SOCIAL SECTOR DEVELOPMENT AND ECONOMIC GROWTH IN ETHIOPIA

MSc THESIS

MITIKU RIKITA REGESSA

WOLKITE UNIVERSITY, WOLKITE, ETHIOPIA

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MITIKU RIKITA

MAJOR ADVISOR: TESFAYE ETENSA (ASS.PROF)

CO-ADVISOR: HUNDAOL ABDISSA(MSc)

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DECLARATION

I hereby declare that this MSc Thesis is my original work and has not been presented for a degree in any other university, and all sources of material used for this thesis have been duly acknowledged.

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ACRONYMS AND ABBREVIATIONS

ADF-Augmented Dickey Fuller

AIC -Aikaike's information criterion

ADLI-Agricultural Development Led Industrialization

BIC -Bayesian information criterion

CSA- Statistics Agency

EEA- Ethiopian Economic Association

ECM-Error Correction Method

EPRDF-Ethiopian People's Revolution Democratic Front

EPRDF-Ethiopian People Revolutionary Democratic Front

FPE -Final Prediction Error

GCF -Gross Capital Formation

GDP-Gross Domestic Product

GTP-Gross and Transformation Program

HQC -Hannan-Quinn Criterion

IMF-International Monetary Fund

MOFEC-Ministry of Finance and Economic Cooperation

MDG-Millennium Development Goal

NBE-National Bank of Ethiopia

ODA-Overseas Development Association

OECD-Organization for Economic Cooperation and Development

OLS-Ordinary Least Square

PP -Phillips Perron

SIC -Schwarz Information Criterion

TP-Transformation Plan

RGDP-Real Domestic Product

VECM-Vector Error Correction Model

UNDP-United Nation Development Program

VEC- Vector Error Correction

VECM- Vector Error Correction Method

WB-World Bank

WDI-World Data Indicator

WDR -World Development Report

WGP -World Gross Product

ABSTRACT

This study examines the causal relationship between social development and economic growth in Ethiopia using time series data over the period 1974/75 to 2017/2018. The study adopted modern time series econometric techniques such as unit root test, lag selection criteria, Johansen co integration test, VECM, and granger causality, Wald test, impulse test, and variance decomposition. In the descriptive part of the analysis the study found that both the Dergue and EPRDF social development has been growing throughout the years under consideration. The found that in the long run, education expenditure, health expenditure, culture expenditure, social welfare expenditure, labor force and trade openness have positive and significant effect on economic growth in Ethiopia. In the long run social development has positive significant effect on economic growth in Ethiopia. In the short run, the empirical revels that one year lagged value of Labor force and Social Welfare is significant in affecting current growth in real GDP. The short run speed of adjustment coefficient of 0.5445 indicates that 54.45% of the short run adjustment made within a year. Empirical findings shows in both long run and short run, there is no causality running from either economic growth to social development or social development to economic growth in Ethiopia. Looking at the causality between components of SDU and Economic growth; there is no short run causality running from LNRGDP to LNHEAL, LNEDUC, and LNCULTU; vice versa is not true. Whereas there is a unidirectional causality running from LNWELFS to LNRGDP and vise verse is not true. In the long run, there is unidirectional causality running from LNRGDP to LNCULT, LNHEAL, and LNWELFS. The impulse analysis shows that expenditure on health and education has permanent effect on economic growth in Ethiopia in the ten years. The results of the variance decomposition indicate that a greater proportion of the variation in LNRGDP is due to its own innovations. Finally, the researcher recommend that government should improve the education quality, health of societies, encouragement of social welfare, credibility of societies culture, and encouragement of trade openness, and yet investment on social sector development does not reach to the poor section of the people , and government should re-examine its social development strategy.

Key words: *Causality, Johanson Cointegration, Economic growth, Ethiopia, Education, Health, Social welfare, Culture*

CHAPTER ONE
INTRODUCTION

1.1. Background of the study

Social development is the process of planned institutional change to bring about better adjustment between human needs and aspirations on the one hand and social policies and programmers. On the other hand, we must acquire a life style which has as its goal maximum freedom and happiness for the individual Tobin (1972).

Economic grow this issue of primary concern to policy makers in both developed and developing countries. As a consequence, growth theory has long occupied a central role in economics. It is a dynamic process, focusing on how and why output, capital expenditure and population change over time. The process of economic growth and the sources of differences in economic performance across nations are some of the most interesting, important and challenging areas in modern social science. The sources of economic growth is a question of great importance to many economists who are interested to know and search for factors enabling some countries to grow and develop while others are suffering from abject poverty (Shiba, 2017).

The Economic growth of Ethiopia has shown various changes in different political regimes. These changes in government structure created a problem of inconsistency in implementing the policies by previous regimes as well as natural disaster like famine, drought, political instability and war (Alemayehu and Befekadu, 2005) had a depressing effect on the history of Ethiopian economic growth.

Because Ethiopia is one of the poorest countries in the world, its economy remains heavily dependent on agriculture, which accounts 43% (UNDP, 2014) of the GDP. Accordingly, 83% of the population gains its livelihood directly or indirectly from agricultural production. Despite the fact that the history of growth performance was poor in the past

decades, the country has experienced strong economic growth in the current time. Real GDP growth averaged 11.2% per annual during 2003/04 and 2008/09 period, placing Ethiopia among the top performing economies in sub-Sahara Africa (NBE, 2013/14).

The global economy remains trapped in a prolonged period of slow economic growth and declining Social development. Since 2012, WGP has expanded at an average annual rate of 2.5 per cent, much lower than the average of 3.4 percent observed in the decade prior to the financial crisis in 2016, growth in both World gross product and world trade dropped to their slowest pace since the Great Recession of 2009. In 2016, the world economy expanded by just 2.2 percent, the slowest rate of growth since the Great Recession of 2009 (United Nations, 2016).

According to World Bank (2012) Growth in Sub-Saharan Africa over last nine years on average only reached 5.2 percent, less than half of Ethiopia average RGDP growth rate. Ethiopia has experienced double-digit economic growth, averaging 10.8% since 2005, which has mainly been underpinned by public-sector-led development. RGDP is estimated to have grown by 10.2% in fiscal year 2014/15. According to World Bank 2017 report, Ethiopia's 2016 estimates of population being around 103 million having average life expectancy of 58 years with total land area of 1.14 million square kilometers. In the modern days of Ethiopia many reforms were made that leads to aquatic change in the socio-political and economic structural pattern (Yes get, 2009).

The new paradigm shift rejects the income as the sole measurement of development of the quality of life; Economic growth and social development of the country reflect the wellbeing of individuals.

UNDP's Human Development Report (2008) clearly states that the main objective of the development is to provide such environment to individuals that would guarantee healthy, long and productive life. There is no denying fact that economic growth and social development are knitted together and there is causal relationship between the two. The Millennium Declaration signed by 189 countries in September 2000 set the Millennium Development Goals like eradicating extreme poverty and hunger, achieving universal

primary education, reducing child mortality, combating certain diseases and the like (World Bank, 2008).

In the 2012 WDB, Bernal et al. (2009) note that improvement in the investment social development expenditure in developing countries are key to increasing the flow of investments and, consequently, a higher level of economic growth and development. However, in the poorest developing countries, such as Ethiopia, businesses frequently operate in social development expenditure that undermine their incentive to invest and grow, thus undermining the performance of trade (UN, 2008). In line with this environment, Ethiopian investors complain about poor infrastructure, particularly power shortages; poor transport; poor telecom connectivity of business locations and lack of efficient tax administration (Mima and David, 2012).

The existence of numerous outliers countries in which social indicators are either lower or higher than expected based on their economic indicators suggests that social development is a complex process influenced by a variety of factors. In particular, the ability of some countries to reach a distinctly superior level of social development than would be expected on the basis of their level of per capita income suggests that social development need not wait for economic development, but can and indeed should be specifically and deliberately pursued by countries at every level of economic development (Streeten, 1977).

The social sector development has been considered as an essential prerequisite for sustained human development and economic growth of an economy (Sen, 1989). Because human capabilities provide a firm basis for evaluating living standards and quality of life (Sen, 1989 and 2000). Hence, deliberate attention to the enhancement of freedoms and capabilities would help in the process of economic development. Social1 sector development sets the foundation for rising income and employment opportunities, productivity growth, and technological advancement. Hence, helps to enhance the quality of life of people (Romer, 1990).

According to Alvi (2010) “No nation can progress without a strong human capital base”. The studies like Nelson and Lucas (1988) find that education plays an important role in the process of innovation and human capital accumulation, which helps to increase the labor productivity and hence boost economic growth. Endogenous growth theory explains the causal connection between economic growth and human capital development (for example, Romer 1986, 1989, 1990 and 1991). Because social sector development needs a strong human capital base which could be built through quality education, better health facility, job opportunities in the organized sector with social security measures and the like. Social sector development increases the capabilities of human beings which increases labor productivity and hence boosts economic growth (Strauss and Thomas, 1998).

The Millennium Declaration signed by 189 countries in September 2000 set the Millennium Development Goals like eradicating extreme poverty and hunger, achieving universal primary education, reducing child mortality, and combating certain diseases and the like (World Bank, 2008). The prime emphasis to achieve the Millennium Development goals has been placed on creating such an environment in developing countries that would enhance the development process and be helpful in eliminating poverty (World Bank, 2008).

1.2. Statement of problem

Ethiopia’s history is full of conflict, drastic policy change and reversals (Alemayehu and Befekadu, 2005). However, in the last 10 years Ethiopia is amongst the fastest growing non-oil economy as well as landlocked country in the world. Today the history of Ethiopia is changing from drought, famine, war and low economic growth to fast and sustainable economic growth. The Ethiopian economy shows an annual growth rate of 7.7% in the year 2008/17 and the annual average growth rate at a constant price was 11% for the period 2004/05 to 2012/13 (NBE , 2018).

Social development is recognized for its positive externalities in society, in 2017 the World Bank stated that social capital was the ‘glue which holds communities together’ (World

Bank, 2018). With a more technical definition this paper refers to social development as the long-term physical assets that facilitate social services (Preqin, 2014) and encompasses municipal structures (e.g. parks, lightings and recreational spaces), housing (e.g. social dwellings), education (e.g. school buildings, education equipment, ICT), health (e.g. hospital structures, medical equipment), which ameliorate human development, quality of life and living standards. Since the beginning of the 1970s, the focus has been shifted from economic growth to social development. The argument put forward was to target social development than economic growth as the former would improve the living conditions of people (Fransen et al. 2017).

Increasing growth of output enables the government to increase the share of spending on social sector development which has implications for long-run socio-economic development. Development is of course more than just income growth. It is a multi-dimensional process, which involves not only a quantitative increase in capital accumulation, production and expenditure, but also qualitative social and political changes that enlarge the choice set of the individuals concerned. Institutional progress, human rights, democracy, gender equality and other capacities are an integral part of development. We can then ask whether these qualitative objectives can be attained by maximizing GDP and in addition, we might worry that income growth will yield negative side-effects, which reduce well-being, such as environmental externalities, the destruction of traditional social links, the concentration of the population in urban and suburban centers, the development of work-related stress, and so on. Economic development with no concern for social development is dubbed as 'development without human face'. Although development of the social sector is one of the most important components of the economic growth, and development, its role is negligible in developing countries like Ethiopia (Shiba, 2017). Therefore, dealing relationship between the social sector and economic growth is paramount of developing countries like Ethiopia.

The Economic growth of Ethiopia has shown various changes in different political regimes. These changes in government structure created a problem of inconsistency in implementing the policies by previous regimes as well as natural disaster like famine,

drought, political instability and war (Alemayehu and Befekadu, 2005) had a depressing effect on the history of Ethiopian economic growth. There is a correlation between social development and economic growth in Ethiopia.

The causal relationship between economic growth and social development is based on the proposition that both are imperative for the progress of the economy. Planning commission in Ethiopia was initiated in 1972 to design programs that would promote sustained development and growth. However, the planning was not able to eliminate the inconsistent and distorted patterns in the development process. However, the African annual growth rate was 4.9% and that of Sub-Saharan countries was 5.3%for the same period (AFDB, 2012). Moreover, the country's aggregate economy reached the sub-Saharan African 5th biggest economy far, just there are many studies such as, Seid (2000), Weeks *et al* (2004) and Tadesse (2011) done on factors affecting Ethiopian economic growth and the relationship between economic growth and different macroeconomic variables. Seid (2017) have been studied the effect of Public Sector Development Expenditures on Economic Growth in Pakistan. Shiba (2017) Social Sector Development and Economic Growth in India have been conducted research on related areas. Looking at Ethiopia, Yet there is no empirical study which shows the relationship between social development and Ethiopian economic growth Ethiopian.

There is no denying fact that economic growth and social development are knitted together and there is causal relationship between the two. Addressing social development related issues is one of the goals of Millennium development goal as of 2000 though it is still an issue of discussion (World Bank, 2018). However, the issue is not well studied in developing countries in general and in Ethiopia in particular, and also to the best knowledge of the researcher there is no study that have been seen the relationship between social development and economic growth and their causality in Ethiopia.

Furthermore, the economic literature mentions two approaches regarding the causal relationship between economic growth and social indicators, which is urban housing due to non-availability data of development "trickle down" and "trickle up". Trickle up hypothesis advocates social development cause real GDP as whereas Trickle down

hypothesis advocates Economic growth cause Social development. Khurrum (2006) supports trickle down hypothesis for Pakistan and concludes that real economic development is the cause of social development. Contrary to this, Shahbaz (2010) concludes in his empirical study, social development enhances economic growth, which is it supports trickle up hypothesis. This shows that even in developing countries there is inconclusive finding regarding to the direction of causality. Again to the best knowledge of the researcher there is no study that have been seen the direction of causality in Ethiopia. Thus, this study is the first rigorous aimed at seen the relationship between social development and economic growth, and their causality in Ethiopia.

1.3 Objectives of the study

The main objective of this study is to investigate the relationship between social development and economic growth in Ethiopia.

Specifically, the study addressed the following objectives:

- To examine the relationship between social development components and economic growth in Ethiopia in the short run.
- To examine the relationship between social development components and economic growth in Ethiopia in the long run.
- To identify the direction of causality relationship between social development components and growth in short run.
- To identify the direction of causality relationship between social development components an Economic growth in the long run.
- To examine the relationship between social development and economic growth in Ethiopia in the short run and long run.
- To identify the direction of causality relationship between social development and growth in short run, and in the long run in Ethiopia.

1.4. Scope and limitation of study

The study will be done on the time series data ranging from 1974/75 to 2017/2018 of Social development and real gross domestic product, which collected from the National Bank of Ethiopia, MOFEC, IMF and WB. The data collected for this study will be limited to the figures officially available with relevant government agencies in Ethiopia. The study will excluded one of the social development indicators, which is urban housing due to non-availability data.

1.5. Significance of the study

The study was based on a time series data of 44 years. Hence, to scholars and academicians this study will increase body of knowledge to the scholars in the area of social development and economic growth. It also suggests areas for further research so that future scholars can pick up these areas and study further.

The study was important to the government especially the ministry of finance for making policy decision whose overall objectives is influence the level of economic activity and social development in with the expanding government budget.

In general this study is expected to generate best outcome to improve the practical knowledge and skill of the researcher of this study by making familiar with factual evidence on social development and economic growth in Ethiopia. Moreover it will produce general information on the relationship between social development and economic growth.

CHAPTER TWO

LITERATURE REVIEW

2.1. Theoretical Literature

Growth models are fundamentally of two types: the neoclassical growth model, also known as the exogenous growth model developed primarily by Solow (1956) and the new growth theory, also known as the endogenous growth model, pioneered by Romer (1986), Lucas (1988), Barro (1990), and Rebelo (1991). Economic growth has been emphasized as a significant factor in many countries for decades. As a discipline core economic growth theory was born in the late 1960s. After two decades, growth theory became popular again in the mid-1980s by the emphasis put on the long-run growth, which is now called endogenous growth theory.

The new growth theory or the endogenous growth theory, underlines the importance of the latter questions, related with the long-run growth performances, rather than the former.

The name endogenous growth models is given to these theories since according to these theories determination of long-run growth rates are explained within the models, rather than by some exogenous variables. The development of endogenous growth theory has followed the neoclassical growth theory. Romer (1990, 1997) introduced the incorporation of resource and development and imperfect competition into the growth framework. Other researchers, especially, Aghion and Howitt (1992), and Grossman and Help man (1991) also considered research and development (R & D) in the growth model.Can the government decisions on the share of public expenditure in output or on the composition of expenditures and taxation affect the steady state growth rate? The answer is absolutely 'no' in the case of the neoclassical growth models of Solow (1956), Swan (1956), Cass (1965) and Koopmans (1965).

In neoclassical growth models government policy cannot have sustained effects on growth rate of per capita income, although government can even influence the population growth

which is assumed to affect the growth rate. In these models, if incentives to save or to invest in new capital are affected by fiscal policy, there will be a change in equilibrium capital output ratio and therefore the output path will change, leaving the steady state growth rate unchanged. The long-run growth rate is driven by exogenous factors of population growth and technological progress while public policy can only influence the transition path of the economy towards steady state growth rate. According to the economists supporting 'endogenous growth models' (Barro 1990, King and Rebelo 1990, Lucas 1990, Mendoza *et al.* 1997, Stokey and Rebelo 1995 and Easterly and Rebelo 1993) the share of public expenditure in output or the composition of expenditures and Social development affects the steady state growth rate. This is in contrast to the neoclassical growth theory where only investment in physical and human capital affects the steady state growth rate. Regarding the endogenous growth model, the long-run growth rate depends on the stable environment of business, specifically, government policies and actions on taxation, law and order, provision of infrastructure services, protection of intellectual of property rights, regulation of an international trade, financial markets, and other aspect of the economy. Therefore, long-run growth rate has also been guided by the government (Barro 1997).

The studies like Hicks (1979), Streeten (1981), Goldstein (1985), Ram (1985), Strauss & Thomas (1995), Duflo (2001) Haddad et al., (2003) and Culter*et al.,* (2005) & Baldacci (2008) have found that social sector development has positive implications for economic growth. Moreover, the empirical studies like Gerdham et al. (1992) &Hitris&Posnett (1992) in OECD countries Schultz (2000) in Africa and South American region, Reza et al. (2014) in Iran and Pradhan and Hall (provide year) in Asia have found that social sector development has positive impact on economic growth. Similarly, in India the earlier studies like Sen (2000); Hooda (2013); Gangal and Gupta (2013); Mohapatra (2013); Haldar*et al.,* (2006) and Bhat& Jain (2004) explains that expenditure on health increases the economic growth through the improvement of health conditions of people which leads to productivity of the people. That productivity expands their per capita income (both in monetary per capita income and real per capita income) as well as their standard of living. Furthermore, it pushes towards the economic growth and development of the economy.

Health is one of the most important assets a human being has. It permits us to fully develop our capacities. If this asset erodes or it is not developed completely, it can cause physical and emotional weakening, causing obstacles in the lives of people. The previous connection can be seen as the relationship between income and health. Life cycle models have explained how one's health status can determine future income, wealth and expenditure (Lilliard and Weiss 1997; Smith 1998; Smith 1999).

Nowadays, it is possible to say every person could expect to live a long and healthy life. We could say its economic value is huge and health gains had the economic consequences of widespread economic growth and an escape of ill-health traps in poverty (World Health Organization, 1999). But also, health problems could be reflected as reductions and obstacles for economic progress. Ainsworth and Over (1994) have studied the impact of AIDS on African economic development, stating the disease is prevalent among young workers, affecting productivity and domestic savings rates.

Therefore, there has been a growing interest to extend the relationship between health and economic growth, catalyzed in considerable extent by a 1993 World Bank report on health (see World Bank 1993). Barro (1996) comments health is a capital productive asset and an engine of economic growth. Using this argument, we can consider health as a determinant of human capital. Likewise, Mushkin (1962) indicates human capital formation, with the help of health services, and education are based on the argument that people develop themselves when they invest in these assets and will earn a future return with them. Grossman (1972), Bloom and Canning (2000) explain healthy individuals are more efficient at assimilating knowledge and, in consequence, obtain higher productivity levels. Hamoudi and Sachs (1999) argue there is a cycle of simultaneous impact between health and wealth.

Datt and Ravallion (1998), explains about the poverty elimination in rural areas for different states of India. Mahal et al. (2000) find that percent of public subsidies on health accrued to urban residents, somewhat higher than their share in the total population of

about 25 percent. And the distribution of public health subsidies in a rural area is lower than the urban area in different states of India. This study also identifies that less amount of money spend of health which has negative impacts on the current social welfare and labour productivity, which reduces the per capita income and standard of living of the people. However, this has a negative impact on economic growth and economic development in future because this is a long-run concept.

The economic literature mentions two approaches regarding the causal relationship between economic growth and social indicators, which is urban housing due to non-availability data of development "trickle down" and "trickle up". "Trickle down" model of development remained powerful for a longer period of time. The model is based on Rostovian stages of development model, in which the economy experiences different stages of development finally to reach to a modern developed society. Ram (1985) sees the improvement in basic needs fulfillment because of the increase in average per capita income. Bruno *et al.,*(1996) and Deininger and Squire (1996) advocate that economic growth reduces poverty but the extent of reduction in poverty depends on the level of income distribution.

Jamal (1989) finds in his empirical study that social development is the outcome of economic growth in Pakistan. The empirical study for the period of 1971-72 to 2003-04 by Iqbal and Khurrum(2006) supports trickle down hypothesis for Pakistan and concludes that real economic development is the cause of social development. Contrary to this, Shahbaz (2010) concludes in his empirical study that economic growth in Pakistan increases income inequality which is a major obstacle in social development. Trickle up proposition is based on the assumption that social development enhances economic growth. Streeten (1977) propagated the basic needs approach for economic growth. According to him public services can play effective role in satisfying the basic needs of individuals. He also views the role of improved education, and health in economic growth (Streeten, 1981). There is another opinion that acceleration of economic growth takes place mainly because of the development of basic human capital (Hicks (1979, 1980). According to Thompson (1991) economic growth depends on social development. Temple

and Johnson (1998) test the predictive power of social development indexes developed in the early 1960s to explain economic growth. Their results suggest the importance of "social capability" for economic growth.

2.2. Empirical Literature

According to Srinivasan, (1977) economic growth and social development are interwoven. The new paradigm shift rejects the income as the sole measurement of development or of the quality of life. Different indices of development have been constructed that include various parameters of development. For example, UNDP (1999) uses "Human Development Index" that includes variables like life expectancy, literacy education and income. Human Poverty Index by excluding income includes access to safe water, access to health services, and underweight children under five as a measure of standard of living. Sen (1985, 1992) suggests a broader measure of the well-being of people and uses "functioning" or the ability to do things approach.

Kenny (2005) makes an effort to estimate the relationship between GDP/per capita growth and growth in subjective well-being in his cross-country analysis. By applying regression techniques his results for low income countries show a positive relationship between income and social well-being. Donglin (1996) in his study explains the past 15-year development of Changzhou city of China and social development. He includes science and technology, education, physical culture, public and social security, public health care, livelihoods, standards of living and family life in the development process and concludes that economic growth does not inevitably result in sustainable development (Donglin, 1996). In the nutshell, the economic literature shows mixed evidence on the direction of causality between economic growth and social development.

Social development is the basic equipment and structures such as roads and bridges that are needed for a country, region, or organization to function properly. Infrastructure contributes to economic development by increasing productivity and providing services, which enhance the quality of life. The services generated as a result of an adequate

infrastructure base will translate to an increase in aggregate output such as increased agriculture output of farmers through improved roads, creation of a sea ports, Rail links., Electrical generation, transmission and distribution, Water and irrigation projects,- Increase quality of life and Urbanization of different areas (Akinyosoye, 2010).

Infrastructure is a key element of poverty alleviation. It often acts as a catalyst to development and enhances the impact of interventions to improve the poor's access to other assets, e.g., human, social, financial, and natural assets. Its impact is felt both on the economic and social sectors. Without roads, the poor are not able to sell their output on the market. The social and economic impact often goes hand in hand (Pouliquen, 2000).

In the most recent works on sustainable development, the social environment is looked upon as an absolutely equivalent factor, which influences social development to the same extent as economic growth or environmental sustainability. In such case, it should be explored: human and socio institutional. Human capital is comprised of those "soft" factors which may be directly attributed to a certain individual, e.g. a person's health status, level of education, knowledge and qualifications, management and communication skills, values cherished. Socio institutional capital means social relations and norms defining common social activity and interaction of individuals, which includes institutions regulating social activity, efficiency and quality of their performance, legislation, cultural environment, traditions, religion, political and social system, and similar factors Balsytė (2007).

Aurangzeb (2003) found positive relation among GDP and health expenditure in both short run and long run. He recommended that more facilities should be there to facilitate lower income groups. Health sector is equally important as education sector and government must devise fundamental efforts to provide basic health facilities to each and every citizen of the country.

Akram& Khan (2007) also pointed out the prevalence of inequalities in resource allocation and service provision in public health spending. Rural areas are being neglected by the government for provision of health facilities. Asghar et al. (2012) stressed that public

expenditures on health and education in rural areas can provide basis for poverty reduction. Zeeshan & Ahmed (2014) also evaluated the positive link among health care spending and economic growth.

Government of Sindh (2015) formulates Vision 2025 which aims to develop medium and long term provincial development plan. Sectoral plans prepare strategy for promoting education, health, irrigation, communication and mass transit. Quality education for all children is focus of the government whereas government has also increased the development budget and non-development spending for health sector.

These social resources have to be distributed and used in such a way that this distribution and use adhere to the four principles: equality, social cohesion, safety, and adaptability The guarantee of social cohesion means that each individual has to be provided an opportunity and a right to participate in the social life and communicate with other members of society. Safety covers both the safe economic and healthy natural environment, and mutual social support and confidence of individuals. The importance of non-decreasing social opportunities for social development was broadly analyzed by Anand and Sen (1996), who proposed extending the concept of non-decreasing opportunities to meet vital needs and rephrasing it as a guarantee of substantive opportunities for all generations and individuals.

The substantive opportunities named by the said authors are as follows: first, an opportunity to be an individual, i.e. to be physically, emotionally and mentally healthy; second, an opportunity to participate in society, i.e. to be respected, educated, non-discriminated, productive, an opportunity to communicate, participate in decision-making, have relationships with relatives and the family.

Attempts are made to relate social sustainability to non-decreasing human and institutional capital, analogously to the concept of sustainable economic development, where non-decreasing opportunities are directly related to non-decreasing stocks of resources. However, it is even harder to express social capital in quantitative terms than natural or

economic capital; therefore, the application of this provision in practice is a more complicated task Anand and Sen (1996).

Qadri and waheed (2011) examined the regional comparison of public expenditures on education and health sectors as a percentage of GDP along with the other education and health indicators and concluded that both the health and education sectors should be given special attention in order to ensure long run economic growth. Meulmester (1995) has shown that education expenditure has positive effects on growth. However, he suggested that this relationship is not always direct. Similarly, Bashir *et. al* (2012) state that Human Capital is an essential determinant of economic growth. They also explain that education expenditures are positively associated with growth.

Gyimah-Brempong (2004) also explored that investment (health expenditure) and stock (child mortality rate) of health human capital have a positive and significant relationship with growth of per capita income. However, the relationship is quadratic. Study concludes that investment in health in LDCs will boost the economic growth in the short run and increases the level of income in the long run because investment in health become a part of Stock of human capital.

In an early empirical review of the impact of health on economic development, Sorkin (1977) concluded that health, seen through reductions in mortality, had an important impact on economic growth during the early twentieth century. However, he comments increases in the health status of the population of developed nations will have little impact on economic growth, but the impact could be different for developing nations. For this matter, he points out several ways how health programs could have an impact on economic development on developing nations.

The first way is through productivity gains and increasing man-hours of work. Jack (1999) explains productivity of labor depends on factors like physical and mental capabilities, investments in human capital and efficiency of labor organization and management, and emphasizes changes in health could affect labor productivity through the previous

channels. Also, labor productivity could also be reduced by the need to care for sick relatives or by reducing years of schooling if parents are chronically ill. On the other hand, improvements in health could positively affect the experience level of the work force by increasing their life expectancy and good health status condition.

Bloom et al. (2001) follows the Solow model with human capital. Although they find that health capital is a significant variable for economic growth under the two-stage least squares method, key variables such as capital and schooling are not significant; therefore, the results are questionable. For Latin America, there is a series of technical research documents of public health developed by the Panamerican Health Organization, which find a strong correlation between economic growth and the regional health, estimating regressions similar to Barro's (1996) where health is much more robust than schooling (Mayer et al. 2000).

Nevertheless, the study of human capital has been focused on the schooling factor. Despite the studies of Bloom et al., it has been assumed that schooling is a matter of great relevance. Recently, this concept has been extended to the variable of interest in this study, health. In this case, health differs from schooling in the sense that it varies through the course of life and is the result of elections based on behavior, primarily during childhood and older adulthood (Strauss and Thomas 1998). Likewise, Gallego (2000) mentions a theoretical solid structure integrating health and economic growth has not been developed. He attributes this to the lack of interaction between the contributions of health economics and economic growth theory, and the bias towards a major importance of schooling as a primary determinant, due to the difficulty to disaggregate the impact of the two variables on the product.

In addition, the relationship between health and labor has been deeply studied. Bloom and Canning (2000) describe how healthy populations tend to have higher productivity due to their greater physical and mental clearness. Likewise, Strauss and Thomas (1998) review the empirical evidence of the relationship between health and productivity, establishing

correlations between physical productivity and some health indicators. They focus particularly on those related with nutrition or specific diseases.

In the field of health economics, the endogenous causality between health and income has been the topic of several studies whose purpose is to establish the direction of the causality. Luft (1978) gives an informal explanation of this causality: "a lot of people who otherwise wouldn't be poor are, simply because they are sick; however, few people who otherwise would be healthy are sick because they are poor". In order to explain the direction of the causality of the impact of health over income, Smith (1999) uses life cycles models, which link health condition with future income, social development expenditure and welfare. According to this, Bloom and Canning (2000) explain this direction of the causality with education, indicating healthy people live more and have higher incentives to invest in their abilities since the present value of the human capital formation is higher. The higher education creates higher productivity and, consequently, higher income.

This theory was advanced by Solow Swan in 1956 as an exogenous growth model (Solow-Swan, 1956). It is an economic model of long-run economic growth set within the framework of neoclassical economics. It endeavors to explain long-run economic growth by looking at capital accumulation, labor or population growth, and increases in productivity. If human capital is enhanced, it promotes economic growth. The reasoning behind this is that people with skills are more productive than the unskilled. Government invests in human capital through tertiary level training and on the job training.

Productivity is enhanced by financing or supplying directly the investments that the private Sector would not supply in sufficient quantities due to various market failures like infrastructure projects and basic education and health expenditure, which could directly enhance private Sector productivity; efficient supply of some basic public services that are crucial to provide basic conditions for entrepreneur activity and long-term investment; and financing its own activities in the manner that minimizes distortions to private Sector savings and investment decision and to economic activities more generally (Romer, 1996).

It is on this basis that government expenditure can impact growth by affecting capital and/or labor as well as the generation and/or assimilation of technological progress reflected in total factor productivity (Maingi, 2010). Conversely, since the model assumes that the long-run growth rate is compelled by the population growth and the rate of technical progress, which is viewed to be exogenous, the effect of government expenditure on growth through production factors is considered to be only transitional (Dominick, 2002). The theory is applicable in Kenya in that Sectoral productivity is likely to increase if labor and capital are allocated with sufficient resources. The labor force is captured under current expenditure while capital formation and government investment is captured under capital expenditure.

Nurudeen and Usman (2010) employed a disaggregated analysis using Johansen cointegration and Error Correction Model (ECM) to examine government expenditure and economic growth in Nigeria. The study established that total capital expenditure and government expenditure on education have a negative relationship with economic growth. In contrast, growing government expenditure on transport & communication and health led to an increase in economic growth.

Nurudeen and Usman (2010) excluded the effect of corruption, inflation and political risk in their study. Besides that, key Sectors Loto (2011) used Vector Auto-Regressive (VAR) to estimate the effect of government expenditure on economic growth for the period 1980 to 2008 in Nigeria. The study established that there is a negative short-run relationship between expenditure on agriculture and economic growth. The relationship between education and economic growth was negative and insignificant whereas health, national security transportation and communication related positively, but then the impacts were not statistically significant. Loto (2011) contends that it is possible that in the long-run, expenditure on education could be positive if brain drain could be checked. Loto (2011) omitted other Sectors like Arts, culture and recreation Sector and used aggregate GDP hence the GDP values are not specific to any Sector. Similarly, the moderating effects of inflation, corruption and political risk were excluded in the Loto (2011) study..

Yahya, Hussin, and Razak (2012) while focusing on causal effect of education expenditure on economic growth in Malaysia using time series data of 1970 to 2010 and VAR established that economic growth positively cointegrated with government expenditure on education. The study findings further revealed that economic growth (GDP) positively cointegrated with fixed capital formation, labor force participation and expenditure on education. Granger causality relationship showed that economic growth is a short term Granger cause for education variable and vice versa. The study further ascertained that human capital such as education variable plays a vital role in influencing economic growth in Malaysia. The study context was outside Africa and focused on education Sector only.

The results of Onokaya (2013) study similarly indicate that public capital expenditure directly promotes the output of oil and infrastructure but is directly detrimental to the 36 output of manufacturing and agriculture. The results suggest a positive but insignificant relationship to the services Sector. The results, however, confirm that public capital spending indirectly enhances economic growth by encouraging private Sector investments due to the facilitating role of government in the provision of public goods. The study, therefore, recommends the privatization of the state-owned enterprises and use of public-private–partnership arrangements to engender efficiency and effectiveness in public service delivery. This study did not go into details of service Sector that comprises of Sectors like education, health, and public administration, which has a component of capital expenditure.

Abdinasir (2013) using time series data covering the period 1980-2010 examined the relationship between public expenditure and economic growth in Kenya. Health, education, agriculture and infrastructure Sectors were selected for the study. The data was converted into log linear form.

The Abdinasir (2013) study employed correlation research design and ECM to establish relationship dynamics. To Augmented Dickey- Fuller test (ADF) was carried out to ascertain the stationarity of time series data while cointegration test was used to test for a relationship between variables. The study established that expenditure to agriculture and infrastructure promotes economic growth while health and education were found to be negatively related to economic growth. The estimated model was a single regression equation with the growth rate of GDP as the dependent variable and expenditure to agriculture, education, health, and infrastructure as dependent variables. The Abdinasir (2013) findings from ECM model, however, indicated that there is no long-term relationship between variables.

Muthui *et al*. (2013) analyzed the impact of public expenditure components on economic growth in Kenya using time series data for the period 1964 - 2011 for government expenditure on infrastructure, education, health, defense and public order and security.

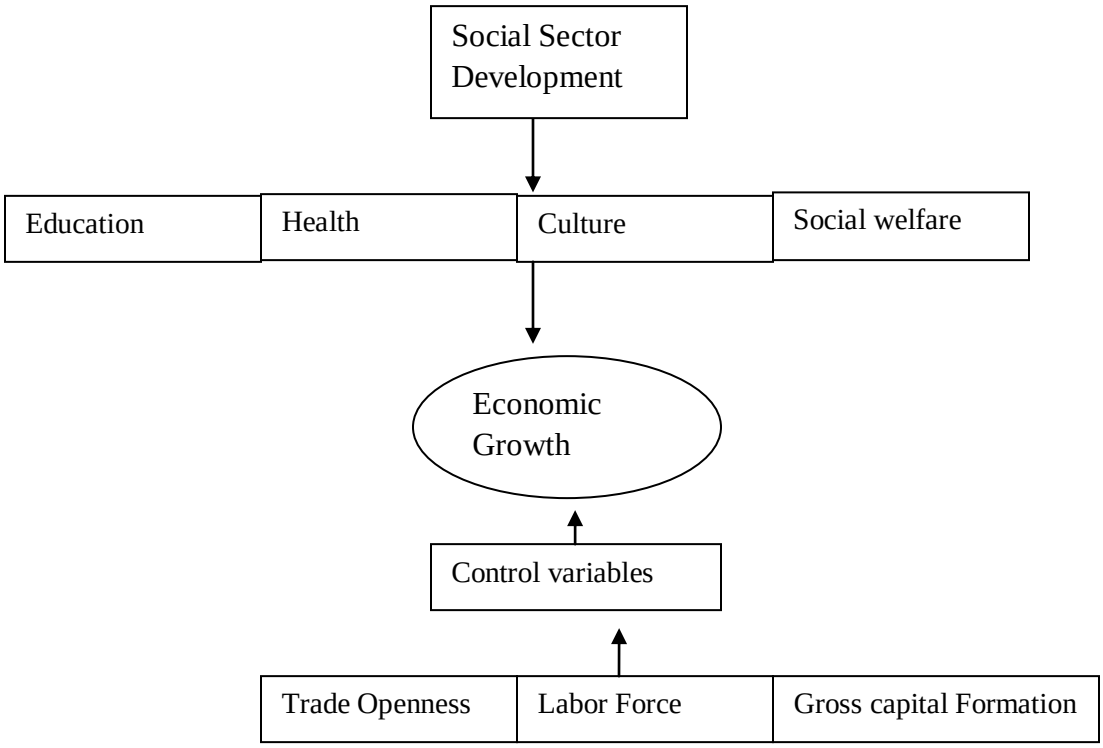
This study employed the ADF test to look out for stationarity and establish the order of integration. Johansen cointegration test was carried out to test for the existence of long-term relationship (co-movement) between variables in a non-stationary series. Granger causality test was used to test the causal direction, exogeneity to test whether the study could estimate the model using simultaneous or single equations. Vector Error Correction Model (VECM) was used to analyze the data.

Kosen and Muturi (2013) used log-linear form model to investigate the effect of Sectoral budgetary allocation on economic growth in Kenya. The model was used due to the sharpness in time series data in developing economics like Kenya. ADF test was carried out and found that all variables were non-stationary at levels leading to test for stationarity at the first difference that showed that all variables were stationary. Breush-Godfrey test for serial correlation was done, and this was preferred because of advantages over traditional techniques of cointegration. The study focused on health, defense, education, agriculture, manufacturing, transport and communication Sectors. The study established a long-run relationship between expenditure to agriculture and education and GDP. Health, defense, transport, and communication related positively but insignificantly. This is in contrast with Muthui *et al*(2013).

Lagat (2015) studied government expenditure and Sectorial GDP growth in Kenya using a correlational research design with a focus on Education, Agriculture & forestry and Health Sectors. The study utilized panel data for the period 1980 to 2012 for GDP growth, development expenditure, recurrent expenditure, growth in public Sector wage employment and growth in non-public Sector wage employment and non-public (private) investments.

In general, the above reviewed studies revealed that there is no common consensus about the relationship between social development and economic growth in developing countries. To the best knowledge of the researcher there is no study have been conducted in Ethiopia on this title so far. As a result this study also attempts contribute to the paucity of literature using recent time series data.

2.3. Conceptual Frame Work



Source: Own design (2019)

CHAPTER THREE

REESEACHMETHODOLOGY

3.1. Sources and Types of Data

The data was used annual covering the period from 1974/75 to 2017/18 for Ethiopia regarding 2010/11 as a base year.

The data will be sourced from the National Bank of Ethiopia, Ministry of Finance and Economic Cooperation (MOFEC). The data collected for this study was limited to the figures officially available with relevant government agencies for the period. Therefore, the study acknowledges that minor error of measurement might have been committed by the primary data collecting agencies.

3.2. Definitions of the Variables

The variables that this study uses are described as the following:

***Real GDP (RGDP)*:** is the market value of the goods and services produced by an economy over time. It is conventionally measured as the percent rate of increase in real Gross Domestic Product. Since most economists argue that economic growth can be measured as growth in real GDP, it includes in the model as main dependent variable in order to measure economic growth. In order to avoid the inconsistency associated with different base year price while computing real GDP, this study was used the real GDP (constant value), which is deflated by Ministry of Finance and Economic Development (MoFEC) based on the constant price of 2015/16. Most of the studies conducted on the relationship of economic growth with any variables (Colombage, 2009, Koch et al., 2005) used the Gross Domestic Product (GDP) as the measurement of economic growth. Hence, this study was used the growth form of real GDP as a proxy to represent economic growth.

Social development (SDU): The social sector development has been considered as an essential prerequisite for sustained human development and economic growth of an economy (Sen, 1989). In this study, capital expenditure on health, education, culture and social welfare were taken as the indicator of social development. These social components were used to examine the relationship between social development and economics growth. To see the causality the study used total expenditure on social developments. The components of social development were discussed below.

Health (HEAL): is one of the most important assets a human being has. It permits us to fully develop our capacities. If this asset erodes or it is not developed completely, it can cause physical and emotional weakening, causing obstacles in the lives of people. The previous connection can be seen as the relationship between income and health. Life cycle models have explained how one's health status can determine future income, wealth and consumption (Lilliard and Weiss, 1997; Smith, 1999).

Education (EDUC): has been measured by average years of total schooling, secondary education, and tertiary education; data is taken from the data set by Barro and Lee (2013). We may presume encouraging role of education in improving the economic growth in first model and social capital in second model. An educated individual is anticipated to be more forbearing and well conscious of his moralities and responsibilities, and more capable of dealing and resolving conflicts. Obviously, investing on education has a positive effect on economic growth. Thus, this study expects that positive sign.

Social welfare (WELFE): the wellbeing of the entire society, Social welfare is not the same as standard of living but is more concerned with the quality of life that includes factors such as the quality of the environment (air, soil, water) level of crime extent of drug abuse, availability of essential social services, as well as religious and spiritual aspects of life. Obviously, investing on Social welfare has a positive effect on economic growth. Thus, this study expects that positive sign.

Trade openness (TROP): It will be measured by the ratio of the sum of the values of exports and imports to nominal GDP. The study will incorporate trade openness of the economy as a control variable in income determination. It will be included to account for the effects of international trade on economic growth of Ethiopia. Empirical literature shows that trade openness or liberalization affects output growth. Most of the studies have concluded that the openness of the trade regime has positive relation with GDP growth (Wacziarg R., 2001; Yanikkaya Halit, 2003).

Culture (CULTU): is one aspect of the general culture of the societies which included society's norm, living standard, act, song, and like this. Although interpret how societies living with other population by accepting the other cultures and sharing his culture for the others. This culture includes culture of clothing, culture of eating, culture of how solving problems, culture of work, cultures song, and like this. culture affect the economic growth one country directly or indirectly; because of this government must giving the attention for culture and more expend on these for encouragement of this wealth societies.

Gross capital formation (GCF): is defined as Gross capital formation (formerly gross investment) in a country. Gross capital formation shows the net rise in fixed capital. Gross fixed capital formation comprises of expenditure on land developments, plant, device, and equipment acquisitions; the edifice of roads, railways, secretive housing, and marketable and industrialized buildings. This variable has been used in first model and is expected to enhance economic growth. However, getting such a readymade time series data in Ethiopia is difficult. Therefore in this study, gross investment was used as proxy of this variable and have been expected a positive impact on economic growth.

Labor Force (TLF): is the actual number of people able to work and willing to work. The labor force of a country includes both the employed and the unemployed. This variable has been used in first model and is expected to enhance economic growth. It is difficult to measure human capital in economics. As a result researchers use different proxy of human capital to indicate as major determinants of economic growth in long term. Therefore this

study has been used expenditure of health and education as proxy of human capital and the sign of the coefficient would be expected positive.

3.3. Model Specification

Many scholars have used different models to analyses the contributions of Social sectors development and related concepts on economies of different developing and developed countries. The study will be used macroeconomic development indicators (RGDP, GCF, TLF, EDU, HEAL, WELFE, CULTU and TROP). However, this study by its very nature is interested to investigate the domestic sources of Social development with economic growth; it improves the past model by including the two regimes of the period spanning 44 years. Therefore, relationship between Social sectors development (gross capital formation, labor, education, health, Social welfare, Culture and trade openness) with economic growth is developed for Ethiopia. From macroeconomic perspective, this model states that economic growth depends on capital, labor, education, health, trade openness, Social welfare and Culture. Therefore, functional form between Social sectors development and economic growth is given as

$$RGDP_t = F(EDUC_t, HEAL_t, WELFS_t, CULTU_t, GCF_t, TLF_t, \text{TROP}_t) \text{----------3.1}$$

Where

RGDP is a real aggregate output, EDUC is education, HEAL is health, WELF is social welfare, CULTU is culture, LF is labor force, GCF is Gross capital formation, TROP is Term off trade and the subscript t denotes the time period.β

$$RGDP_t = \beta_0 + \beta_1 GCF_t + \beta_2 LF_t + \beta_2 EDUCt + \beta_2 HEALt + \beta_2 WELFt + \beta_2 CULTUt + \beta_2 TROP_t + U_t \text{.....(1}a\text{)}$$

Where, β_0 = Intercept Term

β_1 and β_2. =Parameter known as partial regression coefficient

U_t = Error term or unexplained variable

$t =$ Denotes variable at time t

The functional form of the Trivariate model is specified as below

$$RGDP = f(TLF, GCF) ---------------------------(1b)$$

Where, RGDP= Real Gross Domestic Product

GCF= capital.

TLF=Labor

Accordingly we specify;

$$RGDPt = \beta_0 + \beta_1 LA_t + \beta_2 KA_t + \beta_2 SDU + u_t ---------------(1c)$$

Where, β_0= Intercept Term (Parameter)

β_1 *and* β_2= parameter known as partial regression coefficient

u_t= Error term or unexplained variable

$t =$ Denotes variable at time t

The goal of most empirical studies in econometrics is to determine whether a change in one variable causes a change in, or helps to predict another variable. Therefore, based on the objectives of the study both models is estimated using Johansen co integration test, VECM and grange causality test environment.

All variables are transformed into their natural logarithm so that their first differences approximate their growth rates. On the other hand, to eliminate the impact of hetero scedasticity for economic variable time series data, all variables are in natural logarithm. The empirical model will be designed to model the three variables after logarithmic transformation for the linear model, is easy to verify, so the transformed model:

$$\ln RGDP_t = F(\ln GCF_t, \ln TLF, \ln EDUC, \ln HEAL, \ln WELFS, \ln CULTU_t, \ln TROP)......3.2$$

When two or more entirely unrelated variables are trending over time, they will appear to be correlated simply due to shared directionality. Correlation does not necessarily imply causation in any meaningful sense of that word. The econometric graveyard is full of magnificent correlations, which are simply spurious or meaningless. Thus, traditional linear regression or correlation methods cannot be used to establish casual relations among a group of variables. Two methods for testing for causality among time-series variables are Granger causality tests (Granger, C.W.J. 1969) and co-integration analysis (Engle, R.E. & C.W.J. Granger.1987). Hendry and Juselius discuss the application of these methods to social development where they have been applied extensively to test for causality and co-integration between social development, RGDP, and other variables.

The standard Granger (1969) test will be employed in the relevant literature test the causal relationship between two variables. This test states that, if past values of a variable Y significantly contribute to forecast the value of another variable X_{t+1} then Y is said to Granger cause X and vice versa. The test is based on the following regressions.

$$Y_t = \beta_0 + \sum_{q=1}^{N} \beta_1 Y_{t-q} + \sum_{q=1}^{N} \beta_2 GCF_{t-q} + \sum_{q=1}^{N} \beta_3 LF_{t-q} + \sum_{q=1}^{N} \beta_4 EDUC_{t-q} + \sum_{q=1}^{N} \beta HEAL + \sum_{q=1}^{N} \beta_5 WELFS + \sum_{q=1}^{N} \beta_6 CULTUS + \sum_{q=1}^{N} \beta_7 TROP \ldots 3.3$$

$$GCF_t = \alpha_0 + \sum_{q=1}^{M} \alpha_1 Y_{t-q} + \sum_{q=1}^{M} \alpha_2 GCF_{t-q} + \sum_{q=1}^{M} \alpha_3 LF_{t-q} + \sum_{q=1}^{M} \alpha_4 EDUC + \sum_{q=1}^{M} \alpha_5 HEAL + \sum_{q=1}^{M} \alpha_6 WELF + \sum_{q=1}^{M} \alpha_7 CULTU + \sum_{q=1}^{M} \alpha_8 TROP + \varepsilon_t \ldots\ldots 3.4$$

$$LF_t = \mu_0 + \sum_{q=1}^{O} \mu_1 Y_{t-q} + \sum_{q=1}^{O} \mu_2 GCF_{t-q} + \sum_{q=1}^{O} \mu_3 LF_{t-q} + \sum_{q=1}^{O} \mu_4 EDUC + \sum_{q=1}^{O} \mu_5 HEAL + \sum_{q=1}^{O} \mu_6 WELFS + \sum_{q=1}^{O} \mu_7 CULTU + \sum_{q=1}^{O} \mu_8 TROP + \varepsilon_{3t} \ldots\ldots 3.5$$

$$EDUC_t = \phi_0 + \sum_{q=1}^{B} \phi_1 Y_{t-q} + \sum_{q=1}^{B} \phi_2 GCF_{t-q} + \sum_{q=1}^{B} \phi_3 LF_{t-q} + \sum_{q=1}^{B} \phi_4 EDUC + \sum_{q=1}^{B} \phi_5 HEAL + \sum_{q=1}^{B} \phi_6 WELFS + \sum_{q=1}^{B} \phi_7 CULTU + \sum_{q=1}^{B} \phi_8 TROP + \varepsilon_{4t} \ldots\ldots 3.6$$

$$HEAL_t = \psi_0 + \sum_{q=1}^{Z} \psi_1 Y_{t-q} + \sum_{q=1}^{Z} \psi_2 GCF_{t-q} + \sum_{q=1}^{Z} \psi_3 LF_{t-q} + \sum_{q=1}^{Z} \psi_4 EDUC + \sum_{q=1}^{Z} \psi_5 HEAL + \sum_{q=1}^{Z} \psi_6 WELF + \sum_{q=1}^{Z} \psi_7 CULTU + \sum_{q=1}^{Z} \psi_8 TROP + \varepsilon_{5t} \ldots 3.7$$

$$WELF_t = \rho_0 + \sum_{q=1}^{A} \rho_1 Y_{t-q} + \sum_{q=1}^{A} \rho_2 GCF_{t-q} + \sum_{q=1}^{A} \rho_3 LF_{t-q} + \sum_{q=1}^{A} \rho_4 EDUC + \sum_{q=1}^{A} \rho_5 HEAL + \sum_{q=1}^{A} \rho_6 WELF + \sum_{q=1}^{A} \rho_7 CULTU + \sum_{q=1}^{A} \rho_8 TROP + \varepsilon_{7t} \ldots 3.8$$

$$CULTU_t = \upsilon_0 + \sum_{q=1}^{N} \upsilon_1 Y_{t-q} + \sum_{q=1}^{N} \upsilon_2 GCF_{t-q} + \sum_{q=1}^{N} \upsilon_3 LF_{t-q} + \sum_{q=1}^{N} \upsilon_4 EDUC + \sum_{q=1}^{N} \upsilon_5 HEAL + \sum_{q=1}^{N} \upsilon_6 WELF + \sum_{q=1}^{N} \upsilon_7 CULTU + \sum_{q=1}^{N} \upsilon_8 TROP + \varepsilon_{8t} \ldots 3.9$$

$$TROP_t = \kappa_0 + \sum_{q=1}^{Y} \kappa_1 Y_{t-q} + \sum_{q=1}^{Y} \kappa_2 GCF_{t-q} + \sum_{q=1}^{Y} \kappa_3 LF_{t-q} + \sum_{q=1}^{Y} \kappa_4 EDUC + \sum_{q=1}^{Y} \kappa_5 HEAL + \sum_{q=1}^{Y} \kappa_6 WELF + \sum_{q=1}^{Y} \kappa_7 CULTU + \sum_{q=1}^{Y} \kappa_8 TROP + \varepsilon_{9t} \ldots 3.10$$

Where Y, GCFt, LTFt, EDUCt, HEALt, WELFt, CULTUt, and TROPt, are the variables to be tested, and ε_{1t}, ε_{2t}, ε_{3t}, ε_{4t}, ε_{5t}, ε_{6t}, ε_{7t}, ε_{8t}, and ε_{9t}, are mutually uncorrelated white noise errors, and t deotes the time period and "q" is number of lags.

The sixteen variables were measured by their natural logarithm so that their first difference approximates their growth rates. Developments in the time series analysis have suggested some improvements in the standard Granger test. The first step is to check for the stationary of the original variables and then test co-integration between them. According to Granger (1986), the test is valid if the variables are not Co-integrated. Second, the results of Granger causality are very sensitive to the selection of lag length. If the chosen lag length is less than the true lag length, the omission of relevant lags can cause bias. If the chosen lag length is more, the irrelevant lags in the equation cause the estimates to be inefficient.

Finally, both the co integration technique a Granger causality tests, was employed to determine the causal relationship between RGDP and social development, RGDP and various components social development (education, health, culture and welfare). The basic model relates economic growth to total government revenue is the model that shown in equation (3.2)

3.4. Research Hypothesis

To discuss the relationship between Social sectors development and economic growth, the following hypothesis is outlined. The study that has been done on the relationship between Social sectors development and economic growth shows that there are inconclusive findings. To investigate and give strong conclusion and recommendation the following hypothesis was made:

First, regarding the relationship;

H_0:Social sectors development has no contribution to economic growth of Ethiopia.

H_A:Social sectors development growth has contribution to economic growth of Ethiopia.

Second, regarding the time series nature of the data;

$H_0 : \delta = 0$, i.e., there is a unit root, and the series is non-stationary; against

H_A : $\delta < 0$, i.e., there is no unit root and the series is stationary.

Third, regarding the long run relationship between variables;

$H_{0:}$ There is no co integration between series.

$H_{A:}$ There is no co integration between series.

3.5. Unit Root Test

The classical time series regression model is based on the assumption that the data generating processes are stationary, i.e., the moments of the variables under consideration are time invariant. However, as the economy grows and evolves over time, most macroeconomic variables are likely to grow over time rendering them non-stationary (Granger and Newbold, 1974). Regression using non-stationary variables will only reveal a relationship that is not real, and accordingly such regression is termed as "spurious regression."

In case of spurious regression, as the sample size increases, the coefficient of variance doesn't tend to be constant and the consistency property of OLS estimators is not hold. The sampling distribution of the estimators will be non-standard and the usual statistics (t and F) based on normal become invalid (Maddala, 1992). Nelson and Plosser (1982) distinguish between two types of stationary series: trend stationary processes (TSP) and difference stationary processes (DSP). These two distinctions derive from the two widely used techniques of converting non-stationary series into stationary series.

The first one is trend stationary; in this case the mean trend is deterministic. Once the trend is estimated and removed from the data, the residual series is a stationary stochastic process. Trending mean is a common violation of stationary. There are two popular models for non-stationary series with a trending mean. The Second one is difference stationary; in this case the mean trend is stochastic. Differencing the series *d* times yields a stationary stochastic process.

Though both techniques may lead to stationary series, caution is needed in choosing between the two as de-trending a DSP series or differencing a TSP series may lead to spurious autocorrelation. Nelson and Plosser (1982) indicate that in most economic time series DSP is more appropriate and the -TSP should be applied only if we assume the residuals exhibit strong autocorrelation.

Time series that can be made stationary by differencing are called integrated processes. Specifically, when *d* differences are required to make a series stationary, that series is said to be integrated of order *d,* denoted I (*d).* Processes with $d \geq 1$ are often said to have a unit root.

The precondition of co-integration test is the stationary of each individual time series over the sample period. From the time when the seminal paper by Engle and Granger (1987), co integration analysis has increasingly become the favored methodological approach for analyzing time series data containing stochastic trends. Thus, before turning to the analysis of the long run relationships between the variables we check for the unit root properties of the single series, as non-stationary behavior is a precondition for including them in the co integration analysis.

There are several tests of stationary. These tests are Dickey-Fuller unit root tests, Augmented Dickey-Fuller (ADF) unit root tests and Phillips Perron (PP) unit root tests. This study used a test which became popular over the past years. Thus, unit root tests for stationary was examined on the levels and first differences for all variables using the most common unit root tests, which is the Augmented Dickey-Fuller (ADF). In some situation, lack of power in both the ADF and PP tests is widely acknowledged, then the NG-Perron (NP) test must be done (Ng-Perron, 2001). Usually ADF yields superior results than PP test, if the data set has no missing observations and structural breaks whilst PP test also yields superior results than ADF test, if the dataset have some missing observations and have structural breaks (Green, 2003). We assume that the data has no missing observation and structural breaks; ADF unit root test was used in this study.

The technique of co-integration involves three steps. The first step requires a determination of the order of integration of the variables of interest. We have for this purpose was used two popular tests: namely Dickey Fuller (DF) and Augmented Dickey Fuller (ADF) test based on H0: Xt is not I (0). The regression model of the ADF unit root test is given by the following equations.

3.6. Optimal Lag Length Selection

The determination of autoregressive lag length for a time series is especially important in economics studies. Various lag length selection criteria such as the Aikaike's information criterion (AIC), Schwarz information criterion (SIC), Hannan-Quinn criterion (HQC), Final prediction error (FPE) and Bayesian information criterion (BIC) have been employed. As the outcomes of these criteria may influence the ultimate findings of a study, a throughout understanding on the empirical performance of these criteria is necessary.

Akaike Information Criterion (AIC) developed by HirotuguAkaike in 1971; Greene (2003), has been found to be nearly unbiased estimator of selecting lag order and also it's a large sample size measure of thirty and more items, while the Schwarz Information Criterion (SIC) is a small sample measure of less than thirty observations. Moreover, Liew and Venus; KhimSen (2004) as cited in Biruk (2014) provide useful insights for empirical researchers. First, these criteria managed to pick up the correct lag length at least half of the time in small sample. Second, this performance increases substantially as sample size grows. Third, with relatively large sample (120 or more observations), HQC is found to outdo the rest in correctly identifying the true lag length. In contrast, AIC and FPE should be a better choice for smaller sample. Fourth, AIC and FPE are found to produce the least probability of under estimation among all criteria under study. Finally, the problem of over estimation, however, is negligible in all cases. As many econometric testing procedures such as unit root tests, causality tests, co-integration tests and linearity tests involved the determination of autoregressive lag lengths, the findings in this simulation study may be taken as useful guidelines for future economic researches.

Thus, the ability to correctly locating the true lag order depends on IC the ordinary least Squares regression model is run starting with lag zero upwards, since according to Engle et al (1995) it is the mostly used and recommended methodology was used to determine the lag length. Accordingly, lag that provides the minimum value is chosen as the optimal lag length, in other words, among the IC that provides majority lag is chosen as optimal lag length. On the basis of one or more of these criteria this paper was used a model that is the highest $\bar{R}^2$ or the lowest value of AIC or SIC or BIC.

3.7. Co-Integration Test

Granger causality tests are sensitive to the stationary of the series. This is why we first study the stationary properties of the variables. Having, discuss a variety of unit root tests, in order to proceed with co-integration and VEC analyses one needs to be confident as to the order of integration of the series used.

In the second step we estimate co-integration regression using variables having the same order of integration. Co-integration among the variables means that two or more variables are said to be co-integrated if they share common trends that is they have long run equilibrium relationships. More, co-integration is the necessary criteria for stationary among non stationary variables. The series are linked by some long-run equilibrium relationship from which they can deviate in the short run but they must return to in the long-run that is they exhibit the same stochastic trend. Co-integration can be considered as an exception to the general rule which establishes that, if two series are both I(1), then any linear combination of them will yield a series which is also I(1). The exception is when a linear combination of two or more series is integrated of a lower order: In this case, in fact, the common stochastic trend is cancelled out, leading to something that is not spurious but that has some significance in economic terms (Amirat and Bourimun dated).

If a group of variables are individually integrated of the same order and there is at least one linear combination of these variables that is stationary, then the variables are said to be co-integrated. The co-integrated variables will never move far apart, and will be attracted to

their long-run relationship. Testing for co-integration implies testing for the existence of such a long-run relationship between economic variables.

If the series are integrated of the same order one can proceed with the co-integration tests. This initial formulation by Granger used levels of variables as shown in equations. But, following the development of unit root testing and cointegration, for non-stationary variables, integrated of order one or I(1),the following was made:

$$\Delta Y_t = \beta_0 + \sum_{q=1}^{N} \beta_1 \Delta Y_{t-q} + \sum_{q=1}^{N} \beta_2 \Delta GCF_{t-q} + \sum_{q=1}^{N} \beta_3 \Delta LF_{t-q} + \sum_{q=1}^{N} \beta_4 \Delta EDUC_{t-q} + \sum_{q=1}^{N} \beta_5 \Delta HEAL + \sum_{q=1}^{N} \beta_6 \Delta WELFE +$$

$$\sum_{q=1}^{N} \beta_7 \Delta CULTU + \sum_{q=1}^{N} \beta_8 \Delta TROP + \varepsilon_{it} \quad \text{.....3.11}$$

$$\Delta GCF_t = \alpha_0 + \sum_{q=1}^{M} \alpha_1 \Delta Y_{t-q} + \sum_{q=1}^{M} \alpha_2 \Delta GCF_{t-q} + \sum_{q=1}^{M} \alpha_3 \Delta LF_{t-q} + \sum_{q=1}^{M} \alpha_4 \Delta EDUC + \sum_{q=1}^{M} \alpha_5 \Delta HEAL + \sum_{q=1}^{M} \alpha_6 \Delta WELFE +$$

$$\sum_{q=1}^{M} \alpha_7 \Delta CULTU + \sum_{q=1}^{M} \alpha_8 \Delta TROP + \varepsilon_{2t} \quad \text{----------3.12}$$

$$\Delta LF_t = \mu_0 + \sum_{q=1}^{O} \mu_1 \Delta Y_{t-q} + \sum_{q=1}^{O} \mu_2 \Delta GCF_{t-q} + \sum_{q=1}^{O} \mu_3 \Delta LF_{t-q} + \sum_{q=1}^{O} \mu_3 \Delta EDUC + \sum_{q=1}^{O} \mu_4 \Delta HEAL + \sum_{q=1}^{O} \mu_5 \Delta WELFE +$$

$$\sum_{q=1}^{O} \mu_6 \Delta CULTUS + \sum_{q=1}^{O} \mu_7 \Delta TROP + \varepsilon_{3t} \quad \text{----------3.13}$$

$$\Delta EDUC_t = \phi_0 + \sum_{q=1}^{B} \phi_1 \Delta Y_{t-q} + \sum_{q=1}^{B} \phi \Delta_2 GCF_{t-q} + \sum_{q=1}^{B} \phi_3 \Delta LF_{t-q} + \sum_{q=1}^{B} \phi_3 \Delta EDUC + \sum_{q=1}^{B} \phi_4 \Delta HEAL + \sum_{q=1}^{B} \phi_5 \Delta WELFE + \sum_{q=1}^{B} \phi_6 \Delta CULTUS + \sum_{q=1}^{B} \phi_7 \Delta TROP + \varepsilon_{4t} -$$

$$\text{----------3.14}$$

$$\Delta HEAL_t = \psi_0 + \sum_{q=1}^{Z} \psi_1 \Delta Y_{t-q} + \sum_{q=1}^{Z} \psi_2 \Delta GCF_{t-q} + \sum_{q=1}^{Z} \psi_3 \Delta LF_{t-q} + \sum_{q=1}^{Z} \psi_4 \Delta EDUC + \sum_{q=1}^{Z} \psi_5 \Delta HEAL + \sum_{q=1}^{Z} \psi_6 \Delta WELFE + \sum_{q=1}^{Z} \psi_7 \Delta CULTUS + \sum_{q=1}^{Z} \psi_8 \Delta TROP + \varepsilon_{5t} -$$

$$\text{----------3.15}$$

$$\Delta WELFE_t = \rho_0 + \sum_{q=1}^{A} \rho_1 \Delta Y_{t-q} + \sum_{q=1}^{A} \rho_2 GCF_{t-q} + \sum_{q=1}^{A} \rho_3 \Delta LF_{t-q} + \sum_{q=1}^{A} \rho_3 \Delta EDUC + \sum_{q=1}^{A} \rho_5 \Delta HEAL + \sum_{q=1}^{A} \rho_6 \Delta WELFE + \sum_{q=1}^{A} \rho_7 \Delta CULTUS + \sum_{q=1}^{A} \rho_8 \Delta TROP + \varepsilon_{7t} -$$

$$\text{----------3.16}$$

$$\Delta CULTUS_t = \upsilon_0 + \sum_{q=1}^{N} \upsilon_1 \Delta Y_{t-q} + \sum_{q=1}^{N} \upsilon_2 \Delta GCF_{t-q} + \sum_{q=1}^{N} \upsilon_3 \Delta LF_{t-q} + \sum_{q=1}^{N} \upsilon_4 \Delta EDUC + \sum_{q=1}^{N} \upsilon 5 \Delta HEAL + \sum_{q=1}^{N} \upsilon_6 \Delta WELFE + \sum_{q=1}^{N} \upsilon_7 \Delta CULTUS + \sum_{q=1}^{N} \upsilon_8 \Delta TROP + \varepsilon_{8t} -$$

$$\text{----------3.17}$$

$$\Delta TROP_t = \kappa_0 + \sum_{q=1}^{Y} \kappa_1 \Delta Y_{t-q} + \sum_{q=1}^{Y} \kappa_2 \Delta GCF_{t-q} + \sum_{q=1}^{Y} \kappa_3 \Delta LF_{t-q} + \sum_{q=1}^{Y} \kappa_4 \Delta EDUC + \sum_{q=1}^{Y} \kappa_5 \Delta HEAL + \sum_{q=1}^{Y} \kappa_6 \Delta WELFE + \sum_{q=1}^{Y} \kappa_7 \Delta CULTUS + \sum_{q=1}^{Y} \kappa_8 \Delta TROP + \varepsilon_{9t} -$$

$$\text{----------3.18}$$

Where Δ is the first difference operator, so that the terms are introduced in differences to ensure that they are stationary or I(0). Here the concept of causality is formulated in terms of changes to the variables and the presence of Granger-causality depends on the significance of the terms in equations.

This study considers a number of co-integration tests, namely the Engle-Granger method commonly known as the two-step estimation procedure, the Phillips-Ouliaris methods and the Johansen's procedure.

3.7.1. Engle Granger Method

The Engle-Granger, EG has two steps, first create the whole association equation of log (E), log (TLF), log (EDUC), log (HEAL). log (CULTU), log (WELF), log (TROP) and log (GCF) on log(RGDP) by Eviews version 9.0, and then test the residual series from which estimated equation parameters co-integration is stable of not.

As we have stated, the regression of non-stationary series on other series may produce spurious regression. If each variable of the time series data is subjected to unit root analysis and it is found that all the variables are integrated of order one, I(1), then they contain a unit root. There is a possibility that the regression can still be meaningful (i.e. not spurious) provided that the variables co-integrate.

In order to find out whether the variables co-integrate, the least squares regression equation was estimated and the residuals (the error term) of the regression equation are subjected to unit root analysis. If the residuals are stationary, that is I (0), it means that the variables under study co-integrate and have a long-term or equilibrium relationship.

In the two-step estimation procedure, Engle-Granger considered the problem of testing the null hypothesis of no cointegration between a set of variables by estimating the coefficient of a statistic relationship between economic variables using the OLS and applying well-known unit root tests to the residuals to test for stationary. Rejecting the null hypothesis of a unit root is evidence in favor of co-integration.

In the first step we estimate co-integration regression using variables having the same order of integration. The co-integration equation estimated by the OLS method is was given as:

$$Y_t = \gamma_0 + \gamma_1 X_{ti} + \xi_t \text{ ----------(23)}$$

Where Yt is real GDP and Xt is the i^{th} either education, health, social welfare, culture and trade oppeness.

Second step residuals (ξ_t) from the co integration regression are subjected to the stationary test based on the following equations.

Dickey – Fuller (DF)

$$\Delta\xi_t = \alpha + \beta\xi_{t-1} + \nu_t \text{ ---------- --------(3.19)}$$

Augmented Dickey Fuller (ADF) test

$$\Delta\xi_t = \alpha + \beta\xi_{t-1} + \sum_{i=1}^{q} \phi\Delta\xi_{t-i} + \nu_t \text{ ---------- ----- ---- ---------- ---------- ---------- -----(3.20)}$$

Where, ξ_t is the residual from equation (a). The null hypothesis of non-stationary is rejected if β is negative and the calculated DF or ADF statistics is less than the critical value from Fuller's table, i.e., there is a long run stable relationship between the two variables and causality between them is tested by the error correlation model (ECM). Alternatively, if the null hypothesis of non-stationary is rejected and the variables are not co-integrated then the standard Granger causality test is appropriate.

3.7.2. Phillips ouliaris method

Phillips-Ouliaris introduced two residual-based tests namely: the variance ratio test and the multivariate trace statistics. These residual-based tests are used in the same way as the unit root tests, but the data are the residuals from the cointegrating regression. These tests seek to test a null hypothesis of no cointegration against the alternative of the presence of cointegration using scalar unit root tests applied to the residuals. Phillips-Ouliaris methods are based on residuals (differences between the observed and expected values) of the first order autoregression, AR (1), equation. The multivariate trace statistics has the advantage

over the variance ratio test in that it is invariant to normalization, that is, whichever variable is taken to be the dependent variable, and this test will yield the same result (Buruk, 2014).

In the literature, there are no studies directly linked to the application of the Phillips-Ouliaris co-integration test only. However, there are a few studies in which co integration have been tested using other techniques including the Phillips-Ouliaris methods. The results showed that the null distributions of residual-based co-integration tests differed from those derived from the use of the Phillips-Ouliaris methods. The practical implication of these results is that we need to test not only for the presence of a unit root for individual series, but also for the presence of co-integrating vectors for the regressors prior to performing residual-based tests for co-integration. Thus, Johnsen's procedure resolves these issues.

1.7.3. Johansen's Method

Johansen (1988) and Johansen and Juselius (hereafter, JJ) (1990) maximum likelihood (ML) procedure is a very popular co-integration test and useful method to determine the long-run relationship among non-stationary variables.

Since the influential work of Granger and Newbold (1974); and Engle and Granger (1987) on the treatment of integrated time series data, many studies have been conducted using the co-integration methodology in order to yield consistent results and avoid the spurious regression problems, particularly in causality testing. The purpose of co-integration test in this study is to examine whether economic growth and social development share a common stochastic trend, that is, whether they move on the same wave-length in the long-run though there might be some disequilibrium in the short-run. In macroeconomics variable, two variables are said to be co-integration when they have long term, or equilibrium relationship between them (Engle and Granger, 1987). Thus, this study used Johansen (1988) co-integration analysis has been performed to investigate long term relationship between social development and real economic growth

in Ethiopia. This research was employed Johansen's (1988) approach to determine whether any combinations of the variables are co-integrated. Johansen and Juselius (1990) recommend the trace test and the maximum Eigen-value t-statistics in making the inference of the number of co-integrating vectors.

The aim of the co-integration test is to determine whether a group of non-stationary series is co-integrated or not. The Johansen's methods take its starting points in the Vector autoregressive (VAR) model as:

$$Y_t = \varphi + a_1 Y_{t-1} + a_2 Y_{t-2} + \ldots + a_q Y_{t-q} + AXt + \varepsilon_t \text{ ---------- ------- ----- ---------- --- -} \quad (3.22)$$

Where Yt is a n- vector of non-stationary I(1) endogenous variables that are integrated of order one-commonly denoted I (1) and Xt is a m vector of exogenous deterministic variables; $a_1,\ldots,a_q$ and A are matrices of coefficients to be estimated and ε_t is white noise residuals; that is a vector of innovations that may be contemporaneously correlated but are uncorrelated with their own lagged values and uncorrelated with all of the right hand side variables. Because most economic time series are non stationary, the above stated VECM model is generally estimated in its difference form as:

$$\Delta Yt = \varphi + \theta Y_{t-1} + \sum_{i=1}^{q-1} \varpi_i \Delta Y_{t-1} + AX_t + \varepsilon_t ; \theta = \sum_{i=1}^{q} ai \text{ and } \varpi = -\sum_{j=i+1}^{n} a_j \text{ ----------} \quad (3.23)$$

Granger's representation theorem that states if the coefficient matrix θ has reduced rank r<n, then there exist nxr matrices α and β each with rank r such that the method state that if θ matrix has reduced rank r<n, then there exist nxr matrices of α and β each with rank r such that $\theta = \alpha\beta'$ and $\beta' Y_t$ is I(0); r is the number of co integration relations (the co-integrated rank) and each column of β' is the co-integrating vector and α is the matrix of error correlation parameters that measures the speed of adjustments in ΔY_t. On the other hand, model is based on the error correction representation given by the following equation:

$$\Delta Y_t = \varphi + \theta Y_{t-i} + \sum_{i=1}^{q-1} \varpi_i \Delta Y_{t-1} + \varepsilon_t$$

Where Yt is an (nx1) column vector of q variables, is an

(nx1) vector of constant terms, θ and ϖ represent coefficient matrices, Δ is a difference operator, k denotes the lag length, and ε_t is p dimensional Gaussian error with mean zero and variance matrix (white noise disturbance term). The coefficient matrix θ is known as the impact matrix and it contains information about the long-run relationships. This Equation resembles a vector autoregressive (hereafter, VAR) model in first differences, except for the inclusion of the lagged level of Y_{t-1}, an error correction term (hereafter, ECT), which will contain information about the long run among variables in the vector Y_t. The vector error correction (hereafter, VEC) method equation above allows for three model specifications:

(a) If θ is of full rank, then Yt is stationary in levels and a VAR in levels is an appropriate model.

(b) If has zero rank, then it contains no long run information, and the appropriate model is a VAR in first differences.

(c) If the rank of θ is a positive number, r and is less than p (where p is the number of variables in the system), there exists matrices α and β, with dimensions (p x r), such that $\beta\alpha' = \theta$. In this representation β contains the coefficients of the r distinct long run co-integrating vectors that render β'Xt stationary, even though Xt is itself non-stationary, and α contains the short-run speed of adjustment coefficients for the equations in the system (Awokuse, 2003).

The Johansen approach to co-integration test is based on two test statistics: the trace test statistic, and the maximum eigenvalue test statistic, as suggested by Johansen (1988) and OseterwaldLenum (1992).

Trace Test Statistic: The likelihood ratio statistic (LR) for the trace test (λ_{trace}) as suggested by Johanse (1988) can be specified as:

$$\lambda_{trace}(r) = -T\sum_{i=r+1}^{k}\ln(1-\hat{\lambda}_i)$$

where $\hat{\lambda}$i is the ith largest eigen value of matrix θ and T is the number of observations. In the trace test, the null hyphothesis is that the number of
distnict cointegrating vector (s) is less than or equal to the number of cointegration relations (r).
In this ststistic λ_{trace} will be small when the values of the charactersitc roots are closer to zero.

Maximum Eigen value Test: The second test statistic is known as the maximal eigen value test which computes the null hypothesis that there are exactly r co-integrating vectors in Yt. The maximum eigen value test as suggested by Johansen (1988) examines the null hypothesis of exactly r co-integrating relations against the alternative of r+1 co-integrating relations with the test statistic and is given by:

$$\lambda_{\max}(r, r+1) = -T\ln(1-\hat{\lambda}_{r+1})$$

where $\hat{\lambda}_{r+1}$ is the (r+1)th largest squared eigen value. In the trace test,
the null hyphothesis of r=0 is tested against the alternative of r+1 cointegrating vectors.
If the estimated value of the characteristic root is close to zero, then the λ_{trace} will be small.

For trace statistic, the null hypothesis is the number of co-integrating vectors is less than or equal to co-integrating vectors (r) against an unspecified alternative. In the case of maximum Eigen-value co-integration test, the null hypothesis is the number of co-integrating vectors (r) against the alternative of 1 + r (Ng *et al*., 2008). If the trace statistic is greater than the Eigen-value (critical value), we conclude that the model contains at least one co-integrating equation. Where this condition is violated at a higher order, determines the maximum number of co-integrating equations. Therefore, this study was used Johansen approach.

The distributions for these tests are not given by the usual chi-squared distributions. The asymptotic critical values for these likelihood ratio tests are calculated via numerical simulations (Johansen and Juselius, 1990; and Osterwald-Lenum, 1992).

3.8 Vector Error Correction Model

According to Engle-Granger (1987) if two time series are co-integrated then the VECM will represent them most efficiently. If co-integration has been detected between series we know that there exists a long-term equilibrium relationship between them so we apply VECM in order to evaluate the short run properties of the co-integrated series. In case of no co-integration VECM is no longer required and we directly precede to Granger causality tests to establish causal links between variables.

An error correction model is defined as a dynamic model in which the movement of a variable in any period is related to the previous period's gap from the long-run equilibrium. Although it may be possible to estimate the long-run or co-integrating relationship, $Y_t = \beta X_t + \varepsilon_t$ economic systems are rarely in equilibrium, as they are affected by institutional and/or structural changes that might be temporary or permanent.

A simple dynamic model of a short-run adjustment model is given by:

$$Y_t = \varphi_0 + \varpi_0 X_t + \varpi_1 X_{t-1} + \varphi_1 Y_{t-1} + \varepsilon_t \text{---------- ---------- ---------- ---(3.24)}$$

Where,

Yt is dependent variable, and Y_{t-1} are lagged values; X_t is independent variable, and X_{t-1} are lagged values; $\varphi_0, \varpi_0, \varphi_1$ and ϖ_1, are parameters; ε_t is the error term assumed to be $\varepsilon_t \sim IID(0, \sigma^2)$

The problems associated with the use of the short-run model are multicollinearity, and spurious correlation. The problems are solved by estimating the first difference of equation (3.24) to get

$$\Delta Y_t = \varphi_0 + \varpi_0 \Delta X_t + \varpi_1 \Delta X_{t-1} + \varphi_1 \Delta Y_{t-1} + \varepsilon_t \text{-- --- -- -- - -- --- -- --(3.24i)}$$

This, however, introduces problems of loss of information about the long-run equilibrium and the economic theory is differenced away. Thus, the possible solution is to adopt the error-correction mechanism (ECM) formulation of the dynamic structure.

The setup is as follows. $\Delta Y_t = \varpi_0 \Delta X_t - (1-\varphi_1)[Y_{t-1} - \beta_0 - \beta_1 X_{t-1}] + \varepsilon_t$

The above equation (28ii) shows the ECM model. Error correction mechanism satisfies the assumptions of classical normal linear regression model. Among others the assumption includes, a linear regression model, residuals are normally distributed, there is no serial correlation among residuals, and there is no perfect multicollinearity.

Where,

$-(1-\varphi_1)$ is the speed of adjustment; $\varepsilon_{t-1} = Y_{t-1} - \beta_0 - \beta_1 X_{t-1}$ as error-correction mechanism which measures the distance of the system away from equilibrium. Therefore, the coefficient of ε_{t-1} should be negative in sign in order for the system to converge to equilibrium. The size of the coefficient $-(1-\varphi_1)$ is an indication of the speed of adjustment towards equilibrium in that; Small values of $-(1-\varphi_1)$ tending to -1, indicate that economic agents remove a large percentage of disequilibrium in each period; Larger values, tending to 0, indicate that adjustment is slow; Extremely small values, less than -2, indicate an overshooting of economic equilibrium; Positive values would imply that the system diverges from the long-run equilibrium path.

Given from the above reality that the variable was subjected to Johansen co-integration test and if it is found that the variables are co-integrate. Followed by using the Granger causality theorem, we will posit the following testing relationships that constitute a vector error correction (VEC) model for output growth of Multivariate model.

$$Y_t = \beta_0 + \sum_{q=1}^{N} \beta_1 Y_{t-q} + \sum_{q=1}^{N} \beta_2 GCF_{t-q} + \sum_{q=1}^{N} \beta_3 LF_{t-q} + \sum_{q=1}^{N} \beta_4 EDUC_{t-q} + \sum_{q=1}^{N} \beta_5 HEAL + \sum_{q=1}^{N} \beta_6 WELFE + \sum_{q=1}^{N} \beta_7 CULFS + \sum_{q=1}^{N} \beta_8 TROP \text{..3.25}$$

$$GCF_t = \alpha_0 + \sum_{q=1}^{M} \alpha_1 Y_{t-q} + \sum_{q=1}^{M} \alpha_2 GCF_{t-q} + \sum_{q=1}^{M} \alpha_3 LF_{t-q} + \sum_{q=1}^{M} \alpha_4 EDUC + \sum_{q=1}^{M} \alpha_5 HEAL + \sum_{q=1}^{M} \alpha_6 WELFE + \sum_{q=1}^{M} \alpha_7 CULTUS + \sum_{q=1}^{M} \alpha_8 TROP + \varepsilon_{2t} \text{.....3.26}$$

$$LF_t = \mu_0 + \sum_{q=1}^{O} \mu_1 Y_{t-q} + \sum_{q=1}^{O} \mu_2 GCAF_{t-q} + \sum_{q=1}^{O} \mu_3 LF_{t-q} + \sum_{q=1}^{O} \mu_4 EDUC + \sum_{q=1}^{O} \mu_5 HEAL + \sum_{q=1}^{O} \mu_6 WELF + \sum_{q=1}^{O} \mu_7 CULTUS + \sum_{q=1}^{O} \mu_8 TROP + \varepsilon_{3t} \text{.....3.27}$$

$$EDUC_t = \phi_0 + \sum_{q=1}^{B} \phi_1 Y_{t-q} + \sum_{q=1}^{B} \phi_2 GCA_{t-q} + \sum_{q=1}^{B} \phi_3 LF_{t-q} + \sum_{q=1}^{B} \phi_4 EDUC + \sum_{q=1}^{B} \phi_5 HEAL + \sum_{q=1}^{B} \phi_6 WELFE + \sum_{q=1}^{B} \phi_7 CULTUS + \sum_{q=1}^{B} \phi_8 TROP + \varepsilon_{4t} \text{.....3.28}$$

$$HEAL_t = \psi_0 + \sum_{q=1}^{Z} \psi_1 Y_{t-q} + \sum_{q=1}^{Z} \psi_2 GCF_{t-q} + \sum_{q=1}^{Z} \psi_3 LF_{t-q} + \sum_{q=1}^{Z} \psi_3 EDUC + \sum_{q=1}^{Z} \psi_4 HEAL + \sum_{q=1}^{Z} \psi_5 WELFE + \sum_{q=1}^{Z} \psi_6 CULTUS + \sum_{q=1}^{Z} \psi_7 TROP + \varepsilon \quad ....3.29$$

$$WELFE_t = \rho_0 + \sum_{q=1}^{A} \rho_1 Y_{t-q} + \sum_{q=1}^{A} \rho_2 GCF_{t-q} + \sum_{q=1}^{A} \rho_3 LF_{t-q} + \sum_{q=1}^{A} \rho_4 EDUC + \sum_{q=1}^{A} \rho_5 HEAL + \sum_{q=1}^{A} \rho_6 WELF + \sum_{q=1}^{A} \rho_7 CULTU + \sum_{q=1}^{A} \rho_8 TROP + \varepsilon_{7t} \quad ....3.30$$

$$CULTU_t = \upsilon_0 + \sum_{q=1}^{N} \upsilon_1 Y_{t-q} + \sum_{q=1}^{N} \upsilon_2 GCF_{t-q} + \sum_{q=1}^{N} \upsilon_3 LF_{t-q} + \sum_{q=1}^{N} \upsilon_4 EDUC + \sum_{q=1}^{N} \upsilon_5 HEAL + \sum_{q=1}^{N} \upsilon_6 WELF + \sum_{q=1}^{N} \upsilon_7 CULTU + \sum_{q=1}^{N} \upsilon_8 TROP + \varepsilon_{8t} \quad .....3.31$$

$$TROP_t = \kappa_0 + \sum_{q=1}^{Y} \kappa_1 Y_{t-q} + \sum_{q=1}^{Y} \kappa_2 GCF_{t-q} + \sum_{q=1}^{Y} \kappa_3 LF_{t-q} + \sum_{q=1}^{Y} \kappa_4 EDUC + \sum_{q=1}^{Y} \kappa_5 HEAL + \sum_{q=1}^{Y} \kappa_6 WELF + \sum_{q=1}^{Y} \kappa_7 CULTUS + \sum_{q=1}^{Y} \kappa_8 TROP + \varepsilon_{9t} \quad .....3.32$$

The existence of co-integration implies Granger causality; however, does not show the direction of causality. To assess the direction, the study was employed a vector error correction (VEC) modeling. If the variables under study are co-integrated, a vector error correction model should be estimated rather than a VECM as in a standard Granger causality test (Granger, 1988). Thus, following Granger (1988), and Engle and Granger (1987), we was estimated a VEC model for the Granger causality test. The vector error correction model is given by the following equation as:

Where, ui (i= 1,2,3,…) refer to error correction terms whose coefficients measure speeds of adjustment, ϕ_1, ϕ_2, ϕ_3, ϕ_4, ϕ_5, ϕ_5 ϕ_7, ϕ_8 are intercepts, and N, ,O,P,C, and H are lag lengths. The ui (i=1, 2, 3, 4, 5, 6, 7, 8) are derived from long-run co-integrating relationships that is

Y= $EDUC_t, HEAL_t, WELFE_t, CULTU_t, GCF_t, LF_t, TROP_t$

Once the equilibrium conditions represented by the co integrating relations are imposed, the VEC model describes how, in each time period, output growth is adjusting towards its long-run equilibrium state. Since the variables are supposed to be co-integrated, then in the short term, deviation of output from its long-run equilibrium path will feed back on its future changes in order to force its movement towards the long-run equilibrium state. The co integrating vectors from which the error-correction terms are derived are each indicating an independent direction where a stable, meaningful long-run equilibrium state exists. The coefficients of the error-correction terms, however, represent the proportion by which the long-run disequilibrium in the dependent variables is corrected in each short-term period (Ghali and El-Sakka, 2004).

Since our aim is on causality between economic growth and Social sector development, hence on the basis of regression, unidirectional causality from GCFt-s to Yt is implied if not only the estimated coefficients on the lagged TLFt-s variables in Equation 3.26 are statistically different from zero as a group (based on standard F-statistic) but also the coefficient on the error-correction term in Equation 3.27 is significant, and if the set of estimated coefficients on the lagged Yt variables in Equation 3.27 are not statistically different from zero. On the other hand, Yt-s causes social development components if the estimated coefficients on the lagged Yt-s variable in Equation 16 are statistically different from zero as a group, the coefficient on the error-correction term in Equation 3.27 is significant, and if the set of estimated coefficients on the lagged social development components variables in Equation 3.28 are not statistically different from zero. Trial directional causality or feedback between Yt and social development components would exist if the set of estimated coefficients on the lagged social development components t-s variables in Equation 3.29 were statistically significant as a group and the set of estimated coefficients on the lagged Yts variables in Equation 3.27 were also statistically significant as a group and also the coefficient of error-correction terms in both Equations are significant (Chang, Tsangyao, 2002).

Followed by using the Granger causality theorem, we will posit the following testing relationships that constitute a vector error correction (VEC) model for output growth of Trivariate model.

$$Y_t = \beta_0 + \sum_{q=1}^{N} \beta_1 Y_{t-q} + \sum_{q=1}^{N} \beta_2 GCF_{t-q} + \sum_{q=1}^{N} \beta_3 LF_{t-q} + \sum_{q=1}^{N} \beta_4 SDU_{t-q}$$

$$SDU_t = \mu_0 + \sum_{q=1}^{O} \mu_1 Y_{t-q} + \sum_{q=1}^{O} \mu_2 GCAF_{t-q} + \sum_{q=1}^{O} \mu_3 LF_{t-q} + \sum_{q=1}^{O} \mu_4 Y_{t-q}$$

3.9 Granger Causality Test

Depending on the theoretical facts we have discussed, the reported F-statistics of the Wald statistics for the joint hypothesis for each equation was undertaken. The null hypothesis is

that Y does not Granger-cause E in the first regression and that E does not Granger-cause Y in the second regression.

Before testing the causality of the VECM, first Granger causality test between real GDP and total social development expenditure was examined to determine the long run causality in VEC context, and then short run causality has been estimated using VECM. The Granger causality test or well known as 'joint F-test' between total social development expenditure and economic growth was used in order to check the direction of causality between two variables in Ethiopia. The Granger procedure is selected because it consists more powerful but simpler way of testing causal relationship Granger (1986). Using this test the following null and alternative hypotheses are estimated.

In testing long-run causality, four hypotheses was tested using VECM. First, 'growth hypothesis', which asserts that social development cause economic growth as complement to in the social development. If such is the case, the policy implications are that Social sector development policies which reduce Social sector development may possibly reduce real output. The growth hypothesis is supported if there is unidirectional Granger-causality from social development. For the U.S., Akraca and Long (1979), Stern (1993, 2000), and Soytas and Sari (2006) give empirical support for the growth hypothesis.
Equation (39) postulates that total Social sector development is related to its past values, growth in RGDP Capital, labor, education, health, social welfare, culture, and trade openness and a certain proportion of equilibrating error.

The null and alternate hypotheses in this case are;

H_0: Economic growth doesn't granger cause Social sector development.

H_1: Economic growth granger causes Social sector development.

Second, hypothesis' which suggests that policy on social sector development have no effect on the economic growth.

$$Y_t = \beta_0 + \sum_{k}^{r} \phi_1 u_{t-k} + \sum_{q=1}^{N} \beta_1 Y_{t-q} + \sum_{q=1}^{N} \beta_2 GCF_{t-q} + \sum_{q=1}^{N} \beta_3 LF_{t-q} + \sum_{q=1}^{N} \beta_4 EDUC_{t-q} + \sum_{q=1}^{N} \beta_5 HEAL + \sum_{q=1}^{N} \beta_6 WELFE +$$

$$\sum_{q=1}^{N} \beta_7 CULTUS + \sum_{q=1}^{N} \beta_8 TROP + \varepsilon_{it} \text{ ..----------.(3.34)}$$

Equation (3.34) postulates that growth in RGDP is related to past values of itself, Capital, labor, education, health, social welfare, culture and trade openness and a certain proportion of equilibrating error.

The null and alternate hypotheses in this case are;

H_0: Total social sector development doesn't granger cause economic growth.

H_1: Total social sector development granger cause economic growth.

Third, feedback hypothesis suggest that social sector development and economic growth are interdependent. Trial directional causality between social sector development and economic growth show such behavior. Third, the feedback hypothesis asserts that social sector development and real output are interdependent and act as complements to each other. The existence of bidirectional Granger-causality between social sector development and real output substantiates the feedback hypothesis. Research by Glasure and Lee (1995, 1996), Zarnikau (1997), Lee (2006), and Mahadevan and Asafu-Adjaye (2007) lend support to the feedback hypo-thesis for the U.S.

Fourth, Neutrality hypothesis suggest that social sector development and economic growth are independent. That is social sector development and economic growth decisions are taken independently. Furthermore, the neutrality hypothesis views social sector development as a relatively minor the composition of government revenue of real output in which case social sector development policies may not adversely impact real output. The absence of Granger-causality between social sector development and real output is supportive of the neutrality hypothesis. Studies by Akraca Long (1980), Yu and Hwang (1984), Yu and Choi (1985), Erol and Yu (1987), Yu et al. (1988), Yu and Jin (1992), Cheng (1996), Murry and Nan (1996), Soytas and Sari (2003), Chontanawat et al. (2006, 2008), Soytas et al. (2007), Chiou-wei et al. (2008), Narayan and Pra-sad (2008), Payne

(2009), and Payne and Taylor (forth-coming) are supportive of the neutrality hypothesis in the U.S.

Otherwise, independence will happen. This is to mean that social sector development growth and economic growth decisions are taken independently.

The short-run causality between social sector development and economic growth is examined using the difference of the variables. Therefore, the above models are estimated in anticipation of yielding four distinct cases. That is,

$$\Delta Y_t = \beta_0 + \sum_{k}^{r} \phi_1 u_{t-k} + \sum_{q=1}^{N} \beta_1 \Delta Y_{t-q} + \sum_{q=1}^{N} \beta_2 \Delta GCF_{t-q} + \sum_{q=1}^{N} \beta_3 \Delta LF_{t-q} + \sum_{q=1}^{N} \beta_4 \Delta EDUC_{t-q} + \sum_{q=1}^{N} \beta_5 \Delta HEAL +$$

$$\sum_{q=1}^{N} \beta_6 \Delta WELFE + \sum_{q=1}^{N} \beta_7 \Delta CULTU + \sum_{q=1}^{N} \beta_8 \Delta TROP + \varepsilon_{1t} \quad \text{..(3.35)}$$

$$\Delta GCF_t = \alpha_0 + \sum_{k}^{r} \phi_1 u_{t-k} + \sum_{k}^{r} \phi_1 u_{t-k} + \sum_{q=1}^{M} \alpha_1 \Delta Y_{t-q} + \sum_{q=1}^{M} \alpha_2 \Delta GCF_{t-q} + \sum_{q=1}^{M} \alpha_3 \Delta LF_{t-q} + \sum_{q=1}^{M} \alpha_4 \Delta EDUC + \sum_{q=1}^{M} \alpha_5 \Delta HEAL +$$

$$\sum_{q=1}^{M} \alpha_6 \Delta WELF + \sum_{q=1}^{M} \alpha_7 \Delta CULTU + \sum_{q=1}^{M} \alpha_8 \Delta TROP + \varepsilon_{2t} \quad \text{(3.36)}$$

$$\Delta LF_t = \mu_0 + \sum_{k}^{r} \phi_1 u_{t-k} + \sum_{q=1}^{O} \mu_1 \Delta Y_{t-q} + \sum_{q=1}^{O} \mu_2 \Delta GCF_{t-q} + \sum_{q=1}^{O} \mu_3 \Delta LF_{t-q} + \sum_{q=1}^{O} \mu_4 \Delta EDUC +$$

$$\sum_{q=1}^{O} \mu_5 \Delta HEAL + \sum_{q=1}^{O} \mu_6 \Delta WELF + \sum_{q=1}^{O} \mu_7 \Delta CULTU + \sum_{q=1}^{O} \mu_8 \Delta TROP + \varepsilon_{3t} \quad \text{(3.37)}$$

$$\Delta EDUC_t = \phi_0 + \sum_{k}^{r} \phi_1 u_{t-k} + \sum_{q=1}^{B} \phi_1 \Delta Y_{t-q} + \sum_{q=1}^{B} \phi \Delta_2 GCF_{t-q} + \sum_{q=1}^{B} \phi_3 \Delta LF_{t-q} + \sum_{q=1}^{B} \phi_4 \Delta EDUC + \sum_{q=1}^{B} \phi_5 \Delta HEAL +$$

$$\sum_{q=1}^{B} \phi_6 \Delta WELF + \sum_{q=1}^{B} \phi_7 \Delta CULTU + \sum_{q=1}^{B} \phi_8 \Delta TROP + \varepsilon_{4t} \quad \text{(3.38)}$$

$$\Delta HEAL_t = \psi_0 + \sum_{k}^{r} \phi_1 u_{t-k} + \sum_{q=1}^{Z} \psi_1 \Delta Y_{t-q} + \sum_{q=1}^{Z} \psi_2 \Delta GCF_{t-q} + \sum_{q=1}^{Z} \psi_3 \Delta LF_{t-q} + \sum_{q=1}^{Z} \psi_4 \Delta EDUC + \sum_{q=1}^{Z} \psi_5 \Delta HEAL +$$

$$\sum_{q=1}^{Z} \psi_6 \Delta WELF + \sum_{q=1}^{Z} \psi_7 \Delta CULT + \sum_{q=1}^{Z} \psi_8 \Delta TROP + \varepsilon_{5t} \quad \text{(3.39)}$$

$$\Delta WELF_t = \rho_0 + \sum_{k}^{r} \phi_1 u_{t-k} + \sum_{q=1}^{A} \rho_1 \Delta Y_{t-q} + \sum_{q=1}^{A} \rho_2 \Delta GCF_{t-q} + \sum_{q=1}^{A} \rho_3 \Delta LF_{t-q} + \sum_{q=1}^{A} \rho_4 \Delta EDUC + \sum_{q=1}^{A} \rho_5 \Delta HEAL +$$

$$\sum_{q=1}^{A} \rho_6 \Delta WELF + \sum_{q=1}^{A} \rho_7 \Delta CULTU + \sum_{q=1}^{A} \rho_8 \Delta TROP + \varepsilon_{7t} \quad \text{(3.40)}$$

$$\Delta CULTU_t = \upsilon_0 + \sum_{k}^{r} \phi_1 u_{t-k} + \sum_{q=1}^{N} \upsilon_1 \Delta Y_{t-q} + \sum_{q=1}^{N} \upsilon_2 \Delta GCF_{t-q} + \sum_{q=1}^{N} \upsilon_3 \Delta LF_{t-q} + \sum_{q=1}^{N} \upsilon_4 \Delta EDUC + \sum_{q=1}^{N} \upsilon_5 \Delta HEAL + \sum_{q=1}^{N} \upsilon_6 \Delta WELFE +$$

$$\sum_{q=1}^{N} \upsilon_7 \Delta CULTU + \sum_{q=1}^{N} \upsilon_8 \Delta TROP + \varepsilon_{8t} \quad \text{(3.41)}$$

$$\Delta TROP_t = \kappa_0 + \sum_{k}^{r} \phi_1 u_{t-k} + \sum_{q=1}^{Y} \kappa_1 \Delta Y_{t-q} + \sum_{q=1}^{Y} \kappa_2 \Delta GCF_{t-q} + \sum_{q=1}^{Y} \kappa_3 \Delta LF_{t-q} + \sum_{q=1}^{Y} \kappa_3 \Delta EDUC + \sum_{q=1}^{Y} \kappa_4 \Delta HEAL +$$

$$\sum_{q=1}^{Y} \kappa_5 \Delta WELF + \sum_{q=1}^{Y} \kappa_6 \Delta CULTU + \sum_{q=1}^{Y} \kappa_7 \Delta TROP + \varepsilon_{9t} \quad \text{(3.42)}$$

$$\Delta Y_t = \beta_0 + \sum_{k}^{r} \phi_1 u_{t-k} + \sum_{q=1}^{N} \beta_1 \Delta Y_{t-q} + \sum_{q=1}^{N} \beta_2 \Delta GCF_{t-q} + \sum_{q=1}^{N} \beta_3 \Delta LF_{t-q} + \sum_{q=1}^{N} \beta_4 \Delta SDU_{t-q} + \varepsilon_{1t} . \text{---------} ..(3.43)$$

$$\Delta SDU_t = \beta_0 + \sum_{k}^{r} \phi_1 u_{t-k} + \sum_{q=1}^{N} \beta_1 \Delta Y_{t-q} + \sum_{q=1}^{N} \beta_2 \Delta GCF_{t-q} + \sum_{q=1}^{N} \beta_3 \Delta LF_{t-q} + \sum_{q=1}^{N} \beta_4 \Delta Y_{t-q} + \varepsilon_{1t} . \text{---------} ..(3.44)$$

First, unidirectional causality from government revenue to RGDP indicated if the estimated coefficients on the lagged E in equation (3.40) are statistically different from zero as a group $\alpha_1 \neq 0$ and the set of estimated coefficients on the lagged RGDP is not statistically different from zero, that is $\beta_1 = 0$.

Second, conversely, unidirectional causality from RGDP to social development expenditure exists if the set of lagged Ecoefficient in (35) is not statistically different from zero, that is $\alpha_1 = 0$and the set of the lagged RGDP coefficients in (23) is statistically different from zero, that is $\beta_1 \neq 0$.Third, feedback, or bilateral causality is suggested when the set of social sector development use and RGDP coefficients are statistically significantly different from zero in both regressions.

Following Sims' (1980) seminal paper, dynamic analysis of VEC model is routinely carried out using the "orthogonalized" impulse responses, where the underlying shocks to the VEC model are orthogonalized using the Cholesky decomposition method. This method assumes the system is recursive and the estimations of impulse response function and variance decomposition are orthogonalized so that the covariance matrix of the resulting innovations is lower triangular (Chen and Patel, 1998). As a result, the Choleski decomposition method is criticized as an arbitrary method in attributing a common effect and changing the order of the equation may dramatically change the impulses. Recently, Pesaran and Shin (1998/2001) proposed an alternative approach, the generalized impulse response analysis, which is invariant to the ordering of the variables in the VEC. Unlike the Choleski decomposition method, the generalized impulse response functions are unique (Ibid).

CHAPTER FOUR

OVERVIEW OF ETHIOPIAN ECONOMY

4.1. The overall Economic Performance

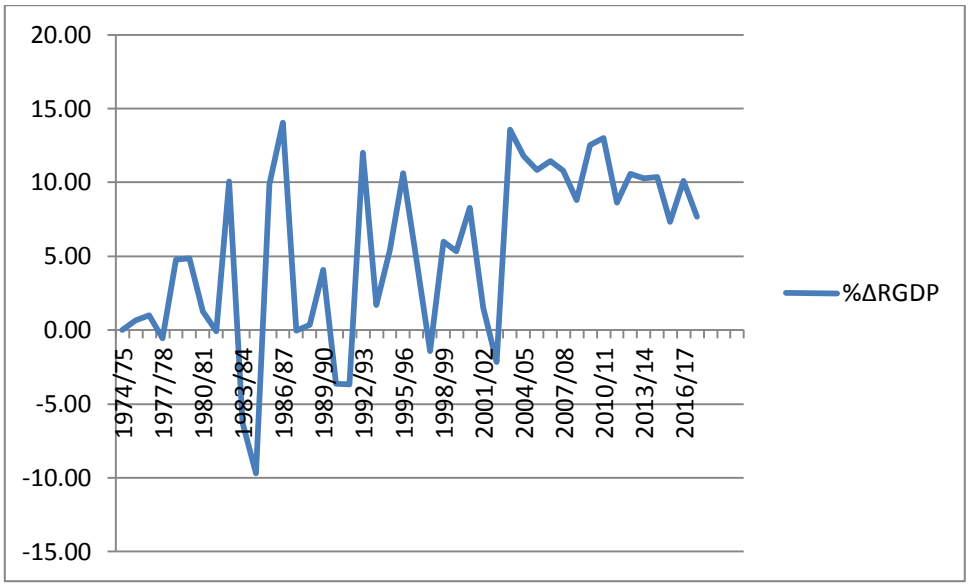
Obviously, the Ethiopian economic growth has shown different changes in various political regimes. These change in government structure created a problem of inconsistency in implementing the policies by previous regimes including external and internal wars as well as natural disaster like famine and drought had a depressing effect on the history of economic growth of the country. In modern Ethiopian political economic history, the country has experienced three policy transitions: the imperial era (prior to 1973/74), the socialist (Derge) regime (1974/75-1990/91) and the EPRDF regime (1991/92 till present) each with unique economic policies with different impact on economic performance of the country. Thus, the performance of the country's economy is highly correlated with changing political economy.

During the Imperial period (pre 1974) economic policy was mainly known to be market oriented economic system and the political process was unpredictable and violent; which exert detrimental impact on the economic performance. As a result, economic performance was not improved. During the Derge regime (1974/75-1990/91), the government exercised centralized economic system and command economic system. Because of intervention of the government in all types of economic activities and nationalization of all types of property, the economy was goes to the worst. After the down fall of the Derge regime in 1991/92, the new government (EPRDF) liberalized the economic system, and relatively good economic performance is recorded though it experienced fluctuations.

As shown from the figure 4.1, growth rate of GDP show tremendous fluctuation. During the derg regime, Ethiopia has recorded the lowest rate of economic growth which is almost

-3.62%. In addition to this, the average growth rate in real GDP was only 1.58% for the seventeenth years. Due to drought, growth was decelerated by 6.29% and 9.63% during 1983/84 and 1984/85 respectively. However, the growth rate displayed amazingly recovery from the previous years and reached 9.9% and 14.04% in 1985/86 and 1986/87 respectively as a result of the economic reforms has been taken and thus it creates relatively conducive environment for domestic and foreign private investors. The Ethiopian economy has grown rapidly as the transition from a command to a market based economy takes place. However, the performance of GDP growth rate in the beginning of current EPRDF regime (1991/1992) was discouraging (-3.69%) due to unfavorable economic basis, violent inherited from the Derge regime. Furthermore, growth rate of GDP had also very low in 1997/98 (-1.44%) because of unexpected Eritrea's aggression. Ethiopia registered the highest GDP growth (double digit growth rate) in the current EPRDF government for the period 2003/04-2014/16, except in 2008/2009 and 2010/11 due to financial crises and inflation.

The Ethiopian economy which had exhibited 10.04 percent average annual growth during 2010/11-2015/16, registered 7.33 percent growth in 2015/16 despite challenging macroeconomic and weather conditions. The 8 percent real GDP growth was 3.77 percentage point lower than base case scenario GTPII target set for the fiscal year although it was significantly higher than 1.6 percent average growth estimated for Sub - Saharan Africa (World Economic Outlook, 2016). The Ethiopian economy is targeted to grow 7.70 percent in 2018/19 in contrast to 3.8 and 5.1 percent growth forecast of the IMF for the world and Sub-Saharan Africa (SSA), respectively (WEO, 2016). Trends of growth rate of real GDP from the year 1974/5-2018/19 can be summarized as follows.



Source: Own drawing based on NBE data (2019)

Figure 4. 1: Trends of growth rate of real GDP

It is fact that, a countries economic growth is significantly affected by the rate of investment and rate of saving. However, Low saving rate has been a dominant feature of the Ethiopian economy comparing to fast investment rate. The share of gross domestic savings from GDP was, on average, 12.9 percent for the last 15 years. On the other hand, gross capital formation as a share of GDP was 28.3 percent over the same years, which is higher than gross domestic saving (EEA, 2007/08). As a result, the resource gap was, on average, -15.4 percent over the last fifteen years, which was financed by external sources. According to the EEA report, the share of gross capital formation financed by the external sector was 73.6 percent during 1997/98 to 2007/08. Similarly, MoFEC (2018) also reported that, domestic saving was small (10.6%) while gross investment rate was 26.9 percent during 200/01 to 2011/12. Accordingly, the resource gap of the country registered 18.1 percent as ratio of GDP during the same period, and which was financed primarily from foreign source (specially, from external debt during 2000 to 2003 and 2007 to 2010 while during 2004 to 2005 was primarily form internal debt.

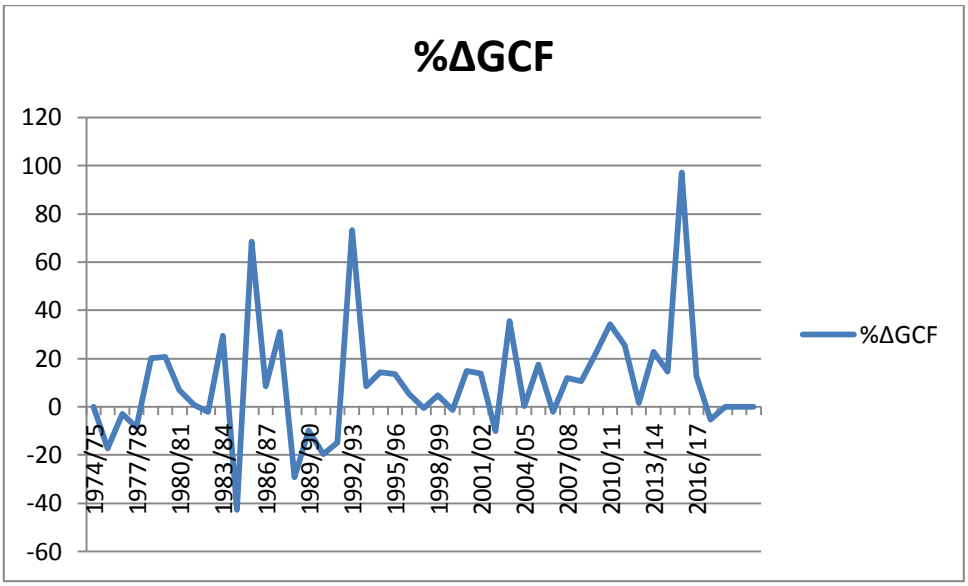


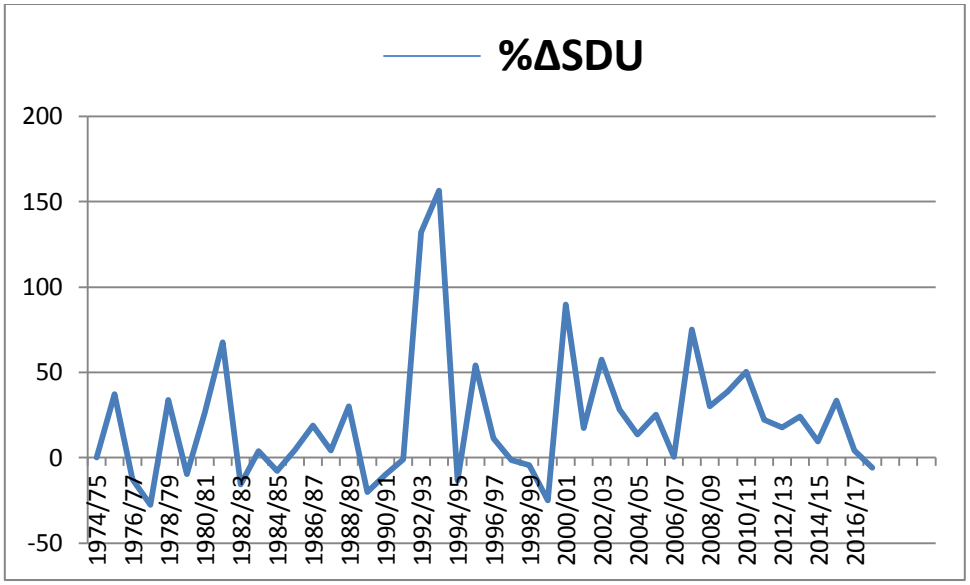
Figure 4.2: Trend of Gross capital of real GDP

Source: Own drawing based on NBE data (2019)

According to the GTP, gross capital formation (formally gross investment) was expected to take 30 percent of GDP share while it reaches 40.3 percent during 2013/14 (NBE, 2013/14), which was achieved before the GTP period completed. Despite, the gross domestic saving rate registered 22.5 percent of GDP share, which is above the GTP target (15%) and even achieved before the period is completed, still it very low as comparing to the investment rate needed. During 2009/10, domestic saving was only 5.2 percent of GDP. However, during the past 4 GTP periods domestic saving started to take off; as a result the share has jumped to 22.5 percent in 2013/14. For the amazing growth of domestic saving rate, the government introduced to stimulate domestic saving including wide range of awareness creation activities in urban and rural areas of the country; strengthening existing saving tools and introduction of new saving mobilization instruments such as selling of government Bonds, deepening of financial institutions, introducing private social security scheme, strengthening government workers social security scheme, strengthening saving for housing program, saving for investment equipment scheme, and sustaining the high level of government savings. Thus expansion

of investment over the past years has been one of the key drivers of growth on the demand side.

4.2. Economic Growth and Share of Social development sectors



Source: Own drawing based on NBE data (2019)

Figure 4.3: Trend of SDU

The social development sector side of the economy is also known as the supply side and it includes the primary production sector (different agricultural activities), secondary sector (manufacturing, construction, electricity and water) and the tertiary sector (service sector like trade and health, education services). Like any developing countries, out of these sectors agriculture has the highest contribution to the economy in terms of value added and employment in Ethiopia. A basic feature of the Ethiopian economy is the dominance of the agricultural sector in terms of output contribution, market contribution, and employment and export earnings. It has an average share of 56 percent over the period 1974/75-2018/19. The sector's contribution varies from the highest 66 percent share in the year 1991/92 to the lowest share of 34 percent in the year 2018/19. This tells that the process of structural change in the economy is a very slow.

In the period where the economy has achieved a double digit growth (2003/04-2014/15), the agricultural sector's contribution is 43 percent on average. Out of this period if we take the first growth and transformation period only the sector's share has declined from 41 percent in 2010/11 to 36 percent in 2014/15, having an average share of 38 percent over the same period. Since the sector has the highest contributions in terms of value added and employment, the government has given a great emphasis for the sector, even though the achievement is not satisfactory. The reasons for this unsatisfactory result especially in the GTP-I period are; according to National Planning Commission (2015), slow transition of the production system to cash crop production and the productivity of producing food items did not grow as it were expected. In 2015/16, the agricultural sector exhibited slower growth rate of 2.3 percent compared with 8.2 percent target mainly due to contraction in grain crop production largely on account of Elino effect (Figure 4.2).

The annual report of National Bank of Ethiopia (2016) shows that the total grain production reached 266.8 million quintals, of which cereal production accounted for 86.7 percent, pulses 10.4 percent and oil seeds 2.9 percent. Cereals production went down by 2 percentage point over the preceding year owing to 1.7 percent reduction in cultivated land area. In contrast, the production of pulses and oilseeds improved by 3.6 and 3.3 percent while cultivated land area expanded by 6.1 and 0.4 percent, respectively during the same period. The total land cultivated for crop production slightly declined by 0.6 percent to 12.5 million hectares, of which cereals production covered 79.9 percent, pulses 13.2 percent and oil seeds 6.9 percent.

The structure of the Ethiopian economy is characterized by a decline in the share of value added in the agriculture over the last decade though agriculture still remained to be dominant in employment creation and a major source of foreign exchange earnings.

Although the country's development plan shows a direction from agriculture to industry and services, no significant change is observed with respect to increasing the share of industry. As we have seen from the figure 4.2, the industrial sector has a more or less constant share over the study period, which indicates that its development was stagnant throughout the last four decades. The average growth rate of the industry sector was 7.07

percent during 1974/75-2018/19. It has an average share of 10 percent from GDP over the period 1974/75-2018/19, and its performance was more or less in line with GTPII target of 21.8 percent growth and 16.6 percent share.

Despite the amazing economic growth, the structure of the economy has not changed very much, agriculture have been dominating the other sectors until 2010/11. However, recently the share of the service sector including both distributive and other services shows substantial increment. According to the Ethiopian Economic Association report, growth in Trade, Hotels, Financial intermediation and education services are the major components that contributed to the growth of the social development (EEA, 2007/08).

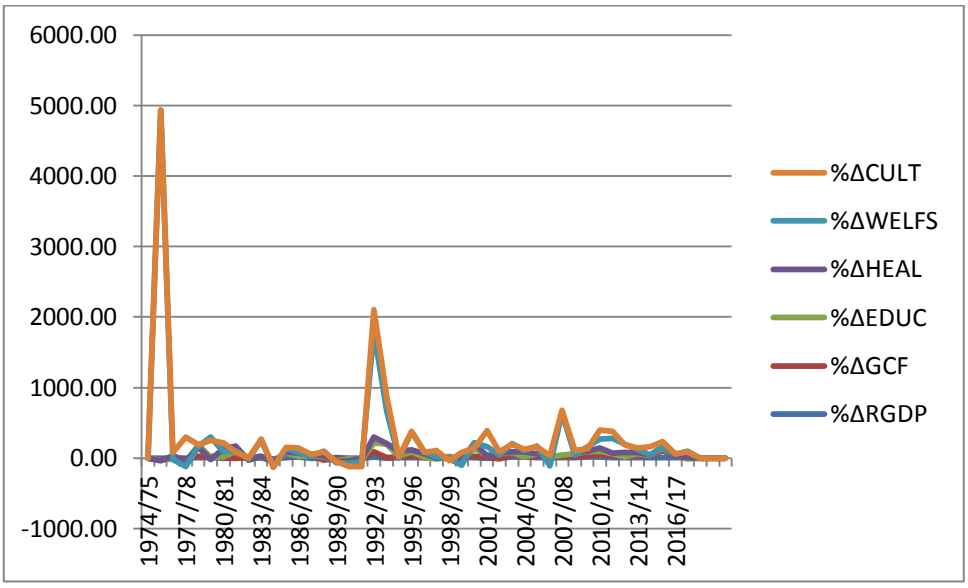
Social sector development is the leading sector in contribution to the economy having 43.7 percent share in GDP in the fiscal year of 2018/19. The sector has also registered an average share of 33.59 percent over the period 1974/75 up to 2015/16.

As shown from the table, Agriculture as compared to other sectors, contributed a lion share of real GDP of Ethiopia during the entire period under study 1974/75-2017/18. That is, the share of agriculture was 56%, while that of industrial and service sectors were 9.67% and 33.59% respectively.

Despite the stagnant industrial growth, since 2011/12, a slight change is observed in the Ethiopian economy. Therefore, share of the economy was dominated by the service sector, which has relatively rapid growth rate among the Social sector development growth rates (i.e. agriculture, industry and service grew by 6.99, 15.57 and 12.75 percent, respectively during 2005/06 – 2015/16).

In all sectors, the Ethiopian economic growth rate during 1992/93-2003/4 was oscillated. However, since 2004 the growth rate had grew evenly with double digits whatever the growth rate is different in its magnitudes. Similarly, agriculture and industry sector growth were also like GDP growth while the Social sector development was in robust growth since the post reform and take over the largest share of GDP during 2015/2016 (GTP, 2012/13) and which accounts 43.7 percent of the total GDP.

4.3. Social Sectors development and Economic Growth



Source: Own computation based on MoFEC data (2019)

Figure 4.4: Share of Education, Health, culture and social welfare

Most of the time expenditures (both recurrent and capital) of health, education and training were employed to measure human capital, which is the major driving force of economic growth. During the military power, the coverage and well distribution of education and health were very low comparing to current. More over the life expectancy at birth was 44 years (WB, 2015). The amounts of budget allocated to this sector were insignificant capering to GDP instead for military force were more. The total budget allocated to health, education and training in 1974 was 208 Million Birr (I.e. 0.2 percent of GDP) and reached 717 Million Birr (0.6 percent of GDP) in the year of 1991 while military expenditure ratio to GDP was 5.8 percent during the same period (WB, 2015).

Post 1992, the Ethiopian government developed 20 years plan of health and education to improve health and education of citizens. To achieve this 20 years plan the government has

been doing its homework by investing relatively more budget. The total amount of budget allocated in 1992 was 948 Million Birr (0.7% ratio to real GDP) and reached 56,157 Million Birr (8.3% ratio to real GDP) in 2013. Parallel to fast growing in human capital expenditure, economic growth was also robust and registered 6.7 percent annual growth during the same period.

Beside the reasonable budget allocation, health and education of the society improvised since 1992 (relatively to the previous). Accordingly, the total student enrollment rate for primary and secondary school were 95.5 and 38.4 percent respectively, in the year 2012/13 (ministry of education report) as quoted in MoFEC report. Similarly the health status and health coverage of the society improved, where life expectancy reached 64.2 years in 2013 from 44 years in 1974 (WB, 2015). On the other hand, the economic growth also goes in the same direction and registered an average growth rate of 11 percent during 2003-2013. Today, there are 397,930 students in per-school, 17 Million students in primary school, 1.5 Million students in secondary school, 335,058 students in TVET, 487,048 in higher education and totally around 20 Million of students are in education and training.

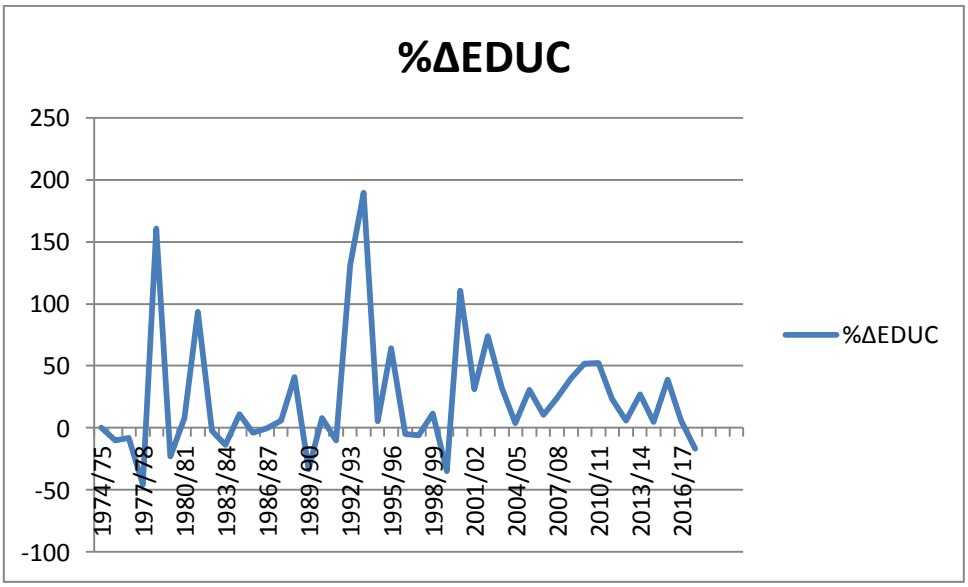


Figure 4.5: Trend of education on real GDP

Source: Own drawing from MoFEC data (2019)

Beside the reasonable budget allocation, health and education of the society improvised since 1992 (relatively to the previous). Accordingly, the total student enrollment rate for primary and secondary school were 95.5 and 38.4 percent respectively, in the year 2012/13 (ministry of education report) as quoted in MoFEC report. Similarly the health status and health coverage of the society improved, where life expectancy reached 64.2 years in 2013 from 44 years in 1974 (WB, 2015). On the other hand, the economic growth also goes in the same direction and registered an average growth rate of 11 percent during 2003-2013. Today, there are 397,930 students in per-school, 17 Million students in primary school, 1.5 Million students in secondary school, 335,058 students in TVET, 487,048 in higher education and totally around 20 Million of students are in education and training.

The economy's growth rate is on average 5.34percent for the last four decades and it has become impressive in the latest decade. The average growth rate in the EPRDF regime is 7.53 percent which is higher than the pre-EPRDF period. The economy has grown by 10.77percent for the period between 2003/04-2018/19. But even with this highest growth rate the structure of the economy is almost as it is before this period, the only exception is that the service sector has become the leading sector and there is a significant decline in the share of agriculture. In GTP-I, the economy has registered an average growth rate of 10.59 percent a little less of the planned 11 percent average growth rate.

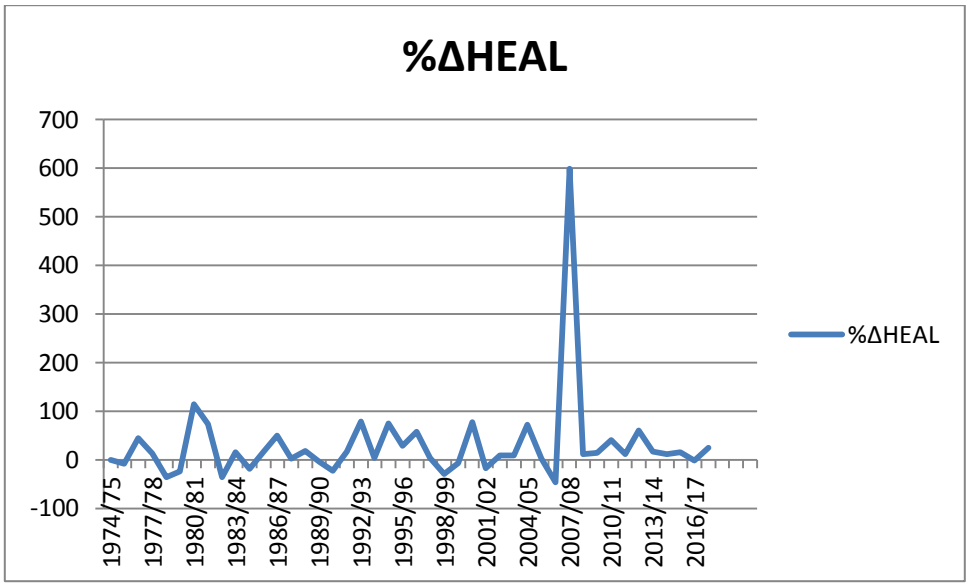


Figure 4.6: Trend of health on real GDP

Source: Own drawing based on NBE data (2019)

Post 1992, the Ethiopian government developed 20 years plan of health and education to improve health and education of citizens. To achieve this 20 years plan the government has been doing its homework by investing relatively more budget. The total amount of budget allocated in 1992 was 948 Million Birr (0.7% ratio to real GDP) and reached 56,157 Million Birr (8.3% ratio to real GDP) in 2013. Parallel to fast growing in human capital expenditure, economic growth was also robust and registered 6.7 percent annual growth during the same period.

Beside the reasonable budget allocation, health and education of the society improvised since 1992 (relatively to the previous). Accordingly, the total student enrollment rate for primary and secondary school were 95.5 and 38.4 percent respectively, in the year 2012/13 (ministry of education report) as quoted in MoFEC report. Similarly the health status and health coverage of the society improved, where life expectancy reached 64.2 years in 2013 from 44 years in 1974 (WB, 2015). On the other hand, the economic growth also goes in the same direction and registered an average growth rate of 11 percent during 2003-2013. Today, there are 397,930 students in per-school, 17 Million students in primary school, 1.5

Million students in secondary school, 335,058 students in TVET, 487,048 in higher education and totally around 20 Million of students are in education and training.

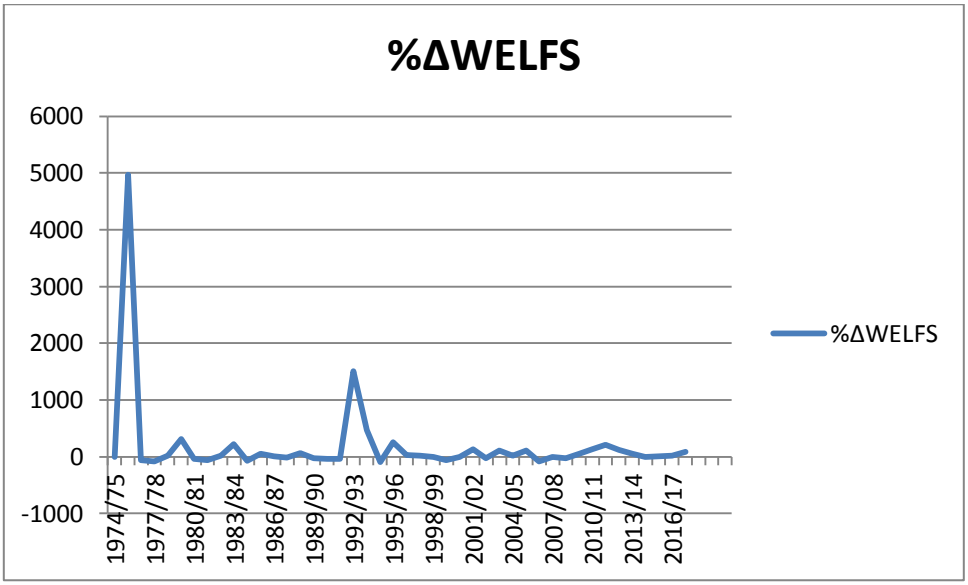


Figure 4.7: Trend of welfare on real GDP

Source: Own drawing based on NBE data (2019)

The structure of the Ethiopian economy is characterized by a decline in the share of value added in the agriculture over the last decade though agriculture still remained to be dominant in employment creation and a major source of foreign exchange earnings.

Although the country's development plan shows a direction from agriculture to industry and services, no significant change is observed with respect to increasing the share of industry. As we have seen from the figure 4.2, the industrial sector has a more or less constant share over the study period, which indicates that its development was stagnant throughout the last four decades. The average growth rate of the industry sector was 7.07 percent during 1974/75-2018/19. It has an average share of 10 percent from GDP over the period 1974/75-2018/19, and its performance was more or less in line with GTPII target of 21.8 percent growth and 16.6 percent share.

Despite the amazing economic growth, the structure of the economy has not changed very much, agriculture have been dominating the other sectors until 2010/11. However, recently

the share of the service sector including both distributive and other services shows substantial increment. According to the Ethiopian Economic Association report, growth in Trade, Hotels, Financial intermediation and education services are the major components that contributed to the growth of the social development (EEA, 2007/08).

Social sector development is the leading sector in contribution to the economy having 43.7 percent share in GDP in the fiscal year of 2018/19. The sector has also registered an average share of 33.59 percent over the period 1974/75 up to 2015/16.

The lion's share of agricultural sector was crop production, comprising 71.9 percent, followed by animal farming & hunting (19.5 percent) and forestry (8.4 percent). In terms of growth rate, crop and forestry increased by 3.4 and 2.2 percent, respectively; while animal farming & hunting went down by 1.5 percent (Table 4.1).

Manufacturing sector increased by 18.4 percent (lower than 20.2 GTPII target) and constituted about 32.4 percent of industrial output. Construction industry, on the other hand, contributed more than half (56.8 percent) to industrial sector and expanded by 25 percent signifying the leading role the construction sector plays in terms growing expansion of roads, railways, dams and residential houses.

4.4. Demand Side of the Economy/GDP by Expenditure Components

Social development expenditure is dominant in the demand side of the GDP as it constitutes on average 35.5 percent of the GDP between 1974/75 and 2014/15. In the EPDRF period (1991/92 up to present) it has 11.53 percent share of the GDP, on average. Real gross capital formation as a share of GDP has also increased from 1.56 percent which was before 1991/92 to 17.82 percent in post 1991/92. In the GTP-I period expenditure has 111.61 percent share of GDP on average, while the average share of gross capital formation in GDP was 50.59.

As it is clearly known, economic growth of a given countries is significantly affected by the rate of investment and rate of saving. Most developing countries in Africa heavily relied on overseas development assistance (ODA) to fund the bulk of investment needed to prop growth and create a sustainable economic development path. Accordingly, the domestic and regional financial markets as sources of funds were neglected considering that no or few viable policies were actively implemented to prop up domestic savings, particularly households' savings. The issue of low levels of domestic savings is a main problem in developing countries due to high levels of unemployment, low wages, and engagement of a large proportion of the population in the informal sector as well as poor performance of the economy (Reddy, 2010).

During the imperial regime (1960/61-73/74), gross domestic saving (17.7%) was greater than investment (14.70%). This shows that domestic saving is fully covered domestic investment.

After the down fall of the imperial regime and the DERG regime, saving has begun to decline , and on average, 1.58 % and investment has decline to 10.28%, on average, this shows that great amount of saving-investment gap has created during the DERG regime.

The share of gross domestic savings from GDP was, on average, 13.34 percent for the last 15 years (2000/01-2014/15). On the other hand, gross capital formation as a share of GDP

was 25.74 percent over the same years, which is higher than gross domestic saving. As a result, the resource gap was, on average, -14.21 percent over the last fifteen years, which was financed by external sources. According to the EEA report, the share of gross capital formation financed by the external sector was 73.6 percent during 1997/98 to 2007/08.

Similarly, MoFEC (2013) also reported that, domestic saving was small (10.6%) while gross investment rate was 26.9 percent during 200/01 to 2011/12. Accordingly, the resource gap of the country registered 18.1 percent as ratio of GDP during the same period, and which was financed primarily from foreign source (specially, from external debt during 2000 to 2003 and 2007 to 2010 while during 2004 to 2005 was primarily from internal debt.

CHAPTER FIVE

EMPERICAL RESULTS AND DISCUSSION

The previous chapter discussed the over view of Ethiopian economy. In this chapter, the study analyses the relationship between Social development expenditure and economic growth using annual data from 1974/5-2017/18 in Ethiopia. Before we go to the direct estimation of the model, we need to first employ the unit root test to check whether the time-series is stationary or not. After identifying the optimal lag length, the presence of the co-integrating vectors was tested using the Johansen co-integration procedure. Furthermore, the granger causality test was employed to find the direction of causality between Social development expenditure and economic growth. Finally, the long-run and short-run relationship is also identified followed by the volatility test.

The main aim of this thesis was to examine the dynamics of the relationship between Social development expenditure and economic growth using time series data over the period 1974/5-2017/18. The data was obtained from Ministry of Finance and Economic Cooperation and National bank of Ethiopia data.

5.1 Descriptive Statistics

The evidence from below table shows that except LNGCF, all the variables are normally distributed. Also, the variables LNCULTU, LNEDUC, and LNHEAL are positively skewed with LNRGDP. The small standard deviation compared to the mean implies that slow growth rate over the period.

Table 5.1: Descriptive Statistics

	LNRGDP	LNTLF	LNCULTU	LNEDUC	LNGCF	LNHEAL	LNWELFS	LNTROP
Mean	5.332896	7.427800	1.033124	2.592888	4.714661	2.268040	1.064370	1.829527
Median	5.244399	7.416088	0.795211	2.528039	4.621458	2.205231	0.992730	1.800338
Maximum	5.981657	7.714212	3.400550	4.448371	5.819369	4.046367	2.848925	2.714866
Minimum	5.010328	7.173175	-1.091515	1.019947	4.149712	0.960613	-0.468521	1.209988
Std. Dev.	0.299682	0.159690	1.232072	1.094384	0.459511	0.961866	0.762619	0.529324
Skewness	0.813124	0.134318	0.381709	0.327052	0.942979	0.504766	0.637206	0.414191
Kurtosis	2.350746	1.859736	2.217763	1.687487	3.012880	1.969895	2.811088	1.710915
Jarque-Bera	5.621391	2.516008	2.190287	3.942660	6.521173	3.813829	3.042994	4.304591
Probability	0.060163	0.284221	0.334492	0.139271	0.038366	0.148538	0.218385	0.116217
Sum	234.6474	326.8232	45.45744	114.0871	207.4451	99.79377	46.83228	80.49919
Sum Sq. Dev.	3.861795	1.096534	65.27403	51.50009	9.079483	39.78300	25.00829	12.04792
Observations	44	44	44	44	44	44	44	44

Source: Own computation (2019)

5.2. Unit Root Test

As clearly discussed under methodology chapter, it is necessary to test the nature of stationarity of the variables before running regression analysis. This helps us to avoid the possibility of running a spurious regression, which makes the result to be unreliable and inconsistent. This test can be done using the Augmented Dickey-Fuller (ADF) unit root tests. When the ADF test statistics is larger than the critical value in absolute terms at 5 % level of significance, the null hypothesis of unit root is rejected, and if the ADF test statistics is less than the critical value in absolute terms, we fail to reject the null hypothesis. The results of ADF test for unit root of variables used in the study is presented in the following table (5.2). All variables are in logarithmic forms. It is worth pointing out that all variables was transformed to natural logarithms before analysis to avoid the problem of heteroscedasticity of the error terms; the estimated coefficients on level variables are elasticity‘s. Since all variables were tested for non-stationary using Unit root test, they were differenced once and the estimated parameters of first differences of the natural logarithms gave approximate growth rates of the variables.

Table 5. 2: Results of Augmented Dickey Fuller Test

Variables	ADF t-statistic at level, I(0)		ADF t-statistic at first difference, I(1)
	Intercept and trend	Intercept &trend	Decision
LNRGDP	0.017845(NS)	-6.686109*** (S)	Stationary (I(1))
LNLTF	-0.735476(NS)	-7.316802***(S)	Stationary (I(1))
LNGCF	-1.455974 (NS)	-8.161544***(S)	Stationary (I(1))
LNEDU	-2.886710(NS)	-7.019154***(S)	Stationary(I(1))
LNLEAL	-2.717192(NS)	-8.043199***(S)	Stationary(I(1))
LNWELFS	-4.058645(S)	-8.155109***(S)	Stationary(I(1))
LNTROP	-2.952843(NS)	-7.929125***(S)	Stationary(I(1))
LNCULTU	-2.609940 (NS)	-7.552244*** (S)	Stationary(I(1))
LNSDU	-2.469211(NS)	-6.522807*** (S	Stationary(I(1))
MacKinnon (1996) with constant, no trend			with constant and trend
Test critical values:	1% level	-3.621	1% level -4.227
	5% level	-2.943	Test critical values: 5% level -3.537
	10% level	-2.610	10% level -3.200

Where NS & S represent not stationary and Stationary respectively

Source: Own computation (2019)

Table 5.2 shows unit root results of the series at level and first differences. The absolute values of the calculated test statistics for all variables are less than its critical value at 5 per cent level of significance. The result indicates that all variables are non-stationary at level. Thus, the null hypothesis that each variable has unit root at a level cannot be rejected by the ADF test. However, all the variables were found to be stationary at their first

differences, and thus we reject the null hypothesis, and the model can be accepted since the coefficients of variables in all cases are negative and statistically significant. The results imply that all the variables included in the models are integrated of order one, I (1). Thus, with the establishment of the order of integration, the study proceeded to testing for long-run relationship by employing Johansen approach to test co-integration. However, before applying this test, we need to determine first the appropriate lag length, and check the stability of the VECM since Johansen's co-integration test and thus VECM is very sensitive to lag length determination.

5.3 Optimum lag length

In the Johansen approach, the first step in testing for co integration and estimating a VECM model is to determine the optimal lag length of the VECM (Alemayehu*et al*, 2009). Johansen co-integration analysis is very sensitive to the number of lags included in the model, the more lags we include, the more initial values we lose. If we include too few lags, the size of the test will be incorrect (Wooldridge, 2000).

The optimal lag order is determined with sequential modified Likelihood Ratio test statistics (LR), the Final Prediction Error (FPE), the Akaiki Information Criterion (AIC), the Schwarz Information Criterion (SC) and the Hannan-Quinn Information Criterion (HQ). Lag that provides the minimum value is chosen as the optimal lag length that means, among the IC that provides majority lag has been chosen as optimal lag length. While, checking up to three lag orders to include the 5% significance level suggest that lag 1 would be the optimum lag length for multivariate model and this has been confirmed by LR, FPE, SC and HQ in both cases. The smaller the value of the information criteria, the better the model is. The lag exclusion test confirms the first lag to be the appropriate lag. In finding optimum lag length up to three lag order was checked to include the 5% significance level suggest that lag 1 would be the optimum lag length for multivariate and 3 is optimum lag length is Trivariate model (Look at table 5.3.1 and 5.3.2). Thus, this study employs the optimal lag length of one for estimation techniques. Thus, the next step

is to estimate Johansen test of co-integration, VECM, Granger causality and Impulse response and variance decomposition models.

Table 5.3: VAR Lag Order Selection Criteria

Table 5.3:1 VAR Lag Order Selection Criteria for Multivariate model

VAR Lag Order Selection Criteria
Endogenous variables: LNRGDP LNTLF LNCULTU LNEDUC LNGCF LNHEAL LNWELFS LNTROP
Date: 12/25/19 Time: 16:13
Sample: 1 440
Included observations: 41

Lag	LogL	LR	FPE	AIC	SC	HQ
0	84.25531	NA	3.35e-12	-3.719771	-3.385416	-3.598018
1	492.3367	637.0050*	1.82e-19*	-20.50423	-17.49503*	-19.40844*
2	553.8519	72.01784	2.97e-19	-20.38302	-14.69898	-18.31320
3	643.3311	69.83745	2.72e-19	-21.62591*	-13.26702	-18.58206

* 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

Table 5.3.2: VAR Lag Order Selection Criteria for Trivariate Model

VAR Lag Order Selection Criteria
Endogenous variables: LNRGDP LNTLF LNGCF LNSDU
Exogenous variables: C
Date: 12/29/19 Time: 12:39
Sample: 1 440
Included observations: 41

Lag	LogL	LR	FPE	AIC	SC	HQ
0	133.8036	NA	2.09e-08	-6.331885	-6.164707	-6.271008
1	363.5225	403.4087	6.23e-13	-16.75719	-15.92130*	-16.45281
2	379.8093	25.42334	6.30e-13	-16.77119	-15.26659	-16.22329
3	407.8862	38.34897*	3.71e-13*	-17.36030*	-15.18699	-16.56890*

* 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

5.4 Johansen Co-Integration Test for Long Run Relationship

The existence of the same order of integration, therefore, allows us to test for Co-integration among the variables. To determine the number of co integrating vectors two test statistics called the maximum Eigen value (λmax) and trace statistics (λtrace) are computed. The trace test tests the null hypothesis of r co integrating vectors against the alternative hypothesis of k co integrating vectors, where k is the number of endogenous variables, for r =0,1,2…,k-1. The maximum Eigen-value test, on the other hand, tests the null hypothesis of r co integrating vectors against the alternative hypothesis of r+1 co integrating vectors.

It can be seen from table 5.4 that the unrestricted co-integration rank tests (both trace statistics(λ trace) and maximum Eigen value (λmax) show the existence of one co-integrating vectors in the system. This means, the null hypothesis of no co-integration is rejected by both the λ max and the λ trace statistics. If the test statistics is greater than the critical values, the null hypothesis that there exists r co-integrating vectors against the alternative hypothesis that there are r+1 (for λtrace) or more than r (for λmax) is rejected. Thus, both λ trace and maximum Eigen value (λmax) conclude that there is one co integrating vector among the variables and there is only one Eigen value significant at 1% level and this outcome determines that the rank of the co integration is unity. It can be conclude that among the variables there is one long run relationship. The result of testing the number of co-integrating vectors is shown in table 5.4.1 and table 5.4.2

5.4.1 Johansen Co-Integration Test for Multivariate model

Table 5.4: Johansen co integration result for Multivariate model

Table 5.4 .1 Unrestricted Cointegration Rank Test (Trace)

Date: 12/25/19 Time: 16:18

Sample (adjusted): 3 44
Included observations: 42 after adjustments
Trend assumption: Linear deterministic trend
Series: LNRGDP LNTLF LNCULTU LNEDUC LNGCF LNHEAL LNWELFS LNTROP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.754237	198.3049	159.5297	0.0001
At most 1	0.598411	125.0471	125.6154	0.0541
At most 2	0.492082	86.72938	95.75366	0.1776
At most 3	0.456956	65.87468	69.81889	0.0991
At most 4	0.402606	40.23098	47.85613	0.2144
At most 5	0.268830	18.59351	29.79707	0.5224
At most 6	0.120573	5.442945	15.49471	0.7601
At most 7	0.001109	0.046609	3.841466	0.8290

Trace test indicates 3 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 5.4: 2 Johansen co integration result for Multivariate model (Maximum Eigen value)

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.754237	58.94223	52.36261	0.0093
At most 1	0.640188	42.93127	46.23142	0.1084
At most 2	0.516904	30.55669	40.07757	0.3881
At most 3	0.456956	25.64369	33.87687	0.3429
At most 4	0.402606	21.63747	27.58434	0.2396
At most 5	0.268830	13.15057	21.13162	0.4385
At most 6	0.120573	5.396335	14.26460	0.6912
At most 7	0.00110`9	0.046609	3.841466	0.8290

Max-eigenvalue test indicates 1 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

1 Cointegrating Equation(s): Log likelihood 495.3307

Normalized cointegrating coefficients (standard error in parentheses)

LNRGDP	LNTLF	LNCULTU	LNEDUC	LNGCF	LNHEAL	LNWELFS	LNTROP
1.000000	-6.766821	-0.059661	-0.052711	0.076669	-0.013540	-0.036896	-0.155497
	(0.37277)	(0.01395)	(0.02595)	(0.03680)	(0.01623)	(0.00664)	(0.04124)

Source: Own computation (2019)

Both the maximum Eigen Value and trace statistic confirm that the variable is cointegrated of at most one. Table 5.4.1 and 5.4.2 reports that the null of no co-integration vector is rejected by both trace statistics and maximum eigen value at 1% significance level. On the other hand, one co-integration vector is not rejected by tests, we can concluded that there exists only one co-integration vector, and thus there exists meaningful long run relationship between the economic growth and education, health, gross capital formation, labor force, culture, social welfare, and trade openness.

In addition to this, the existence of one co integrating vector indicates that the first row of β coefficient and the first column of α vectors are important for further analysis. Thus, table 5.4.3 and table 5.4.4 below reports β and α vector respectively.

Table 5.4.3: Standard beta (β) coefficient/ Long-Run Co-integrating Vectors (Linearised)

1 Cointegrating Equation(s):	Log likelihood	488.5469					
Normalized cointegrating coefficients (standard error in parentheses)							
LNRGDP	LNTLF	LNCULTU	LNEDUC	LNGCF	LNHEAL	LNWELFS	LNTROP
1.000000	-6.766821	-0.059661	-0.052711	0.076669	-0.013540	-0.036896	-0.155497
	(0.37277)	(0.01395)	(0.02595)	(0.03680)	(0.01623)	(0.00664)	(0.04124)

Note: Since the table is not in equation form, the real sign of the coefficients are changed
***Source**: Own Computation (2019)*

As it is presented in table 5.4.3, the long run Cointegrating vector indicates that LNRGDP, LNTLF, LNCULTU, LNEDUC, LNHEAL, LNWELF and LNTROP have registered the expected sign and statistically significant. However, LNGCF does not registered the expected sign, and it is not statistically significant. (On average) , A 1% change in LNTLF, LNCULTU, LNEDUC, LNHEAL, LNWELF and LNTROP will result in 6.76%, 0.06%, 0.05%, 0.01%, 0.03%, and 0.15% increase in LNRGDP respectively.

Table 5.4.4: Standard (α) coefficient

Adjustment coefficients (standard error in parentheses)	
D(LNRGDP)	-0.544506

	(0.18454)
D(LNTLF)	-0.011490
	(0.03489)
D(LNCULTU)	-0.273380
	(2.24200)
D(LNEDUC)	2.954381
	(1.15488)
D(LNGCF)	-0.762877
	(0.82350)
D(LNHEAL)	-0.791172
	(1.75857)
D(LNWELFS)	11.38504
	(3.60970)
D(LNTROP)	0.346012
	(0.54389)

The value of α coefficient obtained from the co integration show the speed of adjustment of the long run parameters towards the equilibrium relationship. For example adjustment coefficients of real GDP (LNRGDP), labor force (LNTLF), Culture and sport (LNCULTU), Gross capital formation (LNGCF), Health (LNHEAL), Education (LNEDUC), Trade openness (LNTROP) and Labor force (LNTLF) are negative indicating the existence of adjustment towards long run equilibrium. That is, the speed of adjustment of LNRGDP, LNWELF, LNEDUC and LNTROP to their long run equilibrium by 54.45%, 1138.50%, 295.43%, and 34.60% respectively. Nonetheless, the adjustment coefficients of the labor force (LNTLF), culture (LNCULTU), Gross capital formation (LNGCF), Health (LNHEAL) is positive which indicate the extent to which this variable may deviate from its long run steady state path after a certain shock. Based on this it would be possible to analyze both the long run and short run relationship between these variables in Ethiopia for the period under consideration.

5. 4. 2 Johansen Co integration Result for Trivariate Model

Table 5.5: Johansen co integration result for Trivariate model

Date: 12/29/19 Time: 12:40
Sample (adjusted): 5 44
Included observations: 40 after adjustments
Trend assumption: Linear deterministic trend
Series: LNRGDP LNTLF LNGCF LNSDU
Lags interval (in first differences): 1 to 3

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.569498	63.01129	47.85613	0.0010
At most 1	0.404102	29.29917	29.79707	0.0570
At most 2	0.124262	8.591723	15.49471	0.4045
At most 3	0.078824	3.284172	3.841466	0.0699

Trace test indicates 1 cointegrating eqn(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 *	0.569498	33.71212	27.58434	0.0072
At most 1	0.404102	20.70744	21.13162	0.0572
At most 2	0.124262	5.307551	14.26460	0.7026
At most 3	0.078824	3.284172	3.841466	0.0699

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

1 Cointegrating Equation(s): Log likelihood 396.6349

Normalized cointegrating coefficients (standard error in parentheses)

LNRGDP	LNTLF	LNGCF	LNSDU
1.000000	-18.21705	1.451976	-0.582402
	(3.14385)	(0.29697)	(0.10646)

Source: Own Computation (2019)

It can be shown from the table 5.5 that the unrestricted cointegration rank test (Trace) shows two co-integrating vectors at the 1% critical value in the system while table, the unrestricted cointegration rank test (Maximum Eigenvalue) shows no co-integrating vectors in the system. Sporadically, the trace and the maximum eigen value test statistics yield conflicting results. In such a case the trace statistics is more robust than the maximum eigen value statistics in testing for co-integration (Luintel & Khan, 1999, and Roman, 2012). Hence, based on trace statistics result we can conclude that there exists

meaningful long run relationship between the social development and its components with economic growth in Ethiopia under investigation.

As it is presented in table 5.5, in this model, the long run Cointegrating vector indicates that all variables except LNGCF, have registered the expected sign and statistically significant. That is LNSDU and LNTLF have a positive significant impact on economic growth in the long run. A 1% change in LNTLF will result in 18.2% increase in LNRGDP, on average. A 1% change in LNSDU will result in 0.58% increase in LNRGDP, on average. This indicates that when expenditure on social sector development sets the foundation for rising income and employment opportunities, productivity growth, technological advancement and hence, helps to enhance the quality of life of people, and it has implications for long-run socio-economic development.

5.5. Short Run Vector Error Correction Model for Multivariate

Table 5.6: Estimates of β coefficients normalized to LNRGDP

Vector Error Correction Estimates
Date: 12/29/19 Time: 12:21
Sample (adjusted): 3 44
Included observations: 42 after adjustments
Standard errors in ( ) & t-statistics in [ ]

CointegratingEq:	CointEq1
LNRGDP(-1)	1.000000
LNTLF(-1)	-6.766821 (0.37277) [-18.1527]
LNCULTU(-1)	-0.059661 (0.01395) [-4.27600]
LNEDUC(-1)	-0.052711 (0.02595) [-2.03131]
LNGCF(-1)	0.076669 (0.03680) [2.08338]
LNHEAL(-1)	-0.013540 (0.01623) [-0.83423]
LNWELFS(-1)	-0.036896

	(0.00664)							
	[-5.55451]							
LNTROP(-1)	-0.155497							
	(0.04124)							
	[-3.77040]							
C	45.12226							

Error Correction:	D(LNRGDP)	D(LNTLF)	D(LNCULTU)	D(LNEDUC)	D(LNGCF)	D(LNHEAL)	D(LNWELFS)	D(LNTROP)
CointEq1	-0.544506	-0.011490	-0.273380	2.954381	-0.762877	-0.791172	11.38504	0.346012
	(0.18454)	(0.03489)	(2.24200)	(1.15488)	(0.82350)	(1.75857)	(3.60970)	(0.54389)
	[-2.95058]	[-0.32936]	[-0.12194]	[2.55817]	[-0.92639]	[-0.44989]	[3.15401]	[0.63618]
D(LNRGDP(-1))	0.375953	0.053185	2.772930	-1.601344	1.856765	2.829888	0.231095	0.491185
	(0.19085)	(0.03608)	(2.31857)	(1.19432)	(0.85162)	(1.81864)	(3.73299)	(0.56246)
	[1.96994]	[1.47414]	[1.19596]	[-1.34080]	[2.18027]	[1.55605]	[0.06191]	[0.87327]
D(LNTLF(-1))	3.850130	-0.338531	-32.62948	2.564067	-12.55401	-16.42891	22.43741	-9.629771
	(1.46593)	(0.27713)	(17.8096)	(9.17391)	(6.54155)	(13.9694)	(28.6741)	(4.32043)
	[2.62640]	[-1.22155]	[-1.83213]	[0.27950]	[-1.91912]	[-1.17606]	[0.78250]	[-2.22889]
D(LNCULTU(-1))	-0.011477	0.004910	-0.173092	0.222576	0.034776	0.052214	-0.292081	0.059004
	(0.01325)	(0.00251)	(0.16103)	(0.08295)	(0.05915)	(0.12630)	(0.25926)	(0.03906)
	[-0.86593]	[1.95944]	[-1.07493]	[2.68338]	[0.58797]	[0.41339]	[-1.12661]	[1.51046]
D(LNEDUC(-1))	0.021279	-0.002599	-0.014628	-0.204393	0.130868	-0.104108	0.003861	0.095681
	(0.02438)	(0.00461)	(0.29614)	(0.15254)	(0.10877)	(0.23228)	(0.47680)	(0.07184)
	[0.87295]	[-0.56398]	[-0.04939]	[-1.33989]	[1.20313]	[-0.44819]	[0.00810]	[1.33185]
D(LNGCF(-1))	0.008704	-0.006734	0.235283	-0.045894	-0.338442	-0.214011	-0.602526	-0.219665
	(0.04505)	(0.00852)	(0.54735)	(0.28194)	(0.20104)	(0.42933)	(0.88125)	(0.13278)
	[0.19319]	[-0.79068]	[0.42986]	[-0.16278]	[-1.68343]	[-0.49848]	[-0.68372]	[-1.65434]
D(LNHEAL(-1))	0.006081	0.000385	0.260124	0.142798	-0.008954	-0.268232	-0.279777	0.027850
	(0.01800)	(0.00340)	(0.21870)	(0.11265)	(0.08033)	(0.17154)	(0.35211)	(0.05305)
	[0.33780]	[0.11316]	[1.18942]	[1.26758]	[-0.11146]	[-1.56365]	[-0.79457]	[0.52493]
D(LNWELFS(-1))	0.015597	0.000985	0.067131	-0.028863	-0.042282	-0.021158	-0.229254	-0.002544
	(0.00640)	(0.00121)	(0.07772)	(0.04003)	(0.02855)	(0.06096)	(0.12513)	(0.01885)
	[2.43823]	[0.81442]	[0.86378]	[-0.72099]	[-1.48118]	[-0.34708]	[-1.83215]	[-0.13491]
D(LNTROP(-1))	-0.020774	-0.003261	0.270772	0.940944	-0.141384	0.106158	2.599091	0.109923
	(0.06316)	(0.01194)	(0.76732)	(0.39525)	(0.28184)	(0.60187)	(1.23541)	(0.18614)
	[-0.32892]	[-0.27310]	[0.35288]	[2.38061]	[-0.50165]	[0.17638]	[2.10383]	[0.59053]
C	0.997137	0.033553	0.932580	-5.201589	1.462620	1.598948	-20.30940	-0.505679
	(0.33697)	(0.06370)	(4.09390)	(2.10881)	(1.50371)	(3.21116)	(6.59133)	(0.99314)
	[2.95909]	[0.52670]	[0.22780]	[-2.46660]	[0.97267]	[0.49793]	[-3.08123]	[-0.50917]
@TREND	-0.041508	-0.000799	-0.022397	0.232548	-0.057905	-0.060488	0.891855	0.028327
	(0.01439)	(0.00272)	(0.17481)	(0.09005)	(0.06421)	(0.13712)	(0.28146)	(0.04241)
	[-2.88467]	[-0.29389]	[-0.12812]	[2.58246]	[-0.90181]	[-0.44113]	[3.16870]	[0.66795]
R-squared	0.526658	0.313464	0.340936	0.507332	0.342549	0.179926	0.470376	0.461147
Adj. R-squared	0.373967	0.092001	0.128335	0.348406	0.130468	-0.084615	0.299529	0.287323
Sum sq. resids	0.012130	0.000434	1.790407	0.475064	0.241549	1.101542	4.641116	0.105365
S.E. equation	0.019781	0.003740	0.240323	0.123793	0.088272	0.188504	0.386928	0.058300
F-statistic	3.449179	1.415423	1.603642	3.192264	1.615181	0.680144	2.753208	2.652958

Log likelihood	111.5487	181.5104	6.664346	34.52604	48.73000	16.86471	-13.33841	66.15237
Akaike AIC	-4.788032	-8.119543	0.206460	-1.120288	-1.796667	-0.279272	1.158972	-2.626304
Schwarz SC	-4.332928	-7.664439	0.661564	-0.665184	-1.341563	0.175832	1.614076	-2.171200
Mean dependent	0.023057	0.012628	0.106017	0.072555	0.037991	0.071125	0.038392	0.033711
S.D. dependent	0.025001	0.003924	0.257407	0.153358	0.094663	0.181001	0.462312	0.069059

Determinant resid covariance (dof adj.)	8.94E-20
Determinant resid covariance	7.88E-21
Log likelihood	495.3307
Akaike information criterion	-19.01575
Schwarz criterion	-15.04393

Source: Own computation (2019)

The long run relationship is derived by normalizing growth in real GDP from table 5.6. The normalized co-integration equation can be written as:

$$LNRGDP = 6.766821\text{LNTLF} + 0.059661LNCULTU + 0.0527111LNEDUC - 0.076669LNGCF + 0.013540LNHEAL + 0.036896\text{LNWELF} + 0.155497\text{LNTROP} - 45.12226$$

As it is presented in table 5.5 and 5.6, in this model, the long run Cointegrating vector indicates that all variables except LNGCF, have registered the expected sign and statistically significant. A 1% change in LNTLF will result in 18.2% increase in LNRGDP, on average. A 1% change in LNWELFS will result in 0.0156%, on average. A 1% change in LNSDU will result in 0.58% increase in LNRGDP, on average (Look at their Standard error and P-value from table **5.7**). This indicates that when expenditure on social sector development sets the foundation for rising income and employment opportunities, productivity growth, technological advancement and hence, helps to enhance the quality of life of people, and it has implications for long-run socio-economic development.

Table 5.7: Estimates of VECM model with P-Value

Dependent Variable: D(LNRGDP)
Method: Least Squares
Date: 12/29/19 Time: 12:17
Sample (adjusted): 3 44
Included observations: 42 after adjustments
D(LNRGDP) = C(1)*(LNRGDP(-1) - 6.76682078224*LNTLF(-1) - 0.059661291759*LNCULTU(-1) - 0.0527105464878*LNEDUC(-1) + 0.0766688384256*LNGCF(-1) - 0.0135401080935*LNHEAL(-1) - 0.0368961505355*LNWELFS(-1) - 0.155496578093*LNTROP(-1) + 45.1222581953) + C(2)*D(LNRGDP(-1)) + C(3)*D(LNTLF(-1)) + C(4)

*D(LNCULTU(-1)) + C(5)*D(LNEDUC(-1)) + C(6)*D(LNGCF(-1)) + C(7)
*D(LNHEAL(-1)) + C(8)*D(LNWELFS(-1)) + C(9)*D(LNTROP(-1)) +
C(10) + C(11)*@TREND

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.544506	0.184542	-2.950579	0.0060
C(2)	0.375953	0.190845	1.969939	0.0578
C(3)	3.850130	1.465933	2.626403	0.0133
C(4)	-0.011477	0.013254	-0.865933	0.3932
C(5)	0.021279	0.024376	0.872953	0.3894
C(6)	0.008704	0.045053	0.193194	0.8481
C(7)	0.006081	0.018001	0.337805	0.7378
C(8)	0.015597	0.006397	2.438230	0.0207
C(9)	-0.020774	0.063159	-0.328920	0.7444
C(10)	0.997137	0.336975	2.959086	0.0059
C(11)	-0.041508	0.014389	-2.884672	0.0071

R-squared	0.526658	Mean dependent var	0.023057
Adjusted R-squared	0.373967	S.D. dependent var	0.025001
S.E. of regression	0.019781	Akaike info criterion	-4.788032
Sum squared resid	0.012130	Schwarz criterion	-4.332928
Log likelihood	111.5487	Hannan-Quinn criter.	-4.621219
F-statistic	3.449179	Durbin-Watson stat	2.091991
Prob(F-statistic)	0.003868		

Source: Own computation (2019)

The result in the above table shows the long run impact of independent variables with growth in real GDP (LNRGDP) for the acceptable lag length. In the short run, LNTLF and LNWELFE are statistically significant. The above table shows that a one percent increase in a one year lag of LNTLF and LNWELFE increases the LNRGDP by 3.85% and 0.015597 % on average respectively. This may due to the fact labor force and welfare are contribute to economic growth through increasing productivity of the output in the short run. However, other variables may not have short run effect on economic growth due to their effect will be observed after over a period of time.

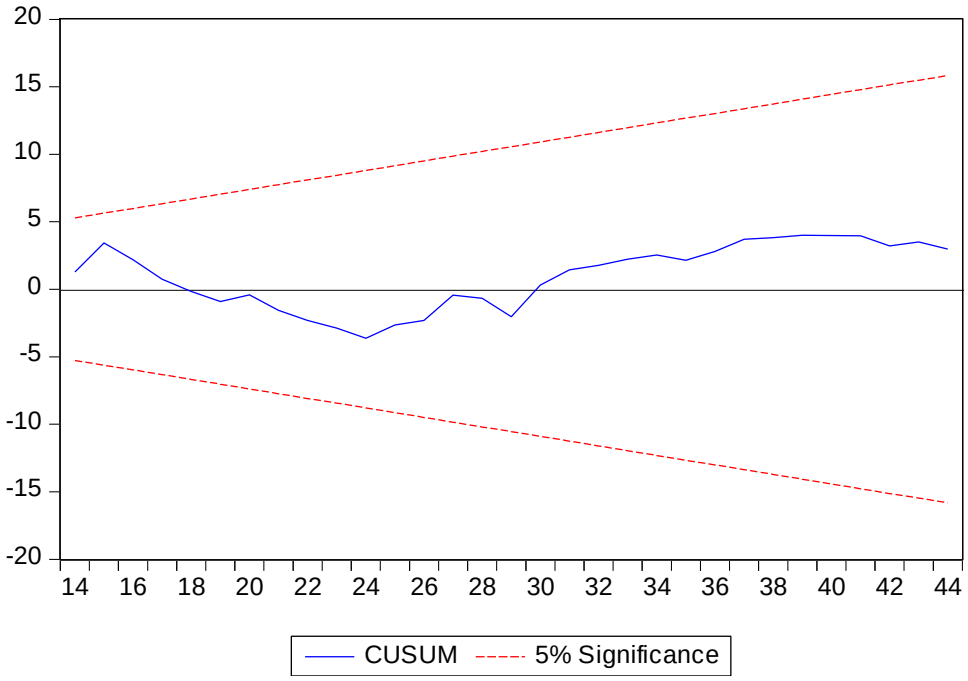
Since Durbin-Watson stat is greater than R-squared we accept the model. Speed of adjustment towards long run equilibrium but it must be significant and the sign must be negative. The coefficient of error correction model depicts that there is long run causality running from independent variables to LNRGDP.

The speed of adjustment or the error correction term (ECT) from the above model is represented by C (1) and come up with the expected sign and level of significance. In an empirical sense, it implies 54% of the disturbance in the short run is corrected each year or it adjusts any disequilibrium towards long run equilibrium state path. It indicates that 54% of the disequilibrium from the long run path will be correcting in one year. When a shock occurs in the system each year, about 54.4% of it will be adjusted towards its long-run equilibrium. The coefficient indicates that there is high correction for divergence of LNRGDP from equilibrium, implying economic agents taking past experience they correct about 54 per cent of errors in one year and the remaining 46% in the next year, and imply a very high speed of adjustment to equilibrium. According to Bannerjee*et al*. (2003) as cited in Kidanemarim (2014), the highly significant error correction term further confirms the existence of a stable long-run relationship. Moreover, the coefficient of the error term (ECM-1) implies that the deviation from long run equilibrium level of real GDP in the current period is corrected by 54.4% in the next period to bring back equilibrium when there is a shock to a steady state relationship.

R^2 is 52.66% which indicate that the fitted value explain the model well, indicates 52.66% of the growth in real GDP is explained by the variables included in the regression. The F test which shows the jointly significant indicate that the variables are jointly significant at 1 per cent level of significance. Moreover, the overall significance of (F-test) established all variables are jointly significant.

Also, in order to strength our analysis, the stability of the estimated parameters in the model is examined using stability test of Recursive residuals. The stability of the model is checked using CUMSUM method and the graphs that show the results are presented as follows. The following figure affirms that the coefficients of the model are stable over a sample interval. Besides, the model can be verified by its ability to justify that the coefficients of the model are stable over a sample interval; otherwise, a shift from one regression scheme to another cannot be located easily. Figure 5.1 shows the parameter stability test of VER model by using CUSUM.

Therefore, according to the above figure, the CUSUM Squares plot bounds within the plus and minus 2 standard errors, and the CUSUM plots bounds within the plus and minus 5 standard errors. Thus, the two test shows that the parameters are stable over the period under investigation. The diagnostic test of residuals shows that the model has desirable properties of OLS. Residual test of normality, serial correlation LM test and heteroskedasticity test is conducted and the result is presented under Appendix 1.



Source: Own drawing (2019), and *Eviews version 9 using NBE data.*

Figure 5.1: CUSUM Stability Test

Among the coefficients of variables only one got statistical significance, however measuring the statistical significance of two independent variables jointly would be very important in order to clearly say whether two independent variables at a given lag length are jointly significant or not. To do this, Wald test of coefficient restriction is examined with null hypothesis of two coefficients can't jointly influence dependent variable, against the alternative hypothesis of joint influence dependent variable.

Furthermore, this study was applied Wald tests on the various null hypothesis involving sets of regression coefficients. The results are shown in table 5.8. The P-value indicates that we reject the null hypothesis that regression coefficients of all the variables in the LNRGDP equation are equal to zero. The null hypothesis that regression coefficients in each equation are equal to zero is also rejected as shown by the p-values. Thus, it indicates that all variables are jointly affects RGDP.

Table 5.8: Wald Coefficient Test

Wald Test:
Equation: Untitled

Test Statistic	Value	Df	Probability
F-statistic	2.823867	(4, 31)	0.0416
Chi-square	11.29547	4	0.0234

Null Hypothesis:
C(1)=C(2)=C(3)=C(4)=C(5)=C(6)=C(7)=C(8)=C(9)=C(10)
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(1) - C(10)	-0.565785	0.183918
C(2) - C(10)	0.354674	0.193706
C(3) - C(10)	-3.871409	1.463828
C(4) - C(10)	-0.032756	0.025374
C(5) - C(10)	-0.975858	0.340125
C(6) - C(10)	-0.988433	0.327067
C(7) - C(10)	-0.991056	0.335532
C(8) - C(10)	-1.012735	0.337668
C(9) - C(10)	-1.017911	0.360938

Restrictions are linear in coefficients.

Source: Own computation (2019)

5. 6 Short Run Vector Error Correction Model for Trivariate model

Table 5.9: Short Run Vector Error Correction Model for Trivariate model

Vector Error Correction Estimates
Date: 12/29/19 Time: 12:41
Sample (adjusted): 5 44
Included observations: 40 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1

LNRGDP(-1)	1.000000
LNTLF(-1)	-18.21705 (3.14385) [-5.79450]
LNGCF(-1)	1.451976 (0.29697) [4.88934]
LNSDU(-1)	-0.582402 (0.10646) [-5.47068]
@TREND(1)	0.199995 (0.03383) [5.91257]
C	120.2744

Error Correction:	D(LNRGDP)	D(LNTLF)	D(LNGCF)	D(LNSD1OU)
CointEq1	-0.231876 (0.04454) [-5.20564]	0.003136 (0.00975) [0.32157]	-0.574282 (0.21618) [-2.65656]	-0.519780 (0.26170) [-1.98619]
D(LNRGDP(-1))	-0.057229 (0.18189) [-0.31463]	0.088364 (0.03983) [2.21875]	1.187789 (0.88275) [1.34556]	0.878045 (1.06864) [0.82165]
D(LNRGDP(-2))	-0.849738 (0.18771) [-4.52695]	0.002284 (0.04110) [0.05557]	-2.127920 (0.91097) [-2.33589]	0.577867 (1.10280) [0.52400]
D(LNRGDP(-3))	-0.248096 (0.23795) [-1.04263]	-0.003585 (0.05210) [-0.06881]	0.215132 (1.15481) [0.18629]	-0.506292 (1.39799) [-0.36216]
D(LNTLF(-1))	-1.217479 (0.92795) [-1.31200]	-0.271155 (0.20318) [-1.33456]	-9.119810 (4.50350) [-2.02505]	-19.07299 (5.45185) [-3.49844]
D(LNTLF(-2))	0.886889 (1.08014) [0.82109]	-0.288497 (0.23650) [-1.21986]	-4.412091 (5.24208) [-0.84167]	-18.94566 (6.34595) [-2.98547]
	K2			
D(LNTLF(-3))	1.280802 (1.23727) [1.03519]	-0.042779 (0.27090) [-0.15791]	-0.621112 (6.00464) [-0.10344]	5.139641 (7.26910) [0.70705]
D(LNGCF(-1))	0.313944 (0.07154) [4.38811]	-0.013249 (0.01566) [-0.84575]	0.521566 (0.34721) [1.50214]	0.625113 (0.42033) [1.48719]
D(LNGCF(-2))	0.382280 (0.08261)	0.012539 (0.01809)	0.936569 (0.40091)	0.459968 (0.48533)

	[4.62763]	[0.69326]	[2.33611]	[0.94773]
D(LNGCF(-3))	0.240573	0.021715	0.170297	0.376961
	(0.07377)	(0.01615)	(0.35803)	(0.43342)
	[3.26104]	[1.34438]	[0.47566]	[0.86974]
D(LNSDU(-1))	-0.079045	-0.002365	-0.342817	-0.466400
	(0.04036)	(0.00884)	(0.19587)	(0.23712)
	[-1.95849]	[-0.26765]	[-1.75019]	[-1.96692]
D(LNSDU(-2))	-0.087025	0.002486	-0.232638	-0.165769
	(0.03662)	(0.00802)	(0.17770)	(0.21512)
	[-2.37676]	[0.31010]	[-1.30917]	[-0.77059]
D(LNSDU(-3))	-0.056845	-0.002865	-0.159824	-0.095075
	(0.02859)	(0.00626)	(0.13874)	(0.16796)
	[-1.98838]	[-0.45775]	[-1.15193]	[-0.56606]
C	0.019401	0.017841	0.224308	0.466246
	(0.02821)	(0.00618)	(0.13689)	(0.16571)
	[0.68785]	[2.88891]	[1.63866]	[2.81362]
R-squared	0.697274	0.428723	0.511343	0.529676
Adj. R-squared	0.545911	0.143084	0.267014	0.294514
Sum sq. resids	0.007441	0.000357	0.175257	0.256839
S.E. equation	0.016917	0.003704	0.082101	0.099390
F-statistic	4.606642	1.500928	2.092850	2.252385
Log likelihood	115.0352	175.7911	51.85013	44.20614
Akaike AIC	-5.051761	-8.089555	-1.892506	-1.510307
Schwarz SC	-4.460653	-7.498447	-1.301398	-0.919199
Mean dependent	0.024161	0.012720	0.041160	0.076967
S.D. dependent	0.025105	0.004001	0.095897	0.118331
Determinant resid covariance (dof adj.)		1.61E-13		
Determinant resid covariance		2.87E-14		
Log likelihood		396.6349		
Akaike information criterion		-16.78174		
Schwarz criterion		-14.20620		

If two series are integrated of order one, i.e., I (1) we could model their relationship by taking first difference of each series and including the difference in VECM. From the Johansen test of co-integration of table 5.4.1 and 5.4.2 for Multivariate model and table 5.5 for Trivariate model, we know that there exists a long-term equilibrium relationship between our variables with real GDP, so after identifying the existence of long-run relationship among the relevant variables, the vector error correction model is estimated in order to evaluate the short run properties of co-integrated series for trivial model.

The VEC has co-integration relations built into the specification so that it restricts the long run behavior of the endogenous variables to converge to their co-integrating relationships while allowing for short-run adjustment dynamics (Harris, 1995). The co-integration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments. The error correction terms lagged one period is shown in table (5.9).

The speed of adjustment or the error correction term (ECT) from the above model is represented by (CointEq1) and come up with the expected sign and level of significance. In an empirical sense, it implies 23.18 % of the disturbance in the short run is corrected each year or it adjusts any disequilibrium towards long run equilibrium state path.
In the short run LNSDU (-2) has a negative significant impact on economic growth because of the effect social development expenditure is seen in long period of time.

R^2 is 69.72% which indicate that the fitted value explain the model well, indicates 69.72% of the growth in real GDP is explained by the variables included in the regression. The F test which shows the jointly significant indicate that the variables are jointly significant at 1 per cent level of significance.

5.7. Granger Causality Test/Long Run Causality for Multivariate Model

To further investigate the dynamic relationship between the variable, we employed Granger causality test using the VEC model. The institution behind of this test is that to find out whether changes in one variable cause the other to change. In order to infer the direction of causation between two variables, the granger causality test analysis must make sense. The following table shows Granger causality test for social development (education, health, culture, social welfare, trade openness, labor and capital) and economic growth in Ethiopia.

Table 5.11: Pairwise Granger Causality Tests for Multivariate Model

Pairwise Granger Causality Tests
Date: 12/29/19 Time: 15:07

Sample: 1 440
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
LNCULTU does not Granger Cause LNRGDP	43	1.34576	0.2529
LNRGDP does not Granger Cause LNCULTU		14.1367	0.0005
LNEDUC does not Granger Cause LNRGDP	43	6.01842	0.0186
LNRGDP does not Granger Cause LNEDUC		0.17921	0.6743
LNHEAL does not Granger Cause LNRGDP	43	1.53457	0.2226
LNRGDP does not Granger Cause LNHEAL		8.74985	0.0052
LNWELFS does not Granger Cause LNRGDP	43	1.40767	0.2424
LNRGDP does not Granger Cause LNWELFS		21.0478	4.E-05
LNTROP does not Granger Cause LNRGDP	43	6.98285	0.0117
LNRGDP does not Granger Cause LNTROP		0.01262	0.9111

Source: Own computation, (2019)

As can be seen from the table above, we fail to reject the null hypothesis that LNRGDP does not Granger Cause LNEDUC. In the long run, there is unidirectional causality running from economic growth to LNCULT, LNHEAL, and LNWELFS. There is unidirectional running from LNEDUC to Economic growth in Ethiopia. This finding indicates that investing in human capital is a base for economic progress (Alvi, 2010).

Table 5.12: Pairwise Granger Causality Tests for Trivariate model

Pairwise Granger Causality Tests
Date: 01/02/20 Time: 16:46
Sample: 1 440
Lags: 3

Null Hypothesis:	Obs	F-Statistic	Prob.
LNSDU does not Granger Cause LNRGDP	41	2.44652	0.0806
LNRGDP does not Granger Cause LNSDU		0.28016	0.8393

Source: Own computation, (2019)

Like in the long run, in the short run, the estimated short run Wald test for causal relationship reveals no short run causality running either from social development to

Economic growth or from economic growth to social development in Ethiopia for the period under investigation. This may be due to the fact that the expenditure allocated for social development (education, health, culture, social welfare and like this) infrastructure of the country is still inadequate to support its quest for rapid economic growth and for eradicating poverty. this is due to the fact that, the per capita expenditure of social development in Ethiopia remains relatively low, due to the heavy reliance on imports, , high budget deficit, weak institutional arrangements, corruption, political instability, climatic change, imperfect market, price inflation and like. Furthermore, the increase of social sector development in Ethiopia could also be affected hugely by the less attention on social development during the last decade.

5.8. Short Run Granger Causality Wald Test: Vector Error Correction Model

As long as, the error correction term has negative sign and got statistical significance that we can test the short run causality between social expenditure (use) and economic growth. To examine the short run causality we use the technique of Wald coefficient restriction. Table 5.13 shows the result of the tests.

Table 5.13 Vector error Correction model for Short Run Granger Causality Test: Multivariate Analysis

VEC Granger Causality/Block Exogeneity Wald Tests
Date: 01/02/20 Time: 16:23
Sample: 1 440
Included observations: 42

Dependent variable: D(LNRGDP)

Excluded	Chi-sq	Df	Prob.
D(LNTLF)	6.897993	1	0.0086
D(LNCULTU)	0.749840	1	0.3865
D(LNEDUC)	0.762047	1	0.3827
D(LNGCF)	0.037324	1	0.8468
D(LNHEAL)	0.114112	1	0.7355
D(LNWELFS)	5.944967	1	0.0148

D(LNTROP)	0.108188	1	0.7422
All	13.25861	7	0.0661

Dependent variable: D(LNCULTU)

Excluded	Chi-sq	Df	Prob.
D(LNRGDP)	1.430328	1	0.2317
D(LNTLF)	3.356695	1	0.0669
D(LNEDUC)	0.002440	1	0.9606
D(LNGCF)	0.184781	1	0.6673
D(LNHEAL)	1.414715	1	0.2343
D(LNWELFS)	0.746120	1	0.3877
D(LNTROP)	0.124525	1	0.7242
All	8.698504	7	0.2750

Dependent variable: D(LNEDUC)

Excluded	Chi-sq	Df	Prob.
D(LNRGDP)	1.797737	1	0.1800
D(LNTLF)	0.078118	1	0.7799
D(LNCULTU)	7.200547	1	0.0073
D(LNGCF)	0.026496	1	0.8707
D(LNHEAL)	1.606756	1	0.2049
D(LNWELFS)	0.519821	1	0.4709
D(LNTROP)	5.667287	1	0.0173
All	23.88344	7	0.0012

Dependent variable: D(LNHEAL)

Excluded	Chi-sq	Df	Prob.
D(LNRGDP)	2.421291	1	0.1197
D(LNTLF)	1.383120	1	0.2396
D(LNCULTU)	0.170894	1	0.6793
D(LNEDUC)	0.200876	1	0.6540
D(LNGCF)	0.248484	1	0.6181
D(LNWELFS)	0.120467	1	0.7285
D(LNTROP)	0.031110	1	0.8600
All	3.339314	7	0.8519

Dependent variable: D(LNWELFS)

Excluded	Chi-sq	Df	Prob.
D(LNRGDP)	0.003832	1	0.9506

D(LNTLF)	0.612303	1	0.4339
D(LNCULTU)	1.269245	1	0.2599
D(LNEDUC)	6.56E-05	1	0.9935
D(LNGCF)	0.467473	1	0.4942
D(LNHEAL)	0.631339	1	0.4269
D(LNTROP)	4.426094	1	0.0354
All	6.204234	7	0.5161

Source: Own computation (2019)

Here also we can induce that there is no short run causality running from LNRGDP to, LNHEAL, LNEDUC, and LNCULTU; vice versa is not true. Whereas there is a unidirectional causality running from LNWELFS to Economic growth and vise verse is not true.

Similarly, the finding of the result is consistent with Masih and Masih (1996) for Pakistan and Indonesia, Olatunji Adeniran (undated) for Nigeria, Jumbe (2004) for Malawi.) who found no Granger causality running from economic growth to social development and vice versa is true.

Table 5.14 Vector error Correction model for Short Run Granger Causality Test: Trivariate model

VEC Granger Causality/Block Exogeneity Wald Tests
Date: 01/14/20 Time: 22:42
Sample: 1 440
Included observations: 40

Dependent variable: D(LNRGDP)

Excluded	Chi-sq	df	Prob.
D(LNSDU)	1.098484	3	0.7774
D(LNLNGCF)	2.300874	3	0.5124
D(LNTLF)	2.463643	3	0.4819
All	4.464091	9	0.8783

Dependent variable: D(LNSDU)

Excluded	Chi-sq	df	Prob.
D(LNRGDP)	3.729382	3	0.2922

D(LNLNGCF)	19.26478	3	0.0002
D(LNTLF)	5.866863	3	0.1183
All	47.06594	9	0.0000

Source: Own computation (2019)

As shown the above table, like in the long run, in the short run there is no causality running from either direction. The finding shows that, there is no causality running either from economic growth to social development or economic growth to social development in both short run and long run may be justified by the fact that:

Ethiopia has not yet reached the social development ladder that may guarantee such a suggestion but it can still substantially improve the detrimental consequences of social development reducing its use. By making its social development sector overhead and by making it available to a larger part of the population (especially education, health) social development used per unit of output can be raised. Although government invested for social sector development but it does not reach to the poor section of the people who are in root in the economy.

5.9. Diagnostic Tests

The Diagnostics test was also employed for VECM to detect model misspecification and as a guide for model improvement. These tests include serial correlation, heteroscedasticity and normality tests. The serial correlation test can be done using Breusch-Godfrey Serial Correlation LM Test to investigate serial correlation, which helps to identify the relationship that may exist between the current value of the regression residuals and lagged values. The null-hypothesis of the LM test that the residuals are not serially correlated is accepted at 5% level of significance (see appendix 1). The Jarque-Bera normality test is used to see whether the regression errors are normally distributed. The null-hypothesis that the residuals are normal is accepted (Appendix 1).

The hetreroscedasticity test helps to identify whether the variances of the errors in the model are constant or not. The null-hypothesis of the test is that the errors are homoscedastic was accepted and independent of the repressors'' and that there is no

problem of misspecification. The null-hypothesis that the residuals are homoscedastic is accepted at 5% significance level. This indeed is not surprising, since heteroskedasticity is not much problem in time series (Green, 2003), (Appendix 1).

5.10. Test of Volatility: Impulse Response and Variance Decomposition

Impulse response is a method of assessing the interaction among the variables in VEC. It can be used either to assess the dynamic behavior of the VEC or to investigate the policy impact of the variables that constitute the VEC (Alemayehu, 2009). The coefficients of VEC models only show the direct or ceteris paribus effect. They do not consider the lagged explanatory variables in each equation are interred linked. That is both with the lag and contemporaneously and thus does not reflect the full impact of one variable on the other. Due to this, the analysis relies to a great extent on impulse response functions to estimate the total short and long run an increase in social development on economic growth.

In sum, impulse response shows how one variable, say economic growth responds over time to a shock in and compares this response to shocks from other variables. Impulse response only traces out the time path of the effects of shocks of other variables contained in the VECM model on a specific variable (Belay, 2016). On the other hand, this method is designed to determine how each variable responds over time to an earlier shock in that variable and to shocks in other variables (Belay, 2015).

The variance decomposition helps in identifying the degree to which one variable influences the other. In this study variance decomposition was used to break down and ascertain the degree to which education influence other variable in the system and vice versa. To make it clear, variance decompositions show the portion (or relative importance) of variance in the prediction for each variable in the system that is attributable to its own innovations and to shocks to other variables in the system.

Enders in Shan *et al.* (2006) as cited in Belay (2015) proposed that the forecast-error variance decomposition permits inferences to be drawn concerning the proportion of the movements in a particular time-series due to its own earlier shocks vis-a-vis shocks arising from other variables in a VECM model. The technique breaks down the variance of the forecast error for each variance following a shock to a particular variable, and thus, it identifies which variables are strongly affected and those that are not.

5.10.1 Impulse response of VEC model

Impulse response function help us to trace the effect of a one standard deviation 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 VECM. This study used the generalized impulse response function; the reason is it does not require orthogonalization of innovations and is invariant of the ordering of the variables in VECM.

Table 5.15.1 indicates the following results. In response to a one standard deviation disturbance output (LNRGDP) itself future output increase by 0.0494 in the first year and it declines in second year and consequently in third year and it continue increase but it never die out in the long run and reaches 0.040620 at the 10^{th} year.

A one standard deviation disturbance originating from capital results in an approximately 0.022609 percent increase in output in first year and it further increase to 0.019184 in the 3rd year and it did not die out in the time horizon and consequently it reaches 0.021314 at the 10th year. A one standard deviation disturbance originating from labor results in an approximately 0.013797 increase in output in first year and it never dies out in the long run and consequently it reaches 0.023740 at the 10^{th} year. The result shows the impact of capital and labor is permanent.

A one standard deviation disturbance originating from LNTLF produces a -0.004 decrease in LNRGDP in the first year. Its effect continues to fall as the forecast horizon is extended and reaches -0.019818 at the 10th year. LNTLF has no permanent impact on GDP, and its effect does die out. In other words, Social development has no a long- run impact on economic growth which is in line with the above findings. The impact of LNGCF, LNTLF, LNCULTU, LNEDUC, LNHEAL, and LNTROP are permanent.

The conspicuous result is the disturbance originating from Social development is negative (although it is small in magnitude) suggesting that social development use negatively impacts on economic growth.

The negative relationship between social development and economic growth implies that the low level of social development efficiency in the country.

Table 5.15 Generalized Impulse Response of VEC model

Table 5.15.2: Impulse Response of LNRGDP

Response of LNRGDP: Period	LNRGDP	LNTLF	LNGCF	LNSDU
1	0.016917	0.000000	0.000000	0.000000
2	0.017511	0.008917	-0.000963	0.005117
3	0.010507	0.017603	0.001168	0.006053
4	0.013697	0.015005	-0.005736	0.007731
5	0.015849	0.011966	-0.019576	0.016873
6	0.011656	0.013774	-0.026161	0.021939
7	0.012107	0.013572	-0.029669	0.023360
8	0.015407	0.012994	-0.033617	0.027228
9	0.014902	0.012943	-0.035819	0.029778
10	0.013937	0.013088	-0.034307	0.030181

Response of LNTLF: Period	LNRGDP	LNTLF	LNGCF	LNSDU
1	0.001527	0.003375	0.000000	0.000000
2	0.002211	0.002412	-0.000727	-0.000383
3	0.002152	0.002335	0.001007	0.000340
4	0.002159	0.003168	0.002315	-0.000296

5	0.002046	0.003052	0.001351	-3.85E-05
6	0.001595	0.003379	0.000117	0.000618
7	0.001538	0.003026	-0.001312	0.000903
8	0.001816	0.002805	-0.001867	0.001511
9	0.001949	0.002906	-0.001893	0.001685
10	0.001975	0.002868	-0.001431	0.001670

Response of LNGCF: Period	LNRGDP	LNTLF	LNGCF	LNSDU
1	0.028512	-0.005135	0.076820	0.000000
2	0.031806	0.001198	0.052714	-0.000763
3	0.001455	0.021071	0.068094	0.011529
4	0.002739	0.020557	0.012953	0.007276
5	0.010616	0.005917	-0.018984	0.036751
6	0.008749	0.007881	-0.046189	0.047016
7	0.009697	0.004614	-0.026035	0.049186
8	0.019226	0.008104	-0.023364	0.048059
9	0.016670	0.009500	-0.014920	0.051114
10	0.011864	0.011163	-0.020308	0.049236

Response of LNSDU: Period	LNRGDP	LNTLF	LNGCF	LNSDU
1	0.027512	-0.024034	0.013986	0.091369
2	0.010706	-0.051845	0.001742	0.076414
3	-0.011447	-0.069433	-0.007224	0.096985
4	-0.015649	-0.015073	-0.037493	0.106488
5	-0.010873	-0.042688	-0.119298	0.118586
6	-0.007401	-0.056273	-0.128327	0.148931
7	0.000453	-0.052989	-0.111206	0.142506
8	0.005485	-0.051881	-0.087081	0.141933
9	0.002273	-0.041200	-0.079408	0.139416
10	-0.002701	-0.044117	-0.085380	0.137999

Source: Own Computation (2019)

Table (5.15.2) presents the accumulated response of LNTLF. In response to one standard deviation shock of LNTLF, LNTLF itself increases by 0.003375 in the first year and continues to fall in the long-run reaching -0.000383 in 10^{th} period. A one standard deviation disturbance originating from LNRGDP produces a 0.001527increase in LNTLF in the first year. However, its effect continues to grow and reaches 0.001975at the 10th year. Hence, LNRGDP has a significant impact on LNTLF implying that economic growth has a long-run impact on social development expenditure. In other words, the empirical

results indicated that the response of social development on to economic growth negatively while the response of economic growth to social development is positively.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMANDATION

6.1. SUMMARY

This study has examined the causal relationship between social development and economic growth using the time-series data from Ethiopia during the period from 1974/75 to 2017/18. The study is basically different from the few of previous studies on social development-growth causality link in that it has used a multivariate framework – with gross capital formation, labor, education, health culture, Social welfare and trade openness as the intermittent variables. The study used the VECM approach to determine the long-run and short-run relationship between social development and economic growth. Furthermore, Johansen co integration was employed to determine the existence of long run relationship between RGDP and independent variables; the granger causality test was employed to test the direction of causality. Before applying at the co-integration, VECM, and Error correction results, test for stationary using Augmented Dickey Fuller Test (ADF) test for all variables were conducted. Accordingly, all the variables are non stationary at the level and all are stationary in first difference with trend and intercept option. This shows that the existence of one co integration relationship among the variables. The λmax and $\lambda trace$ test statistics were employed to assess the number of co-integration vectors in the models. The result shows that the null hypothesis of zero co integration vector is rejected in favor of one co-integration relationship. The Johansen co integration test confirmed the existence of one co integration relationship between dependent and independent variables.

Next to testing for time series property, the model stability was done by testing the diagonal testing techniques. The result revealed that no evidence of serial correlation, the residual is normally distributed and no evidence of hetroscedasticity problem.

6.2. CONCLUSSION

Both Johansen's Trace statistics and Maximum Eigen value test suggests that there exists long run relationship between RGDP and social sector expenditure. This implies the fact that in the long run RGDP and social sector development are inter-dependent.

-The expected growth of RGDP and social sector expenditure would increase further in long period and more importantly, the increasing expenditure on social sector development would increase labor productivity through skill development. This skill development programmer would encourage people to participate in labor market. Increment of labor force participation in labor market leads to increase per capita income and standard of living which leads to growth of RGDP in Ethiopia. It is clear from the results of Johansen co-integration that growth of RGDP and social sector expenditure are significantly related in the long-run i.e. there is a long-run relationship between RGDP and social expenditure in Ethiopia.

In the long run, the model estimation shows that LNTLF, LNCULTU, LNEDUC, LNGCF LNHEAL, LNWELFS, and LNTROP have positive and statistically significant relationship with RGDP. However, LNGCF has a negative and insignificant effect on real GDP in the long run.

Looking at the causality between components of SDU and Economic growth; there is no short run causality running from LNRGDP to LNHEAL, LNEDUC, and LNCULTU; vice versa is not true. Whereas there is a unidirectional causality running from LNWELFS to LNRGDP and vise verse is not true. In the long run, there is unidirectional causality running from LNRGDP to LNCULT, LNHEAL, and LNWELFS.

In the short run, the empirical revels that one year lagged value of Labor force and Social Welfare is significant in affecting current growth in real GDP.

Like in the long run, in the short run, the estimated short run Wald test for causal relationship reveals no short run causality running either from social development to Economic growth or from economic growth to social development in Ethiopia for the

period under investigation. This may be due to the fact that the expenditure allocated for social development (education, health, culture, social welfare and like this) infrastructure of the country is still inadequate to support its quest for rapid economic growth and for eradicating poverty. this is due to the fact that, the per capita expenditure of social development in Ethiopia remains relatively low, due to the heavy reliance on imports, weak institutional arrangements, corruption, political instability, climatic change, imperfect market, price inflation and like. Furthermore, this might have happened because of the fact that in the short-run, the government of Ethiopia could not able to spend on social sector development. Consequently, the increase of social sector development in Ethiopia could also be affected hugely by the central social development during the last decade

The short run speed of adjustment coefficient is estimated is significant and have a correct sign. The adjustment coefficient of -0.5446 indicates that 54.4 % of the short run adjustment made within a year, and it is the speed of adjustment is high implying that it takes short time (less than one year) for growth in real GDP to move back to its equilibrium once it drifts away from its long run equilibrium value.

The impulse analysis shows that expenditure on health and education has permanent effect on economic growth in Ethiopia in the ten years. The results of the variance decomposition indicate that a greater proportion of the variation in LNRGDP is due to its own innovations.

The results of Impulse response analysis indicate that the expenditure on health and education has permanent effect on economic growth in Ethiopia in the ten years.

The strength of this causal relationship, as measured by the variance decomposition analysis, reveals that, a greater proportion of the variation in LNRGDP is due to its own innovations.

6.3. RECCOMMANDATIONS

Based on the empirical result, we the following recommendations were made:

- The major findings of the paper show that increased expenditure on social sector development has a strong and positive impact on growth of RGDP in Ethiopia. The role of the state government of Ethiopia becomes very important for initiating various developmental strategies for the all-round development of the state. In the recent years, an increase in the public spending on various heads of social development has increased in Ethiopia. Though government of Ethiopia invested for social sector development but it does not reach to the poor section of the people who are in root in the economy. Therefore, Government of Ethiopia should focus on public investment in social sector development. That means expenditure on social sector development that will encourage to the growth of the economy.
- The results of this study shows health and education expenditure have a strong impact in the long run and permanent effect on economic growth in Ethiopia. In order to enhance the contribution of the human capital formation and health societies as they are a spring board of economic growth in bring technology and innovation, and they have permanent effect on economic growth, the government of Ethiopia should allocate adequate finance which will help to work on quality of education and providing basic health services to the society.
- The study found that expenditure on culture and social welfare has a positive impact in the long run. Thus, budget officers should scrutinize past performance before allocating expenditure to various expenditure components. They should critically assess and evaluate whether value for money was achieved. The critical assessment involves a great sense of fiscal responsibility and good stewardship that take into account the greatest possible achievement of the country. This will eliminate wasteful spending and enhance prioritization of key projects.
- The finding shows that one year lagged of social welfare is significant in the short run. Thus, the government should have give attention in developing social welfare.
- The results of this study show, there is no short run causality running either from social development to Economic growth or from economic growth to social

development in Ethiopia. That is neither social development nor economic growth predicts each other. Thus, the executive, judicial and legislative arms of government should reduce levels of corruption to accelerate growth. This could be achieved through thorough scrutiny of all government expenditures and prosecution of government official who are found guilty of corruption. More, the government should develop strong institutional arrangements.

- There is no causality running either from economic growth to social development or economic growth to social development in both short run and long run. This due to investing on social sector development does not reach to the poor section of the people who are in root in the economy. Hence, Ethiopian government should focus on public investment i.e, expenditure on social sector development that will support to the growth of the economy.

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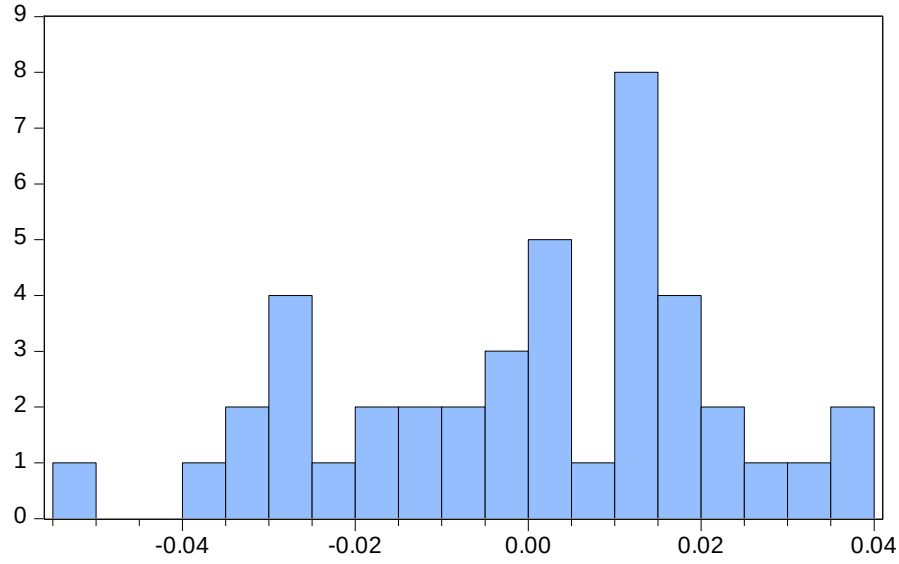
Appendices

Appendix 1:

1. Diagnostic tests of VECM for Multivariate model

1.1.Residual test of normality



Series: Residuals	
Sample 3 44	
Observations 42	
Mean	-5.66e-18
Median	0.002120
Maximum	0.036218
Minimum	-0.051828
Std. Dev.	0.021450
Skewness	-0.401189
Kurtosis	2.420156
Jarque-Bera	1.715054
Probability	0.424210

1.2.Serial correlation test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.329637	Prob. F(2,30)	0.7218
Obs*R-squared	0.903136	Prob. Chi-Square(2)	0.6366

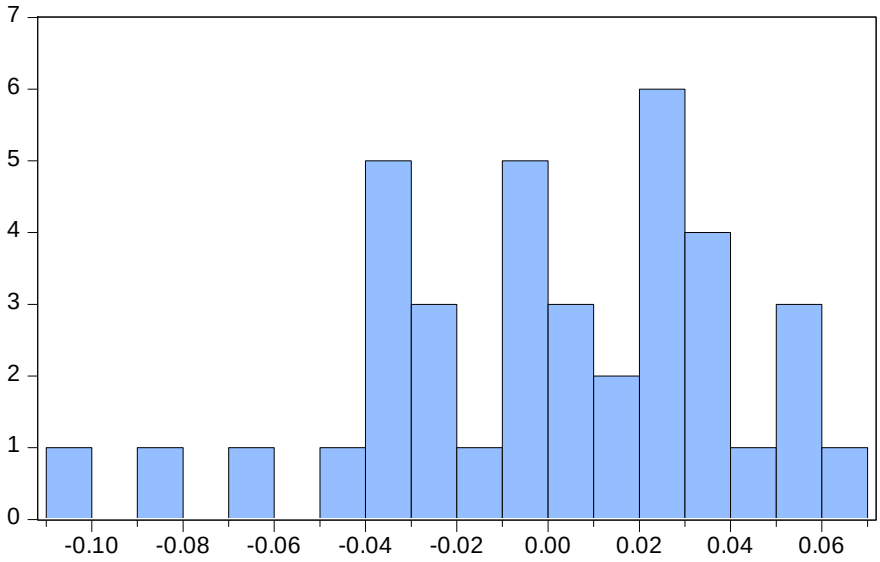
1.3 Heteroskedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.860366	Prob. F(16,25)	0.6152
Obs*R-squared	14.91431	Prob. Chi-Square(16)	0.5309
Scaled explained SS	6.147671	Prob. Chi-Square(16)	0.9864

3. Diagnostic tests of VER for Trivariate model

3.1 Residual test of normality



Series: Residuals	
Sample 4 41	
Observations 38	
Mean	-5.62e-16
Median	0.005307
Maximum	0.064730
Minimum	-0.108595
Std. Dev.	0.039487
Skewness	-0.675780
Kurtosis	3.308156
Jarque-Bera	3.042648
Probability	0.218422

3.2 Serial correlation test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.945207	Prob. F(3,25)	0.4337
Obs*R-squared	3.871068	Prob. Chi-Square(3)	0.2757

3.3 Heteroskedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.481489	Prob. F(9,28)	0.8746
Obs*R-squared	5.092857	Prob. Chi-Square(9)	0.8261
Scaled explained SS	3.191137	Prob. Chi-Square(9)	0.9562