006 using the co integration and error correction model and result indicates that terms of trade have positive and significant effect for the growth of the country.

The effect of Real Exchange Rate on Export Growth Rate is statistically significant at 10%level of significant for the 1st lag but not at level.

This finding is similar with that of Ahmad (2005) studding the determinants of exports in developing countries and he found that real exchange rate are positively affects exports. It is further argued that a competitive exchange rate is associated with export growth. Ngeno (1990) in Kenya, using export growth as a function of gross domestic product and real exchange rate found that both are significantly affect export growth.

This finding is inconsistent with some studies conducted in the country by Yisak(2009) and Sisay Menji(2010) and they found that real exchange rate has statistically insignificant effect on Ethiopia's export performance and for both merchandise and manufacturing export respectively

The result also different from the study of trade liberalization on export volumes by Kasekende and Atingi-Ego (1999) in Uganda and they found that insignificant relationship between real exchange rate and export volumes. But also contradicts a number of other findings.

Some studies also shows negative and significant relationship like Fosu (1992) and Sharma (2001) in Ghana and India respectively have shown that Real Exchange Rate has a significant negative relationship with export growth. Sharma concluded that a fall in domestic prices due to exchange rate depreciation makes exports cheaper in the international markets resulting into their increased demand. However this also different from the finding of this study. In the same Kihangrie D, Potts,DJ and Cameron,S (2005) have estimated the effect of exchange rate variability on Uganda's flowers exports during 1999-2001 and results suggest that although the Uganda's flowers exports are negatively correlated with exchange rate variability, the measured effects are insignificant.

A study conducted by Franc Klaassen(1999) on the exchange rate risk on trade using data on bilateral aggregate export and result shows that export decisions are mostly affected by the exchange rate about one year later, and conclude that its effect is ambiguous.

The relationship between the exchange rate and export growth rate depends on the price elasticity of export supply because the real exchange rate should incorporate the price effect on exports. Thus, the higher the price elasticity, the more competition face exports of a particular country on the world market.

In general, industrial products have a higher price elasticity than primary products, which causes industrial exports to respond perfectly to changes in the exchange rate (Roshan, 2007) and similarly, the low response to price changes of demand for primary products, which are the main exports of LDCs, implies that LDC exports respond imperfectly to changes in the real exchange rates, i.e. the effect of exchange rate changes on LDCs exports is ambiguous.

Foreign price level has a significant and positive effect on export growth rate. The effect is statistically significant at 1% and 10% levels. The lagged values of foreign price level both at 1^{st} lag significantly affect current period's export growth rate. This finding is

consistent with that of Ndulu and Lipumba (1990) who while studying opportunities and constraints to trade and their influence on growth and development of African economies, discovered that foreign prices of primary commodities significantly affect the export performance of country's involved in their production. Edwards and Golub (2004) investigated the determinants of export supply in South African using time series data and he found out that foreign prices have a highly significant impact on manufacturing export performance in South Africa.

The effect of Foreign Direct Investment is statistically insignificant and inconsistent with the theory. This finding is consistent with that of ((Nimrod Agasha (2009), Yishak(2009), and Sisay Menji(2010)) in Uganda and Ethiopia respectively, they found out that lagged foreign direct investment has a statistically insignificant impact on current year's growth rate. Similarly many studies find insignificant or weaker impact of FDI on exports (see Hoekman and Djankov (1997)), Such studies point out that the role of FDI in export promotion in developing countries remains controversial and depends crucially on the motive for such investment. If the motive behind FDI is to capture domestic market (tariff-jumping type investment), it may not contribute to export growth. On the other hand, if the motive is top tap exports markets by taking advantage of the country's comparative advantage, then FDI may contributes to export growth.

On the other hand, this finding contradicts with that of Hoekman and Djankov (1998) analysed the magnitude of change in export structure in eastern European countries and the findings suggested that there is a significant positive association between FDI and exports structure in only Poland which is also a different finding from the one in this study. Fugzza (2004) and Ahmad (2005) also they conduct a study on the export performance and its determinants and they found that there is positive relationship between export growth rate and foreign direct investment for developing countries.

The model is estimated dependent variable with three lags and the independent variables are two and one lags, the negative coefficient of the error correction term is statistically significant implies that there is a feedback mechanism in the short and this shows that any shock in the short-run will adjust to the long run equilibrium by 123 percent annually on average. The error correction term is also significant in the adjustment process.

5.5 Diagnostics test

The model was tested for normality, serial correlation, autoregressive conditional Heterokedasticity and stability that was previously used by Musingui et al (2000) and the model is reasonably well specified and tests results are (reported in Table 5.5.1). Diagnostics tests also indicated that the residuals are normally distributed, homoskedastic and serially uncorrelated and the parameters appear to be stable. In addition the model its self avoid the occurrence of spurious regression, heteroskedascitiy, and multicolinearity problems. Even though the probability of occurrence of endogeneity is less, it was checked through the Durbin WU Hausman Endogeneity and simple correlation tests; and result shows that there is no endogeneity problem.

Table 5.5.1 DIAGONSTIC TEST

Test	Method of test	Statistics		probability
Normality	Jarque Bera statistics	x^2 -*statistics*	1.16	0.56
Serial correlation	Breusch-Godfrey serial	*F*- statistics	4.25	0.1989
	Correlation LM test	x^2 -*statistics*	4.25	0.0985
Heteroskeda.	ARCH LM test	x^2 -*statistics*	1.61	0.2045
Stability	Chow Breakpoint test	*F*- statistics	0.38	0.881
		LR-statistics	3.54	0.738
	Chow Forecast test	*F*- statistics	0.64	0.78
		LR-statistics	39.41	0.006
Specification error	Ramsey RESET test	*F*- statistics	0.16	0.9215
Endogeneity test	Wu-Hausman test	*F*- statistics	1.53	0.2477

CHAPTER SIX

6. CONCLUSION AND POLICY RECOMMENDATION

6.1 Conclusion

The study aimed at identifying the major determinants of export growth rate which have been a matter of argument in Ethiopia and Africa as a whole for a long period of time. The paper empirically examined the export growth rate and its major factors in the Ethiopian context using time series data for the period 1980-2010 collected from UNCTAD and WEO by employing co integration and error correction model which is previous used by Musinguzi et al (2000) was adopted for this study.

In this study the impact of gross domestic product, terms of trade, real exchange rate, foreign price level, and foreign direct investment on export growth rate has been analyzed.

Review of the three regimes of the country's trade strategy and performance of the export sector shows that, in the pre-reform the country's trade strategy was strongly inward oriented (extensive tariff and non tariff trade barriers) in both the Imperial and the Dergue regimes but they differ in the degree of intervention, and the post-reform (1992) structural adjustment program and trade liberalization has been undertaken which aimed to create macroeconomic stabilization especially trade reform was taken to ensure and promote the sector through diversifying country's exports.

The Imperial regime has been trying to employ partially the permissive and positive policies like income tax holidays and improving infrastructure but there were other policies discourage exporters, like overvalued exchange rate and other problems while in the Dergue regime there were no permissive and positive policies even partially. Even though some effort is taken on improving of the sector but it could not be achieved the intended goal in both regimes.

The recent government EPRDF led government has undertaken policy reforms such as devaluation, reduction of tariffs and elimination of export taxes except on coffee. The regime tried to implement permissive and positive policies in his export strategy including removing of overvalued exchange rate, improving infrastructure, provision of

credit, etc. These and other effort taken by the government brings an improvement on the sector but it is not satisfactory.

Annual growth rate of exports was 13.56 and 11.5 percent per annum on average in the regimes of Imperial and EPRDF respectively. While in the Dergue the export growth was declined on average by 8.56 percent per year (ERCA annual report and WEO report; 2010).

Empirical results and analysis presented in the previous sections suggest that foreign price level and terms of trade have a significant positive relationship with export growth rate, and similarly the gross domestic product have a positive significant relationship with export growth rate but it is not statistically strong may be this due to the economy is small and the production is absorbed by the domestic demand. This result is consistent with that of Ngeno studied the determinants of export performance in Kenya in 1990 and he found out that Gross Domestic Product has a positive significant effect in increasing export growth rate.

The positive relationship of foreign price level is consistent with past findings. Ndulu and Lipumba studied the influence of trade opportunities and constraints on the growth of African economies in 1990 and found out that foreign price especially for primary commodities significantly impact on export performance. Kasekende and Atingi-Ego while studying the impact of trade liberalization on key markets in Sub Saharan Africa discovered that there is a significant correlation between export performance and Terms of Trade which is consistent with the finding of this study. The significance of foreign price level explains the structure of Ethiopia's exports. Primary exports are known to experience price fluctuations which are also synonymous with export growth rates. The above finding therefore is a clear manifestation of Ethiopia's export performance trend.

While results of the other variables shows that statistically insignificant in explaining the export growth rate of the country and this finding is not similar with expectation of the theoretical review for the variables of Foreign Direct Investment and Real Exchange Rate. The findings of those variables contradict a number of previous findings including those reviewed in this study and other studies. Amelia and Santos (2000) studied the

effect of trade liberalization on export performance in selected developing countries and the estimation result shows that FDI significantly affect export volumes. Sharma (2000), while studding the determinants of exports in India discovered that a fall in domestic prices due to exchange rate depreciation makes exports cheaper in the international markets resulting in their increased demand.

6.2 Recommendations

The findings of this study and data trend indicates that there is a way to improve the export sector‘s growth rate and this leads to improve the economy as a whole by understanding of the country economic structure, situation and other policies related to the sector.

Having the above overall recommendation various policy implications are forwarded as follows:

Finding of this study shows that the effect GDP on the export growth rate is positive and significant but not statistically strong this may be due to the size of the economy is small and poor countries tend to have highly homogeneous export structures, exporting goods belonging to few groups of products and this leads no contribution for export diversification[4]. Therefore, it is of critical importance to maintain a high and sustainable economic growth rate as evidence has shown that a sustainable growth patterns promote exports.

In addition, Improving the road net work would enable producer especially in the agriculture sector sell their produce in the nearby markets hence a shift from subsistence production to commercial production and specialization on different group of products would lead to a bigger proportion of the Gross Domestic Product constituting export volumes and this leads to contribute to the increase of export sector.

The model depicted that there is a positive and significant relationship between the real exchange rate and export growth rate but it is not strong result. So the government has to

[4] See the detail on : Parteka, and M. Tamberi, “Determinants of export diversification: an empirical investigation,” paper prepared for ITC in 2008

ensure a stable exchange rate policy in order to avoid the exchange rate risk attached to the assets, import prices and profit considerations of direct investor in developing countries that contributes to improve and promote export growth sector.

The agriculture exports (primary product) which cannot be compute in the international market is better to be replaced by the industrial exports, which command reasonable and stable prices in the world markets. Moreover, the industrialization will reduce the dependence on imports by initiating the process of import substitution and directly increases to the growth of export.

The relationship between FDI and export growth rate depicted in this study insignificant effect this result may be due to the direction of FDI is capture by the domestic market than the exporting, existence of a few export oriented FDI projects, the incentive structure that has an influence on exports, and most manufacture and agriculture projects are focusing on the domestic market (Diagnostic Trade Integration Study DTIS, World Bank, 2004).

Increasing capital stock, FDI can contribute to a more efficient use of existing resources and absorb unemployed resources and thus increase a country's output and productivity (Seetanah and Khadaroo, 2007).

So to be beneficiary the country from the foreign direct investment it is advisable: to direct FDI to the motive of export market by using the comparative advantages of the country; incentive structure should be revised; improving the domestic business environment; and encouraging the existing FDI projects to produce value added products to the international market is the remedy for the problem.

In addition to redirection of FDI to production for export and the country also try to attract more export oriented MNCs not only to improve its exports growth, but also to bring in foreign exchange, capital, technology & other important resources such as market knowledge.

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Appendix A

1. Result of Unit Root Test

Table A1. Summary of Unit Root test using DF and ADF several lags at level and first difference

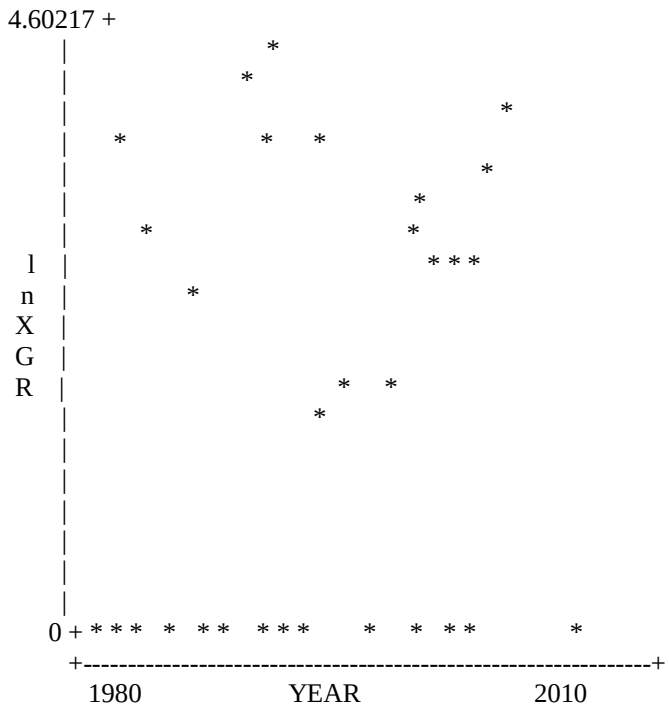
Variable		DF	ADF test one up to six lags					
			1	2	3	4	5	6
LnXGR		-4.882	-3.153	-2.917	-2.253	-2.074	-1.845	-1.845
LnGDP		3.564	1.776	1.198	1.295	0.833	1.406	1.493
LnTOT		-4.667	-2.518	-2.081	-1.950	-2.177	-1.981	-1.772
LnRER		1.02	0.633	0.314	0.721	0.373	0.018	0.208
LnFPL		-0.726	-1.861	-1.421	-1.382	-1.299	-1.440	-2.128
LnFDI		1.304	0.540	0.551	0.321	-0.058	-0.713	-0.660
DlnGDP		-9.447	-5.383	-4.265	-3.655	-3.092	-2.794	-2.658
DlnGDP		-3.101	-1.848	-1.370	-1.343	-1.597	-2.169	-2.590
DlnTOT		-7.176	-5.410	-3.448	-2.617	-2.405	-2.463	-2.162
DlnRER		-3.362	-3.463	-2.609	-2.843	-1.528	-0.276	-0.250
DlnFPL		-4.302	-3.209	-2.545	-1.597	-1.680	-1.837	-2.422
DlnFDI		-3.555	-3.065	-2.479	-1.861	-1.485	-1.566	-1.676
Critical values	1%	-3.716	-3.723	-3.73	-3.736	-3.743	-3.750	-3.750
	5%	-2.986	-2.989	-2.992	-2.994	-2.997	-3.001	-3.001
	10%	-2.624	-2.625	-2.626	-2.628	-2.629	-2.63	-2.63

From the above test result we see that the variables are non-stationary at levels but are stationary at first difference hence the variables are considered as I (1) processes.

Appendix B

- **Additional tests of unit root for the dependent variable using different test mechanisms as follows:**
  - Graphical representation of dependent variable with time to see the dependency.

Figure B1:
plot lnxgr year

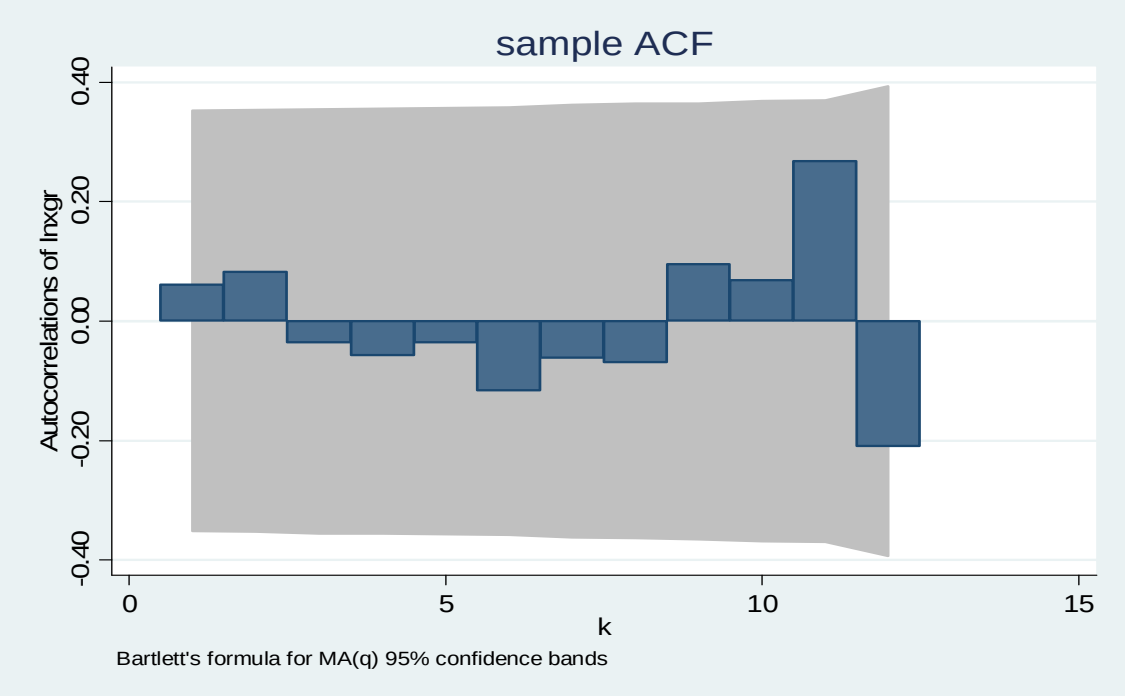


The plot graph above shows that log of the export growth rate is distributed dependent of time. This indicates, to some extent, the existence of unit root (non stationary) of the series.

❖ The stationary of dependent variable checked through graphical representation of sample ACF and PACF as follows:

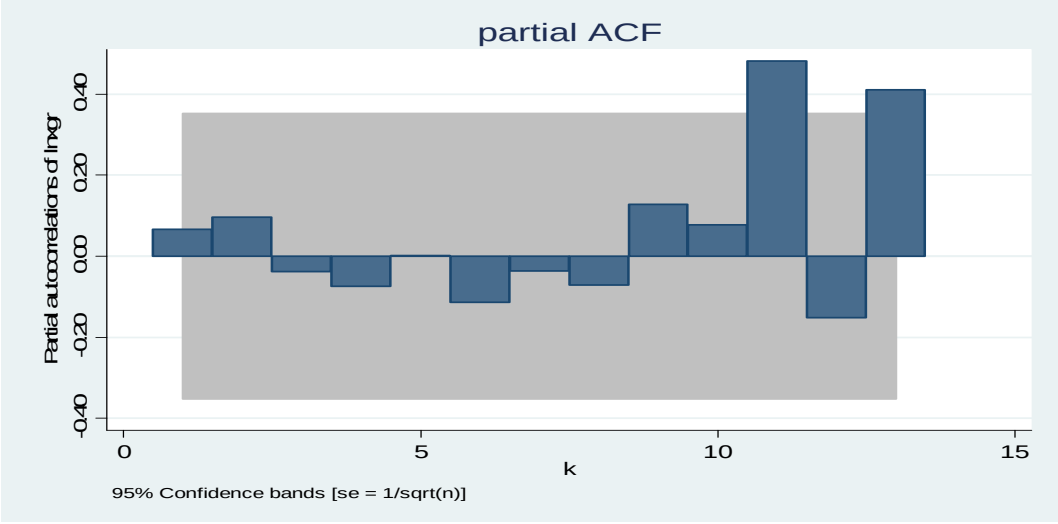
ac lnxgr, lags(12) recast (bar) xtitle (k) title (sample ACF)

Figure B2: sample ACF



pac lnxgr, lags(13) recast (bar) xtitle (k) title (partial ACF)

figure B3: partial ACF



The autocorrelation graphs depicted above, on the other hand shows that sample ACF is depression (apart) from zero for lags greater than 12 and the partial ACF is not decays to the mean. Although an obvious model cannot be determined by looking at these graphs, it indicates the existence of unit root in series of the data.

❖ Test unit root for the dependent variable also can be test by generating different lags of the dependent variable itself and regress by OLS, then see on the value of t and p.

. gen lnxgr1= lnxgr[_n-1]
. gen lnxgr2= lnxgr[_n-2]
. gen lnxgr3= lnxgr[_n-3]

```
. reg lnxgr lnxgr1
```

Source	SS	df	MS	Number of obs =	30
				F(1, 28) =	0.12
Model	.39898697	1	.39898697	Prob > F =	0.7317
Residual	93.1855941	28	3.32805693	R-squared =	0.0043
				Adj R-squared =	-0.0313
Total	93.5845811	29	3.22705452	Root MSE =	1.8243

lnxgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lnxgr1	.0662208	.1912539	0.35	0.732	-.3255451	.4579867
_cons	1.777328	.4723793	3.76	0.001	.8097032	2.744953

predict v2, resid

```
. wntestq u, lags(1)

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =     0.0585
 Prob > chi2(1)            =     0.8089
```

```
. reg lnxgr lnxgr2
```

Source	SS	df	MS	Number of obs =	29
				F(1, 27) =	0.25
Model	.837757572	1	.837757572	Prob > F =	0.6183
Residual	89.0385884	27	3.2977255	R-squared =	0.0093
				Adj R-squared =	-0.0274
Total	89.876346	28	3.2098695	Root MSE =	1.816

lnxgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lnxgr2	.097958	.1943515	0.50	0.618	-.3008184	.4967343
_cons	1.7934	.4702552	3.81	0.001	.8285156	2.758284

```
. predict u1, resid
(2 missing values generated)

. wntestq u1, lags(1)

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =     0.0021
 Prob > chi2(1)            =     0.9635
```

```
. reg lnxgr lnxgr3
```

Source	SS	df	MS	Number of obs =	28
				F(1, 26) =	0.03
Model	.114362603	1	.114362603	Prob > F =	0.8538
Residual	85.7888743	26	3.29957209	R-squared =	0.0013
				Adj R-squared =	-0.0371
Total	85.9032369	27	3.18160137	Root MSE =	1.8165

lnxgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lnxgr3	-.0368193	.1977708	-0.19	0.854	-.4433431	.3697045
_cons	2.092858	.4869988	4.30	0.000	1.091818	3.093899

```
. predict u2, resid
(3 missing values generated)

. wntestq u2, lags(1)

Portmanteau test for white noise
---------------------------------------
 Portmanteau (Q) statistic =     0.0408
 Prob > chi2(1)            =     0.8398
```

Hypothesis: $H_{0:}$ white noise

H_1: not white noise

In the above test since prob. is large, we accept H_o of white noise implies there no unit root (stationary)

In general, the test of unit root at level using different testing method shows that inconclusive but the test first difference is stationary implies the variable is I(1) process.

Appendix C

2. Co integration test

This test performed using residual (joint test) and individual tests to check whether they are co integrated or not between the dependent and independent variables for long run relationship and the formulation of the hypothesis is:

$H_{0:}$ No co integration

H_1: Co integration

```
. reg lnxgr lngdp lntot lnrer lnfpl lnfdi

      Source |       SS       df       MS              Number of obs =      31
-------------+------------------------------           F(  5,    25) =   12.40
       Model |  31.5198228     5  6.30396455            Prob > F      =  0.0053
    Residual |  65.5337525    25   2.6213501            R-squared     =  0.4248
-------------+------------------------------           Adj R-squared =  0.3897
       Total |  97.0535753    30  3.23511918            Root MSE      =  1.6191

------------------------------------------------------------------------------
       lnxgr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       lngdp |  -4.255755   3.181503    -1.34   0.193    -10.80818    2.296673
       lntot |  -4.371982   2.475595    -1.77   0.090    -9.470566     .726601
       lnrer |   1.924964   1.768412     1.09   0.287    -1.717148    5.567077
       lnfpl |   5.141259   2.337337     2.20   0.037     .3274227    9.955096
       lnfdi |    -.11291     .65964    -0.17   0.865    -1.471464    1.245644
       _cons |   27.12264   17.21636     1.58   0.128     -8.33513     62.5804
------------------------------------------------------------------------------

. estat dwatson

Durbin-Watson d-statistic(  6,    31) =  2.398965
```

Prdict v,resid
gen v1=v[_n-1]

2.1 Joint test of residual using DF and several ADF lags for co- integration test

Table C1.1 Joint test of Residual v

test of	test statistics	Critical value (1%)	Critical value (5%)	Critical value (10%)
DF	-6.909	-3.716	-2.986	-2.624
ADF(1)	-4.201	-3.723	-2.989	-2.625
ADF(2)	-3.094	-3.730	-2.992	-2.626
ADF(3)	-3.642	-3.736	-2.994	-2.628
ADF(4)	-2.895	-3.743	-2.997	-2.629

Given the appropriate critical values for DF and Durbin-Watson tests for a joint test, we reject the null hypothesis of no co-integration. This implies the existence of long-run relationship between dependent and independent variables even though they are non stationary in the short run or since the Durbin-Watson d-statistic statistics is greater than R- squared shows that there is stationary.

2.2 Individual test of residual using DF and several ADF lags for co-integration test of each variable

This helps how many lags of the variables are included in the model in addition of checking of co integration individually with the dependent.

Table C2.1 Co integration test for Dlnxgr

test of	test statistics	Critical value (1%)	Critical value (5%)	Critical value (10%)
DF	-9.447	-3.723	-2.989	-2.625
ADF(1)	-5.383	-3.730	-2.992	-2.626
ADF(2)	-4.265	-3.736	-2.994	-2.628
ADF(3)	-3.655	-3.743	-2.997	-2.629

❖ Co integration test for lnxgr lngdp

```
. reg lnxgr lngdp
```

Source	SS	df	MS	Number of obs =	31
				F(1, 29) =	4.48
Model	12.9778982	1	12.9778982	Prob > F =	0.0431
Residual	84.075677	29	2.89916128	R-squared =	0.1337
				Adj R-squared =	0.1038
Total	97.0535753	30	3.23511918	Root MSE =	1.7027

lnxgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lngdp	.7235875	.3419992	2.12	0.043	.0241206	1.423054
_cons	-5.974677	3.702541	-1.61	0.117	-13.54722	1.597869

Prdict e1, resid

Table C2.2 of the residual e_1 from the regression of lnxgr lngdp				
test of	**test statistics**	**Critical value (1%)**	**Critical value (5%)**	**Critical value (10%)**
DF	-5.491	-3.716	-2.986	-2.624
ADF(1)	-3.635	-3.723	-2.989	-2.625
ADF(2)	-3.422	-3.730	-2.992	-2.626
ADF(3)	-3.162	-3.736	-2.994	-2.628
ADF(4)	-2.888	-3.743	-2.997	-2.629

❖ Co integration test for lnxgr lntot

```
. reg lnxgr lntot
```

Source	SS	df	MS	Number of obs =	31
				F(1, 29) =	2.00
Model	6.25576713	1	6.25576713	Prob > F =	0.1681
Residual	90.7978081	29	3.1309589	R-squared =	0.0645
				Adj R-squared =	0.0322
Total	97.0535753	30	3.23511918	Root MSE =	1.7695

lnxgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lntot	-3.09967	2.192875	-1.41	0.168	-7.584602	1.385263
_cons	16.6112	10.46027	1.59	0.123	-4.782455	38.00486

predict e2, resid

TableC2.3 of the residual e_2 from the regression of lnxgr lntot				
test of	**test statistics**	**Critical value (1%)**	**Critical value (5%)**	**Critical value (10%)**
DF	-4.823	-3.716	-2.986	-2.624
ADF(1)	-3.104	-3.723	-2.989	-2.625
ADF(2)	-2.825	-3.730	-2.992	-2.626
ADF(3)	-2.402	-3.736	-2.994	-2.628

❖ **Co integration test for lnxgr lnrer**

```
. reg lnxgr lnrer
```

Source	SS	df	MS	Number of obs =	31
				F(1, 29) =	0.42
Model	1.39139922	1	1.39139922	Prob > F =	0.5212
Residual	95.662176	29	3.29869573	R-squared =	0.0143
				Adj R-squared =	-0.0197
Total	97.0535753	30	3.23511918	Root MSE =	1.8162

lnxgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lnrer	-.5997516	.9234569	-0.65	0.521	-2.488433	1.28893
_cons	4.79903	4.5797	1.05	0.303	-4.567509	14.16557

predict e3, resid

Table C2.4 of the residual e_3 from the regression of lnxgr lnrer

test of	test statistics	Critical value (1%)	Critical value (5%)	Critical value (10%)
DF	-4.849	-3.716	-2.986	-2.624
ADF(1)	-3.079	-3.723	-2.989	-2.625
ADF(2)	-2.818	-3.730	-2.992	-2.626
ADF(3)	-2.183	-3.736	-2.994	-2.629

❖ **Co integration test for lnxgr lnfpl**

```
. reg lnxgr lnfpl
```

Source	SS	df	MS	Number of obs =	31
				F(1, 29) =	6.29
Model	17.3016453	1	17.3016453	Prob > F =	0.0180
Residual	79.75193	29	2.75006655	R-squared =	0.1783
				Adj R-squared =	0.1499
Total	97.0535753	30	3.23511918	Root MSE =	1.6583

lnxgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lnfpl	.8261779	.3293832	2.51	0.018	.1525136	1.499842
_cons	-3.439816	2.122877	-1.62	0.116	-7.781587	.9019544

Predict e4,resid

Table C2.5 of the residual e_4 from the regression of lnxgr lnfpl

test of	test statistics	Critical value (1%)	Critical value (5%)	Critical value (10%)
DF	-5.668	-3.716	-2.986	-2.624
ADF(1)	-3.649	-3.723	-2.989	-2.625
ADF(2)	-3.272	-3.730	-2.992	-2.626
ADF(3)	-3.155	-3.736	-2.994	-2.628
ADF(4)	-2.859	-3.743	-2.997	-2.629

❖ **Co integration test for lnxgr lnfd**

```
. reg lnxgr lnfdi
```

Source	SS	df	MS	Number of obs =	31
Model	10.2890426	1	10.2890426	F(1, 29) =	3.44
Residual	86.7645326	29	2.99188044	Prob > F =	0.0739
				R-squared =	0.1060
				Adj R-squared =	0.0752
Total	97.0535753	30	3.23511918	Root MSE =	1.7297

lnxgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lnfdi	.2781929	.1500136	1.85	0.074	-.0286194	.5850053
_cons	-.2841648	1.182783	-0.24	0.812	-2.703227	2.134898

predict e5, resid

Table C2.6 of the residual e_5 from the regression of lnxgr lnfdi

test of	test statistics	Critical value (1%)	Critical value (5%)	Critical value (10%)
DF	-5.348	-3.716	-2.986	-2.624
ADF(1)	-3.484	-3.723	-2.989	-2.625
ADF(2)	-3.192	-3.730	-2.992	-2.626
ADF(3)	-2.838	-3.736	-2.994	-2.628

❖ **Co integration test for lnxgr v1**

```
. reg lnxgr v1
```

Source	SS	df	MS	Number of obs =	30
Model	1.13741347	1	1.13741347	F(1, 28) =	0.34
Residual	92.4471676	28	3.30168456	Prob > F =	0.5619
				R-squared =	0.0122
				Adj R-squared =	-0.0231
Total	93.5845811	29	3.22705452	Root MSE =	1.8171

lnxgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
v1	-.1322949	.2253988	-0.59	0.562	-.5940035	.3294137
_cons	1.890106	.3317921	5.70	0.000	1.210461	2.569751

predict v2, residual

Table **C**2.7 of the residual v2 from the regression of lnxgr v1

test of	test statistics	Critical value (1%)	Critical value (5%)	Critical value (10%)
DF	-6.891	-3.716	-2.986	-2.624
ADF(1)	-3.913	-3.723	-2.989	-2.625
ADF(2)	-2.907	-3.736	-2.994	-2.628
ADF(3)	-3.543	-3.743	-2.997	-2.629
ADF(4)	-3.014	-3.750	-3.000	-2.630

Appendix D

6 Estimation Result and Diagnostic tests

Table 3.1 Results of short run relationship of the model

reg dlnxgr dlnxgr1 dlnxgr2 dlnxgr3 dlngdp dlngdp1 dlngdp2 dlntot dlntot1 dlntot2 dlnrer dlnrer1 dlnfpl dlnfpl1 dlnfpl2 dlnfdi dlnf di1 dlnfdi2 v1

Source	SS	df	MS	Number of obs =27
Model	153.447475	18	8.52485974	F(18, 8) =19.25
Residual	3.5436321	8	.442954013	Prob > F =0.0001
Total	156.991107	26	6.03811952	R-squared =0.8774
				Adj R-squared =0.8266
				Root MSE =0.36555

dlnxgr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dlnxgr1	.5924037	.110404	5.37	0.001	-.8469958	-.337811
dlnxgr2	.3750912	.1421052	2.64	0.030	-.7027864	-.0473959
dlnxgr3	-.1223861	.1082236	-1.13	0.291	-.3719502	.127178
dlngdp	4.279033	2.085917	2.05	0.074	-9.089166	.5311008
dlngdp1	3.793518	2.030097	1.87	0.099	-8.47493	.8878932
dlngdp2	-.3993913	2.401954	-0.17	0.872	-5.938308	5.139525
dlntot	-7.596526	2.03514	-3.73	0.006	-12.28958	-2.903469
dlntot1	-3.974755	1.655442	-2.40	0.043	-7.79221	-.157299
dlntot2	-5.518211	2.111181	-2.61	0.031	-10.3866	-.64982
dlnrer	1.768348	1.2402	1.43	0.192	-1.091558	4.628254
dlnrer1	2.845801	1.378365	2.06	0.073	-.3327151	6.024317
dlnfpl	4.224	1.353297	3.12	0.014	1.103292	7.344707
dlnfpl1	3.057321	1.423465	2.15	0.064	-.2251943	6.339836
dlnfpl2	1.234353	1.170045	1.05	0.322	-1.463775	3.932482
dlnfdi	.9783286	1.095058	0.89	0.398	-1.54688	3.503538
dlnfdi1	-.4898395	1.138966	-0.43	0.678	-3.116301	2.136622
dlnfdi2	.7972782	.826158	0.97	0.363	-1.107846	2.702402
v1	-1.232183	.1301415	-9.47	0.000	-.9320758	1.532289
_cons	-.0958625	.3017095	-0.32	0.759	-.7916059	.599880

estat dwatson

Durbin-Watson d-statistic(19, 27) = 2.31430

. estat ic

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
.	27	-62.0761	-10.8971	19	59.7942	84.4151

Note: N=Obs used in calculating BIC; see [R] BIC note

Appendix E

4. Results of Diagnostic test

4.1 Heterokedasticity Test

```
  estat hettest
Breusch-Pagan / Cook-Weisberg test for Heterokedasticity
        Ho: Constant variance
        Variables: fitted values of dlnxgr
          chi2(1)       = 0.33
        Prob > chi2  = 0.5648
. estat archlm
LM test for autoregressive conditional heteroskedasticity (ARCH)
-------------------------------------------------------------------------
   lags(p)  |        chi2            df             Prob > chi2
------------+------------------------------------------------------------
      1     |       1.610            1              0.2045
-------------------------------------------------------------------------
       H0: no ARCH effects      vs.  H1: ARCH(p) disturbance
```

- We fail to reject the null hypothesis.

4.2 Mosel specification test

```
estat ovtest
Ramsey RESET test using powers of the fitted values of dlnxgr
      Ho:  model has no omitted variables
                F(3, 5) =      0.16
              Prob > F =      0.9215
```

- We fail to reject the null.

4.3 Autocorrelation Test

```
estat bgodfrey
Breusch-Godfrey LM test for autocorrelation
-------------------------------------------------------------------------
   lags(p)  |        chi2            df             Prob > chi2
------------+------------------------------------------------------------
      1     |       4.250            1              0.0985
-------------------------------------------------------------------------
                    H0: no serial correlation
estat bgodfrey
Breusch-Godfrey LM test for autocorrelation
-------------------------------------------------------------------------
   lags(p)  |        F               df             Prob > F
------------+------------------------------------------------------------
      1     |      4.250          (  1,    7 )          0.1989
-------------------------------------------------------------------------
                    H0: no serial correlation
```

estat durbinalt

Durbin's alternative test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	1.308	1	0.2528

H0: no serial correlation

- ***The above result shows that we fail to reject the null since p-value is greater than 0.05.***

4.4 Stability Test

4.4.1 Chow Breakpoint Test: 1991

Null Hypothesis: No breaks at specified breakpoints
Varying regressors: All equation variables
Equation Sample: 1980 2010

F-statistic	0.383087	Prob. F(6,19)	0.8807
Log likelihood ratio	3.540155	Prob. Chi-Square(6)	0.7386
Wald Statistic	2.298519	Prob. Chi-Square(6)	0.8903

4.4.2 Chow Forecast Test

Equation: short run
Specification: dlnxgr dlnxgr1 dlnxgr2 dlnxgr2 dlngdp dlngdp1 dlngdp2 dlntot dlntot1 dlntot2 dlnrer dlnrer1 dlnfpl dlnfpl1 dlnfpl2 dlnfdi dlnfdi1 dlnfdi2 v1
Test predictions for observations from 1991 to 2010

	Value	df	Probability
F-statistic	0.641155	(20, 5)	0.7832
Likelihood ratio	39.40278	20	0.0059

- We fail to reject the null hypothesis of no break at specified breakpoints.

4.5 *Correlation Coefficient Test*

```
. corr dlnxgr dlnxgr1 dlnxgr2 dlnxgr3 dlngdp dlngdp1 dlngdp2 dlntot dlntot1 dlntot2 dlnrer dlnrer1 dlnfp1 dlnfp11 dlnfp12 dlnfd
> i1 dlnfdi2 v1
(obs=27)
```

	dlnxgr	dlnxgr1	dlnxgr2	dlnxgr3	dlngdp	dlngdp1	dlngdp2	dlntot	dlntot1	dlntot2	dlnrer	dlnrer1	dl
dlnxgr	1.0000												
dlnxgr1	-0.1586	1.0000											
dlnxgr2	0.1425	-0.5675	1.0000										
dlnxgr3	-0.0644	0.1501	-0.5356	1.0000									
dlngdp	0.0423	-0.0687	0.0379	0.1370	1.0000								
dlngdp1	0.0236	0.0351	-0.0828	0.0498	0.4843	1.0000							
dlngdp2	-0.0480	-0.0258	-0.0703	0.0108	0.4549	0.5028	1.0000						
dlntot	-0.2755	0.1157	0.0894	0.0860	-0.0042	0.1413	0.4470	1.0000					
dlntot1	0.2076	-0.2696	0.0900	0.1217	0.2558	-0.0086	0.1091	-0.1445	1.0000				
dlntot2	0.0524	0.1952	-0.3254	0.1330	0.2351	0.2527	-0.0676	-0.3358	-0.1633	1.0000			
dlnrer	-0.2622	-0.0709	-0.0829	0.1093	0.2975	0.3058	0.3371	0.1301	-0.0804	0.1074	1.0000		
dlnrer1	0.2381	-0.2515	-0.0766	-0.0830	0.1718	0.2974	0.3226	0.3417	0.1298	-0.0323	0.4116	1.0000	
dlnfp1	0.1748	0.3045	-0.1165	-0.1020	0.2788	0.4129	0.2783	0.1605	0.0235	0.0978	-0.3117	0.0106	1.0
dlnfp11	-0.1629	0.2209	0.2287	-0.0346	0.4651	0.2734	0.2986	0.0370	0.1291	-0.0268	0.0485	-0.3281	0.1
dlnfp12	0.0926	-0.2216	0.2479	0.2097	0.2980	0.4591	0.3432	0.2288	0.0456	0.1384	0.2238	0.0486	0.1
dlnfdi	0.1107	0.1966	-0.1428	-0.2733	-0.1327	0.0959	0.1739	0.1921	-0.3452	0.1626	-0.2469	0.1416	0.3
dlnfdi1	-0.0896	0.0427	0.1808	-0.1246	-0.0195	-0.1313	0.0931	0.0418	0.1822	-0.3554	-0.3088	-0.2432	-0.0
dlnfdi2	0.0704	-0.0845	0.0268	0.2025	0.0227	-0.0201	-0.1471	-0.2064	0.0349	0.1725	-0.1731	-0.3064	-0.0
v1	-0.2180	0.3058	-0.2544	0.1215	0.0420	0.1492	-0.0139	0.1644	-0.0827	0.2473	-0.0262	-0.3604	0.3

	dlnfp11	dlnfp12	dlnfdi	dlnfdi1	dlnfdi2	v1
dlnfp11	1.0000					
dlnfp12	0.1362	1.0000				
dlnfdi	-0.0765	-0.0833	1.0000			
dlnfdi1	0.2677	-0.0196	0.3409	1.0000		
dlnfdi2	-0.1123	0.2996	0.0526	0.3562	1.0000	
v1	0.2623	-0.0304	-0.0361	-0.0317	-0.0324	1.0000

- The above result shows no correlation

4.6 Durbin WU Hausman Endogeneity Test

. ivregress 2sls dlnxgr dlnxgr1 dlnxgr2 dlnxgr3 dlntot dlntot1 dlntot2 dlnrer dlnrer1 dlnfpl dlnfpl1 dlnfpl2 dlnfdi dlnfdi1 dlnfdi2 e (dlngdp= dl.dlngdp)

Instrumental variables (2SLS) regression Number of obs =27
Wald chi2(16) =127.22
Prob > chi2 = 0.0000
R-squared = 0.7967
Root MSE = 1.087

dlnxgr	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
dlngdp	11.66179	20.27999	0.58	0.565	-28.08626	51.40984
dlnxgr1	-.3372882	.3031106	-1.11	0.266	-.931374	.2567976
dlnxgr2	-.3069402	.1943581	-1.58	0.114	-.6878751	.0739946
dlnxgr3	-.2286637	.2277061	-1.00	0.315	-.6749595	.217632
dlntot	-6.847864	3.01501	-2.27	0.023	-12.75717	-.9385534
dlntot1	-2.393217	2.863948	-0.84	0.403	-8.006453	3.220019
dlntot2	-12.00715	8.003496	-1.50	0.134	-27.69372	3.679412
dlnrer	-.2997812	3.045742	-0.10	0.922	-6.269326	5.669763
dlnrer1	-1.205479	4.547179	-0.27	0.791	-10.11779	7.706827
dlnfpl	-1.478687	6.124199	-0.24	0.809	-13.4819	10.52452
dlnfpl1	-2.612845	6.262791	-0.42	0.677	-14.88769	9.662
dlnfpl2	.7537647	1.7565	0.43	0.668	-2.688911	4.196441
dlnfdi	3.752138	3.539855	1.06	0.289	-3.18585	10.69013
dlnfdi1	-3.161205	3.472246	-0.91	0.363	-9.966683	3.644273
dlnfdi2	.763788	1.344692	0.57	0.570	-1.871759	3.399335
v1	-1.35968	.2372035	5.73	0.000	.8947699	1.82459
_cons	-1.084632	1.129875	-0.96	0.337	-3.299145	1.129882

Instrumented: dlngdp
Instruments: dlnxgr1 dlnxgr2 dlnxgr3 dlntot dlntot1 dlntot2 dlnrer dlnrer1 dlnfpl dlnfpl1 dlnfpl2 dlnfdi dlnfdi1 dlnfdi2 e LD.dlngdp

. estat endogenous

Tests of endogeneity
Ho: variables are exogenous
Durbin (score) chi2(1) = 3.91814 (p = 0.0478)
Wu-Hausman F(1,9) = 1.52775 (p = 0.2477)

- No endogeneity problem since the p value is greater.

Figure E1: graph for normality test