TRANSMISSION CHANNELS OF FINANCIAL CRISES TO ETHIOPIAN ECONOMY

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Transmission Channels of Financial Crises to Ethiopian Economy

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APPROVAL SHEET

As members of board of examining of the final MA thesis open defense, we certify that we have read and evaluated the thesis prepared by Amdemicael Bereket Adma under the title "***Transmission Channels of Financial Crises to Ethiopian Economy***" we recommend that the this be accepted as fulfilling the thesis requirement for the Degree of Master of art in Development Economics.

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I the undersigned, declare that this thesis is my original work, prepared under the guidance of SisayDebebe (PHD). All sources of materials used for the thesis have been duly 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 St. Mary's University, school of Graduate Studies for examination with my approval as a university advisor.

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Advisor Signature

St. Mary's University, Addis Ababa January, 2018

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ACRONYMS

ADB	African Development Bank
ADF	Augmented Dickey-Fuller
AFRODAD	Africa Forum and Network on Debt and Development
AIC	Akaike Information Criteria
BVAR	Bayesian Vector-Autoregressive
EFY	Ethiopian Fiscal Year
ERM	European Exchange rate Mechanism
HIC	Hannan –Quinn information criteria
IMF	International Monetary Fund
LDC	Less Developing Countries
LICs	Less Income Countries
LMICs	Less and Medium Income Countries
MDGs	Millennium Development Goals
MoFED	Ministry of Finance and Economic Development
NBE	National Bank of Ethiopia
ODA	Official Development Assistance
RBI	Reserve Bank of India
SIC	Schawarz information criteria
SSA	Sub Saharan Africa
TFP	Total Factor Productivity
UPA	United Progressive Alliance
VAR	Vector Auto Regression

ABSTRACT

Financial crises mean a sudden change in the financial stability in the country, a situation where some of the huge financial institutions suddenly lose a large part of their assets. The European financial crises have reached its global dimensions that are going beyond the geographical borders of Europe. It does not matter whether it is about the economy of the developed or developing countries. This study aims to analyze transmission channels of financial crisis to Ethiopia economy, with time series data of 1975 to 2015 using structural break test, Bayesian Vector-Autoregressive model applied in order to know the short run and long run effect of financial crises on Ethiopian economy. All necessary time series tests such as stationary test, co-integration test, causality test and other necessary test are done. And the result of the study reveals that only net transfer affected by the crises and external aid and external debt does not affect by the crisis but overall the economy does not affect by transmission channels of financial crises. In the long run net transfer and aid effect is high. On the other hand, external debt have a negative effect on the economy. Therefore, Ethiopia as a country should learn from the past event even if aid and debt not decline at the time of the crises. And also there should be efficient use of debt.

***Key words**: financial crises, Ethiopian economy, aid, debt, net transfer and Ethiopia.*

1.INTRODUCTION

1.1 Background of the study

The term financial crises refer to the loss of confidence in a country's currency or other financial assets causing international investors to withdraw their funds from the country. According to Nkoro and Uko (2012) Financial crises means a sudden change in the financial stability in the country, a situation where some of the huge financial institutions suddenly lose a large part of their assets. It could be a situation of slow down or decline in economic activities. Also, it is a lull in an economy, characterized by recession or depression. It could be local when it affected only a handful of countries in a region/geographical area or global when it is more pervasive and affects many countries.

The European financial crises have reached its global dimensions that are going beyond the geographical borders of Europe. It does not matter whether it is about the economy of the developed or developing countries; this crises spreads anxiety about the fate and the world's economy future. The European financial crises is more complex. It touches not only the problem of a budget deficit or increase of indebtedness, but it also delves deeply. The lack of financial balance is only a result of the crises and not necessarily its etiology (Verdier-Chouchane et al. 2011 as cited in Tarek, 2013).

In 2009 some 59 million people lose their jobs, whilst 200 million was added to the ranks of the 1.3 billion of those working but living on less than $2 per day. Some 53 million could be driven into absolute poverty, on top of the 135-150 million that were already pushed there in 2007-08 due to the rise in food and fuel prices. Given the unprecedented scale of the crises (Conny,2009).

This is particularly dangerous for low income countries since private capital flows to emerging economies are expected to drop by $US165 billion as banks restrain lending (World Bank) Remittances, which easily outstrip ODA are also drying up, with migrant workers losing jobs or not being able to afford to send as much money home. Early evidence suggests those most hard hit are European Neighborhood Countries and Latin American countries. Naudé and World Institute for Development Economics Research (2009) enumerates six key channels through

which the financial crises may transmit to developing economies; through the contraction of Foreign Direct Investment (FDI), decline in the performance of the banking sector, fall in stock prices, decline in trade, drop in remittances and decline in aid (as cited in Michael, 2011).

In Ethiopia considering decreases in remittances and FDI flows, the reduction in export income, and declining levels of donor aid following the global economic slowdown, foreign currency reserves can be expected to remain low. Reports state that there has been a recent recovery in foreign currency reserves (NBE, 2008/09 and 2009/10) but growth in the local economy is causing continuing pressure on foreign reserves because of high demand for imported goods.

It is undoubtedly true that Ethiopia is one of the least integrated countries in the global financial market. The Ethiopian financial sector has no direct link with international financial markets. For this reason, many people believed that Ethiopia would not be directly affected by the current financial turmoil. However, the country has indeed been affected as the financial crises has translated into a global economic slowdown (Amdissa, 2008).

So financial crises effect is not bounded only in specific continent rather it dispersed the whole world including developed and developing country and Ethiopia also one of the developing country it may affected by the crises through different macroeconomic variable.

1.2. Statement of problem

When the crises began, it was assumed that the impact on Africa would be minimal because the region is not well integrated into global financial markets. However, recent developments have shown that this assessment was overly optimistic: the crises has had a very serious impact on the region. It led to a decline in the region's real growth rate by between 4 and 4.5 percentage points. It has also reduced prospects for achieving the United Nations Millennium Development Goals (MDGs) in several countries in the region. As a result of the crises, the number of African countries with growth rates of 5 per cent and above fell from 29 in 2007 to 7 in 2009. Furthermore, the number of countries with negative growth rates increased from 2 to 8 over the same period (Patrick, 2010)

The reason is a risk of negative economic impact from a protracted slowdown in the European Union (EU) and other high-income economies, mainly through reduced remittances and slowing demand for exports. A slowdown of remittances (standing at around 9 percent of GDP) could

reduce disposable income and ultimately decrease domestic consumption. Although Ethiopian exports are only around 15 percent of GDP, they may be vulnerable due to the highconcentration of commodity and primary goods and to the 50-plus percentage share of OECD as export destination (World Bank,2012)

The Ethiopian economy is fairly open, import intensive and aid dependent. Naturally, this makes it vulnerable to the crises. The economy has already started to feel the negative impacts in the form of reduced export prices, quantities and hence values, reduced remittances and declining FDI inflows. Together, these factors and others have exposed the economy to foreign exchange constraints, with a significant impact on import volumes (Getnet,2010).

According to Genet (2010) the reason is that the Ethiopian economy is integrated in the global market through various trade relations. Changes in international export and import prices and demand affect the real economy. Similarly, Ethiopia is also linked to the rest of the world in that it has to compete for a finite pool of private transfers, FDI, and even bilateral and multilateral aid. Given the prominent role of these sources of capital to the Ethiopian economy, changes in these sources of foreign financial flows have had significant impact on the Ethiopian economy.

Amdissa (2008) explain that there are three areas in which the financial crises might affect Ethiopia – reduced aid, investment and remittance. Ethiopia relies on the outside world to finance many of its development programmes. The funds come in a form of aid or investment from countries hard hit by the crises. Therefore, the crises is likely to reduce the flow of aid and investment. Finally, there are hundreds of thousands of Ethiopians leaving abroad mainly in Europe and North America who transfer money to their relatives back home. As the financial crises bites, the ability of these people sending remittance will be severely affected. This will have negative effect on the livelihoods of those who depend on remittance (Ibid).

Getnet (2010) see the effect of financial crises on dairy industry by using primary data using descriptive method and found that dairy farming affected by financial crisis negatively. According to Lulit et al. (2011) the overall impact on the Ethiopian economic growth can be seen in terms of the slight slowdown in GDP growth. GDP growth declined from 11.8 % in 2007/08 to 10.0 % in 2008/09 and to 10.4 % in 2009/10. This entails a decline of 15.2 % in annual growth rate for the EFY 2008/09 by taking data only at the period of crises and does not show which economic variable affected by the crises.

In addition, Ethiopia's recent growth has been accompanied by mounting macroeconomic pressures (which are now easing). The country has had to grapple with the twin macroeconomic challenges of high inflation and low international reserves. Pressures on prices and the balance of payment heightened from EFY 2007/2008 as a result of the global food and economic crises. The difficult macroeconomic situation Ethiopia faced during the period EFY 2007/08 to 2008/09 is also attributable to the structural weaknesses in the economy, including supply-side rigidities. The growing domestic supply-demand gap, in the context of the surge in growth, contributed to a rise of inflation and the depletion of foreign exchange between 2007/08 and 2008/09(Peter and Lamin ,2010).

Getnet (2009) seen that the impact of financial crises on FDI, inflation, remittance inflows, Tourism, Official Development Assistance (ODA) inflow and export Import Trade by considering its effect on diary sector. And also Getnet A. (2010) studies focus four transmission channels through which the impact of the crises has spread. These are FDI, remittances, trade and foreign aid. In order to see the level, direction and trend of the crises using descriptive analysis.

Genet A. (2010) used a mix of both secondary and primary data to assess the impact. To see the level, direction and trend by considering before and after comparisons using monthly base data . The fiscal impact of the financial crisis is reflected in both government revenues and expenditures. The possible contraction in tax revenue resulting from the slowdown in GDP growth (since tax revenue is closely related to GDP growth) and the decline in trade may drive down government revenue.

Both Genet (2009), Genet (2010) and Getinet (2009) consider the transmission channels of financial crises on sectoral level and does not show its effect to the economy. To fill this gap the paper see macroeconomic variable which financial crises transmitted to the economy.

To the best of my knowledge there is no paper which show the transmission channels of financial crises to Ethiopian economy using Econometrics model rather explaining which economic variable is affected by the crises using descriptive analysis.

1.3. Objective of the study

1.3.1. General Objective of the study

The main objective of this study is to analyze transmission channels of financial crises to Ethiopian economy.

1.3.2. Specific objective of the study

In order to achieve the broad objective, this paper is specifically designed:

- To identify macro economic variables which financial crises transmitted to Ethiopian economy.
- To analyze the long run and short run effect of financial crises on Ethiopian economy.

1.4. Significance of the Study

There is shortage of studies regarding the transmission channel of financial crises or economic shock aggregately and it does not give significant attention from the researchers to see the effect and what should be taken to minimize the effect. This study is significance to monetary authority, policy maker, government and academia. The findings of this study help government to see the effect of financial crises to the Ethiopian economy and to be proactive if the incidence occur again. This research work further serves as a guide and provides insight for future research on the topic and related field for academia's and policy makers who are willing to improve on it.

1.5. Scope and Limitations of the Study

As far as research is concerned, there would always be certain limitations. This study has also encountered certain challenges time, and budget has played a limiting role on the scope and content of the study.

The study is limited in scope with regard to the issue of examining transmission channels of financial crises to Ethiopian economy by considering macroeconomics variables. The study covers the period between the years 1975 - 2015 G.C in Ethiopia.

1.6. Organization of the thesis

This paper is organized into five chapters. Following the introduction part, chapter two present literature review. Chapter three discusses model specification and methodology employed.

Chapter four presents empirical results and its interpretation and finally chapter five provides summery, conclusion and policy implications based on the findings.

2. LITERATURE REVIEW

2.1. Overview on the situation of Ethiopia

Ethiopia's economy is highly vulnerable to exogenous shocks due to its dependence on primary commodities and rain-fed agriculture. Agricultural productivity remains low even though agricultural production has increased considerably (Mwanakatwe and Barrow, 2010). In recent years, Ethiopia has experienced strong economic growth. This is mainly due to the increasing contribution of the service sector and industrial sector to GDP. Real GDP growth averaged 11.2 percent per annum during the 2003/04 and 2008/09 period, placing Ethiopia among the top performing economies in sub-Sahara Africa (Mwanakatwe and Barrow, 2010).

Ethiopia continued to maintain the double digit growth it has started since the last eight years. In 2010/11, real GDP growth was 11.4 percent moderately higher than the 10 percent growth a year earlier. This robust and broad based economic growth places Ethiopia among the top performing African and other developing Asian countries. During the fiscal year, agriculture grew by 9.0 percent due to improved productivity, good weather conditions and conducive policy environment. The industry sector expanded by 15.0 percent, owing to investment in electricity & water and construction sector. Service sector growth, however, slightly declined to 12.5 percent from 13.0 percent a year ago. (NBE ,2011)

According to Ncube, Lufumpa and Ndikumana (2015) real GDP averaged 11.2 % per annum during the 2012/13 and 2013/14 period, placing Ethiopia among the top performing economies in sub Saharan Africa. This growth performance is well in excess of the population growth rate and the 7 percent rate required for attaining the MDG goal of halving poverty in 2015. However, there are a number of challenges to sustain the current trend of economic growth. The high dependency of economic growth on timely and adequate rainfall and the country's vulnerability to terms of trade and similar external shocks are structural constraints facing the economy. There is a strong correlation between weather condition and economic performance in Ethiopia.

Alemayehu (2010) argued that in explaining growth in Ethiopia it will be necessary to examine the agricultural sector, its linkage with the other sectors and household behavior in rural Ethiopia. The other important factor in explaining growth in Ethiopia is the external environment. The high dependence on imported inputs such as fertilizers, raw materials and the

like which are highly sensitive to the availability of foreign exchange has an important implication for the functioning of the economy. The country is dependent on coffee as the main means of foreign exchange earnings while non-coffee export's contribution to the foreign exchange earnings is quite weak. As a result, the country remains victim of foreign exchange constraint and adverse terms of trade. Moreover, if exogenous shocks are supported by poor policies (institutional, economic and political)-which remained detrimental to Ethiopia's growth-they have the tendency to deteriorate economic growth.

2.2. Theoretical literature review

The term financial crises refer to the loss of confidence in a country's currency or other financial assets causing international investors to withdraw their funds from the country. Financial crises mean a sudden change in the financial stability in the country, a situation where some of the huge financial institutions suddenly lose a large part of their assets. It could be a situation of slow down or decline in economic activities. Also, it is a lull in an economy, characterized by recession or depression. It could be local when it affected only a handful of countries in a region/geographical area or global when it is more pervasive and affects many countries (Daniel and Hansjorg ,2014)

Historically, the global economy has witnessed several financial crises in the past. Some of it were experienced in 1830s, 1930s and recently, 2008. The most severe was the great depression of the 1930s. And the Asian financial crises in the latter part of 1990s, all these recessionary trends had been accompanied by shocks to the economies of one or more markets.

The 1830 depression affected land speculators in US where farmers lost their farms through mortgage, many construction works stopped, banks faced crises, unemployment rose and prices due to wave of speculations rose. The 1930 depression was very vicious where securities sold fifty times their earning power with dividend earning rising from $40 to $50 per share. Before 1930, from 1925-1929 the market value of US securities tripled from $27billion to $87billion as a result of high wave of speculations. But by the end of 1929 the market began to weaken resulting in the 1930 great depression. The recent, 2007-2008 financial crises can be said to be global in nature as it affected almost all the economies of the world. 2007- 2008 crises is the crux of the subject matter.

Kaldor, in 1940 built a model of trade cycle based on the Keynesian terminology of savings and investment. He showed that trade cycle is the result of pressure that push the economy towards the equality of anticipated, expected, or planned (ex-ante) saving and investment. Kaldor shows the stability and instability conditions in the form of linear diagrams, through the cycle is only possible when investment and savings are non-linear. The forces that bring about lower turning point are not so certain at the higher level. A boom left to it is certain to come to an end but depression might get into a position of stationeries and remain there until external changes (the discovery of new markets) come to rescue. Thus the cycle in this model are not necessarily symmetrical, as a matter of fact, they depend on the slopes of investment and savings curves and the rate at which they shift in each phase of the cycle.

2.2.1. Types of Financial Crises

While financial crises can take various shapes and forms, in terms of classification, broadly two types can be distinguished. Reinhart and Rogoff (2009) distinguish two types of crises: those classified using strictly quantitative definitions; and those dependent largely on qualitative and judgmental analysis. The first group mainly includes currency and sudden stop crises and the second group contains debt and banking crises. Regardless, definitions are strongly influenced by the theories trying to explain crises.

While financial crises can take various shapes and forms, the literature has been able to arrive at concrete definitions of many types of crises. For example, a currency crisis involves a speculative attack on the currency resulting in a devaluation (or sharp depreciation), or forcing the authorities to defend the currency by expending large amount of international reserves, or sharply raising interest rates, or imposing capital controls. A sudden stop (or a capital account or balance of payments crises) can be defined as a large (and often unexpected) fall in international capital inflows or a sharp reversal in aggregate capital flows

to a country, likely taking place in conjunction with a sharp rise in its credit spreads. Since these are measurable variables, they lend themselves to the use of quantitative methodologies. Other crises are associated with adverse debt dynamics or banking system turmoil. A foreign debt crisis takes place when a country cannot (or does not want to) service its foreign debt. It can take the form of a sovereign or private (or both) debt crises. A domestic public debt crisis takes place when a country does not honor its domestic fiscal obligations in real terms, either by defaulting

explicitly, or by inflating or otherwise debasing its currency, or by employing some (other) forms of financial repression. In a systemic banking crises, actual or potential bank runs and failures can induce banks to suspend the convertibility of their liabilities or compel the government to intervene to prevent this by extending liquidity and capital assistance on a large scale. Since these are not so easily measurable variables, they lend themselves more to the use of qualitative methodologies.

Currency Crises

Theories on currency crises, often more precisely articulated than for other types of crises, have evolved over time in part as the nature of such crises has changed. In particular, the literature has evolved from a focus on the fundamental causes of currency crises, to emphasizing the scope for multiple equilibrium, and to stressing the role of financial variables, especially changes in balance sheets, in triggering currency crises (and other types of financial turmoil). Three generations of models are typically used to explain currency crises that took place during the past four decades.

Sudden stops

Models with sudden stops make a closer association with disruptions in the supply of external financing. These models resemble the latest generation of currency crises models in that they also focus on balance sheet mismatches – notably currency, but also maturity – in financial and corporate sectors (Calvo et al., 2006). They tend to give greater weight, however, to the role of international factors (as captured, for example, by changes in international interest rates or spreads on risky assets) in causing "sudden stops" in capital flows. These models can account for the current account reversals and the real exchange rate depreciation typically observed during crises in emerging markets. The models explain less well the typical sharp drops in output and total factor productivity (TFP).In order to match data better, more recent sudden stop models introduce various frictions.

While counterintuitive, in most models, a sudden stop cum currency crises generates an increase in output, rather than a drop. This happens through an abrupt increase in net exports resulting from the currency depreciation. This has led to various arguments explaining why sudden stops in capital flows are associated with large output losses, as is often the case. Models typically include Fisherian channels and financial accelerator mechanisms, or frictions in labor markets, to

generate an output drop during a sudden stop, without losing the ability to account for the movements of other variables.

Foreign and domestic debt crises

Theories on foreign debt crises and default are closely linked to those explaining sovereign lending. Absent "gun-boat" diplomacy, lenders cannot seize collateral from another country, or at least from a sovereign, when it refuses to honor its debt obligations. Without an enforcement mechanism, i.e., the analogue to domestic bankruptcy, economic reasons, instead of legal arguments, are needed to explain why international (sovereign) lending exists at all. Models developed rely, as a gross simplification, on either inter-temporal or inter-temporal sanctions.

Inter-temporal sanctions arise because of a threat of cutoff from future lending if a country defaults (Eaton and Gersovitz, 1981). With no access (forever or for some time), the country can no longer smooth idiosyncratic income shocks using international financial markets. This cost can induce the country to continue its debt payments today, even though there are no immediate, direct costs to default. Inter-temporal sanctions can arise from the inability to earn foreign exchange today because trading partners impose sanctions or otherwise shut the country out of international markets, again forever or for some time (Bulow and Rogoff, 1989). Both types of costs can support a certain volume of sovereign lending Debt intolerance tends to be associated with the "extreme duress" many emerging economies experience at levels of external debt that would often be easily managed by advanced countries. More importantly, when an emerging market country becomes a serial defaulter of its external debt, this increases its debt intolerance and, in turn, makes it very difficult to graduate to the club of countries that have continuous access to global capital markets.

Banking crises

Banking crises are quite common, but perhaps the least understood type of crises. Banks are inherently fragile, making them subject to runs by depositors. Moreover, problems of individual banks can quickly spread to the whole banking system. While public safety nets –including deposit insurance – can limit this risk, public support comes with distortions that can actually increase the likelihood of a crises. Institutional weaknesses can also elevate the risk of a crises.

Financial institutions are inherently fragile entities, giving rise to many possible coordination problems. Because of their roles in maturity transformation and liquidity creation, financial institutions operate with highly leveraged balance sheets. Hence, banking, and other similar

forms of financial intermediation, can be precarious undertakings. Fragility makes coordination, or lack thereof, a major challenge in financial markets. Coordination problem series when investors and/or institutions take actions – like withdrawing liquidity or capital –merely out of fear that others also take similar actions. Given this fragility, a crisis can easily take place, where large amounts of liquidity or capital are withdrawn because of a self-fulfilling belief – it happens because investors fear it will happen. Small shocks, whether real or financial, can translate into turmoil in markets and even a financial crisis.

2.2.2. Theories of Financial Development

There are many theoretical literatures about the relationship between financial development and economic growth. The debate on whether the causal relationship runs from financial development to economic growth on the one hand and economic growth to financial development on the other hand is far from settled.

Demand following hypothesis which states that as the economy grow demand is created in the process. It is economic growth that creates demand for financial development. Increasing demand for financial services might lead to an expansion in the financial sector as the economy grows Patrick, (1966). This hypothesis is shared both by Robinson J, 1952 and Lucas, (1988). Thus, according to the Demand following hypothesis economic growth is a causal factor for financial development.

According to supply-leading and demand-following hypothesis by Patrick (1966), the supply-leading hypothesis argues a causal relationship from financial development to economic growth, which means the creation of financial institutions and markets increase the supply of financial services and thus leads to real economic growth.

2.2.3. Economic Crises Model

The increase in the number of crises and their impact of the economy has generated a large amount of research into their causes. At theoretical level, the literature distinguished between

three main types (first, second and third and generation) models. The following literature review examines each of these theories in turn.

First generation models

First generation models (Salant and Henderson, 1978; Krugman, 1979) and its extension models represent the balance-of-payment crises. These models view crises as the unavoidable consequence of macroeconomic policies that vary with the maintenance of a pegged exchange rate (Tularam and Subramanian,2013).

First generation crises theories represent crises that are mainly due to weakness in economic fundamentals. In these models, there is the assumption that there are two types of exchange rate systems, namely, flexible and pegged exchange rates. Under the flexible system, changes in expectations are reflected in the short run by changes in the exchange rate. Pegged exchange rate regimes are directly reflected by changes in the government's reserves. In first generation crises models the strength of a fixed exchange rate is established by external fundaments unconnected to how economic agents behave (Salant and Henderson, 1978; Krugman, 1979; Flood and Garber 1984 as sited in Tularam and Subramanian,2013).

Krugman (1979) explained how a standard crisis occurs and suggested that timing of the speculative attack is dependent on a critical official foreign reserve level. Esquivel and Larrain (1998) argued that the original source of problems in Krugman's (1979) model is the excessive creation of domestic credit to either finance deficits or provide assistance to a weak banking system. The first generation models of crises were ultimately driven by ongoing fiscal deficits. However, fiscal amounts were essentially in balance before the Mexican 1994 and the Asian 1997-1998 crashes, and hence the first generation models were inadequate.

Second generation model

Second generation models of financial crises such as Obstfeld (1994) were developed after the collapse of the European Exchange rate Mechanism (ERM) in 1992-1993 and described devaluation as a multiple equilibrium process. In second generation models, crises are attributed either to some deterioration of domestic conditions or to shifts in expectations. The monetary crises start either with the worsening of economic fundamentals, or a shift from the expectations to consider endogenous exchange rate policies with optimizing policy makers

These models introduce government decision making and show the possibility of multiple equilibriums (Obstfeld, 1994). Even if the fundamentals are not bad, currency crises can still occur so long as speculative attacks on currencies are able to drive market participants to believe that policy makers will devalue the currencies; leading to a so called self-fulfilling currency crises.

During the mid-1990s, when the economic fundamentals of the affected countries were found to be rather sound, outbreak of the crises continued.

Third generation model

A new third generation of theoretical models were then developed that included financial sector indicators derived from aggregate balance sheets of banks. After the failure of two generations of models, two approaches were featured: herd behavior and the moral hazard problem. Under the herd behavior, speculators follow behavior with the assumption that it reflects knowledge sets of others, and that multiple equilibriums are likely to occur (Froot et al.,1992).

2.2.4. Economic crises theory

The Keynesian Economics

An unexpectedly destructive and lasting depression across the 1930s shook neoclassical economics to its roots, challenging its underlying humanist tradition and utopian faith in capitalism. The "Great Depression" staggered nearly all the west European and North American capitalist economies. Massive unemployment, falling wages and prices, bankruptcies, home foreclosures, and the consequent social disruptions and clashes filled the 1930s. They forced a back-to-the-drawing-boards anxiety among neoclassical economists. Their theories, in both the original classical and the post-1870 neoclassical form, had not imagined, let alone prepared, anyone for such a depression. Most notions of an economic utopia delivered or guaranteed by capitalism faded quickly.

Neoclassical economists had few explanations to offer for the economic crises, and still fewer solutions that seemed adequate to the vast human tragedy and growing fears that spread everywhere in the 1930s. Most serious of all was their theory' s suggestion that the state "do nothing," since they believed that the system' s celebrated self-correcting mechanism would best solve the problem. A do-nothing policy struck most people then as ineffective, unworkable, and

intolerably cruel in the face of so much suffering. Across the 1930s in most capitalist economies including the United States and United Kingdom, the ever worsening economy suggested to many a very broken capitalist machine (Richard and Stephen,2012).

Marxism theory

Marxism provided a different analysis of the crises; it was rooted in and emerging from the internal contradictions of the capitalist system. Marxism also offered a different solution; substitute social or collectively owned for private property and national planning instead of markets. To achieve such a basic social change required a mass confrontation with the entrenched powers of those occupying the top positions of wealth and power in capitalist economies. Insufficient numbers in the United States, United Kingdom, and most other countries were willing to undertake the kinds of struggles needed to overcome those positioned at the top economically and politically. This was the social climate in which the newly elected Roosevelt administration in the United States had to respond.

Cole and Ohanian (1999) who have entertained the idea that the economic disaster stemmed from real supply shocks such as innovations or changes in regulations. Others like Bordo, Erceg and Evans (2000) have considered monetary factors such as price trends, interest rates and monetary policy. And in Harrison and Weder (2006) and Weder (2001, 2006) a decline in aggregate spending has formed the foundation of analysis. These varied approaches have two central ideas in common: (i) they apply dynamic general equilibrium modeling, and (ii) they calibrate models and use these calibrated models to generate artificial data that are then compared with actual data. as sited as Mark (2010)

2.2.5. Minsky's domestic theory of financial crises

according to Minsky financial crises have different reason like the systematic development of financial fragility, the movement to the brink of financial crises and debt-deflation.

Minsky's theory of financial crises is set within the context of expending economy. As the expansion develops, optimism increases, and conventions about the proper level of debt and risk begin to change. price of financial asset rise and the general level of speculation increases. Speculation is taken to be the attempt to bet the future direction and psychology of the market and also the more general process of financial assets whose value depends on future development

(Minsky 1975,120-23) cited as Martin (2002) And also a vulnerable situation, a non unusual event is capable of initiating a financial crisis. Since the future is uncertain, if such as event, like failure of a large company of bank, suddenly occurs, the optimistic expectations that had developed during the boom are subject to significant revision (Crotty, 1994). There events are surprises in the sense that they cannot be predicted (Martin, 2002).

2.3. Empirical literature

According to the report of institute of development studies (2008) The debate in rich countries about the impact of the financial crises has largely ignored its impact on developing countries. But the instability in financial markets around the world is already spilling over to the 'real economy' in poorer countries around the world.

Otaviano (2008) As the financial crises entered its acute phase in mid-September, Brazil suddenly faced a negative shock in its foreign capital flows. Portfolio equity outflows and carry trade unwinding abruptly accelerated the pace at which they were taking place in previous months. Even low-risk trade credit lines vanished. As a result, not only domestic stock markets dived, but also the local currency underwent a sharp depreciation in a matter of days.

Mingtai (2008) the transmission mechanisms are complex for China, the main pathways through which the current financial crises is likely to be transmitted to the Chinese economy are the financial wealth channel and the real trade balance. The impact of the crises is also giving rise to fluctuations in Chinas stock market because of the portfolio linkages between China and the advanced economies. In addition, the declining trade surplus is causing bankruptcies of some medium-sized private enterprises that are highly dependent on exports.

And also Yang and Huizenga (2010) found that The economic and financial crises have affected China differently from other countries, in that its impact has been felt more by the real economy than by the Chinese financial system. The global crises caused a dramatic fall in China's foreign trade and foreign direct investment (FDI) inflows, higher unemployment rates and strong price fluctuations. Regarding China's foreign trade, its exports of capital- and technology-intensive products were affected more than its exports of labor-intensive products. In addition, Qin (2012) found the crisis have a significantly negative shock on China's macro economy from both supply and demand side. Moreover, the crisis will decrease China's international trade, more for exports than for

imports, and the impacts will be increased with more countries involved in the crisis and more serious of the crisis.

Benny (2008) The pronouncements from the ruling United Progressive Alliance (UPA) Government on the implications of the financial crises on India have been typical and opportunistic. Both the Reserve Bank of India (RBI) and UPA representatives have repeatedly stated that India is likely to escape the worst consequences of the crises because of a strong internal driver for growth and limited liberalization of the banking and insurance sector.

Betty (2008) Tourism earnings have fallen by 30 per cent. From KSh49.3 billion to KSh34.5 billion over the same time last year, caused by increased fuel prices and the financial crises. Slowed activity in tourism has also contributed to shilling loosing value to the dollar, Reductions in purchase of Kenyan Export produce mainly Tea, Coffee and Flowers and The expected laying off of workers abroad to imply reduced remittance.

Lesetja (2012) the Euro crises had affected us had been through export growth through-out the Sub-Saharan African economies. When the global crises set in, export growth from the Sub-Saharan economies declined from an annual average of 7.0 per cent between 2000 and 2007 to only 1.4 per cent between 2008 and 2010. A significant slow-down. Much of this deceleration comes from slower growth in Europe. The proportion of exports from Sub-Saharan Africa to Europe mirrors that of South Africa, where it has fallen from about 36 per cent in 2005 to about 26 per cent in 2011.

According to Isabella et al. (2012) developing countries have a significant degree of exposure to a contraction in trade flows, capital flows, and ODA from the EU and the most vulnerable countries include Mozambique, Kenya and Niger among LICs, and Cape Verde, Moldova, Cameroon, Paraguay, and São Tomé and Príncipe among LMICs.

Qin (2012) found the crisis have a significantly negative shock on China's macro economy from both supply and demand side. Moreover, the crisis will decrease China's international trade, more for exports than for imports, and the impacts will be increased with more countries involved in the crisis and more serious of the crisis.

The debt profile was also at increase. Foreign portfolio investors have withdrawn over $15 billion, while remittances and official development assistance (ODA) fell greatly from 2008 to 2009. Unemployment and inflation rate increased from 6.6 percent and 12.70 percent in 2007 to

15.1 percent and 14.90 percent in 2008, respectively. Government projects were affected with less budgetary allocation, thus, leading to instability in the Nigerian economy. (Nkoro and Uko, 2012).

Remittances from the Kenyan diaspora increased by 6.6% in 2008. In the first 10 months of 2009 they declined slightly, to $504.6 million, compared with $527.1 million in the same period in 2008 but more than $476.7 million in 2007. The database of the Organisation for Economic Development's Development Assistance Committee (OECD-DAC) shows a substantial increase in foreign aid to the country in 2008. Kenya received $1523 million in 2008 (compared with $1345 million in 2007), with committed funds fully disbursed in 2009 compared with only 53% in 2008, reflecting the urgency of the situation.

And also with the global financial crisis and other crises, current account and budget deficits have widened. The current account deficit rose from $2.12 billion in 2008 to $2.388 billion in the year to August 2009, affecting the exchange rate and foreign exchange reserves. Implementation of the 2008/09 budget also faced numerous challenges, which included inability to achieve revenue targets and additional drought-related expenditures. In the 2009/10 fiscal year, the government adopted an expansionary fiscal stance. A budget deficit of KSh109 billion (about 6% of gross domestic product (GDP)) is envisaged, with concerns that heavy borrowing will crowd out lending to the private sector. Francis (2010)

after two quarters on a downward trend, the Brazilian economy bottomed out in the second quarter of 2009 and returned to growth. The country has come out of the crisis relatively quickly and has been rewarded for this. the sustainability of Brazilian growth at high rates is still not guaranteed. Even so, Brazil has shown that it is, along with China and India, in the group of countries that has best weathered the economic crisis. Moreover, from the international point of view, its influence has continued to grow during the crisis, as can be seen from its active role in the G-20 and its budding regional leadership. (Mendonca, 2010)

On this basis, it is clear that the financial crisis has knocked emerging and developing economies onto a lower trajectory for output, exports and remittances. Nominal GDP for this group of countries will be around US$1.3 trillion lower in 2010 than was expected in 2007, and the cumulated loss over the three years 2008 to 2010 will amount to US$2.6 trillion. Lost remittances over the same period will amount to more than US$100 billion. And private portfolio

flows to emerging and developing countries fell sharply as the financial crisis deepened, but they were clearly at an unsustainable level in the lead-up to the crisis. Direct investment flows have held up much better.

Aid flows to low-income countries will be lower than hoped. The money value of aid targets has been reduced and some countries will choose to fall short of their targets because of pressures on their public finances. African countries will see only U$11 billion of the US$25 billion in increased aid promised for 2010 at the Gleneagles G8 and Millennium +5 meetings in 2005. (Tony and Laura (2010).

The crisis strengthened the German economy because of growing exports but worsened its national deficit. In particular, it left Germany's partners that have not experienced economic rebound in a critical situation. The financial crisis pushed many industrial countries into a state of emergency, while it showed the potential of the BRIC and especially Brazil. It demonstrated the importance of prudential regulations and a solid national fiscal policy with responsible deficits (Daniel, 2011).

Getinet (2010) identified its effect on Ethiopia foreign direct investment (FDI), trade, remittances and aid as channels through which the crisis transmitted its effects. After the crisis hit, it was observed that FDI, remittances, export volumes and export prices declined. The decline in exports and remittances led the government to ration foreign exchange, with a resultant decline in imports of Ethiopian economy. The decline in growth and the observed decline in public expenditure and private consumption resulting from the crisis are expected to have increased incidence of poverty.

From the empirical literature can see the effect of the financial crises and which economic variable affect the economy. All empirical literature shows that there is a negative effect of the crises except it strength the economy of German.

2.4 Conceptual framework

The study conducts based on the conceptual framework which draws from the above theoretical and empirical literature reviews. This research focuses on studying the transmission channels financial crises to Ethiopian economy. From the literature review mention above the study found external aid, external debt and net transfer as the main economic variables financial crises transmitted to Ethiopian economy by using Bayesian VAR.

3. RESEARCH METHODOLOGY

3.1. Research design

The study employing a longitudinal research design to achieve my research objectives. Longitudinal research design serves to discover the effect of European financial crises on the economy by considering structural break. Longitudinal research design facilitates the analysis of the duration of a particular phenomenon The design permits the measurement of differences or change in a variable from one period to another and facilitate the prediction of future outcomes based upon earlier factors. It describes patterns of change and help establish the direction and magnitude of causal relationships. Measurements are taken on each variable over two or more distinct time periods. This allows the researcher to measure change in variables. A key strength of a longitudinal study is the ability to measure change in outcomes and/or exposure at the individual level. Longitudinal studies provide the opportunity to observe individual patterns of change. And hence, this design often needs quatitative research data to explain fluctuations in the results.

3.2. Data types and methods of collection

This study does the empirical analysis by employing data sets for the period 1975-2015 for all the variables specified in the model. This period is chosen based on the availability of data. Data growth as the real per capita, External aid and External debt is obtained from the National Bank of Ethiopia. net transfer USD obtained from the World Bank.

3.3. Method of data analysis

This study used both descriptive and econometric data analysis method. The descriptive statistics such as average, maximum values, minimum values, cumulative values and charts. The study applies the Bayesian VAR model approach to identify the effect of financial crises on Ethiopian economy. The use of structural break model is to see the shock time and to see before and after effect. this study will use Bai-Parron break point test. The data is analyzed using E-views 9.

3.4. Econometrics model

The study measures economic growth by real gross domestic product growth rate (RGDPGR). External aid (EXAID) relative to (GDP), External debt(EXD) relative to (GDP) and remittance

by net transfer USD (NET) relative to (GDP). Total external debt measured by total borrowing, aid measured by aid receive from the donor and remittance measured by net transfer from abroad.

Bayesian econometrics is now widely used for inference, shock, forecasting and decision analysis in economics, in particular, in macroeconomics, finance and marketing. Three practical examples of its use are: In many modern macro-economies the risk of a liquidity trap, defined as low inflation, low growth and an interest rate close to the zero lower bound, is relevant information for the specification of an adequate monetary and fiscal policy; international corporations that sell their goods abroad want to know the risk of foreign exchange rate exposure that they incur in order to specify an optimal time pattern for the repatriation of their sales proceeds; evaluating the uncertainty of the effect of a new pricing policy is highly relevant in advertising strategies of supermarket chains (Nalaes, 2014).

VAR models are an alternative to structural macro econometric models as a methodology to obtain point estimates and measures of the uncertainty surrounding it, BVAR models have advantages that are concerned not only with overcoming the over fitting problems associated with unrestricted VAR models, but also with its objectivity and flexibility. The uncertainty surrounding economic relationships behind the economic system under analysis. This kind of flexibility leads to a better model in terms of economic forecasting when compared to structural models with more restrictions; and to a more accurate model than traditional VAR models (Ricardo and Stephen, 2012).

3.4.1. Econometric model specification

The model will be specified as

$RGDPGR_t = F(EXAID_t, EXD_t, NET_t)$

$RGDPGR_t = \beta_1 + \beta_2 EXAID_t + \beta_3 EXD_t + \beta_4 NET_t + \mu$

In order to avoid the problem of normality problem take log on both sides of the model as following.

$LRGDPGR_t = \beta_{t1} + \beta_2 LEXAID_t + \beta_3 L\,EXD_t + L\,\beta_4 NETT_t + \mu$

Where

$LRGDPGR_t$ = the log of Real GDP groth rate at a time t

$LEXAID_t$=The log of External Aid relative to GDPat a time t

$LEXD_t$= The log of External debt relative to GDPat a time t

$LNETT_t$ = the log total net transfer relative to GDPat a time t

μ= error term

3.4.2. Estimation procedure

It is a standard practice for every effective research that requires the use of econometric technique to highlight the significance of investigating the data generating process that are fundamental to the variables before estimating the parameters and carrying out various hypothesis testing. This procedure is meant to avoid the problem of false regression results. Since the paper interested in finding out whether a long-run or short-run effect of the crises existon Ethiopian economy and major macroeconomic variables the paper employed various diagnostic tests such unit root test using ADF test, serial correlation test using Brush and Godfray test, normality test using Jague-Berra, the Johansen Co-integration,structural break using Bai-Parron test.

Unit Root Test

There are two models which have been frequently used to characterize non-stationary:

Random walk without drift (i.e., no constant or intercept term)

Suppose ut*is* a white noise error term with mean 0 and variance σ^2.

$Y_t = Y_{t-1} + u_t$.....*(1)*

In this model the value of Y at time t is equal to its value at time (t) plus a random shock; thus it is an AR (1) we can write

Y1 = Y0 + u1

Y2 = Y1 + u2 = Y0 + u1 + u2

Y3 = Y2 + u3 = Y0 + u1 + u2 + u3

In general, if the process started at some time 0 with a value of Y_0, we have

Yt = Y0 + Σut

Therefore

E(*Yt*) = *E(Y*0 +Σ*ut)*= *Y*0

In like fashion, it can be shown that

var (*Yt*) = $t\sigma^2$

As the preceding expression shows, the mean of *Y* is equal to its initial, or starting, value, which is constant, but as *t* increases, its variance increases indefinitely, thus violating a condition of stationarity. In short, the RWM without drift is a non stationary stochastic process. In practice Y_0 is often set at zero, in which case E(*Yt*) = 0.

It is easy to show that, while *Yt* is non stationary, its first difference is stationary. In other words, the first differences of a random walk time series are stationary.

Random walk with drift (i.e., a constant term is present).

$Yt = \delta + Yt{-}1 + ut$

Where δis known as the drift parameter, the name drift comes from the fact that if we write the preceding equation as it shows that Yt drifts upward or downward, depending on δ being positive or negative.

$E(Yt) = Y0 + t \cdot \delta$

var $(Yt) = t\sigma 2$

Then $Yt = \rho Yt{-}1 + ut - 1 \leq \rho \leq 1$

If ρ = 1, becomes a RWM (without drift). If ρ is in fact 1, we face what is known as the unit root problem, that is, a situation of non-stationary; we already know that in this case the variance of Yt is not stationary. The name unit root is due to the fact that ρ = 1.11 Thus the terms non stationary, random walk, and unit root can be treated as synonymous. If, however, $|\rho| \leq 1$, that is if the absolute value of ρ is less than one, then it can be shown that the time series Yt is stationary in the sense we have defined it. RWM with drift the mean as well as the variance increases over time, again violating the conditions of (weak) stationary. In short, RWM, with or without drift, is a non-stationary stochastic process. Therefore, in order to test for the existence of a unit root in time series, we use the popular tests: Dickey-Fuller (ADF) test. Dickey and Fuller (1976) tested (Gujarati 2004).

Serial Correlation Test: the other diagnostic test for evaluating the complete specification and robustness of the results of an econometric model is the test of serial correlation of the residuals using Brush and Godfray test.

Normality test: The assumption of normality is $\varepsilon_t \sim N(0, \sigma^2)$. The null is that the skewness (α_3) and kurtosis (α_4) coefficients of the conditional distribution of y_t (or, equivalently, of the distribution of ε_t) are 0 and 3, respectively:

H_0 : α_3 =0(if $\alpha_3 < 0$ then f (y_t/x_t) is skewed to the left)

$\alpha_4 = 3$ (if$\alpha_4 > 0$ then f (y_t/x_t) is leptokurtic)

The above assumptions can be tested using the Jarque-Bera test (JB). The JB test follows the null hypothesis that the distribution of the series is symmetric. The null hypothesis of normality would be rejected if the residuals from the model are either significantly skewed or leptokurtic (or both).

Co-integration tests: - 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 *Xt* and *Yt* both *1* (1) to be co integrated there should exist α such that $Yt - \alpha Xt$ is *1* (0) (i.e. $Yt - \alpha Xt$ is stationary). *(Xt, Yt)* 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 non stationary variable over another non stationary 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 repressors'. In this case, one will have *k-J* co integrating parameters.

Structural break test: -the test shows that whether each variable affect by the shock or not to the economy. Structural changes and parameter instability is being researched in various scientific disciplines e.g. economics Stock and Watson (1996), finance Andreou and Ghysels (2002), political sciences Piehl et al. (2003) or biostatistics Muggeo (2003). The tests can be very helpful in time of sudden structural changes. The best example in economics is represented by starting crises, when a switch from one regime changes to another. Other example can be perceived in opposite event, when crises phase out and a situation is being stabilized. cited as Michael (2016)

When structural breaks are researched there are two basic meanings changes in structure. There could be either economic point of view explaining a shift in economy represented some

important moment e.g. economic crises, economic integration, or econometric point of view which describes a shift in time series resulting in different coefficients, various volatility levels (ibid)

Bai (1997) and Bai and Perron (1998) showed that it is possible to consistently estimate all break fractions sequentially, i.e., one at a time. And also When estimating a single break model in the presence of multiple breaks, the estimate of the break fraction will converge to one of the true break fractions, the one that is dominant in the sense that taking it into account allows the greatest reduction in the sum of squared residuals. (Pierre, 2005)

3.4.3. Bayesian Vector-Autoregressive (BVAR)

Bayesian VAR used to identify shocks which affect specific phenomena or events and to see the effect whether affected the economy or not.

Bayesian econometrics is based on a few simple rules of probability. This is one of the chief advantages of the Bayesian approach. All of the things that an econometrician would wish to do, such as estimate the parameters of a model, compare different models or obtain predictions from a model. Bayesian methods are, thus, universal and can be used anytime a researcher is interested in using data to learn about a phenomenon (Gary ,2003).

Bayesian statistics provides a rational theory of personal beliefs compounded with real world data in the context of uncertainty. The central aim of characterizing how an individual should make inferences or act in order to avoid certain kinds of undesirable behavioral inconsistencies and consequent are all successfully accomplished through this process (Dipak and Reo, 2005).

It is useful to think of the construction of an empirical model as the process of combining historical and a-priori information, both of statistical and of economic nature. Alternative modeling techniques provide different a-priori information or different relative weights to sample and prior information. Unrestricted VARs employ a-priori information very sparsely- in choosing the variables of the VAR; in selecting the lag length of the model; in imposing identification restrictions. Because of this choice, over fitting may obtain when the dataset is short, sample information is weak or the number of parameters is large. In-sample over fitting typically translates into poor forecasting performance, both in unconditional and conditional sense. Bayesian methods can solve these problems: they can make in-sample fitting less dramatic

and improve out-of-sample performance. While Bayesian VAR (BVAR)were originally devised to improve macroeconomic forecasts and identify shocks.

3.4.4. Definition of Variables and Expected signs

Real GDP Growth: is the percentage change in real GDP from one year to another.

Foreign aid: is defined as 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). It's expected to a positive sign.

According to Getnet (2010) the high import intensity of the economy, limited capacity to produce capital goods, low levels of domestic savings and limited capacity to generate foreign exchange make the development effort in Ethiopian beyond domestic capacity. All these factors have provided an apparently objective justification for the huge inflow of foreign aid. Consequently, foreign aid has been playing a critical role in the development efforts of Ethiopia since the 1950s and the financial crises effect is transmitted to economy. And uses aid as one variable to see the effect of financial crises.

And also Ethiopia relies on various multilateral and bilateral donors to finance many of its development programmes. Funds come in the form of aid (loan and grants) from countries that have been hard hit by the crisis.

External debt: is the portion of a country's debt that was borrowed from foreign lenders including commercial banks, international financial institutions like IMF, WB and African Development Bank (ADB) etc. and from the government of foreign nations. These loans, including interest, must usually be paid in the currency in which the loan was made. External debt is expected to have a negative impact on output growth because of debt service repayment cost on loan.

And also Ethiopia relies on various multilateral and bilateral donors to finance many of its development programmes. Funds come in the form of aid (loan and grants) from countries that have been hard hit by the crisis used as one variable to see the effect of financial crises.

Net transfer: is transfer of funds from abroad the to the Ethiopia country. Transfers of money from abroad represent a significant share of many household incomes in developing countries. If more people become unemployed and face lower incomes as a result of the economic downturn, remittances are likely to decrease. Yet while remittances to Africa did fall slightly in the aftermath of the global economic crisis, from $ 41.1 billion in 2008 to $ 38.3 billion in 2009 (ECA ,2012).

According to world bank (2009) financial crisis was expected to adversely affect developing countries through slowing down remittances as a result of weakening economic performance in developed countries; almost two-thirds of the remittances that migrants send home to developing countries are sent from developed countries.

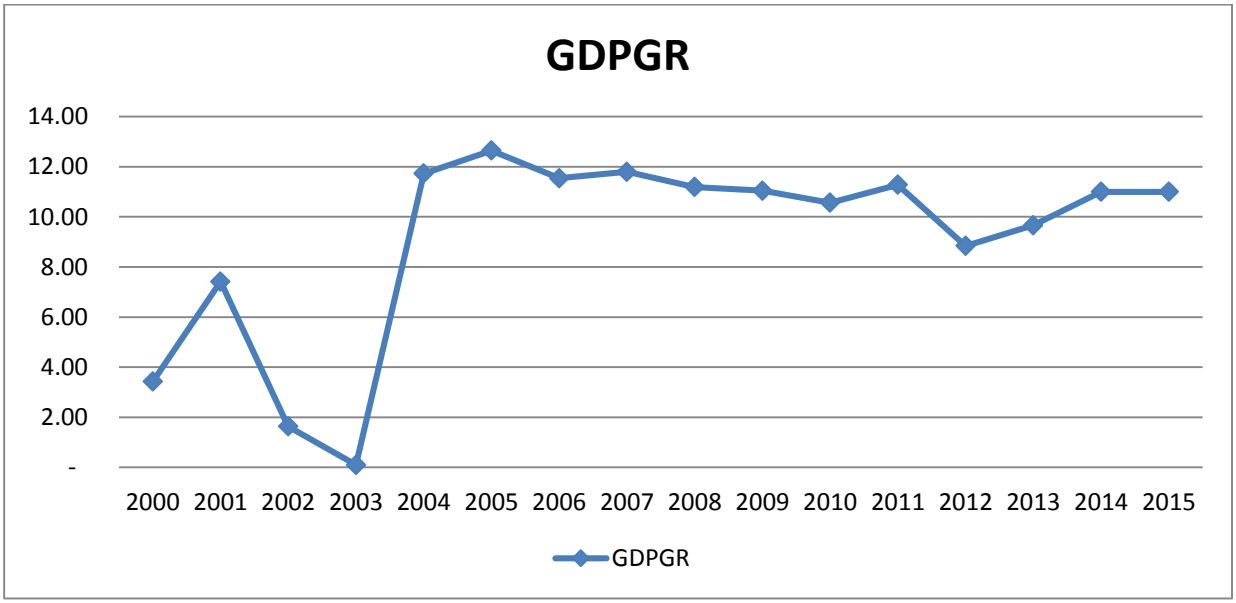
To see the effect of each variable to the economy impulse response used as how much is affected by the shock.

4: RESULT AND DESCUSION

This chapter analysis the effect of financial crises on Ethiopian economy using annual data of forty years from 1975 – 2015 and contains both the descriptive and econometrics analysis. Under the descriptive statistics the trends and overall performances of the variables of interest are presented. The statistical tools such as tables and graphs are used to describe the variables used in the model. The econometric analysis begins by testing the necessary tests such as stationary tests, diagnostic tests and bound test. After passed the necessary tests both the long run and short run models are estimated using structural break test and Bayesian Vector-Autoregressive (BVAR), respectively. After estimation has been made the interpretation and discussion are continued based on the model results.

4.1. Descriptive Statistics Analysis result

4.1.1. Trends of real GDP growth rate in Ethiopia from 2000 to 2015



Source: Author computation based on NBE data,

Figure 4.1: GDPGR trend in Ethiopia

The Ethiopian economic growth rate is one of the fastest growth rate in the world and even if there is economic crises which affect the whole world but it doesn't affect the growth of the economy significantly. As shown in the above graph its average growth rate at the time of

economic crises from 2007-2009 was 11% and it maintain its economic performance even those it doesn't show increase in economic growth rate.

4.1.2. Trend in external aid to real GDP ratio in Ethiopia from 2000-2015

AID performance is improving from time to time even at the time of crises its ratio to the RGDP show a progress because ODA to developing country does not significant reduction the paper descriptive finding is correlate with Alemayew G. and Kibrom T. (2011) There has been no improvement in aligning aid flows to national development strategies since 2007. There also appears to have been a small reduction in ODA grants, amounting to 5%, in the aftermath of the 2008 global financial crises, while ODA loans tripled in 2009 more than offsetting the effect of grants.

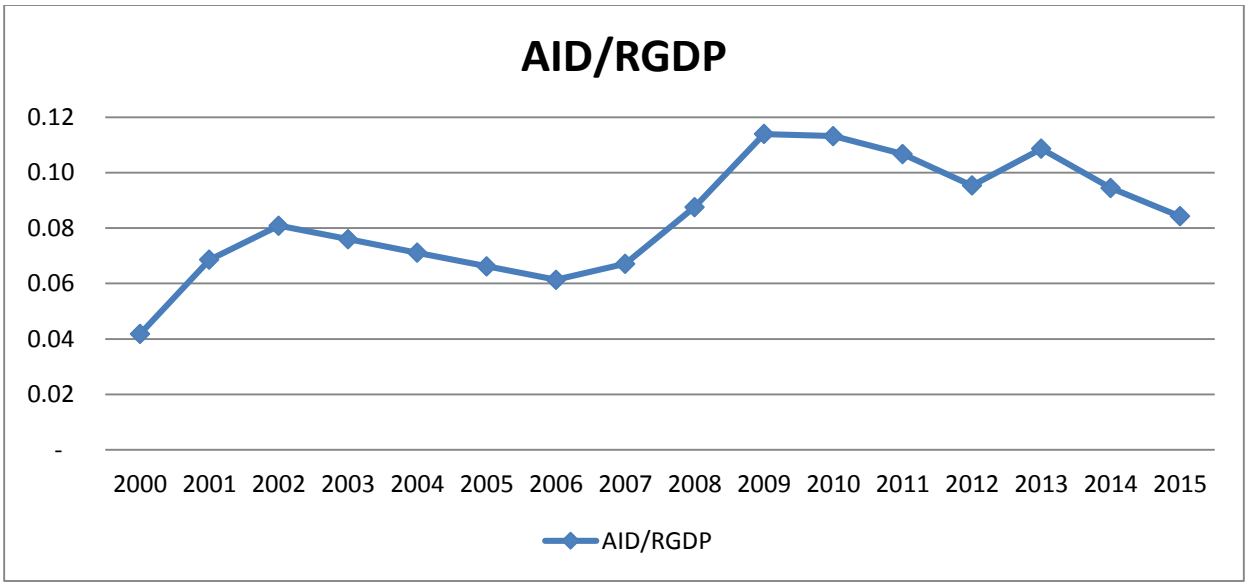


Figure 4.2: EXAID to RGDP ratio in Ethiopia

Source: Author computation based on NBE data

Aid play a vital role in Ethiopia economy and its contribution to GDP affect more because the volume of assistance has been increasing steadily over the years. External resources are financing around a third of the national budget using MoFED data and about 60 % of the national budget using OECD data. (Alemayehu G. and Kibrom ,2011).

4.1.3. Trend in net transfer to real GDP ratio in Ethiopia from 2000-2015

Nowadays, remittance has risen in a significant way in Ethiopian economy. Currently significance of remittance in developing countries become a source of finance and brings an economic growth and development through reducing household poverty and increasing their consumption and further in building investment in both human and physical capital which results in less vulnerability (Tasew and Nandeeswar, 2016) And also the paper result show that their no effect of European financial crises to Ethiopian economy.

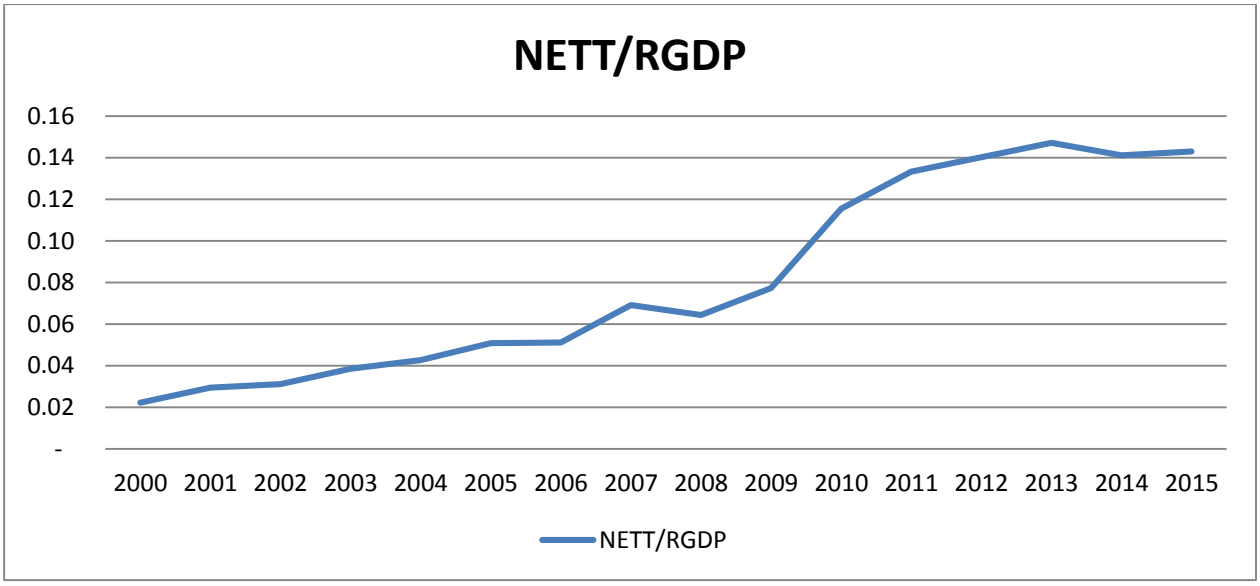


Figure 4.3: NETT to RGDP ratio in Ethiopia

Source: Author computation based on WB data.

When we see the performance of remittance is decline at the time of crises and it also show a higher improvement after the time of the crises and according to Mikias (2014) inflow of remittances leaps strangely in 2007 which is associated with the celebration of the Ethiopian Millennium. This continuous increase, however, witnessed a slight decline in 2008 after reaching nearly 386 million USD due to the global financial crises that occurred in the western economies, which is the main source of remittance for Ethiopia.

4.1.4. Trend in external debt to real GDP ratio in Ethiopia from 2000-2015

External debt from 2006 it shows a continuous growth to RGDP ration because the Ethiopian government implement big projects which need huge financial support. Getting other source of loan from new emerging country and china make the progress good.

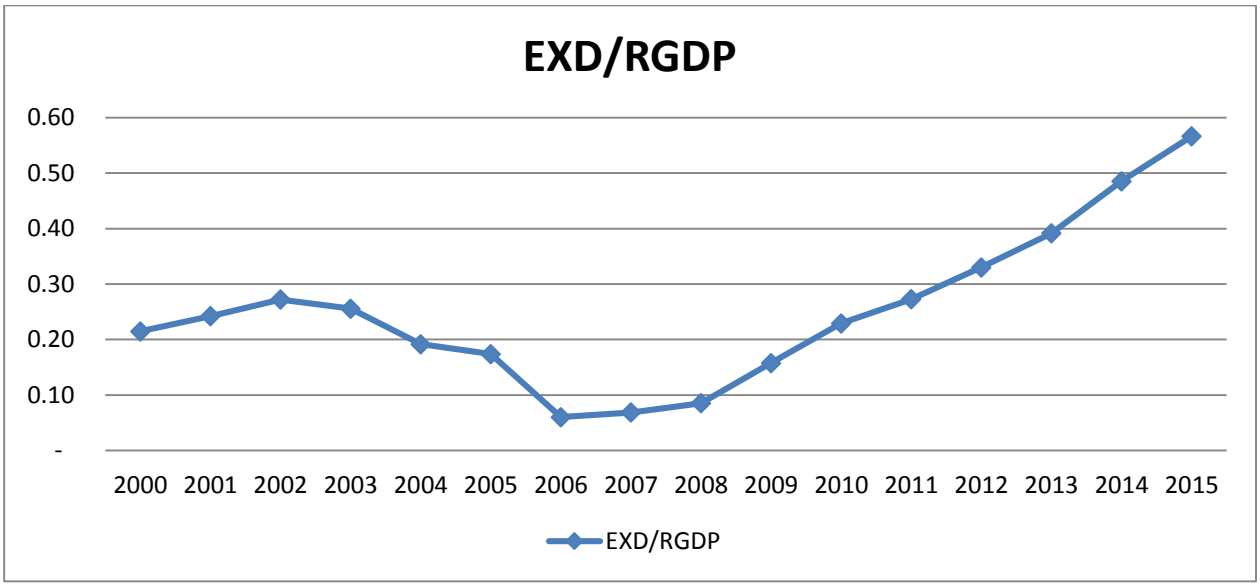


Figure 4.4 EXD to RGDP ratio in Ethiopia

Source: Author computation date from NBE

According to IMF 2015 report Ethiopian Telecom: purchased US$1.1 billion of equipment using commercial loans during 2014/15.Power related projects (mostly in electricity transmission): disbursements for the Genale Dawadam and the final phase of the Gilgel Gibe III dam could reach US$0.6 billion.US$1 billion Eurobond and other loans to support development of industrial parks, the sugar industry, and power transmission infrastructure; also expansion of the road network and Bole International airport in Addis Ababa.

4.2. Econometrics Model Results

4.2.1. Unit root test result

This test is made using the Augmented Dickey-Fuller (ADF) unit root tests. When the ADF test statistics is larger than the critical value in absolute terms, the null hypothesis of unit root is rejected, and if the ADF test statistics is less than the critical value in absolute terms, fail to reject

the null hypothesis, therefore unit root tests conducted discovered that all variables have unit root in their level hence they are not stationary. As a result, the variables have to be differenced to accomplish stationary. From the test results on the first difference given in Tables 1, the null hypothesis has been rejected because of the fact that all variables become stationary at their first difference. As the Unit root tests revealed that all variables used in this study are stationary at their first difference.

The Table 1 shows that all variables at level have a unit root since the absolute value of the test statistics is greater than the critical value at five percent therefore we fail to reject the null hypothesis that is the variables are unit root.

Table 4.1: Augmented Dickey-Fuller test for unit root at level

variables	Test statistics	Critical value at 5%	P -value
EXAID-RGDP	-5.262042	-2.954021	0.000
EXD-RGDP	-3.167067	-2.938987	0.02
RGDPG	-9.430216	-2.941145	0.000
NETT-RGDP	-3.332532	-2.938987	**0.02**

Source: own computation using e views nine

As Table 4.1 above shows the absolute values of the test statistics for all variables in the first different are greater than its critical value at 5% level of significance. The result indicates that the variables are stationary at first difference. So the null hypothesis that suggests each variable has unit root can be rejected by the ADF test.

4.2.2. Diagnostics of tests of the model

Diagnostics test is undertaken to become aware of model misspecification and as a direct for model perfection. These tests are serial correlation, model stability and normality tests. The serial correlation test done using the Lagrange multiplier (LM) test. The null-hypothesis of the LM test that the residuals are not serially correlated is accepted at 5% level of significance (see appendix F). The stability of the model shows the validity of the estimated model therefore 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 their cursive graphics that bounds with in the 95% critical values and our model satisfies the stability condition (see appendix C).

the null hypothesis that shows the existence of heteroscedasity is rejected and the alternative hypothesis which is homescedasic is accepted (see appendix E).

4.2.3. Break point test

To identify whether there is shock or not in each variable by using Bai-Parron break point test I found the following results.

Dependent variable RGDPG

Table 4.2 Bai-Parron break point test

Variables	Co efficient	Sd	T statistics	P value
EXAID_RGDP	-10.40237	7.953834	-1.307844	0.1990
EXD_RGDP	25.10014	40.91481	0.613473	0.5433
NETT_RGDP	64.90632	30.95065	2.097091	0.0429

Source: Own computation using e views nine

The above table shows that for EXAID and EXD accept the Ho and reject H1 and the result show that there is no break, On the other hand reject the Ho and accept H1for NETT which explain there is shock on NETT variable at 95% of confidence.

The result show that EXAID and EXD doesn't create shock on the economy. In line with the finding of Isabella et .al (2012) EXD Looking separately at specific LICs and LMICs there is a mixed picture: some countries have improved compared to 2007, while others experienced minor external debt increases during 2010 SSA countries showed the greatest improvements in debt to GDP ratios, although this might be more related to debt relief programmes such as the Heavily Indebted Poor Countries Initiative than to particular government policies

According to Alemayehu and Kibrom (2011) Also recent events show that in addition to the traditional donors, new sources of development finance to Ethiopia have emerged. In this regard,

China, India and Turkey are leading the way. In particular, the role of China as an emerging source of finance for Ethiopia is noticeable in the last decade.

Overall, developing countries are facing the euro zone crises with relatively stable external debt burdens, but further consolidation and fiscal discipline may be needed to preserve their debt sustainability over the long term, though on the other hand the need for stimulating growth may require higher borrowing.

Regarding aid, the paper result show that there is no shock and it is supported by Isabella Met .al (2012) ODA commitments across all donors are highest for low middle income countries. In absolute terms commitments for LDCs and LICs have, however, grown rapidly – and this growth appears to have held up in spite of the global financial crises. In terms of disbursements, LMICs, LDCs and LICs are the major recipients, and growth has similarly been maintained (more strongly in the latter two groups) despite the effects of the global financial crises.

After years of rapid growth, remittances flowing to LDCs were less affected by the financial crises than had been feared. The role of remittances during the crises has a double aspect. Remittances as a source of foreign capital can be seen as one of the driver of the crises in developing countries through a pause in the growth of rate of remittances due to the crises in advanced economies. On the other hand, remittances by being a non-negligible source of income provision can also play the role of a compensatory finance. This second effect seems to have been higher in the LDCs during the crises (Cindy,2012).

The result show that there is break on net transfer and at the time of the crises it is decline. According to World Bank (2009) report, the global economic crises had led to 5.5 percent decline in remittance flow to developing countries between 2008 and 2009. In Ethiopia, during this particular period, remittance inflow had declined by about 32 per cent which is by far higher than the average decline for developing countries. Apart from this, however, the year 2010 witnessed an immediate recovery of about 31 per cent and reached nearly 345 million USD. By 2012, the remittance flow had reached about 625million USD with a growth rate of about 22 percent compared to the previous year's growth of 49 percent.

4.2.4. VAR Lag Order Selection Criteria

There are many tests that can be used to choose appropriate lag length. These are the Akaike information criteria(AIC), the Schawarz 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 4.3 VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SIC	HIQ
0	103.5605	NA	6.23e-08	-5.240027	-5.067650	-5.178697
1	255.4341	263.7804	4.91e-11	-12.39127	-11.52938*	-12.08461
2	282.1053	40.70868*	2.89e-11*	-12.95291*	-11.40151	-12.40093*
3	295.2682	17.31958	3.63e-11	-12.80359	-10.56268	-12.00629

Source: Own computation using e views nine

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

4.2.5. Bayesian Vector-Autoregressive (BVAR)

BVAR result shows that the financial crises whether there is significant effect in the economy or not.

Table 4.4 Bayesian Vector-Autoregressive result

GDPG		coef	std	T
AID_RGDP	AID_RGDP(-1)	15.84720	31.9640	0.49578
	AID_RGDP(-2)	13.76330	19.5011	0.70577
EXD_RGDP	EXD_RGDP(-1)	-5.034755	8.67723	-0.58023
	EXD_RGDP(-2)	1.655814	5.97592	0.27708
NTT_RGDP	EXD_RGDP(-1)	46.19802	43.1052	1.07175
	EXD_RGDP(-2)	0.589846	(38.4713)	0.01533

Source: Own computation using e views nine

The BVAR result all variables NETT, AID and EXD there is no short run effect on the economy because NETT the household used the money for different purpose like for building house, education purpose and investment. And this effect may not been see in the particular period rather its effect will be seen after a long period of time like effect of investment start to production and create job opportunity. the result is in line with Tony and Laura (2010) found that The effect of the financial crisis on sub-Saharan Africa has not been as great as was initially feared. In part, this is due to the limited integration of many of the region's economies and financial systems into the global economy. But it also reflects the stronger macroeconomic position of the region in 2008, when compared to its position ahead of earlier crises.

When we see EXAID its effect is not seen in short run because ODA used to improve health, education and other sector performance. And also when we see EXD the finance we get from debt used for huge project according to IMF 2015 report Ethio Telecom: purchased US$1.1 billion of equipment using commercial loans during 2014/15,Power related projects (mostly in electricity transmission): disbursements for the Genale Dawadam and the final phase of the Gilgel Gibe III dam could reach US$0.6 billion and US$1 billion Eurobond and other loans to support development of industrial parks, the sugar industry, and power transmission infrastructure; also expansion of the road network and Bole International airport in Addis Ababa. And their effect on the Ethiopian economy may see in the long run.

If the result shown there in no short run effect, we go to impulse response after co integration test in order to see the long run effect of those variables.

4.2.6. Co integration test result

To evaluate the long run relationship between variables we use the co integration technique, be short of co-integration between variables suggests being no of long-run association between them. consequently, the Johansen co-integration method is practical (Gujarati ,2004).

Table 4.4 Co integration Rank Test

Hypothesized		Max-Eigen		
No. of CE(s)	Eigenvalue	Statistic	Critical Value0.05	Prob.**
None*	0.515936	27.57046	27.58434	0.0502
At most 1 *	0.427481	21.19294	21.13162	0.0490
At most 2	0.223825	9.628329	14.26460	0.2375
At most 3	0.056029	2.191083	3.841466	0.1388

Source: Owen computation using e views nine

It can be seen from the table 4.4 that the co integration rank test (Trace) statistics shows two co integrating vectors at the 5% critical value in the system. Thus based on trace statistics result we can conclude that there exists meaningful long run relationship between the variables under consideration even if Eigen value show there is no co integration between variables under consideration.

4.2.7. Impulse response

Impulse response function is used to trace the effect of a one shock to one of the innovations on current and future values of the endogenous variables. We can identify the positive or negative impact of the variables and determine how long it would take for that effect to work. It is a method of assessing the interaction among the variables in the VAR. table7 below illustrates the response of RGDGR due to a shock of (generalized impulse) each explanatory variable. In the first graph, response of RGDPGR to RGDPGR implies growth rate of real gross domestic product in the future will depend on the current growth rate of gross domestic product growth rate. Any shock will affect RGDPGR immediately but it will increase after three periods and this effect remains the same in the economy for a long time period and will not die out even in the

long run quarter though it shows a fluctuation. Therefore, current RGDPGR rate will affect future RGDPGR significantly.

Table 5.5 Impulse Response of LRGDP

step	RGDPG	AID	EXD	NETT
1	-0.010242	0.005902	0.038904	0.000000
2	-0.007417	0.007348	0.020431	0.003221
3	-0.004341	0.008968	0.012942	0.006049
4	-0.001319	0.011037	0.007000	0.007551
5	0.000782	0.012910	0.002923	0.008659
6	0.002269	0.014416	0.000113	0.009395
7	0.003318	0.015562	-0.001814	0.009913
8	0.004049	0.016412	-0.003134	0.010281
9	0.004560	0.017514	-0.004040	0.010551
10	0.004918	0.017043	-0.004664	0.010755

Source: Owen computation based on e-views nine

Any positive shock in net transfer (NETT) shock is quite low in RGDPG and this effect begins to increase and does not die out over the time period and may reflect a cyclical effect. Immediate effect of AID makes slow increase and however after time period it gradually increase its affect will not die out in the long run. EXD shock is high in RGFPG and it start to decline in 7 period it goes to negative in the long run.

External debt result shows decline and negative because in the future if we cannot manage the debt and misuse of it will be burden to the county. According to Isabella (2012) Issuing external debt is an essential tool for governments to finance their activities. Although there is still no consensus on a particular ‘sustainable’ threshold, the IMF and World Bank suggest that a burden of a 30 to 50% ratio of debt to GDP is within manageable limits. In the case of developing countries, heavy debt burdens limit the potential growth of their economies. In particular, poorer countries are required to service their debts and drain resources from their economy that otherwise could be allocated to boost growth. Before the 2008–9 global financial crises most developing countries carried a heavy burden of external debt. In LICs and LDCs external debt

averaged around 60% of GDP, while other groups of countries (LMICs) were below the 50% threshold.

According to Mulugeta (2014) results of the study reveal that real GDP is influenced negatively by the past stock of external debt and debt servicing and, positively by the current external debt inflows. This is indicating the existence of debt overhang problem and crowding out effect in Ethiopian economy.

In line with the paper finding IMF 2015 report explain that Ethiopia's external debt remains sustainable, but the risk of external debt distress has increased from "low" to "moderate" due to weak export performance and higher than expected non-concessional borrowing, reflecting faster execution of the government's investment program.

On the other hand, there is a problem on donor side which increase the burden of the debt according to Patrick (2010) The increasing number of multi-donor programmes has contributed to raising the proportion of joint missions, and will likely continue to do so. Partnerships in the health sector, rural economic development and food security development have improved donor mission co‑ordination. However, a significant number of donors still follow a project-based approach and organize stand-alone missions, which both overburden the implementing partners and increases transaction costs.

The accumulation of debt caused a number of concerns. The amount of debt that had been accumulated by Ethiopia was huge relative to the size of its economy, as measured relative to its GDP. Secondly, the economic growth performance of Ethiopia had been modest, at best, to make the accumulated debt sustainable. Thirdly, even if it were willing to pay, the opportunity cost of doing so would have had severe socio-economic and possibly political consequences on the Ethiopian people. Finally, the international pressure on lenders to grant debt relief had been mounting during the 1990s, spearheaded by institutions like the Jubilee 2000(AFRODAD 2006).

NETT and AID their response to the shock is positive and their effect to the economy improve from time to time because it facilitates the growth of the economy by creating financial support to the county and source of foreign currency to import the necessity machinery and material to improve the growth and development of the economy.

The same as the research finding Tasew (2011) also found the growth equation revealed that aid contributed positively to economic growth in the long run, but its short run effect appeared insignificant.

And also in related to net transfer Mikias (2014) found that the long run growth impact of international remittance to the economy during his study period is positive and significant.

5: SUMMERY, CONLUSION AND POLICY IMPLICATIONS

5.1 Summery

The study found that shock for net transfer on the economy during the financial crises but there is no structural shock on external aid and debt. And also a Bayesian Vector-Autoregressive(BVAR) result indicate that there is no effect on the economy due to financial crises. But the variables under consideration have a positive and negative effect on the Ethiopian economy on the long run by implementing impulse response. The research employed Johansen's Co-integration test to check for the co-integration of these variables. And found that the variables in the study are all two co-integrated, i.e. there is the presence of long-run relationship between RGDP and net transfer external aid and debt.

5.2. Conclusion

This research study investigates that the effect of financial crises on Ethiopian economy, using a Bayesian Vector-Autoregressive(BVAR) and structural break test. In doing so the time series date from 1975-2015 used at annual base. All variables are transformed in to natural logarithm and main variables are RGDP (Real gross domestic product), EXAID (External aid), EXD (External debt relative to GDP) and NETT (total net transfer relative to GDP). Before using the time series data checking whether the data are stationary or not is necessary, ADF unit root test is implemented to check the stationary in this paper the result of ADF test shows that all of the variables are stationary at first difference. Co-integration analysis 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 long run relationship between variables. The diagnostic tests are taken and have result of no autocorrelation, stability of variables and there is normal distribution of variables.

Then, structural break test using Bai-Parron test, implemented in this paper to see either shock exist or not in each variable at the time of financial crises and the result show that EXAID and EXD P-value show that insignificant which means there is no financial crises shock on this variable on the other hand NETT P-value significant and it implies the shock affect the

performance of net transfer. Bayesian Vector-Autoregressive (BVAR) explain that financial crises do not affect economic growth of the country aggregately. To see the long run effect, the study used impulse response and the result show that EXAID and NETT have positive effect in the long run even if at the beginning their effect is small in the long run its effect increase on the other hand EXD its effect in the long run is negative and create debit crises or debt burden.

5.3. Policy Implication

Since financial crises is not a onetime phenomenon it may occur at any time and we cannot control cause of the crises rather identify the reason why we are not affected by the crises and also what should be the policy measures under taken in order to sustain the economic growth of the country before it create economic shock.

Therefore, the policy makers should take a major

- ✓ Effective use of debt is essential as the study found that its effect is negative in the future and it create burden to the economy it may create debt crises.
- ✓ The government has to give pay attention to improve net transfer because it is good source of foreign currency and in the long run positively affect the GDP.
- ✓ The government should not depend on external aid and external debt rather it should create other government source of income because if the crises affect their ability of aid and debt the economy may affect highly.

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APPENDIX

Appendix A: structural break test

Dependent Variable: GDPGR
Method: Least Squares with Breaks
Date: 10/05/17 Time: 21:44
Sample: 1 41
Included observations: 41
Break type: Bai-Perron tests of L+1 vs. L sequentially determined breaks
Break selection: Trimming 0.15, , Sig. level 0.05
No breakpoints selected

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXD_RGDP	-10.40237	7.953834	-1.307844	0.1990
AID_RGDP	25.10014	40.91481	0.613473	0.5433
NETT_RGDP	64.90632	30.95065	2.097091	0.0429
C	3.753796	1.290974	2.907724	0.0061

R-squared	0.351864	Mean dependent var	5.961104
Adjusted R-squared	0.299312	S.D. dependent var	4.784596
S.E. of regression	4.005046	Akaike info criterion	5.705455
Sum squared resid	593.4944	Schwarz criterion	5.872633
Log likelihood	-112.9618	Hannan-Quinn criter.	5.766332
F-statistic	6.695593	Durbin-Watson stat	1.961689
Prob(F-statistic)	0.001007		

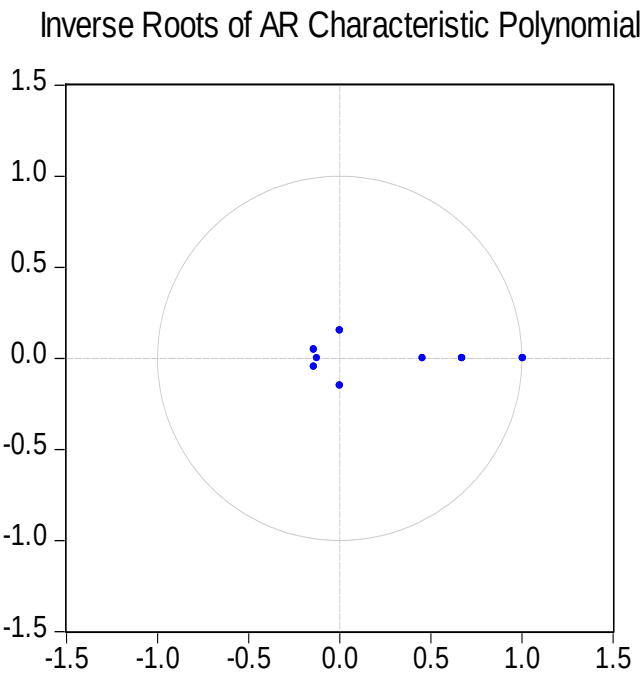
Appendix B:Bayesian VAR Estimates

Bayesian VAR Estimates

Date: 10/07/17 Time: 10:56
Sample (adjusted): 3 41
Included observations: 39 after adjustments
Prior type: Litterman/Minnesota
Initial residual covariance: Univariate AR
Hyper-parameters: Mu: 0, L1: 0.1, L2: 0.99, L3: 1
Standard errors in ( ) & t-statistics in [ ]

	GDPGR	AID_RGDP	EXD_RGDP	NETT_RGDP
GDPGR(-1)	0.014007	0.000130	-0.000668	5.09E-05
	(0.08856)	(0.00021)	(0.00067)	(0.00010)
	[0.15817]	[0.61255]	[-1.00362]	[0.50585]
GDPGR(-2)	-0.018355	3.27E-05	-0.000171	3.30E-05
	(0.04830)	(0.00012)	(0.00036)	(5.5E-05)
	[-0.38002]	[0.28349]	[-0.47125]	[0.60208]
AID_RGDP(-1)	15.84720	0.381960	0.140590	0.142431
	(31.9640)	(0.07760)	(0.24211)	(0.03661)
	[0.49578]	[4.92232]	[0.58070]	[3.89066]
AID_RGDP(-2)	13.76330	0.040329	-0.041494	0.032616
	(19.5011)	(0.04748)	(0.14769)	(0.02233)
	[0.70577]	[0.84936]	[-0.28095]	[1.46069]
EXD_RGDP(-1)	-5.034755	0.016822	0.549575	-0.011534
	(8.67723)	(0.02094)	(0.06608)	(0.00994)
	[-0.58023]	[0.80343]	[8.31697]	[-1.16078]
EXD_RGDP(-2)	1.655814	0.002175	0.079883	-0.003085
	(5.97592)	(0.01442)	(0.04567)	(0.00684)
	[0.27708]	[0.15086]	[1.74926]	[-0.45087]
NETT_RGDP(-1)	46.19802	0.330418	0.793952	0.791940
	(43.1052)	(0.10408)	(0.32643)	(0.04969)
	[1.07175]	[3.17462]	[2.43223]	[15.9379]
NETT_RGDP(-2)	0.589846	-0.044437	0.410196	0.151527
	(38.4713)	(0.09281)	(0.29137)	(0.04446)
	[0.01533]	[-0.47880]	[1.40781]	[3.40811]
C	3.376141	0.016027	0.022731	-0.000744
	(1.33936)	(0.00323)	(0.01014)	(0.00153)
	[2.52071]	[4.95566]	[2.24177]	[-0.48570]
R-squared	0.371904	0.842724	0.912872	0.989100
Adj. R-squared	0.204411	0.800784	0.889638	0.986193
Sum sq. resids	550.2175	0.006639	0.059518	0.000944
S.E. equation	4.282591	0.014876	0.044541	0.005611
F-statistic	2.220421	20.09347	39.29015	340.2843
Mean dependent	5.976754	0.050385	0.148381	0.039853
S.D. dependent	4.801338	0.033328	0.134077	0.047750

Appendix C: VAR stability



Appendix D: VAR Lag Order Selection Criteria

VAR Lag Order Selection Criteria
Endogenous variables: GDPGR AID_RGDP EXD_RGDP NETT_RGDP
Exogenous variables: C
Date: 10/07/17 Time: 11:43
Sample: 1 41
Included observations: 38

Lag	LogL	LR	FPE	AIC	SC	HQ
0	103.5605	NA	6.23e-08	-5.240027	-5.067650	-5.178697
1	255.4341	263.7804	4.91e-11	-12.39127	-11.52938*	-12.08461
2	282.1053	40.70868*	2.89e-11*	-12.95291*	-11.40151	-12.40093*
3	295.2682	17.31958	3.63e-11	-12.80359	-10.56268	-12.00629

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Appendix E: Heteroskedasticity Tests

VAR Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)

Date: 12/25/17 Time: 11:44

Sample: 1971 2011

Included observations: 39

Joint test:

Chi-sq	df	Prob.
211.6596	160	0.0039

Individual components:

Dependent	R-squared	F(16,22)	Prob.	Chi-sq(16)	Prob.
res1*res1	0.540572	1.617850	0.1458	21.08230	0.1754
res2*res2	0.901205	12.54274	0.0000	35.14701	0.0038
res3*res3	0.449626	1.123303	0.3927	17.53543	0.3518
res4*res4	0.785341	5.030497	0.0003	30.62828	0.0150
res2*res1	0.457100	1.157696	0.3682	17.82691	0.3341
res3*res1	0.512392	1.444888	0.2085	19.98329	0.2210
res3*res2	0.870006	9.202385	0.0000	33.93022	0.0056
res4*res1	0.300836	0.591634	0.8575	11.73259	0.7622
res4*res2	0.850225	7.805439	0.0000	33.15878	0.0070
res4*res3	0.577067	1.876102	0.0850	22.50559	0.1276

Appendix F: Serial correlation test

VAR Residual Serial Correlation LM Tests

Null Hypothesis: no serial correlation at lag order h

Date: 12/25/17 Time: 11:43

Sample: 1971 2011

Included observations: 39

Lags	LM-Stat	Prob
1	71.66292	0.0000
2	74.29036	0.0000
3	73.92187	0.0000

Probs from chi-square with 16 df.

Appendix G: Cointegration test

Date: 12/25/17 Time: 11:46

Sample (adjusted): 1974 2011

Included observations: 38 after adjustments

Trend assumption: Linear deterministic trend

Series: GDPGR EXT_RGDP EXD_RGDP NETT_RGDP

Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Trace	0.05

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.515936	60.58280	47.85613	0.0021
At most 1 *	0.427481	33.01235	29.79707	0.0206
At most 2	0.223825	11.81941	15.49471	0.1658
At most 3	0.056029	2.191083	3.841466	0.1388

Trace test indicates 2 cointegratingeqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.515936	27.57046	27.58434	0.0502
At most 1 *	0.427481	21.19294	21.13162	0.0490
At most 2	0.223825	9.628329	14.26460	0.2375
At most 3	0.056029	2.191083	3.841466	0.1388

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Appendix H: The Row Data from 1975-2015 G.C for variables used in the model

YEAR	RGDP	EXAID	EXD	NETT	GDPGR
1975	103,100	1,042	766	108	10.10
1976	104,155	1,091	901	120	1.21
1977	103,567	801	995	137	0.76
1978	108,533	865	1,060	156	0.36
1979	113,795	1,062	1,294	187	3.65
1980	115,224	1,067	1,489	180	5.02
1981	115,111	1,367	1,895	190	0.83
1982	126,707	1,139	2,107	248	0.23
1983	118,729	1,932	3,183	382	10.10
1984	107,221	2,222	3,395	572	0.14
1985	117,837	4,157	3,910	933	0.79
1986	134,380	3,030	5,386	1,056	9.93
1987	134,309	2,599	6,176	760	13.14
1988	134,767	3,733	6,491	634	0.53
1989	140,248	2,795	7,257	822	0.74
1990	135,165	3,364	7,498	690	4.31
1991	130,177	3,549	6,551	1,018	0.01
1992	145,799	4,848	18,779	1,547	0.29
1993	148,276	9,486	25,722	2,767	11.17
1994	156,247	9,907	27,732	2,882	0.05
1995	172,839	7,620	27,088	4,505	5.72
1996	180,911	7,308	26,510	4,454	10.12
1997	178,301	6,005	27,917	3,130	4.23

1998	188,990	7,631	31,566	3,720	0.79
1999	199,102	7,903	44,648	3,500	6.31
2000	215,630	9,015	46,269	4,809	3.42
2001	218,897	15,009	52,994	6,448	7.42
2002	214,166	17,316	58,282	6,690	1.63
2003	243,234	18,494	62,188	9,394	0.10
2004	271,981	19,335	52,094	11,613	11.73
2005	301,449	19,957	52,337	15,337	12.64
2006	335,983	20,621	20,215	17,208	11.54
2007	372,231	24,985	25,455	25,747	11.79
2008	404,996	35,467	34,451	34,211	11.19
2009	455,826	51,916	71,800	44,376	10.04
2010	515,079	58,300	117,963	59,495	10.57
2011	559,622	59,711	152,631	74,596	11.28
2012	618,842	59,011	204,194	86,850	8.84
2013	682,359	74,096	267,201	100,432	9.66
2014	753,230	71,146	365,622	106,358	11.00
2015	810,187	68,256	458,850	115,915	11.00
Source	NBE	NBE	NBE	WB	NBE