



**SAINT MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES**

INSTITUTE OF AGRICULTURE AND DEVELOPMENT STUDIES

**THE IMPACT OF OFFICIAL DEVELOPMENT ASSISTANCE
ON AGRICULTURAL GROWTH OF ETHIOPIA**

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June 2017

Addis Ababa, Ethiopia

**THE IMPACT OF OFFICIAL DEVELOPMENT ASSISTANCE
ON AGRICULTURAL GROWTH OF ETHIOPIA**

By

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**A THESIS SUBMITTED TO St. MARY'S UNIVERSITY, SCHOOL OF GRADUATE
STUDIES IN PARTIAL FULLFILLMENT OF THE REQUIREMENT FOR THE
DEGREE OF MASTER OF DEVELOPMENT ECONOMICS**

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DECLARATION

I, the undersigned, declare that this Thesis is my original work; prepared under the guidance of Gemoraw Adinew (PhD). All the sources of materials used for this thesis have been dully acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

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ENDORSEMENT

This thesis has been submitted to Saint Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

Advisor

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Acknowledgment

I have no word to thank my Almighty God, for giving me the strength, courage to pass all the difficulties that I went through in the pursuit of a course of these studies and the thesis too. In writing this thesis I would like to extend my gratitude to my advisor, Dr. Gomoraw Adinew who has supported me with necessary directives of carrying out this research work.

I am also extremely indebted to my friends Addisalem, Samri, Abdulhadi, Haleluya, Ermi, my office staffs, to all friends for their dedicated support, advice, encouragement, comment on my thesis and put their trust that I can do this research.

Finally, I would like to express my deep gratitude to my MOM, sister and to all my family for their moral and financial assistance, love you all.

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Acronyms

ADF	Augmented Dickey-Fuller
ADLI	Agricultural development led Industrialization
AGDP	Agricultural Gross Domestic Product
AIC	Akaike Information Criteria
DAC	Development Assistance Committee
DF	Dickey –Fuller
ECM	Error Correction Model
EC	Ethiopian Calendar
EEA	Ethiopian Economic Association
EFY	Ethiopian Fiscal Year
EPRDF	Ethiopian People`s Revolutionary Democratic Front
GDP	Growth Domestic Product
GOVA	Government expenditure on agriculture
GTP1	Growth Transformation Plan one
GTP2	Growth Transformation Plan Two
HQC	Hannan –Quinn criteria
IMF	International Monetary Fund
LDCs	less Developing Countries
MoFED	Ministry of Finance and Economic Development
NBE	National Bank of Ethiopia
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares

SBC	Schwartz-Bayesian Criteria
SSA	Sub Saharan Africa
UN	United Nation
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nation Development Program
USD	United State Dollar
VAR	Vector Auto Regression
VECM	Vector Error Correction Model
WB	World Bank
WWII	World War the Second

Abstract

Less developing countries including Ethiopia, mainly their economy is dependent on agriculture, and less productivity of this sector is not a question of only being poor nation rather it is a livelihood of their society and with a visible resource gap the productivity of this sector is unexpected. To fill this resource gap least developing country's lookup and depend on external assistance from developed countries.

This study have an objective of whether official development assistances has an impact on agricultural growth of Ethiopia or not, with time series data of 1985 to 2013 using vector error correction model in order to know if they have a short run and long run relationship. All necessary time series tests such as stationary test, co-integration test, causality test and other necessary test are taken. And the result of the study reveals that Official Development Assistance has a negative and significant impact on agricultural growth in the short run there will be displacement or dutch disease effect and also it has a positive significant impact in the long run since financing in investment or adapting new technology or knowledge, its result will be after a while.

There for Ethiopia, as a country has to work on enhancing domestic factors for productivity of agriculture sector, raising the capacity of producers through different mechanisms and use resources more effectively and in advanced way, also effective use of the external assistance is very necessary since it has significant impact both in the short run and long run.

Key words: ODA (official development Assistance), Agricultural growth, Ethiopian agricultural growth

CHAPTER ONE: INTRODUCTION

1.1. Background

Developing countries face challenges of massive poverty, slow Gross Domestic Product (GDP), high mortality rate, less saving rate and domestic investment etc and the economy of these poor nations is mainly based on agriculture sector with traditional farming system.

Official development assistance (ODA), with its main objective of promoting economic development and welfare in the form of Foreign aid has played as an instrumental role in the implementation of development program to combat the challenges related with less economic growth(Todarro ,1994).

Official Development Assistance (ODA), commonly known as foreign aid which is a flow of financial resources from developed countries to developing countries on development grounds. It is an international transfer of public funds in the form of loan or grants either directly from one government to another (bilateral) or indirectly multilateral assistance agency such as International Monetary Fund and World Bank (OECD, 2009).

According to the 2007 World Development Report states the primacy of agricultural development to stimulate growth in many poor countries such as Ethiopia. The cause of agricultural productivity growth cannot be divorced from growth outcome, and agriculture is the main driver of growth and it is the focal point to examine its ability to stimulate growth in other sector for less developing countries.

The agriculture sector in developing countries which is based on rainfall variability challenged by lack of technology, lack of education, lack of finance and being dependent on rain fed agriculture. To overcome these challenges, the governments in these countries do not have sufficient financial resources.

It is generally argued that foreign aid tries to achieve one or more of a broad economic and development objectives : to stimulate economic growth through, agriculture, bringing new ideas and technologies ,building infrastructure to strengthen important sectors such as education

,health, environment or political systems, to support subsistence consumption of food and other essential commodities, especially during relief operations or humanitarian crises , to help stabilize an economy following economic shocks (UN report of 2007).

The volume of ODA from bilateral and multilateral agency flows has grown from an annual rate of under USD5 billion in 1960 to USD50 billion in 2000 and then USD128 billion in 2008 (Todaro and Smith, 2012) and USD 131.6 billion in 2015 (OECD, 2016).

Africa in general and SSA in particular receives a greater share of global aid than any other region in the world which is USD49.5 billion, East Africa receiving approximately 25% of all ODA to SSA (OECD ,2016). With in east Africa, Ethiopia receives the largest percentage of total ODA from all donors, followed by Kenya and Tanzania topped the list in east Africa (UNDP, 2016).

As a developing nation, Ethiopia has a long history of receiving foreign aid, dating back to the early 1950s, mainly in the form of humanitarian aid and that can be seen through a continual and increase in flow of aid as a share of investment until recent times. This is because the country faced long years binding constraint of capital deficiency leading to the saving-investment gap, low quality and unstable export performances with import oriented economy leading to the export –import gap and the foreign exchange gap pushing the country to depend on external assistance (Yohannes, 2011).

Ethiopia has received USD14.1 billion in terms of Official Development Assistance (ODA) over the GTPI implementation period (2003 – 2007 Ethiopian fiscal year, EFY). Out of this, agriculture takes the highest share 24.3 % followed by health sector 14.8 % (MoFED, 2015). The increase of aid inflow in form of a loan has put the country in the problem of indebtedness for many years. The simultaneous move of the increase in aid inflow associated with economic growth made the issue area for this study.

1.2. Statement of the Problem

With these broader objectives of Official Development Assistance as well as the tremendous increase in the flow of foreign aid to developing countries like Ethiopia from time to time, there is an argument about aid effectiveness which go back to decades. There are debates on the impact of foreign aid on economic growth, one side argue that aid has a positive effect on economic growth, particularly in countries with sound economic and trade policies (Ozgur k, Ilker k and lewlli G 2008).

In the contrary, researchers like Moyo (2009) challenged the theoretical strand surrounding the effectiveness of aid and opine that the billions of dollars in aid sent from wealthy countries to developing Africa nations has not helped to reduce poverty and increase growth. Thus, there is no consensus among scholars to the actual effects of foreign aid on economic growth

Generally many researchers try to study the effect of foreign aid on economic growth, and they cannot conclude on the significant effect of aid on economic growth. This is because the economic agents associated with aid administration are dynamic and also many of them did not disaggregate the GDP in to different sector levels to capture the different impact of earmarked aid on the sectors. Since the agriculture is the baseline for the current achievement of the economy of Ethiopia and the sector linkage makes it the ladder to achieve the growth transformation plan (GTP) of the country through policies like ADLI (Agricultural development led industrialization). This study basically needs to investigate the effect of official development assistance has an impact on agricultural growth of Ethiopia.

1.3 .Objective of the Study

The major objective this study is to analyze the impact of foreign aid on agricultural sector of Ethiopian economy. Specifically,

- To describe the trend of official development assistance (ODA) in Ethiopia.
- To investigate empirically the impact of official development assistance (ODA) on agriculture sector growth in Ethiopia.

1.4. Significance of the Study

The result of this study is useful for improving institutional set up, implementation, monitoring and evaluation in the area of foreign aid allocation to public spending in general and sector wise in particular for the sake of economic growth. The result of the study also becomes a stepping stone for researchers, students, policy makers and other organization that are in need to use its result as an input in their organization and fill the gap of this sectoral analysis of official development assistance research.

1.5 Scope of the Study

The study analysis the impact of an Official Development Assistance on Agricultural Growth of Ethiopia, use a time series data from 1985 to 2013. This period is chosen based on availability of data.

1.6 Limitation of the Study

Lack of complete, reliable, and consistence data is a critical limitation of this study, the only data available and easily accessible data for ODA flow is compiled by the World Bank website even this data does not provide a consistence and comparable breakdown of ODA flow by sectors, and it does not classify the flow of ODA whither it is through bilateral or multilateral donors

1.7 Organization of the Study

This paper is organized under five chapters. The first chapter states; background of the study , statement of the problem , objective of the study , significance of the study , scope and limitation of the study and organization of the research paper . The second chapter reviews the literature having both theoretical and empirical literature. Chapter three is deals with model specification and methodologies. Chapter four discusses the results of the study and the final chapter gives conclusion and recommendation.

CHAPTER TWO: LITRATURE RIEVIEW

2.1 Theoretical Literature

2.1.1 Definition and Classification of Official Development Assistance

An important objective of much Official Development Assistance (here after foreign aid) to developing countries is the promotion of economic development and welfare, usually measured by its impact on economic growth.

Foreign aid can be defined differently with different scholars. According to (Todarro, 1994) it can be defined as a bilateral, multilateral and concessional transfer of resource between countries.

Bilateral aid

Bilateral aid is the dominant type of state-run aid. Bilateral aid occurs when one government directly transfer money or other assets to recipient country. The most important in terms of its size and influence is official aid. The definition of official development assistance (ODA) Is provided by the development assistance committee (DAC) of the organization for economic cooperation and development (OECD, 2009).

Multilateral aid

Multilateral aid is assistance provided by many governments who pool funds to international organizations like the World Bank, United Nations and international monetary fund that are then used to reduce poverty in developing nations.

Concessional term

It is the debt that is given by a country to another country on the concessional rate. The concessional element may be:-

- Rates of interest lower than the prevailing rates of interest in the international commercial money market.

- Longer period for repayment
- Grant, which does not entail the payment of the principal or interest i.e. a free gift.

Or it is terms for the extension of credit that are more favorable to the borrower than those available through standard financial markets.

2.1.2 Rational of Official Development Assistance

The basic justification for the transfer of resources to LDCs in the form of aid takes many factors in to account. The 1950s and 1960s of the ‘Marshall Plan’ of aid incipient gave a financial assistance to revive the economy of western Europeans. Though it started with the goal of reestablishing the war –torn economy, latter on its scope and objective were widened and aid started to flow to the majority of LDCs largely to meet the development purposes (Todaro and Smith, 2012).

Then onward the flow of foreign aid to developing countries have been increasing from time to time although the determining factors of aid inflow to LDCs and the motives of donors in giving aid an important issues to be addressed .

Many literatures proposed that donor countries give aid primarily because it is their political or economic self interest purpose. Some donors and development assistances may be prompted by moral and humanitarian desire to assist the less fortunate`s like emergency food relief programs. But there is no evidence to suggest that over long period of time donor nation assist others without awaiting some corresponding benefits (political, economic, military etc) in return. Thus ,motivation of donor nation in giving foreign aid can therefore be classified in to two broad aspects, but often interrelated, categories as political and economic (Todaro,1994).

2.1.3 Motives of Donors

Donor countries give aid primarily according to their policies pertaining to their political, strategic or economic interests. Some development assistance may be motivated by moral and humanitarian consideration of a less fortunate country hit by famine, earthquake, flood etc. but in normal circumstances there is no historical evidence to support that over lengthy periods of time,

donor nations assist others without expecting some corresponding benefits (political, economic, military etc) in return. Donors' motives are explained below.

Political motivations

According to Todaro (1994), Political motivations have been a most important factor for aid-granting nations, especially for a major donor country like the United States. Even in the 1940s marshal plan aimed at reconstructing the war thorn economy of Western Europe has been a means of spreading their political ideology.

After the flow of resources to war devastated economy the support shifted to the LDCs economies in mid-1950s. Here also the aid program of the US has a policy of making support for "friendly" less developed nations by making emphasis towards political, economic and military aspects, especially those considered geographically strategic. most aid programs to developing countries were therefore focused more toward their needs for political security and the like than encouraging the long-term social and economic development (Todaro, 1994) .Aid flows to further the donors' interests .the flow of funds tends to vary in accordance with the donors political assessment of changing international scenario rather than the relative need of potential recipients.

Economic motivations

Within the broad context of political and strategic priorities, foreign aid programs of the developed nations have had a strong economic rationale. Even though political motivation may have been of Paramount importance for other donors, the economic rationale was at least given lip service as the overriding motivation for assistance.

Providing aid to LDCs ensures that the savings gap and the foreign exchange gap are filled. For domestic investment to take place domestic savings must occur. If these are absent then a flow of development assistance can help to finance investment projects.

2.1.4 Why Developing Countries Accept Official Development Assistance

The reasons why developing nations, at least until recently, have been eager to accept aid, even in its most stringent and restrictive forms have been given much less attention than the reasons why donors provide aid. Syed A, Imtiaz A, Mohammed S , 2005, identifies three reasons .

Economic reasons

The major reason is clearly economic. developing countries have often tended to accept uncritically the proposition that aid is a crucial and essential ingredient , helps transform the economy structurally and contributes to the achievement of LDC take offs into self sustaining economic growth . Thus the economic rationale for aid in LDCs is based largely on their acceptance of the donors' perceptions of what the poor countries require to promote their economic development.

Conflicts, therefore, generally rise not out of any disagreement about the role of aid but over its amount and conditions. Naturally, LDCs would like to have more aid in the form of outright grants or long term low cost loan with minimum strings attached. This means not trying aid to donor exports and granting greater latitude to Recipient countries to decide for themselves what is in their best long run development interests.

Political reasons

In some countries aid is conceived by both donor and recipient as providing greater political leverage to the existing leadership to suppress opposition and maintain itself in power .the problem is that once aid is accepted the ability of recipient governments to extricate themselves from implied political or economic obligations to donors and prevent donor governments from interfering in their internal affairs can be greatly diminished.

Moral motivation

Whether on grounds of basic humanitarian responsibilities of the rich toward the welfare of the poor or because of a belief that the rich nations owe the poor nations conscience money for past exploitations, many proponents of foreign aid in both developed and developing countries

believe that rich nations have an obligation to support the economic and social development of the third world .they then go on to link this moral obligation with the need for greater LDC autonomy with respect to the allocation and use of aid funds .

There are different sides to the debate on the impact of foreign aid on economic growth. One side argues that aid has a positive effect on economic growth , particularly in countries with sound economic and trade policies , while the other side contends that foreign aid fosters corruption , encourages rent –seeking behavior , and erodes bureaucratic institutions . And the others believe that there no actual effect if foreign aid on economic growth.

2.1.5 Official Development Assistance and Displacement Theories

Displacement theories suggest that there are possibilities that more aid inflows may not raise investment by as much as of the value of aid inflow and therefore an increase in aid may not lead higher rate of economic growth. One possibility is that aid inflows may displace domestic savings as a result ‘crowd out’ private investment. The debate in this view has been reproduced within the saving debate and the fiscal response debate. Another prospect concerns the impact of aid on real exchange rate .aid could affect export earnings, and then it reduces the ability to increase investment as required. This is the case of ‘Dutch disease effect’.

While research on aid effectiveness mainly focuses on the analysis of the direct impact aid has on growth, there are also factors that indirectly influence aid effectiveness: first, the Fungibility of aid, second the so called Dutch disease and third aid Volatility.

Fungibility

Fungibility incurs when aid inflows are directed to different uses than those initially planned by donors and recipient governments (McGillivray and Morrissey, 2000). In addition, fungibility can occur when aid recipient governments, because of aid inflows targeting a sector, divert their own funds that would have been invested in that specific sector to another.

Petterson (2007) focusing on sector aid and studying 57 aid recipient countries , finds that this form of aid is fungible 65% of aid flows have different uses than the ones planned for- but

supports that fungible sectoral aid is not less effective than non- fungible aid. A crucial factor that can induce fungibility is when donors and recipients do have different approaches on how money should be allocated. Conditionally and close monitoring by donors of aid flows allocation are some methods that might restrict the different use of funds. In case where aid flows are high and monitoring capabilities are increased, levels of fungibility should be negatively related to aid flows; however, fungibility should not always be considered as a negative aspect, as a trusted recipient government that follows good policies may be given the opportunity to make alterations in aid allocations (Petterson, 2007).

Aid volatility

Where aid is volatile or unpredictable, recipient governments are less able to plan expenditures effectively. This raises the costs of financial management and can worsen the composition of government spending (e.g. divert resources from capital investment towards recurrent expenditure).

The issue of uncertainty and volatility of aid inflows becomes important , developing countries are more sensitive to external shocks and have fewer instruments and resources to overcome them (Pallage and Robe ,2001). Volatility and lack of predictability can negatively affect medium and long term developing plans of aid recipients.

Dutch disease

Dutch disease arises when the high level of aid flow brings about real exchange rate appreciation and creates booming sector (non tradable sector) at the cost of recession in the other sectors (tradable sectors). The symptom of Dutch disease can be observed once the increase of aid inflows draws resources away from tradable to non tradable sectors. As a result, tradable production declines and hence threatens export performance. It is obvious that the effect of Dutch disease will erode the recipients export earnings and hence the ability to import. When Dutch disease arises due to the high level of aid inflow creating a booming in the economy, it is important to analyze the level of aid inflows that may cause the Dutch disease effect, indicate that aid may not have a positive impact on growth if high levels of aid inflow make tradable

sectors less competitive in the world market through the appreciation of the real exchange rate and the lowering of export earnings.

2.1.6. Development Theories of ODA

In the late 1950s and 1960s, the standard of foreign aid policy makers and development economists was the “take off into self –sustaining growth “hypothesis presents by Walter Rostow. To sustain economic growth, Rostow suggested that during the take off period domestic savings can be supplemented by foreign capital to increase the level of investment. Later in the 1970s, with the better understanding of the development process, the “take off” theory becomes less popular.

In 1960s, Paul Rosenstein _Rodan developed the theory of “big Push”, the idea was that in order to pave the ground for the take off, the balanced economic theory is required to promote development on all fronts and ensure a relatively rapid rate of growth in all sectors, including agriculture, industry, infrastructure and human skills. and similar with Rostow theory Paul`s theory was later found inconsistent and infeasible and was rejected by other development economist Hirshman , believe that growth proceeds by process of induced investments in which one sector moves ahead of others in an economy, which in turn induces investments in other sectors of the economy (Mikesell R and Zinser J, 1973).

2.1.7 Agriculture and Official Development Assistance

The agricultural sector is at the heart of the economies of the least-developed countries (LDCs) including Ethiopia. It accounts for a large share of gross domestic product (GDP) ranging from 30% to 60 % is about two thirds of them, employs a large proportion of labour force (from 40% as much as 90% in most case), represents a major source of foreign exchange (from 25% to as much as 95% in three quarters of countries), supplies the bulk of basic food and provides subsistence and other income to more than half of the LDCs population. The strong forward and backward linkages within the rural sector and with other sectors of the economy provide added stimulus for growth and income generation (OECD, 2001).

Thus, significant progress in promoting economic growth, reducing poverty and enhancing food security cannot be achieved in most of these countries without developing more fully the potential human and productive capacity of the agricultural sector and enhancing its contribution to overall economic and social development.

LDCs face many difficulties, both internal and external, in their efforts to develop their agriculture and to achieve their objectives of improving food security and increasing export earnings. Internal difficulties include low productivity, inflexible production and trade structures, low skill capacity, low life expectancy and educational attainments, poor infrastructure, and deficient institutional and policy frameworks, ODI (Overseas development institute, 2012).

Effective ways need to be found to support LDCs with a view to improving their economic and social conditions, achieving structural transformation, diversification and international competitiveness ,overcoming their supply-side constraints and , ultimately ,accelerating sustainable growth through foreign aid .

In sum, the role of agricultural development in overall economic development and in eradicating poverty and food insecurity in LDCs is crucial. Measures to that end include: raising agricultural productivity and encouraging other sources of rural development, notably through rural infrastructure; enhancing human capabilities in rural areas through health, education and sanitation services and access to productive resources, with stress on gender equality; and preserving the capacity of the natural environment to sustain the present population and future generations.

In almost all LDCs official development assistance (ODA) is the main catalyst of investment in agriculture. However, such external assistance to the sector has been on the decline since the early 1990s, according to ODI (Overseas development institute, 2012).

Given the importance of the agricultural sector in LDCs for poverty reduction and economic growth, current initiatives to provide financial assistance through targeted debit relief and other measures could in part be directed to supporting efforts to develop their sustainable agricultural potential.

2.1.8. Agricultural Growth and the Contribution of ODA in Ethiopia

While Ethiopia has been witnessed three major political regime changes in the recent history, the importance of agriculture has been recognized by each government in this period. However, different policies pursued by the different regimes have resulted in very different outcomes in agricultural and rural development, particularly between the last two regimes in the past 35 years. In this period, the Derg regime (1975EC-1991EC) has been characterized as an agrarian socialist regime with widespread government controls in all economic spheres including agriculture (OECD, 2010).

After overthrowing the imperial regime of Haile Selassie, the Derg announced an agrarian reform program to declare all rural land to be the property of the state together with the nationalization of almost all other assets in the industrial and services sectors such as manufacturing factories, financial institutions, big hotels and many residential buildings. While the agrarian reform had prohibited all tenancy relations and provided a large number of rural households with equal access to cultivation land according to their needs, the restriction on plot size per family, the prohibition of hired agricultural labour, the intensification of collectivization, the establishment of large-scale state farms, and a series of other anti-market and state-controlled economic instruments had not only significantly negatively affected the incentives of farmers but also distorted the market mechanism in guiding land allocation and promoting productivity improvement(OECD,2010).

While central planning types of development strategies had identified agricultural as an engine of growth and targeted the improvement of food security through agricultural productivity, most growth targets became just a piece of paper and had never been able to achieve. Ethiopia suffered the worst famine on record in 1984 and the country's economy was in the dismal state at the end of Derg regime (OECD, 2010).

Bad political repression during the Derg period generated disastrous economic outcomes and led to civil conflict. As a consequence the Derg regime collapsed in 1991 and the Ethiopian people's revolutionary democratic front (EPDRF) assumed power. The years that followed witnessed a radical shift overall government policy. The EPDRF government that followed initiated

extensive economic reforms including significant market liberalization and a structural adjustment program. Tariffs have been cut , quota constraints relaxed , licensing procedures simplified, foreign exchange controls eased, compulsory cooperative membership and gram delivery discontinued, subsidized rationing of manufactured consumer goods and fertilizers have been discontinued, privatization of state-owned enterprises begun, private banks authorized, and interest rates decontrolled and an inter –bank money market introduced.

Since 1991, Ethiopia has pursued a policy of Agricultural Development Led Industrialization (ADLI). ADIL mainly focuses in developing of smallholder agriculture needs to be developed first to facilitate demand for industrial commodities overall production, as well as invest in those industries with most production linkages to rural areas.

Since the late 2000s, ADIL has been gradually complemented by efforts to support a process of structural transformation. The First Growth and Transformation Plan (2010-2015) , increasingly promoted light manufacturing in key sectors where the country has supposed comparative advantage for industrial sector . This was supported by a two-pronged industrial policy: cross-cutting sectoral support in the form of tax incentives and preferential access to land, credit, and foreign exchange, and a reliance on industrial park as a tool to attract FDI. The Second Growth and Transformation Plan (2015-2020), GTP2, puts an even stronger emphasis on structural transformation, industrialization, urbanization, and export promotion, where progress in GTP1 had modest (Document of World Bank, 2016).

Ethiopia also suffers the problem of financial and economic problem and in order to survive this critical issue the country is almost the big recipient of Official Development Assistance (ODA) or foreign aid. even if the country has a plan to be middle income class for the coming five years , still the contribution of the official development assistance is not questionable , according to the UNDP report of 2015 the total expenditure of the nation was birr 132.4 billion (21% to recurrent , 32% to capital expenditure , and 47% was transfer to regional governments) annual ODA flow increased by 6.4 % on average between 2011/2012 and 2013/14 , 39.7% of the disbursement went to support for enhancing expansion and quality of social development and 35.9% was allocated for maintaining agriculture as major source of economic growth . And total ODA flow

in the first six months of 2014/2015 was USD797 million (71% in form of grants and 29% in loan).

The external debt stock reached USD14 billion in 2013/2014, which is 25.5% of GDP. And agriculture cover almost the half of the country's GDP and it generate high employment for the countries according to UNDP 2015 report the country GDP reached USD55 billion with per capita GDP of USD 631 by end of 2013/14. And agriculture covers almost 40% of the GDP, 14% industry and 46% to the GDP. Real GDP grew by 10.3 % in 2013/14 and 5.3 % of this growth came from the service sector, 2.7 % from industry and the balance from agriculture. As of 2016, 72.7% of employment is generated in the agriculture sector, 19.8 % in service 7.4% in industry (MoFED, 2015).

Agriculture is the backbone of the Ethiopian economy. This particular sector determines the growth of all other sectors and consequently, the whole national economy. On average, crop production make up 60 % of the sector's outputs, whereas livestock accounts for 27 % and other areas contribute 13 % of the total agricultural value added.

The agriculture sector has not yet succeeded in generating strong positive, economy – wide spill-over effects to other sectors within wide scale. Ethiopia with poor resource and poor income is heavily constrained by meager capacity to mobilize domestic resources as well as attract external resources apart from official aid flows sustaining a minimum level of investment that prevents the development process from stalling altogether. As agriculture take a lion share of Ethiopian economy, agriculture get 3.4 billion or 24.3 % of the total disbursement of total official development assistance during 2010-2015 (MoFED, 2015).

Keeping ADLI as the cornerstone of industrialization in Ethiopia, it is proposed that manufacturing sector may be encouraged to select green industrial development .hence, formulation of a new green manufacturing policy and action plan that encourages private entrepreneurs both national and international is recommended.

Ethiopia has experienced double –digit economic growth, averaging 10.8 % since 2005 which has mainly been underpinned by public sector led development. Real gross domestic product

(GDP) is estimated to have grown by 10.2 % in fiscal year 2014/15. The agriculture sector covers 38.8% of real GDP, respectively (UNDP, 2016). there is no literature specifically study on the impact of foreign aid or an official development assistance on agricultural growth sector growth of Ethiopia , almost many researches take its impact on aggregate economic growth among them .

2.2. Empirical Literature

Even though there are polar views on the effects of economic growth on development and poverty reduction, it is argued that economic growth benefits the poor on average. Although the majority of early development strategies relied on urban bias and industrialization as the main source for economic growth and development during 1960s and 1970s agriculture has been considered to have an active role in the development process. Agricultural growth promotes poverty reduction; hence the agricultural sector is an ‘engine of growth for’ at early stages of development. Economic growth to poverty reduction has found that general GDP growth has led less impact on poverty reduction than growth in agricultural sector, partly because of the high level of poverty in rural areas of developing countries. Thus growth in agricultural sector would be more pro-poor in the rural areas of developing countries than growth in the nonagricultural sector since agricultural growth is considered to have direct and indirect linkage with the growth process and it can be used as the engine of growth for agricultural demand led industrialization (Ozgur k, Ilker k and lewll G ,2008).

There is a prevailing view that had to agriculture has suffered a steep decline (ODI,2012) , even if economic growth to poverty reduction has found that general GDP growth has had less impact on poverty reduction than growth in the agricultural sector, partly because of the high level of poverty in rural areas of developing countries like Ethiopia(Ozgur K, Ilker K and Lewell G,2008) .

Growth in the agricultural sector is considered to be more pro- poor than the growth in the non agricultural sector for developing countries. There is a positive and statistically significant relationship between growth in the agricultural output and agricultural assistance for rural development so foreign assistance given for developmental purposes can achieve its goal if aid is

targeted for the agricultural sector of developing countries (Ozgur K, Ilker K and Lewell G, 2008).

Foreign agricultural aid has a positive and significant relationship with agricultural productivity , the study reveals that bilateral foreign agricultural aid influence agricultural productivity more than multilateral foreign agricultural aid , while multilateral foreign agricultural aid influences agricultural GDP more than bilateral foreign agricultural aid .this means that while bilateral agricultural aid can be more influential for agricultural productivity, multilateral aid can have greater influence on agriculture`s contribution to the economy than the bilateral agricultural aid . The finding may indicate that it is not only the amount of aid that can influence agriculture but that the nature, origin, and purpose of aid can be important in measuring its impact.

It will be important to scale up foreign agricultural aid in order to increase its impact on agricultural productivity and its contribution to the economy of SSA. However, the sectoral foreign agricultural aid allocation should give priority to factors that will enhance agricultural productivity in SSA (Reuben A, 2014).

(Godwin A. and Ben U,2007) study the effect of aid flows on Nigeria`s agricultural growth , by using simultaneous equation system was specified with agricultural growth , savings , aid and agricultural imports as endogenous variables . The result show that official development assistance significantly impact agricultural growth in a positive manner, lending credence to the hypothesis that agricultural growth is promoted by development assistance, however the view that aid flows more to countries with low savings is not supported by the findings of this study. Moreover, the view that aid flows generate increased imports by recipient countries is not in consonance with the results of this study.

The negative association between aid and per capita income may be evidence that countries that are the poorest receive more foreign aid. Finally agricultural imports and aid were negatively signed, implying that aid does not necessarily fill a trade gap and may not promote trade ties between donor and Nigeria.

Mohammad S (2017) had a study on the impact of Official Development Assistance on Agricultural Growth and Agriculture Imports in Developing countries and according to his result is appositve relationship between agricultural growth and ODA, both in the short run and long run. And he concludes that ODA to developing countries increase these countries` demand for agricultural products. That is, official development assistance flow into developing countries help increase income per capita and therefore leads to an increase in agricultural imports into the developing countries.

According to Kettesa D. (2012), aid has a positive and significant impact on growth in the long run showing that good macroeconomic environment favor the effectiveness of foreign aid in supporting the growth performance of the country and its negative impact in the short run indicate that most of foreign aid have been used to finance investment projects that have long gestation periods.

Being one of LDCs; Ethiopia has been the major recipient of aid since the 1950s that can be seen through a continual and increase in flow of aid as a share of investment until recent times. This is so because the country faced long years binding constraint of capital deficiency leading to the saving – investment gap, low quality and unstable export performances with import oriented economy leading to the export- import gap and the foreign exchange gap pushing the country to depend on external assistance (Yohannes, 2011).

(Tesfahun B, 2014) on his study of foreign aid and economic growth in Ethiopia using , a co integration analysis , using annual time series data from 1960-2013 and he found that the effect of foreign aid on economic growth is negative in the short run and becomes positive in the long run . Which indicate that most aid has been used to finance investment which has a long gestation period, and there is no causality between foreign aid and economic growth .

(Tasew T ,2011) in his study of foreign aid and economic growth in Ethiopia, he use a co integration analysis like Tesfahun B ,2014 and he found that aid contributes positively to economic growth in the long run but its short run effect appeared insignificant , due to the presence of poor policy environment in the country

CHAPTER THREE: MODEL SPECIFICATION AND METHODOLOGY

3.1 Data type and Sources

Concerns of analyzing the impact of foreign aid are important for Ethiopia due to an increasing per capita of foreign aid and the country's dependence on it . The study used time series data. The relevant data was collected from various sources Ministry of Finance and Economic Development (MoFED), National Bank of Ethiopia, World Bank, World Bank development indicator database and OECD websites.

3.2 Model Specification

To analyze the impact of foreign aid on agricultural growth of Ethiopia, Agricultural Sector and independent variables and each of them are explained by dependent variables which are assumed to explain those independent variables.

Based on this paper agriculture sector growth are expected to be explained by an official development assistance (ODA), government expenditure on agriculture sector(GOVEA), foreign direct investment (FDI) , climate variability which is determined by rainfall (RN).The model specification will be:-

$$AGDP = f (ODA, GOVEA, FDI, RN)$$

Description of variables,

AGDP, is Agricultural growth which is explained by explanatory variables

ODA, Official development assistance means the technological and service, goods, and primary assistance from both grant and loan during the time specified in this study.

FDI, Foreign direct investment.

RN, Annual Rain fall used to represent climate variability as a determinant of agricultural growth.

GOVA, Government expenditure on agriculture used as a proxy of government direct involvement in agriculture.

The study takes the above variables by considering they are main source of financial resource for the agriculture sector and agriculture productivity mainly depend on climate variability ,rainfall used as a variable as a determinant of this climate variability.

3.3 Econometric Estimation

As the study uses is a time series data there will be testing for stationary (unit root test), co-integration test, and if co integration between variables exist Vector Error Correction Model (VECM), will be used, if not Vector auto regressive (VAR) model will employed. In addition other test like granger causality will conducted to examine the causal relationship between variables under consideration. The equation is transformed into log in order to prevent the problem of hetroscedacity and to show the elasticity of the variables.

Therefore the transformed equation will be

$$\text{LAGDP} = \beta_0 + \beta_1 \text{LODA} + \beta_2 \text{LGOVEA} + \beta_3 \text{LRN} + \beta_4 \text{LFDI} + \mu$$

Where,

LAGDP = the log of agricultural growth

LODA= the log of official development assistance

LGOVEA= the log of government expenditure on agriculture sector

LRN=the log of rain fall

LFDI = the log of foreign direct investment

μ = error term

3.4 Econometric Estimation Techniques

As the data used is time series, testing for stationary (unit root test) the standard estimation and hypothesis testing assumed that all, in particular regression, variables are stationary. A data series is said to be stationary if its error term has zero mean, constant variance and the covariance between any two times period depends only on the distance or lag between the two periods and not on the actual time which it is computed. However in reality most macroeconomic variables are non stationary. if variables entering into the estimation are non stationary, then the result obtained would be spurious in the sense that variables would seem to have promising diagnostic test (high R^2 and low Durbin Watson test) result just because they have common trend over time rather than actual causation, Therefore hypothesis testing and inference using such results will be invalid. To avoid such wrong inferences from non stationary regressions, the time series property of the data should be checked before the estimation of the long run model.

3.4.1 Unit root Test

A time serious data is said to be stationary if its mean and variance are constant over time and the value of the covariance between the two periods depends only on the distance or gap or lag between the two time periods and not the actual time at which the covariance is computed . if the time series is not stationary in the sense just defined, it is called a no stationary time series. In other word, a no stationary time series will have a time varying mean or a time varying variance or both (Gujarati, 2004).

In general, if a (non stationary)time series has to be differenced d times to make it stationary , that time series is said to be integrated of order d , a time series Y_t integrated of order d is denoted as $Y_t \sim I(d)$. if a time series Y_t is stationary to begin with (i.e. it does not require any differencing) , it is said to be integrated of order zero , denoted by $Y_t \sim I(0)$. Most economic time series are generally $I(1)$; that is generally become stationary after taking their first differences (Gujarati, 2004).

A study on the stationarity of variables is relevant for the reason that it incorporates important behavior for these variables and making analysis with nonstationary variables may result in

spurious correlation. a stationary time series is superior or more important than a nonstationary in economic analysis as it makes easier the study of the behavior of variables in the long run (Gujarati ,2004).

Stationary test will be done on all time series properties of data avoid possible spurious regression result by employing the unit root test by Augmented Dickey –Fuller (ADF) and Phillips Perron (PP) test. A commonly applied formal test for existence of a unit root in this data is the Dickey –Fuller (DF) tests. it`s simple extension being the Augmented Dickey Fuller (ADF) test.

The ADF unit root test requires the estimation of the following regression:

$$\Delta Y_t = \beta_1 + \delta Y_{t-1} + a_i + \varepsilon \dots\dots\dots 1$$

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + a_i + \varepsilon_t \dots\dots\dots 2$$

$$\Delta Y_t = \delta Y_{t-1} + a_i + \varepsilon_t \dots\dots\dots 3$$

Where ε is a pure white noise error term and $\Delta Y_{t-1} = (\Delta Y_{t-1} - \Delta Y_{t-2})$, $\Delta Y_{t-2} = (\Delta Y_{t-2} - \Delta Y_{t-3})$, etc are consecutive lagged differences augmented, β_1 is intercept, β_2 is trend coefficient, t is time or trend variables.

The hypotheses of this test will be:

Ho: $\delta = 0$, i.e., there is a unit root - the time series is non-stationary.

HI: $\delta < 0$, i.e., there is no unit root - the time series is stationary.

If the computed absolute value of t statics exceeds the ADF critical values, we reject the hypothesis that $\delta = 0$, in which the time series is stationary and vice versa.

3.4.2 Co-Integration Test

Variables will be co-integrated if they have a long-term, or equilibrium, relationship between them (Gujarati, 2004). Co-integration among the variables reflects the presence of long run relationship among non stationary variables in the system.

Testing for co-integration is important because differencing the variables to attain stationary generates a model that does not show long run behavior of the variables. Thus testing for co integration is the same as testing for long run relationship. In order to determine whether or not a long-run equilibrium relationship exists among the unit root variables in a given model, we need to test empirically that the series in the model are co-integrated. To conduct test for co – integration, we use Johanson maximum likelihood estimation procedure.

According to Engle and Granger (1987), for X_t and Y_t both $I(1)$ to be co integrated there should exist α such that $Y_t - \alpha X_t$ is $I(0)$ (i.e. $Y_t - \alpha X_t$ is stationary). (X_t, Y_t) is denoted as $CI(1, 1)$. Granger noted (cited in Gujarati 2004) that "A test for co integration can be thought as a pre-test to avoid 'spurious regression' situations". A regression of one nonstationary variable over another nonstationary variable may yield a stationary series and if so, it is known as co integrating regression and the slope parameter in such a regression is known as co-integrating parameter. The concept of co integration can be extended to a regression model containing k regressors'. In this case, one will have $k-J$ co integrating parameters.

Johansen method of co integration applies the maximum likelihood procedure to determine the presence of co integrating vectors in a vector autoregressive system. Johansen's methodology is given by the following vector autoregressive (VAR) of order p form:

$$Y_t = \mu + A_1 Y_{t-1} + \dots + A_p Y_{t-p} + E_t \quad 4$$

Where Y_t is an $n \times 1$ vector of variables that are integrated of order one [$I(1)$], μ is a vector of constant, is an $n \times 1$ vector and $A_1, A_2 \dots A_p$ are $P \times P$ matrices of estimable parameters.

In the original work of Johansen and Juselius (cited in Gujarati 2004) , the model incorporates a vector of

Non stochastic variables (D_t) orthogonal to the constant term such as seasonal dummies, 'dummy type' variables and/or stochastic 'weekly exogenous' variables. Thus, the model can also be given as:

$$y_t = \mu + \alpha_1 Y_{t-1} + \dots + \alpha_p Y_{t-p} + \theta D_t + E_t \text{-----} 5$$

3.4.3 Model Stability and Diagnostic Tests

Stability test

Stability test is required to know that we have included all variables we need to explain the dependent variables and also testing for omitted variable bias is important for one model since it is related to the assumption that the error term and the independent variables in the model are not correlated ($E(e/X) = 0$).

Autocorrelation test

Autocorrelation is the correlation between the error terms arising in the time series data. The error term μ_t at time period t is correlated with error terms $\mu_{t+1}, \mu_{t+2}, \dots$. And so on. Such correlation in error term often arises from correlation of the omitted variables that the error terms capture.

3.4.4 Vector Error Correction Model (VECM)

If two variables are not co-integrated or proved to have no long run relationship, the testing procedure will stop there and one will not go for the construction of an error correction model. But if they are co-integrated or proved to have a long run relationship it proceeds to an error correction mechanism. The error correction mechanism (ECM) is a mechanism used to correct any short run deviation of the variables from their long run equilibrium.

If two variables Y and Z are co-integrated, then the long term or equilibrium relationship that exists between the two can be expressed as ECM (Gujarati 2004). This means one shall go for the step of an error correction model if and only if the two variables are co-integrated. The ECM can be given by:

$$\Delta Y_t = \alpha_0 + \alpha_1 \Delta X_t + \alpha_2 U_{t-1} + \varepsilon_t \dots\dots\dots 6$$

Where Δ denotes the first difference operator, ε_t is a random error term, and $U_{t-1} =$

$(Y_{t-1} - \beta_1 - \beta_2 X_{t-1})$, that is, the one-period lagged value of the error term from the Co-integrating regression.

This ECM equation states that ΔY_t depends on ΔX_t and also on the equilibrium error term. If the latter [error term] is nonzero, the model is out of equilibrium. Suppose ΔX_t is zero and

u_{t-1} is positive. This means Y_{t-1} is too high [above] to be in equilibrium. Since α_2 is expected to be negative, the term $\alpha_2 u_{t-1}$ is negative and, therefore, ΔY_t will be negative to restore the equilibrium. That is, if Y_t is above its equilibrium value, it will start falling in the next period to correct the equilibrium error; hence the name ECM. By the same token, if u_{t-1} is negative (i.e., Y_t is below its equilibrium value), $\alpha_2 u_{t-1}$ will be positive, which will cause ΔY_t to be positive, leading Y_t to rise in period t . The absolute value of α_2 determines how quickly the equilibrium is restored (Gujarati 2004).

CHAPTER FOUR: DISCUSION OF RESULTS

Based on the priory described methods of estimation, this section explores the estimation and interpretation of results. Accordingly, after the test of unit root is done for all variables in the model; test for co-integration is followed to assess the long run relationship among the variables entering the growth model. Finally, the dynamic short run is estimated.

4.1. Trend Major Variables (ODA and AGDP)

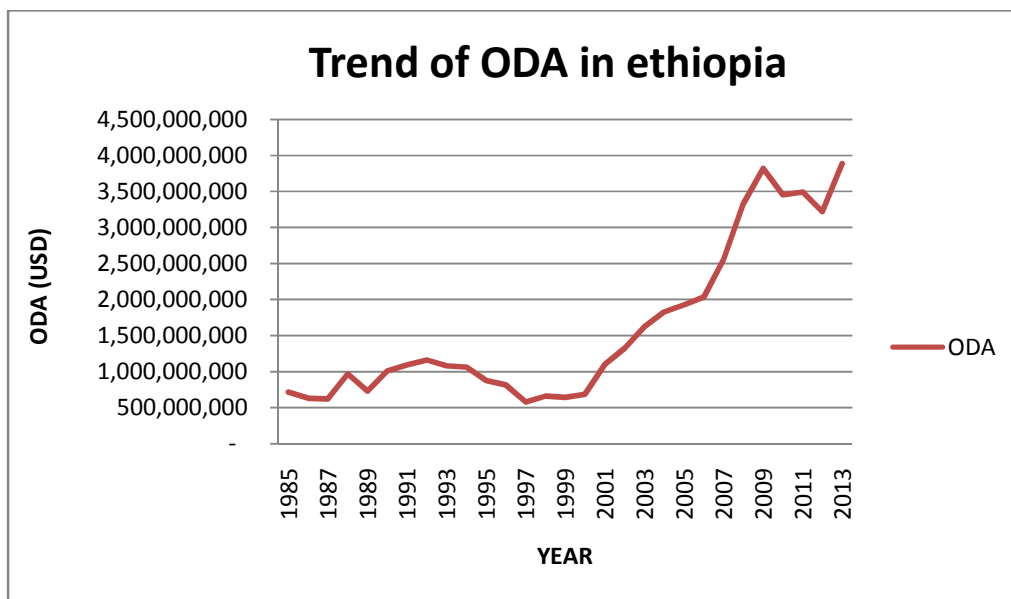


Figure 4.1: ODA trend in Ethiopia

Source: Author computation based on World Bank data base,

The magnitude of aid flow to Ethiopia is not stable; it varies depending on the nature and characteristics of the political ideology, the economic system that the regime follows, and the relationship with donor countries. During the socialist Derg regime Ethiopia had been receiving development assistance from Eastern Block donors particularly from the Soviet Union and East Germany. In Derg regime the country received Birr 1.1 billion on average terms per year.

Comparatively the total flow of foreign aid has increased in the post 1991 period due to change in policies which meet the interests of donors, and adoption of a market-oriented economic

system. Since the policy change by the present regime the magnitude of development assistance both in the form of loan and grant has increased continuously. In this period (1991-2013) average annual flow of aid has reached to USD14billion. The period 1996/97-2001 witnessed a decline in aid which was Ethio-Eritrea war, majority of donors were denying this war. After that the flow of ODA increase in each year since the country mainly focused on development activity by Implementing gross transformation plan.

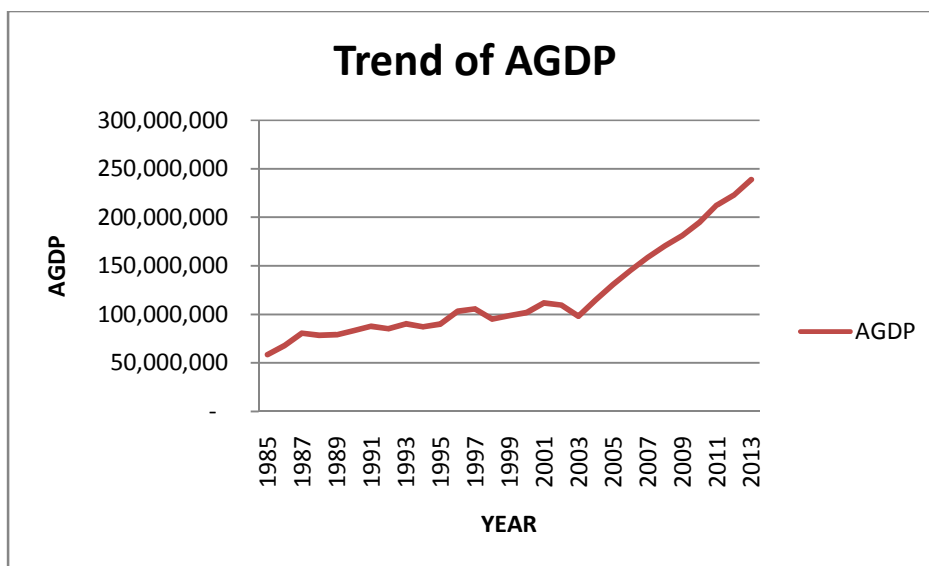


Figure 4.2: Agricultural GDP trend in Ethiopia

Source: Author computation data from MoFED.

Ethiopia has been well known for its agricultural development challenge given its large and rapid growing population and climate variability. As we see in the above graph at the beginning which is in 1985 there was serious drought that starved a lot of people and let them to die and the productivity of agriculture is low.

Since the early 1990s Ethiopia gives priority for agricultural sector with framework of ADLI (agriculture development led industrialization).and we see the high increase of the agriculture growth during the GTP1 (2010/11-2014/2015) period, its vision to build an economy which has a modern and productive agriculture sector with enhanced technology.

4.2 Unit Root Test

Before any meaningful regression is performed with the time series variables, it is essential to test the existence of unit root test in the variables and hence to establish their order of integration. The variables used in the analysis need to be stationary and should be co-integrated in order to give a meaningful relationship from the regression. In order to test the stationary on variables, there is formal test called Dickey –Fuller test (DF) unit root test.

Table 4.1: Dickey – Fuller Test for unit root test of variables at first difference

Variables	Test statics	Lag length	1%critical value	5%critical value	P- value
dLn AGDP	-4.627	0	-3.736	-2.994	0.0001
dLn FDI	-3.388	2	-3.750	-3.000	0.0114
dLn RN	-3.877	2	-3.750	-3.000	0.0022
dLn GOVA	-6.497	0	-3.736	-2.994	0.0000
dln ODA	-5.244	0	-3.736	-2.994	0.0000

Source: Stata result the data

All variables are not stationary at level, that's why we use first difference of the variables and ADF adjusted for lag length by Akaike information criteria, therefore the variables in first difference suggest the presence of stationary. And the absolute values of the ADF test statistics for all variables in the first difference are greater than its critical value at 5% level of significant, this indicate that the variables are stationary at first difference , so the null hypothesis that suggests each variables has unit root can be rejected by the ADF unit root test .

Gujarati 2004, noted “..... a data series is said to be stationary if its error term has zero mean , constant variance, and the covariance between any two- time periods depends only on the distance or lag between the two periods and not on the actual time at which it is computed.”

4.3 Co-Integration Test Result

Co-integration test is usually preceded by attest of optimal (appropriate) lag length selection as the result of the test is affected by the number of lags included in VAR model. There are many tests that can be used to choose appropriate lag length. These are the Akaike information criteria (AIC), the Schwarz information criteria (SIC) , The Hannan –Quinn information criteria (HIC) . The optimal lag length for this study is determined by using the Akaike Information Criteria (AIC) .according to the Akaike information criteria, the VAR estimate with the lowest AIC in absolute value is the most efficient one. In addition, the optimal lag length that is obtained from the AIC is also confirmed by the VAR estimates considering successive lag.

Table 4.2: The lag length selection,

Selection-order criteria
 Sample: 1990 - 2013

Number of obs = 24

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-9.78464				2.4e-06	1.23205	1.29717*	1.47748*
1	7.25666	34.083	25	0.106	4.8e-06	1.89528	2.28595	3.36785
2	40.1631	65.813	25	0.000	3.4e-06	1.23641	1.95264	3.93612
3	73.7614	67.197*	25	0.000	4.6e-06	.51988*	1.56167	4.44673
4	.	.	25	.	-1.4e-37*	.	.	.

Source: Stata result of data

As we see in the above result of lag selection that AIC choose lag lengths at lag three.

Table 4.3: Johansen co-integration test

Johansen tests for cointegration					
Trend: constant			Number of obs = 25		
Sample: 1989 - 2013			Lags = 3		
<hr/>					
					5%
maximum				trace	critical
rank	parms	LL	eigenvalue	statistic	value
0	55	26.076084	.	78.4447	68.52
1	64	43.208079	0.74604	44.1807*	47.21
2	71	52.794775	0.53557	25.0073	29.68
3	76	60.364595	0.45425	9.8677	15.41
4	79	63.824903	0.24181	2.9471	3.76
5	80	65.298431	0.11120		

Source: from stata result of data

As we see in the above stata result the johansen co-integration test shows that one co-integrating vectors at the 5% critical value, and based on the above result we can conclude that there exists meaningful long run relationship between variables under consideration.

4.4. Granger Causality Test

Table 4.4: Granger causality result

Granger causality Wald tests

Equation	Excluded	chi2	df	Prob > chi2
LNAGDP	LNFDI	25.693	3	0.000
LNAGDP	LNRN	2.0292	3	0.566
LNAGDP	LNGOVA	35.435	3	0.000
LNAGDP	LNODA	39.178	3	0.000
LNAGDP	ALL	115.6	12	0.000
LNFDI	LNAGDP	1.4067	3	0.704
LNFDI	LNRN	10.106	3	0.018
LNFDI	LNGOVA	8.279	3	0.041
LNFDI	LNODA	10.625	3	0.014
LNFDI	ALL	27.282	12	0.007
LNRN	LNAGDP	5.0462	3	0.168
LNRN	LNFDI	.57166	3	0.903
LNRN	LNGOVA	.91873	3	0.821
LNRN	LNODA	1.3319	3	0.722
LNRN	ALL	8.2874	12	0.762
LNGOVA	LNAGDP	4.8907	3	0.180
LNGOVA	LNFDI	11.291	3	0.010
LNGOVA	LNRN	2.4942	3	0.476
LNGOVA	LNODA	6.9376	3	0.074
LNGOVA	ALL	25.698	12	0.012
LNODA	LNAGDP	2.718	3	0.437
LNODA	LNFDI	6.9631	3	0.073
LNODA	LNRN	3.3854	3	0.336
LNODA	LNGOVA	29.743	3	0.000
LNODA	ALL	55.556	12	0.000

Source: stata result of data

As the table above shows we reject the null hypothesis that AGDP is not granger cause for ODA and we fail to reject the null hypothesis that ODA does not granger cause for AGDP .therefore the direction of causation is running from AGDP to ODA. This is consistent with the findings of the study.

The growth of the economy indirectly the increase in the agriculture sector will be the causes for ODA, because of many donate country’s need to the effectiveness of their assistance for the country. And it is reasonable result that we get that the growth of the sector will be the cause for the assistance .and also ODA is a cause for agricultural growth as we see the granger causality test in the above table so we can conclude that they have a bidirectional relationship between the two variables.

4.5. Diagnostic Tests

Autocorrelation test

Diagnostics test are usually undertaken to detect model misspecification and as guided for model improvement. Tests include serial correlation, normality, stability are taken on this study. The serial correlation test can be done using the Lagrange multiplier (LM) test. It helps to identify the relationship that may exist between the current value of the regression residuals and lagged values. As it stated below on the stata finding of our data there is no autocorrelation between.

Table 4.5: Diagnostic test for autocorrelation

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	22.6864	25	0.59587
2	18.7285	25	0.80995
3	32.0901	25	0.15542

H0: no autocorrelation at lag order

Source: from stata result of data

According to the result since the most of P-values are greater than 10% critical value, we failed to reject the null-hypothesis. And the model is free from autocorrelation problem.

Normality test

The Jarque –bera normality test is used to see whether the regression errors are normally distributed or not and the result below shows that the data distributed are normal because it is above 10%.

Table 4.6: Jarque- Bera test of normality,

Jarque-Bera test

Equation	chi2	df	Prob > chi2
D_LNAGDP	0.062	2	0.96938
D_LNFDI	0.341	2	0.84323
D_LNRN	1.266	2	0.53088
D_LNGOVA	2.310	2	0.31512
D_LNODA	1.103	2	0.57622
ALL	5.082	10	0.88565

Source: from stata result of data

Stability test

The stability of the model shows the validity of the estimated model; there for it should be tested before preceding it further. It shows that all characteristic roots of the polynomial lie inside the unit circle. as well as the stability of the parameters in the long run is tested by the plot of the recursive graphics that bounds with in the 95% critical values as shown below and our model satisfies the stability condition .

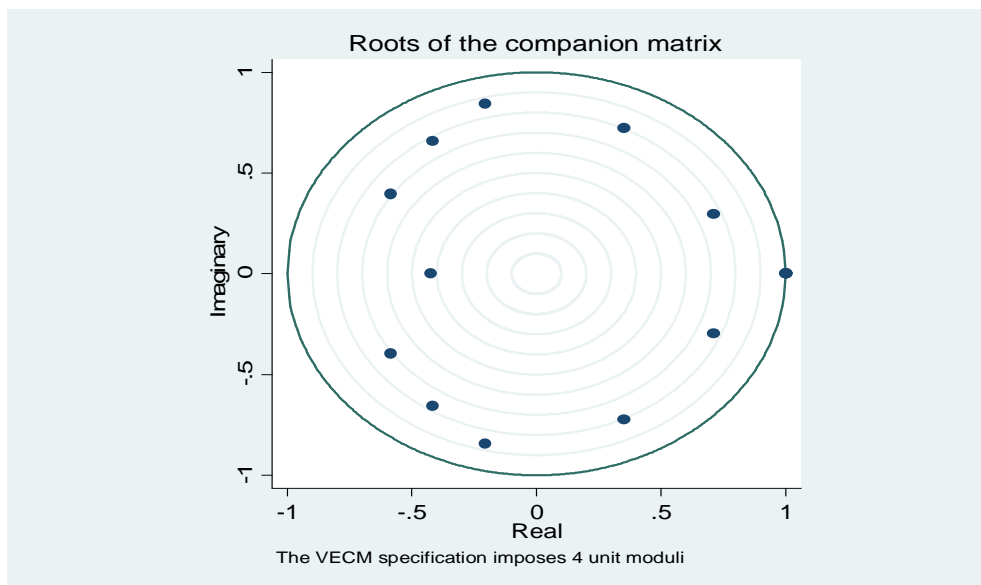


Figure 4.3: Stability result of variables,

Source: from stata result

4.6. The Short Run and Long Run Dynamic Modeling (Vector Error Correction Model)

Having obtained the long run model estimated coefficients the next step is to estimate Vector Error Correction Model (VECM). The VEC has co-integration relations built into the specification so that it restricts the long run behavior of the endogenous variables to converge to their co-integrating relationships while allowing for short run adjustment dynamics (Harris, 1995) . The co-integration term is known as the error correction term since the deviation from long run equilibrium is corrected gradually through a series of partial short run adjustments.

Table 4.7: VECM result for long run relation of variables

Variable	Coff.	Std.error	Z	P>|z|
LnAGDP	-0.3349201	-0.762832	-4.39	0.000
cel				
L1				

Source: Result of stata

Equation ce1 (error correction coefficient) , for the table above , shows the speed of adjustment towards long run equilibrium which is negative and significant because p- value is 0.000; meaning ODA (official development assistance) , FDI (foreign direct investment) , RN (rainfall) , GOVA (government expenditure on agriculture) have long run influence on agricultural GDP.

Table 4.8: Estimates of β coefficients to LnAGDP

Vavriables	B	Std error	P-Value
LnAGDP	1		
LnFDI	-0.03	0.122	0.021
LnRN	0.59	0.301	0.051
LnGOVA	-0.06	0.756	0.458
LnODA	-0.45	0.976	0.000
Constant	-11.30		

Source: Johansen normalization finding of stata

The normalized co- integration equation can be written as :-

$$\text{LnAGDP} = 11.30 + 0.03\text{LnFDI} - 0.59\text{LnRN} + 0.45\text{LnODA} \dots \dots \dots (7)$$

Foreign direct investment and official development assistance has a positive and significant impact on the agricultural growth in the long run the main mechanism for this positive long run impact can be either through financing in investment or by increasing worker productivity , using new technology or knowledge. Rainfall has a negative and significant impact for the agricultural growth which indicates that fluctuation (irregularity) of rainfall has deleterious influence on agricultural growth. Government expenditure for agriculture has a positive and insignificant impact for agricultural growth in the long run, since the government supported by supported

policy and other mechanisms government expenditure impact will be insignificant in the long run.

Table 4.9: VECM result for short run relation of variables

Variables	Coff.	Std.error	Z	P> |z|
Ln ODA	-0.054245	0.0517119	-1.05	0.000
Ln FDI	-0.291048	0.0069099	-4.21	0.000
Ln RN	0.1414842	0.053579	2.64	0.008
Ln GOVA	0.0404785	0.0295362	-1.37	0.000

Source: Stata result of data

And official development assistance (ODA) has a negative and significant short run impact on agricultural GDP, result shown on post estimation, which means that the allocation of ODA to agriculture has a negative impact in the short run, there will be a displacement , allocating more ODA to other sectors or it may be a Dutch disease effect which will be ODA cause overvalued wage or employment in labor intensive sector , and the more ODA specially to the country like Ethiopia affected by climate variability and it results low productivity in agriculture which result food insecurity and there is high flow of ODA in the name of food insecurity and humanitarian assistance and this might make the country dependent on foreign aid rather than use the maximum and efficient utilization what they have and this may cause a negative and significant impact of ODA to agricultural GDP. The high flow of ODA did not stop only on the negative impact in the agriculture sector it will proceed to the other sector even to the aggregate economic growth since the major economic GDP is hold by this sector and this result lower accountability of government and favors' corruption (Mohammed Sami, 2017).

And as the post estimation test suggests FDI, has significant and negative short run impact on agricultural GDP, this might be the increase in foreign direct investment leads to mass

displacement of productive farmers from land of cultivation and as the foreign industry established around fertile land of agriculture the labor will abandon the agriculture and move to the other sector that decrease agricultural output. And there may be a crowding out effect in the short run and this may decrease the productivity of the sector, that is because the FDI mainly attracted to the manufacturing and industrial sector and this may have an effect on the short run result of growth in agriculture.

However Rain fall has a positive and significant short run impact on agricultural GDP this because Ethiopian agriculture is mainly dependent of rain fall. Also the post estimation indicated that GOVA (government expenditure on agriculture) has a positive and significant short run impact on agriculture. Because it helps to solve the financial problem of the sectors in order to modernize the system of productivity and the government will allocate expenditure on it including facilitation of credits for farmers.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This research paper investigates that the impact of Official Development Assistance on Agricultural Growth of Ethiopia, using a co-integrated vector error correction model (VECM). In doing so the time series data from 1985-2013 used at annual base. All variables are transformed into natural logarithm and main variables are AGDP (agricultural gross domestic product), ODA (official development assistance), GOVA (government expenditure on agriculture), FDI (foreign direct investment), and RN (annual rainfall). Before using the time series data, checking whether the data are stationary or not is necessary. An ADF unit root test is implemented to check the stationarity in this paper. The result of the ADF test shows that all of the variables are stationary at first difference. Co-integration analysis is used to see that whether there is a long run relationship between variables in the model. According to Johansen maximum likelihood co-integration vectors in the model that confirms the presence of a long run relationship between variables. The diagnostic tests are taken and have a result of no autocorrelation, stability of variables, and there is a normal distribution of variables.

Then, the Vector error correction model (VECM), implemented in this paper to show both the long run and short run relation among variables, the error correction coefficient is -0.3349205 and a P-value of 0.000 implies that the speed of adjustment to return to equilibrium after a shock happens to hold its long run equilibrium. The significance of this coefficient shows that all explanatory variables have an impact respectively for the growth of agriculture in the long run, which is foreign direct investment and official development assistance has a positive and significant impact in the long run, rainfall has a negative and significant impact, and government expenditure on agriculture has a positive and insignificant impact for the growth of agriculture.

In the short run FDI (foreign direct investment) and ODA (official development assistance) have a negative and significant impact, and GOVA (government expenditure on agriculture) and RN (rainfall) have a positive and significant impact for the agricultural growth of Ethiopia.

5.2. Recommendation

- Agriculture, being a critical engine for the growth of an economy, and it should be the primary target of investment, since the majority of the population involved in this sector, and it proven relation the other sector and also the aggregate economy directly, the Ethiopian government should give a big emphasis for this sector.
- The Government has to manage and improve spending police of external official development assistance in order to have its positive and significant impact in the long run. Because as indicated in other studies, low controlling of the official development assistance may lead to inefficient use of aid in both agriculture and other sectors.
- The effective use of allocated ODA is very necessary as the study found its positive significant impact in the long run, using a better policies having responsible body for all flow of ODA.

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APPENDIX

Appendix one: ADF Unit Root test result of stata software

1. Result for LNAGDP (Agricultural GDP)

. varsoc dLNAGDP

Selection-order criteria

Sample: 1990 - 2013

Number of obs = 24

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	31.3149				.004682*	-2.52624*	-2.51322*	-2.47715*
1	31.4121	.19449	1	0.659	.005049	-2.45101	-2.42496	-2.35284
2	32.2182	1.6122	1	0.204	.005136	-2.43485	-2.39578	-2.28759
3	32.3108	.18525	1	0.667	.00555	-2.35924	-2.30715	-2.16289
4	32.4015	.18128	1	0.670	.006005	-2.28346	-2.21834	-2.03803

Endogenous: dLNAGDP

Exogenous: _cons

. dfuller dLNAGDP, lags(0)

Dickey-Fuller test for unit root

Number of obs = 27

Test Statistic	Interpolated Dickey-Fuller		
	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-4.627	-3.736	-2.994

MacKinnon approximate p-value for Z(t) = 0.0001

4. Result For Ln RN (Rainfall)

. varsoc dLNRN

Selection-order criteria

Sample: 1990 - 2013

Number of obs = 24

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-.97026				.069001	.164188	.177211	.213274
1	5.52806	12.997	1	0.000	.043652	-.294005	-.267961	-.195834
2	9.9395	8.8229*	1	0.003	.032881*	-.578291*	-.539224*	-.431035*
3	10.0605	.24191	1	0.623	.035445	-.505038	-.452948	-.308695
4	10.8939	1.6669	1	0.197	.03605	-.491157	-.426045	-.245729

Endogenous: dLNRN

Exogenous: _cons

. dfuller dLNRN, lags(2)

Augmented Dickey-Fuller test for unit root

Number of obs = 25

Test Statistic	Interpolated Dickey-Fuller			
	1% Critical Value	5% Critical Value	10% Critical Value	
Z(t)	-3.877	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.0022

Appendix Two: Estimations

1. Lag order selection criteria

```
. varsoc dLNAGDP dLNFDI dLNRN dLNGOVA dLNODA
```

Selection-order criteria

Sample: 1990 - 2013

Number of obs = 24

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-9.78464				2.4e-06	1.23205	1.29717*	1.47748*
1	7.25666	34.083	25	0.106	4.8e-06	1.89528	2.28595	3.36785
2	40.1631	65.813	25	0.000	3.4e-06	1.23641	1.95264	3.93612
3	73.7614	67.197*	25	0.000	4.6e-06	.51988*	1.56167	4.44673
4	.	.	25	.	-1.4e-37*	.	.	.

Endogenous: dLNAGDP dLNFDI dLNRN dLNGOVA dLNODA

Exogenous: _cons

2. Johansen Co – Integration result

```
. vecrank dLNAGDP dLNFDI dLNRN dLNGOVA dLNODA,lags(3)
```

Johansen tests for cointegration

Trend: constant

Number of obs = 25

Sample: 1989 - 2013

Lags = 3

maximum				trace	5%
rank	parms	LL	eigenvalue	statistic	critical
0	55	26.076084	.	78.4447	68.52
1	64	43.208079	0.74604	44.1807*	47.21
2	71	52.794775	0.53557	25.0073	29.68
3	76	60.364595	0.45425	9.8677	15.41
4	79	63.824903	0.24181	2.9471	3.76
5	80	65.298431	0.11120		

3. Granger causality test

. vargranger

Granger causality Wald tests

Equation	Excluded	chi2	df	Prob > chi2
LNAGDP	LNFDI	22.046	1	0.000
LNAGDP	LNRN	.24928	1	0.618
LNAGDP	LNGOVA	17.041	1	0.000
LNAGDP	LNODA	32.901	1	0.000
LNAGDP	ALL	103.51	4	0.000
LNFDI	LNAGDP	.97757	1	0.323
LNFDI	LNRN	1.7916	1	0.181
LNFDI	LNGOVA	3.7648	1	0.052
LNFDI	LNODA	2.0443	1	0.153
LNFDI	ALL	6.9251	4	0.140
LNRN	LNAGDP	.07375	1	0.786
LNRN	LNFDI	.04827	1	0.826
LNRN	LNGOVA	.00051	1	0.982
LNRN	LNODA	.0001	1	0.992
LNRN	ALL	.43016	4	0.980
LNGOVA	LNAGDP	2.5554	1	0.110
LNGOVA	LNFDI	23.158	1	0.000
LNGOVA	LNRN	.05239	1	0.819
LNGOVA	LNODA	6.3356	1	0.012
LNGOVA	ALL	31.099	4	0.000
LNODA	LNAGDP	1.5872	1	0.208
LNODA	LNFDI	1.6892	1	0.194
LNODA	LNRN	.17521	1	0.676
LNODA	LNGOVA	16.31	1	0.000
LNODA	ALL	29.335	4	0.000

Appendix Three: Diagnostic tests

1. Test for autocorrelation

```
. veclmar, mlag(3)
```

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	22.6864	25	0.59587
2	18.7285	25	0.80995
3	32.0901	25	0.15542

H0: no autocorrelation at lag order

2. Stability test

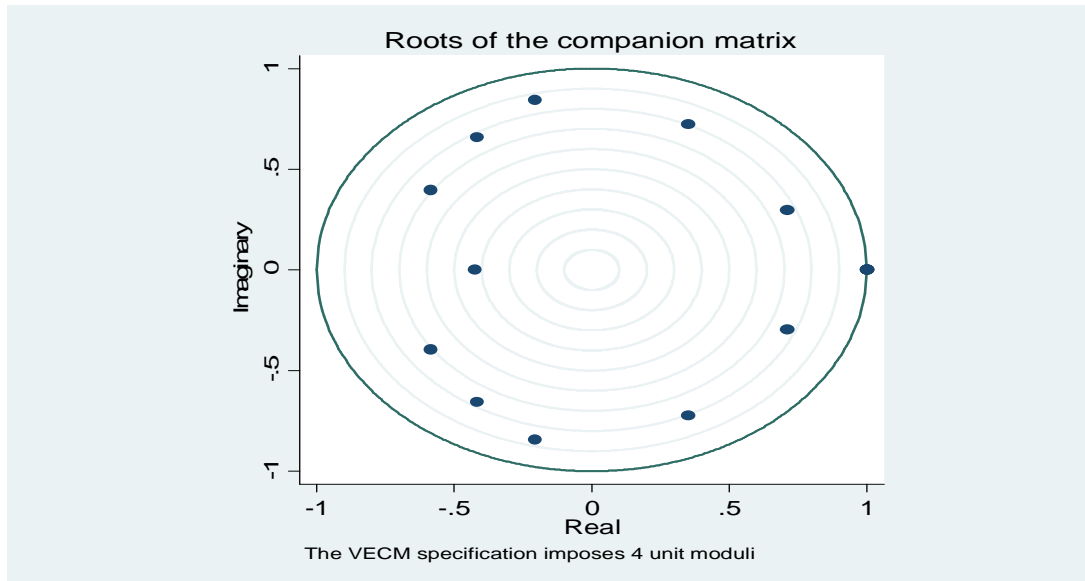
```
. vecstable, graph
```

Eigenvalue stability condition

Eigenvalue	Modulus
1	1
1	1
1	1
1	1
-.206091 + .8436933i	.8685
-.206091 - .8436933i	.8685
.3513568 + .7236911i	.804475
.3513568 - .7236911i	.804475
-.4160347 + .6571748i	.777794
-.4160347 - .6571748i	.777794
.7094178 + .2957073i	.768581
.7094178 - .2957073i	.768581
-.5859491 + .395721i	.707058
-.5859491 - .395721i	.707058
-.4244652	.424465

The VECM specification imposes 4 unit moduli.

- **Graph for stability**



3. Jarque – Bera Normality test

. vecnorm, jbera

Jarque-Bera test

Equation	chi2	df	Prob > chi2
D_LNAGDP	0.062	2	0.96938
D_LNFDI	0.341	2	0.84323
D_LNRN	1.266	2	0.53088
D_LNGOVA	2.310	2	0.31512
D_LNODA	1.103	2	0.57622
ALL	5.082	10	0.88565

Appendix four: Vector Error Correction Estimation (VECM)

. vec LNAGDP LNFDI LNRN LNGOVA LNODA, trend(constant) lags(3)

Vector error-correction model

Sample: 1988 - 2013	No. of obs	=	26
	AIC	=	.5488055
Log likelihood = 56.86553	HQIC	=	1.440587
Det(Sigma_ml) = 8.67e-09	SBIC	=	3.645659

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_LNAGDP	12	.039454	0.8593	85.50482	0.0000
D_LNFDI	12	1.07394	0.6930	31.59797	0.0016
D_LNRN	12	.198518	0.6382	24.69532	0.0163
D_LNGOVA	12	.340384	0.5535	17.3572	0.1366
D_LNODA	12	.191069	0.5308	15.83641	0.1988

	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
D_LNAGDP						
_cel						
L1.	-.3349205	.0762832	-4.39	0.000	-.4844328	-.1854082
LNAGDP						
LD.	.298333	.1338076	2.23	0.026	.036075	.5605911
L2D.	-.4039505	.1274655	-3.17	0.002	-.6537783	-.1541227
LNFDI						
LD.	-.0291048	.0069099	-4.21	0.000	-.0426479	-.0155617
L2D.	-.005173	.006161	-0.84	0.401	-.0172483	.0069023
LNRN						
LD.	.1414842	.053579	2.64	0.008	.0364714	.2464971
L2D.	.0925411	.0452941	2.04	0.041	.0037662	.181316
LNGOVA						
LD.	-.0404785	.0295362	-1.37	0.171	-.0983683	.0174113
L2D.	.0902676	.0287059	3.14	0.002	.0340051	.1465301
LNODA						
LD.	-.0542425	.0517119	-1.05	0.294	-.155596	.047111
L2D.	-.1907611	.0521975	-3.65	0.000	-.2930663	-.0884558
_cons	.1221313	.0193042	6.33	0.000	.0842958	.1599669

D_LNFDI						
_cel						
L1.	1.217391	2.076454	0.59	0.558	-2.852385	5.287166
LNAGDP						
LD.	-1.21229	3.642288	-0.33	0.739	-8.351044	5.926464
L2D.	.4692491	3.469654	0.14	0.892	-6.331148	7.269646
LNFDI						
LD.	-.3168403	.1880892	-1.68	0.092	-.6854884	.0518078
L2D.	-.6081141	.1677037	-3.63	0.000	-.9368072	-.279421
LNRN						
LD.	-1.368982	1.458438	-0.94	0.348	-4.227467	1.489503
L2D.	-1.418935	1.232922	-1.15	0.250	-3.835417	.9975471
LNGOVA						
LD.	.7884239	.8039841	0.98	0.327	-.787356	2.364204
L2D.	-.4183156	.7813839	-0.54	0.592	-1.9498	1.113169
LNODA						
LD.	-2.215357	1.407616	-1.57	0.116	-4.974233	.5435188
L2D.	-.3271359	1.420834	-0.23	0.818	-3.111919	2.457648
_cons	.6381912	.5254668	1.21	0.225	-.3917049	1.668087
D_LNRN						
_cel						
L1.	-.1571234	.3838313	-0.41	0.682	-.9094188	.5951721
LNAGDP						
LD.	.0787825	.6732747	0.12	0.907	-1.240812	1.398377
L2D.	-.8161398	.6413634	-1.27	0.203	-2.073189	.4409093
LNFDI						
LD.	.0000764	.0347682	0.00	0.998	-.068068	.0682207
L2D.	.0084916	.0309999	0.27	0.784	-.0522671	.0692503
LNRN						
LD.	-.8969418	.2695912	-3.33	0.001	-1.425331	-.3685527
L2D.	-.465166	.2279048	-2.04	0.041	-.9118511	-.0184808
LNGOVA						
LD.	.0621342	.148616	0.42	0.676	-.2291477	.3534162
L2D.	.0049539	.1444383	0.03	0.973	-.27814	.2880478
LNODA						
LD.	.0092248	.2601969	0.04	0.972	-.5007517	.5192013
L2D.	-.1023878	.2626403	-0.39	0.697	-.6171533	.4123777
_cons	.0404659	.0971322	0.42	0.677	-.1499097	.2308415

D_LNGOVA						
_cel						
L1.	-1.250242	.6581278	-1.90	0.057	-2.540148	.0396651
LNAGDP						
LD.	.4757817	1.154416	0.41	0.680	-1.786831	2.738395
L2D.	-1.056472	1.0997	-0.96	0.337	-3.211844	1.0989
LNFDI						
LD.	-.0997965	.0596145	-1.67	0.094	-.2166388	.0170457
L2D.	-.0335071	.0531533	-0.63	0.528	-.1376857	.0706714
LNRN						
LD.	.718621	.4622487	1.55	0.120	-.1873698	1.624612
L2D.	.191129	.3907719	0.49	0.625	-.5747699	.9570278
LNGOVA						
LD.	-.4012302	.2548211	-1.57	0.115	-.9006703	.0982099
L2D.	-.1543505	.247658	-0.62	0.533	-.6397512	.3310502
LNODA						
LD.	-.0069916	.4461408	-0.02	0.987	-.8814115	.8674283
L2D.	-.7568447	.4503303	-1.68	0.093	-1.639476	.1257865
_cons	.5168052	.1665456	3.10	0.002	.1903818	.8432286
D_LNODA						
_cel						
L1.	.72927	.3694296	1.97	0.048	.0052013	1.453339
LNAGDP						
LD.	.7083849	.6480129	1.09	0.274	-.5616969	1.978467
L2D.	-.4237328	.6172989	-0.69	0.492	-1.633616	.7861508
LNFDI						
LD.	.0094851	.0334636	0.28	0.777	-.0561025	.0750726
L2D.	-.0160251	.0298368	-0.54	0.591	-.0745041	.0424539
LNRN						
LD.	-.2003361	.259476	-0.77	0.440	-.7088996	.3082274
L2D.	-.0663758	.2193536	-0.30	0.762	-.496301	.3635494
LNGOVA						
LD.	-.1211771	.1430398	-0.85	0.397	-.4015299	.1591757
L2D.	.2475979	.1390189	1.78	0.075	-.0248741	.5200699
LNODA						
LD.	.317541	.2504341	1.27	0.205	-.1733007	.8083828
L2D.	.5408725	.2527858	2.14	0.032	.0454214	1.036324
_cons	-.1145449	.0934877	-1.23	0.220	-.2977774	.0686877

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	4	442.0759	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
_ce1						
LNAGDP	1	.	.	.	.	.
LNFDI	-.0282875	.0122752	-2.30	0.021	-.0523465	-.0042285
LNRN	.5883352	.3017391	1.95	0.051	-.0030625	1.179733
LNGOVA	-.0562131	.0756738	-0.74	0.458	-.204531	.0921048
LNODA	-.4503254	.0976007	-4.61	0.000	-.6416192	-.2590316
_cons	-11.30493	.	.	.	.	.

Appendix five: -The Row Data from 1985-2013 G.C for variables used in the model

year	ODA	GOVEA	RN(MIL .L)	FDI	AGDP
1985	718,410,000	284,200,000	1,467	414,000	58,665,485
1986	631,110,000	402,000,000	988	1,242,000	68,025,790
1987	623,280,000	335,100,000	999	5,382,000	80,635,820
1988	965,440,000	326,300,000	964	3,519,000	78,451,308
1989	727,790,000	331,500,000	964	1,035,000	79,269,533
1990	1,009,250,000	339,000,000	1,134	24,840,000	83,447,171
1991	1,091,870,000	249,700,000	1,048	12,420,000	87,726,171
1992	1,162,510,000	245,200,000	1,110	414,000	85,376,225
1993	1,080,730,000	343,500,000	1,093	9,816,800	90,470,129
1994	1,063,090,000	373,300,000	1,135	99,319,680	87,223,536
1995	876,490,000	292,300,000	1,066	88,132,050	90,183,933
1996	816,010,000	357,700,000	865	138,359,820	103,147,945
1997	578,350,000	356,500,000	924	1,875,451,950	105,798,834
1998	660,170,000	293,000,000	1,058	1,794,059,190	95,292,139
1999	643,110,000	702,100,000	1,052	525,777,000	98,650,734
2000	687,220,000	547,000,000	991	1,095,993,960	101,792,828
2001	1,103,130,000	579,800,000	975	2,909,768,260	111,846,691
2002	1,324,380,000	1,063,000,000	1,208	2,178,337,500	109,749,946
2003	1,626,430,000	649,700,000	821	3,990,118,500	98,174,548
2004	1,828,370,000	1,358,700,000	1,017	1,297,800,000	114,909,407
2005	1,927,830,000	2,832,100,000	1,537	3,169,400,000	130,646,691
2006	2,033,560,000	3,359,600,000	883	5,583,600,000	145,061,723

2007	2,558,420,000	2,334,400,000	1,577	7,530,200,000	158,668,054
2008	3,328,700,000	3,880,000,000	941	9,311,800,000	170,489,656
2009	3,818,830,000	4,788,000,000	902	12,328,900,000	181,175,028
2010	3,452,500,000	4,809,500,000	1,103	20,026,400,000	194,969,478
2011	3,492,890,000	5,412,600,000	891	18,497,600,000	212,469,712
2012	3,220,630,000	7,651,500,000	941	22,409,000,000	222,927,378
2013	3,884,860,000	11,375,300,000	913	27,982,100,000	238,752,105

Where:-

ODA , Official Development Assistance

GOVA, Government expenditure on agriculture

RN, Annual Rain Fall

FDI, Foreign Direct Investment

AGDP, Agricultural Growth Domestic Product