



UNIVERSITY OF NAIROBI

**MACROECONOMIC DETERMINANTS OF ECONOMIC
GROWTH IN SOMALIA**

BY

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Abstract

In the last forty years, Somalia has seen immense unrest and civil conflict, that has had a negative influence on the country's people and economy. Despite being one of the world's poorest and most corrupt countries, Somalia has seen modest improvement in the past few years.

The goal of this study is to look into the macroeconomic factors and to examine that influence or determine Somalia's economic development. The research used secondary data from 1991-2017 to run interpolation steps on the connections among Gross Domestic Product, exchange rate, inflation rate, and foreign direct investment by using STATA and R-Studio statistical software to determine whether the data was stationary or not and to analyze the data.

Descriptive statistics were calculated in the form of graphs and tables copied from R Studio or Stata platforms to search for the factors determining economic growth in Somalia. The inferential statistics were evaluated using time series data methodological approaches including the Autoregressive Distributed Lag Model (ARDL), unit roots for testing stationarity, Multiple Cointegrating Relationships to determine if two variables or more were cointegrated, Bound Test to examine the maximum lag for each variable, and Long-run and short-run coefficients to evaluate whether the ARDL model was used for the long-run or short-run coefficients using the bound test.

All the variables from the data were found to be strong predictors of economic growth in Somalia since they were all statistically significant in the study. The economic growth in Somalia will increase for each unit of the dollar increase in the exchange rate and the inflation rate, and it will decrease for every additional unit of foreign direct investment. According to this study, the rate of inflation, the rate of exchange, and foreign direct investments are all important determinants of economic growth in Somalia.

The study recommends that to improve the contribution of the exchange rate and foreign direct investment, raising for the exchange rate, and decreasing foreign direct investment. Somalia's government has set aside sufficient funds to assist stabilize or regulate inflation.


Keywords:

GDP in Somalia, the Autoregressive Distributed Lag Model (ARDL), Bound Test, and short-run test

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Declaration and Approval

I the undersigned declare that this dissertation is my original work and to the best of my knowledge, it has not been submitted in support of an award of a degree in any other university or institution of learning.

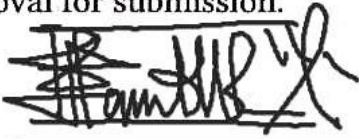


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In my capacity as a supervisor of the candidate's dissertation, I certify that this dissertation has my approval for submission.



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Dedication

I hereby dedicate this work to my brothers and sisters for their encouragements, my brother for his full support during this business plan writing and the whole of the study.

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1 Introduction

1.1 Research Background

In recent years, there has been very little empirical study that precisely examines variables that influenced growth in developing economies. Because growth is such a dynamic process, studies based on situations from hundreds of years ago may no longer be applicable at present. In the previous few decades, technological advancements have transformed the way countries improve their economies (Upreti, 2015). Economists began mapping the links among both foreign aid and economic growth for poor or developing countries roughly 40 years ago. Their analysis has turned into much more advanced over time (Iqbal and Zahid (1998)). Therefore, the variables that promote or stifle economic growth have remained a contentious issue, particularly in emerging and developing countries by Oye-bowale and Algarhi (2020).

Commendable study efforts or exertion have been put in place attempting to understand the impacts of macroeconomic factors on the growth of economy in developing countries as considered by Kargbo (2007). The growth rate of these countries seems to be dependent on different factors, where some factors have an inverse connection while other factors show a direct positive connection as per Kira (2013).

The economy in Africa grew at a remarkable rate of nearly 5% per year between 1990 and 2013. For 2012, as example, Africa's GDP grew by 6.6 percent, despite the fact that Western or developed countries' economies were contracting. This has been ascribed to growing exchange rate and international capital inflows, as well as the dividends of the reforms undertaken by most African governments during this time period. Despite a recent minor decrease in incidence, poverty stays high, and the number of people living in poverty has risen dramatically. Despite the fact that the percentage of people in Sub-Saharan Africa (SSA) living on less than \$1.25 per day decreased from 51.5 percent in 1981 to 48.5 percent in 2010, the number of people living in poverty increased significantly from 204.9 million in 1981 to 414 million in 2010, a 102 percent increase as mentioned Anyanwu (2014).

From the World Bank, it is estimated that the GDP of Sub-Sahara accounts for about 2% of the global GDP, with around 13% of the total population residing in this continent. The region is characterized by annual GDP rate of 3.6% from 1961 with 2014 having the highest growth rate of about 11.6%. The region has vast raw resources which include but not limited to energy, agricultural goods and different valuable metals. This makes

the regions exports major source of income. Among the most developed regions with largest GDP in the region are Angola, Nigeria, Sudan, South Africa and Angola. these six countries collectively contribute to about 71% total GDP in the region (Drummond andLiu, 2013).

Nations in Sub-Saharan Africa over time have relied on trade with North America and Europe over time, but have increased involvement with other new trade partners for new markets, marking historical trade reorientation (Elmorsy, 2016). China and India have recently been in the spotlight for both exports and imports. China has risen to becomeSSA's most important trading partner, accounting for approximately 16.54% of inflowsand 13.99% of outflows in 2015. Other main import partners were Germany 5.33%, India 5.56%, and the US 4.61%, and other export partners were India 6.19%, the Netherlands 4.22%, and the US 5.38% in 2015. The trade between SSA and China has been fueled anddriven growth of investments in the country for example investing in capital goods, needfor primary commodities as inputs, notably metals and oil as considered by Drummondand Liu (2013).

Currently, there is stability in macroeconomic growth in Somali even though her povertyindex is ranked high based on the net worth per person. Recently, Somali posted 6% positive change in its economy which is largely aNributed to high growth rate of differentsectors like tourism and mining. Nonetheless, fund from donors such as the World Bank have been used to boost Somali's old economy, such as trade connections for landlockedcountries (CIA, 2014). Infrastructure was to bring forth the growth of the economy, which could result from increased markets.

There are still some complaints from the farmers due to a lack of adequate markets. Therefore, these measures have not yet satisfied the farmers. The recent amendmenton banking has helped to improve the growth of public owned and individual invest- ments, with the state adjusting its agricultural expenditure to about 7% of the national revenues. Nevertheless, there are still higher interest rates which reflect higher risks of frauds. Growth in economy is the pillar of development in the country and its im-provement is a key strategic and policy issues for those making policies. This growth isdepending on different factors which include but not limited to the quality of economicpolicies, extent on the nature and other factors of macroeconomic as noted by Khamfula and Draft (2004).

Models of macroeconomic have been applied in the formulation of economic rules al- most in every country as it has been considered by Kira (2013). Therefore, fluctuations of growth of economy in countries? are main aspects of macroeconomic models as recordedby Kira (2013).

In macroeconomics, the concept of determining the factors of growth of economy can be approached from the demand side as well as from the supply side (Kira (2013); DuN (2006); Petrakos and Pavleas (2012)). There are four major classification of demand namely: investment spending (firms), consumption spending (households), exports (rest of the world) and government spending (government) as it was considered by Keynes in the year 1936. This theory of economic growth is called the aggregate demand theory or the Keynesian theory of economic growth (DuN, 2006). Theories of macroeconomic such as Keynesian have improved over time to analyze differences or changes in the GDP of the economies. Therefore, there is misunderstanding about the effects, causes, and mitigation of the macroeconomic fluctuations in the literature of Keynesian economics has abrief as well as a lengthy theory (Kira, 2013).

Foreign Direct Investment (FDI) has caused the debate of being vehicle for the technological transfer which disadvantage the growth of domestic investment as opposed to increase in bigger bar. (Levine et al., 2002) concluded frequent offering of incentive by economic rationale to entice FDI concludes that non-citizen investment yields externalities in the term of transfer and overflows. In the past, Foreign Direct Investment (FDI), are being attracted by the availability of Natural resources, this is due to the desire by developing nations of North America together with those of Europe to protect an Economic and minerals and primary products' sources.

Since Somalia's civil war began in 1990, there has been no government in Somalia since that time until 2010, but there has been a government in Somalia since 2010, but it is very weak, so there are no journals that can explain the economic growth in Somalia before 2017. Therefore, now there are some research journals that talk about economic growth in Somalia. This research will become a cornerstone in the Somali government, which means the recommendation will help it very well.

This research was to provide a clear explanation of the relationship between Somalia's Gross Domestic Product, exchange rate, inflation rate, and Foreign Direct Investment. It employed STATA and R-Studio statistical software and secondary data to examine the link using the autoregressive distributed lag (ARDL) model for simultaneous integration from 1991 to 2017. The results of this research can help establish a short-run model strategy to assist sustainable development by determining which of the predictor factors has the most impact on Somalian economic growth.

1.2 Statement Of Research Problem

Following the civil war in Somali on 1991, the country has faced several challenges. Economic is one of the serious problem the country is trying to address. Increase democratic and political stability is the key of getting growing economic very well. Long-term of economic growth is necessary for Somalia to improve income and realize the Somali become as a major trade and investment in the globe.

Without clear understanding of economic determinants, it's difficult for national legislation to allocate resources evenly because the ministry of finance doesn't have full control over these factors which are creating leakages in the economic. Somalia has been putting in action on macroeconomic amendments in order to export its economy as from 1990s. This has resulted to the growth of economy at a fair mean rate that is around 6%. The country determines its economic growth after these amendments. Somalia is seen as a country with raised deficits. Lack of governing rules in the country at different times are viewed as the reason of deficits.

However, there is no comprehensive research that examines the variables that influence Somalia's economic growth, such as Gross Domestic Product, exchange rate, inflation rate, and Foreign Direct Investment. Understanding the macroeconomic determinants of economic growth is a critical step in understanding the factors that contribute to rapid growth in this research. The study mentioned aims to determine the primary elements influencing Somalia's economic growth. As a result, this research seeks to bridge the gap by analyzing the chosen macroeconomic factors of Somalia economic growth over the defined time frame.

However this methodology is criticized for its weakness when there is more than one cointegrating. The Autoregressive distributed lag (ARDL) model is an alternative superior methodology. This study aims to look at Somalia's economic growth, with a particular emphasis on macroeconomic causes of growth. Once the factors that influence growth are identified, it will be simple and easy to implement policies that build on the previous decade's progress while avoiding a return to the negative growth period.

1.3 Objectives

1.3.1 Overall Objective

The General objective of the research is to examine the factors determining economy growth in Somalia.

1.3.2 Specific Objectives

- I) Determine the association between economic growth and inflation rate in Somalia.
- II) Determine the incidences and extend of association between different foreign direct investment and economic growth economic.
- III) Examine the impact of exchange rate on economic growth in Somalia.

Study questions

1. What is the impact of inflation rate of macro – economic growth in Somalia?
2. How is the nexus between economic growth and foreign direct investment?
3. What is the effect of exchange rate and economic development in Somalia?

Study hypotheses

- 1) H_0^1 : The inflation rate has not significant influence on the GDP in Somalia.
- 2) H_0^2 : FDI does has not significant influence Gross Domestic Product
- 3) H_0^3 : Exchange rate has not significant influence e GDP increase.

1.4 Importance of the research

Empirical research on Somalia's key determinants of economic growth. As a result, the goal of this study is to fill in the actual literature gap on this topic. It would allow politicians to develop appropriate government policies that would boost overall economic growth through policy design and implementation.

Broadly said, this study will assist policymakers in understanding the major macroeconomic causes of economic growth in Somalia, as well as the policies that should be implemented to accelerate growth. As a result, poverty is reduced.

This research is advantageous to personal, private and public organizations in specific from different views; for personal use, the research directs them on how state economic rules are affected by the main economic rule determinants. Secondly, this research is helpful to those who make the constitution that governs the nation majorly on making sure that the economy is not affected.

For a group of people specifically the one included in the business section, the research gives awareness on improved economic levels for them to conclude on the amount of product to be produced at specific periods. The research is important to the state on the taste that it can be able to a certain rule solve a problem in existence relating to their capacity to achieve macroeconomic goals.

1.5 Organization of the research

Five chapters are covered in this research. The first chapter necessitates the research by emphasizing important problems of the research background. The general and other goals were given to give the research direction. Chapter 2 debates both the abstract and verifiable literature reviews connecting the research. Chapter 3 is about the methodological aspect of the research of macroeconomic growth. Chapter 4 avails the results of the research and describes the major things related to the research hypotheses. The fifth chapter completes the research and emphasizes on the predicates of the results. Nonetheless, endorsement is presented to show the role of each key players and how they should take issues throughout the process.

1.6 Limitations

This research is limited due to a lack of sufficient data, since there have been conflicts and civil war in Somalia until now. Some of those data are social data such as the exchange rate, the inflation rate, foreign direct investment, and GDP.

Furthermore, expenses influenced the research because there were no offices collecting data in Somalia, particularly the time series data, which came from a website and is difficult to generalize in Somalia.

2 Literature Review

2.1 Introduction

The review evaluates the prior researches connecting to the research problem. The literature deliberated examines the comparison between inflation rate, budget fiscal deficit, trade rate, growth of Somali economically and different countries direct investment. Thus, it evaluates macroeconomic policy determinants in detailed relation to other Somali developed findings developed.

2.2 Literature study of theorists

The crowding out effect theory describes the results of budget deficit to bigger interest rates which delay individual expenditure as per Gwartney et al. (2011). It influences entails that the growth fiscal rules will have a few influences on output, employment and demand. The major subject embody in the influence model is that the decrease of non-state expenditure as an outcome of larger rates of interests will offset another spending as a result of deficits. The economic growth is said to be affected by the deficit thus, a negative association between economic growth and budget deficit. The theory focuses in describing the comparison between interest rate and budget deficit on the economy.

The theory of monetarist mainly describes the function of money supply figuring out the balance level of actual Gross Domestic Product. Nonetheless, supply of money is seen as a process towards growth economy. Researches by Smarzynska Javorcik (2004) in the country of Somali, shows the impacts of strong monetary rule on stabling particularly in the amid-1990s and which led to inflation decrease. Monetarists believe differences in the provision of monetary rule and money ways are important in describing economy differences as pointed by Haifer in the year (2005). Monetary rule or policy clearly describes the differences experienced in the nation of Somali over strengthened fiscal rules or policies. Various researches tried to view how the GDP growth and inflation are connected. Observations according to Baramay (2015) discuss a continuous rise in the level of price has unsuitable impacts on the growth of economy in Somali. Nevertheless, the connection described is due to putting in practice of positive financial rules regulated by the state.

Changes in fiscal rule in the monetarist is believed to have only low-term impacts on the actual GDP: The impact of difference in supply of money is considered in change of the level of price in long run term as indicated by Baramay (2015). Thus, in long run the

produced GDP of the economy has been affected by inflation as an output of fiscal rules. The literature proposes the existence of the connection between inflation and GDP in the country of Somali, hence the theory of monetarist was significance to this research.

2.3 Empirical study review on economic factors in Somalia

The growth of economy in Somalia has displayed inclination in economic growth for aduration of time, therefore, Somali growth of economy is mixed relying on rules and time looking upon procedures for growth of economy. From the Babu et al. (2014) proposeshow to correct the growth of economy condition which was present in Somalia before the year 1990s. In the amid 1990s the country of Somalia carried on its amendments with a transparent and hold dedication to macroeconomic strength through monetary and fiscal rules as the act founding of growth of economy as considered by Sarris et al. (2006). The actual section process of developing as metricized by the growth of economy rate has abided either modest or high all through the post reformation period as argued by Odhiambo (2011). The country of Somalia in the year (1991) and (2000) collected an annual GDP increment rate of about 3% as indicated by Odhiambo (2011); Odhiambo et al. (2012). Back in the year 1991 Somalia recorded a 2.1% annual GDP growth rate and in the year 1992 it recorded a 0.6% annual GDP growth rate which was lower which later raised to 5.1% in the year 2000 as indicated by Odhiambo (2011).

The connection between budget fiscal deficit, growth rate, different countries investment and trade rate variables of macroeconomic and economic growth are described in various levels. Baramay (2015), according to research into the monetary policy and economic growth, a maintaining rising in the overall budget level has a detrimental grow up on Somalia's economic. According to the findings, overall level of prices (inflation) rises by 1%, economic growth (GDP) falls by 48.105 percent, and the analysis output that inflation accounts for 64% of the factors that influence economic development in Somalia, while only 36% are accounted for by other factors.

The trade speed in country of Somali shows fall and rise motion in distinct time durations as per N.C and Dimoso (2011). Research on the association between economic growth and trade rate in Somalia are limited and therefore giving liNle description on the connection of the given two variables.

Somali budget quality is said to be an interests of issue in the economy the growth of Somali banking system in financial amendments handled to maintain the improvement of quality budget. Nevertheless, besides external and internal borrowing which were a result of amendments, also budget deficiency existed as indicated by Said in 2013.

2.4 Study gap

In the research, the gap is proven by four main elements; Firstly, limited research which investigates the association of macroeconomic main four determinants of economic status in Somalia towards studies. Secondly, presence of variations of outputs over investigated variables and economic growth in Somalia. Lastly, the state macroeconomic rule to be the working of the macroeconomic determinants due to the failure overtime. It also proves the reason of research.

2.5 Somalia's economic growth prospects

According to Kraler et al. (2020), for the period 1990 to 2010, the country recorded a positive change in its growth rate recording the highest Gross Domestic Product of rough mean 7% per year. This was the highest GDP recorded per annum ever in the country for the year 2002 to 2009. The peak of the GDP growth was recorded in the year 2004 which was at 7.8%. Nevertheless, the country was affected by lack of rainfall for over a year in 2005 which negatively affected the economy.

In matters to do with Gross Domestic Product (GDP), an assessment of the world economy in 2012 showed that the rate at which the GDP grew in Somalia in 1990 marked an small increase as a result of the accomplishment of economic amendments. The inclination continued to decrease but experienced a small increase in 1995. This decline was attributed majorly to reduction in donor funding in early 1990s due to the short time amendments collapse, it elevated again when amendments embarked during the reign of Hassan Sheikh Mohamud in 16th September, 2012 Abdullah et al. (2012). This decline was also brought about by tight conditions and several conditions from the Donors seeking help from different foreign countries. During the era 2012-2017 the growth rate varied meaningfully rising to 917 M USD in 2015 (World Bank report, 2017).

2.5.1 Weakness of Budget from Somalia

Somalia is being affected by Budget spending which has become one of the problems affecting its economy. Solomon and De Wet (2004) depict Somalia to be a state with financial constraints for a very long duration of time. This problem has been attributed to, as a result of various factors such as policies on finance at different time period. It was pointed out that the government of Somalia owned the country's financial sector with bank of Somalia being the main source of state fiscal instrument. Thus, it being the sole banking system exercise no fiscal deficit control over policies on monetary and therefore it was forced to print money so as to be able to gather for the monetary constraints as recorded by Kasidi and Said (2013). Nevertheless, the amendments on finances which were put in place later on led to the changes being noticed.

There was a general growth in banking system which brought about remarkable changes in financial sector in the country. Foreign borrowing, domestic borrowing and monetization were some of the ways used to finance the budget deficits. Nevertheless, these finances were not sufficient as the country's growing economy had created a lot of effects. Solomon and De Wet (2004), expound that the transparency and cooperation with financiers on microeconomic rule, which as help to mobilize support on finance. The budget deficit in Somali remains a difficulty making the country budget to heavily relying on even after different measures put in action such as borrowing from inside the country and assist from other donors from different habitations, which scope at financing the budget deficits in Somalia.

2.5.2 Somalia's inflationary economy

The country's history dating back to 1966 indicates that the country has been experiencing the inflation for all that long. according to the Solomon and De Wet (2004), had a suggestion and explanation that the country has been on a two-digit inflation figure from the year 1966 to the peak being 1970s which hit at 30%. The government of Somalia over time has been designing reform measures aimed at mitigating the problem of inflation in the country. Among the reforms put forward by the government are like the economic survival program that was to be done nationwide, improving the structure under (Structural Adjustment Program) and boosting economy through a program called Economic Recovery Program (ERP I and ERP II) as recorded by Solomon and De Wet (2004). Despite these measures yielding a lot of success and resulting in economic boost in the country, inflation continued remain at higher rate ranging between 30.6 and 19.8% in 1986 and 1995 respectively. The packages positively impacted the economy by reducing inflation by 20%. From the Mnali (2012) was of the view that the implementation institutional and legal amendments frameworks were instrumental in curbing the rate of inflation in the country; between 1997 and 2005 which recorded a decline in inflation from 16 percent to 4 percent respectively. Therefore, it is clear that Somali has recorded decreasing inflation from 1995 to 2000 which was in a significant rate to about one digit inflation rate Feltenstein and Sarangi (2002).

The history and explanation of inflation behaviors and trends in Somali since financial amendments is mixed. Nevertheless, putting together inflation trends proposed by Othman (2012) and Mnali (2012), economy degradation as a result of inflation in Somali from 2002 to 2011 successfully reduced and expanded with time. From this journal Mnali (2012) contests that 2006-2007 inflation rate raised by 7% to 12% in 2009 while in 2010 it falls to 5% and rose again in 2011.

Inflation in Somali has been there over a long period of time, this can be explained in various ways. considering this journal Solomon and De Wet (2004), explained various policies put in place by the state such as procedures for reducing inflation. Foreign direct invest-

ments were considered to own satisfying impacts on balanced rates of inflation. Other researchers considered enhancement of management and operations steps of budget s to lower inflation. From this journal Gabagambi (2013) proposed that restricted activities to be freed so as to positively impact inflation rate in Somalia. A country's inflation should be monetary and structure wise because the flow of activities accounts for increase in experience resulting from the rise of commodity prices like oil, imported goods, withdrawal of other nations leading to the decrease of countries outflow. Inflation in Somali is as a result of several factors as described above.

2.5.3 External investing and trade called FDI in Somalia)

Foreign Direct Investment in Somalia is described to be appealing as time goes by in spite of a drop in African Sub Sahara. Nevertheless, the rise in Foreign Direct Investment chain in Africa including Somalia is affected by implementing financial amendments in the early 1990s. The main frameworks captured by the state in Somalia in 1980 brought a rise in inflow of FDI. The distribution of FDI in Somalia to be condensed in places be-gifted with different types of non-man-made resources as it was noted by Msuya (2007). In spite of the experienced importance from inflows growth of FDI in Somalia, their influences on the growth of economy isn't satisfactory as expected. FDI is prevalent in few sections of economy for example trade, manufacturing industry and mining as pointed by Baramay(2015).

The report as per Mnali (2012) reported a number of difficulties affecting FDI in Somali, they include; lack of projects for investments, inadequate infrastructure and in availability of adequate power. Secondly, another report by Dupasquier and Osakwe (2006) views unfavorable climate to affect low FDI inclinations in Somalia.

2.5.4 GDP (gross domestic output)

It explained total market value or value of all accomplished goods and services yielded within the borders of country in a specific time. As a capacity of total domestic production, it operates as a scorecard of a particular nation's economically. It includes all consumptions in both individual and government sectors, investments, state expense, Investments and others that take place within a country's boundaries.

GDP can be given in form of the below formula:

$$C+G+I+NX = GDP$$

Where;

I= the total nation's businesses expense on per capital income
 C = all non-governmental consumptions in a Nation's Economy,
 NX= total Nation's net export given as (NX = Export – Import).

2.5.5 Weakness of Budget

It occurs at the time when expenditure surpass revenues and betoken financial state of a nation. It is used when the country directing to consuming fairly than individuals or business.

2.5.6 expansion rates

It is the increase or decrease in percentage of prices in a particular a duration of time mostly monthly or annually. The percentage informs how fast the price lowers in that particular duration.

2.5.7 The rates of exchanging

It is the value of country's shilling versus the shilling of other country. For example, the currency of US dollars is 1.18 to buy one euro. An exchange rate of a nation's shilling is different to that another country's currency.

Amendments and introduction of legislation by Somali government are part of the changes that aim on facilitating financial objectives reflecting new reforms. In the year 1992, there was introduction of the Foreign Exchange Act which aimed at creating good environs for allocation of trade with outside countries as recorded by Feltenstein and Sarangi (2002). The exchange rates between the banks was brought in place which projected rising effectiveness the turnover of different countries trade substitutes by easing market determined trade rate.

In spite of frequent rising and falling of the Somali currency as compared to those of other countries, the progress of reform have not yet met their goals. Moreover, the financial sector amendments are not such appealing as anticipated. According to this journal Nyamrunda and Mbogela (2014) came to a conclusion that, Somali currency trade rate downed as from SAP program and this has effect on economy in the long run. Secondly, It was noted that the decrease in trade rate in Somalia led to decline in quality investment. The fall in value of currency has led to increase in domestic prices and also increase the pressure of inflation. .

2.5.8 External investing and trade called FDI

It is an individual or firm investment made in one nation inside commercial enterprise sited to another nation. Usually, Foreign Direct Investment occurs when an investor establishes outside country acquires or operations outside country business components or assts inside outside country companies.

2.6 Literature Summary

It is clear that the economic growth and GDP requires an urgent attention. There is need to involve different sectors in discussions to reveal the macro- economic determinants of economic growth in Somalia. Past studies have not shown clearly how the macro- economic determinants contribute to the low GDP IN Somalia. It is within the interest of this gap that the current study will fill it by investigating the macro- economic determinants of economic growth in Somalia.

3 Research Methodology

3.1 Research design

The data for this study comes from the World Bank's, which spans 1991 to 2017. It was used for time series data, that is called longitudinal research designs. Because the re-search data was secondary data, the analysis approach used in this study was a quantitative and qualitative method with a multiple time series study since in general, that was used multiple time series analysis. That came from research problems. This research was carried out in Somalia. The autoregressive distributed lag (ARDL) technique to cointegration analysis is proposed in this study to estimate the economic growth in Somalia.

3.2 Sample and sampling procedures

The research used data collected between 1991-2017 as variables of this study was four variables. Data collected on a yearly basis was applied in the process to boost the size of the specimen or sample to achieve thorough analysis. The data includes 27 observations. Each observation has four variables. The sample total was 108, which was used to analyze. Because most economists believe that economic growth can be quantified by GDP growth, it is included as the main dependent variable in the study to calculate economic growth.

3.3 Procedure

Data were collected in time sequences of various variables of interest from World Development Indicators and international organizations.

3.4 Data processing and analysis

The research used secondary data from 1991-2017 to run out interpolation steps on the connection among Gross Domestic Product, Exchange rate, inflation rate, and Foreign Direct Investment by using STATA and R-Studio statistical software to determine both stationary and non-stationary. To determine the statistical connection among Gross Domestic Product dependent variable and inflation rate, and FDI using the cointegration regression analysis and vector Autoregressive models.

3.4.1 Empirical model

In the study the following formula was applied for the formation of Empirical model.

$$f(INFL, EXCH, FDI) = GDP$$

- INFL represents Inflation rate in
- EXCH represents Exchange rate in SOM S/US Dollar,
- FDI represents Foreign Direct Investment in US Dollar,
- GDP represents Gross Domestic Product in US Dollar,

The above equation function can be represented in an econometric linear form as given below

$$GROWTHGDP_t = \beta_0 + \beta_1 FDI_t + \beta_2 INFL_t + \beta_3 EXCH_t + \varepsilon_t \quad (3.1)$$

Where $\beta_0 = \text{constant}$, β_1 , β_2 , β_3 , β_4 are coefficients of explanatory variables and the ε_t is error term.

3.5 The conceptual framework

Prices have risen as a result of an increase in inflation. Inflation weakens money's buying power, lowering demand and, as a result, GDP decreases. That means if the inflation rate changes, then the GDP will change. That is, the GDP depends on inflation change. As we discovered in our research, boosting the trend of FDI also boosts the GDP of the country. That tells the FDI influence to GDP. GDP is the yearly amount of gross domestic product in local currency for each country, and ER is the yearly amount of the exchange rate at the end of the period for each country. In theory, the ER variable should have a true association with the GDP variable. The greater the exchange rate, the more output there is. So the exchange rate affects GDP. Finally, the GDP depends on inflation, FDI, and the exchange rate, as appears in the picture 3.1 on the next page.

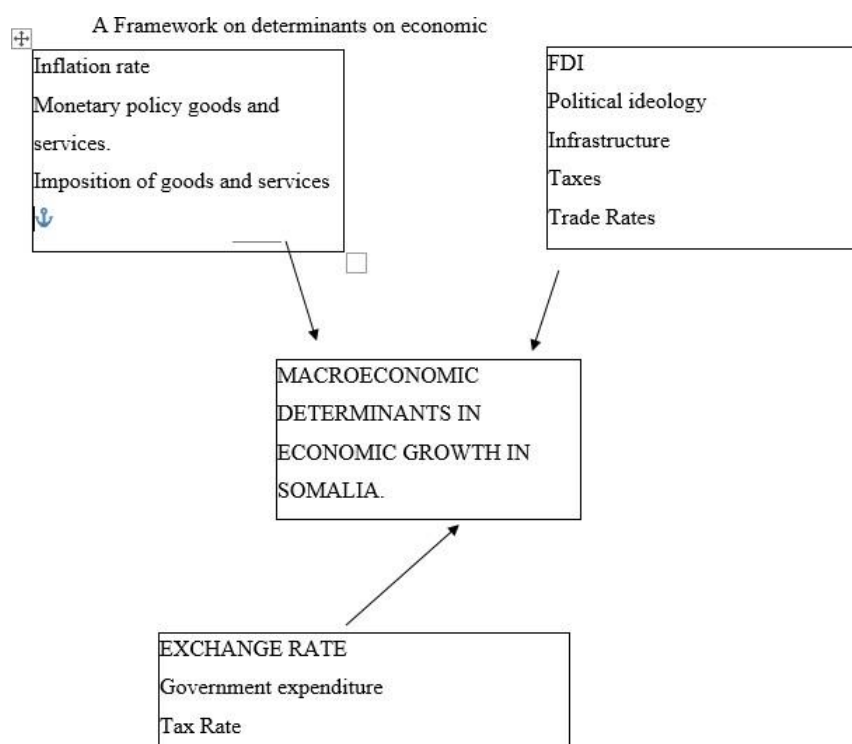


Figure 3.1. A Framework on determinants on economic

3.6 Data Analysis

Considering for this Ayuba and Zubairu (2015), i found that the uni-variate models take consideration for a single time series only, $GDP_1, GDP_2, GDP_3, \dots, GDP_T$, and represent the systematic variation in y_t as a function of its own history, i.e. $E[GDP_t | GDP_{t-1}, GDP_{t-2}, \dots]$.

Despite its limitations, the uni-variate technique serves two crucial goals. The initial goal is to use it as a descriptive tool for describing a time series' dynamic features. For ex-ample, we might be interested in the strength of the time series' time dependency or persistence, and we might want to see if the key idea of stationarity is likely to be met. In empirical applications, a simple uni-variate description of the data is frequently followed by a more complex multivariate analysis of the data. The second goal is to forecast: To

forecast GDP_{T+1} at time T using a multivariate model for GDP_t conditional on FDI_t , it's evident that you'll need to know FDI_{T+1} , which isn't always in the information set at time

Consider a model for providing an information set that includes other explanatory variables, such as the vector FDI_t . These models are clearly more interesting from an economic standpoint, and they enable the calculation of dynamic multipliers.

$$\frac{\partial GDP_t}{\partial FDI_t}, \frac{\partial GDP_{t-1}}{\partial FDI_{t-1}}, \frac{\partial GDP_{t-2}}{\partial FDI_{t-2}}, \frac{\partial GDP_{t-3}}{\partial FDI_{t-3}}, \dots \quad (3.2)$$

We examine a model for GDP_t dependent on and the past, that is.

$$E[GDP_t | GDP_{t-1}, GDP_{t-2}, GDP_{t-3}, \dots, FDI_t, FDI_{t-1}, FDI_{t-2}, FDI_{t-3}, \dots] \quad (3.3)$$

The autoregressive distributed lag (ADL) model is a powerhouse in single-equation dynamic modeling.

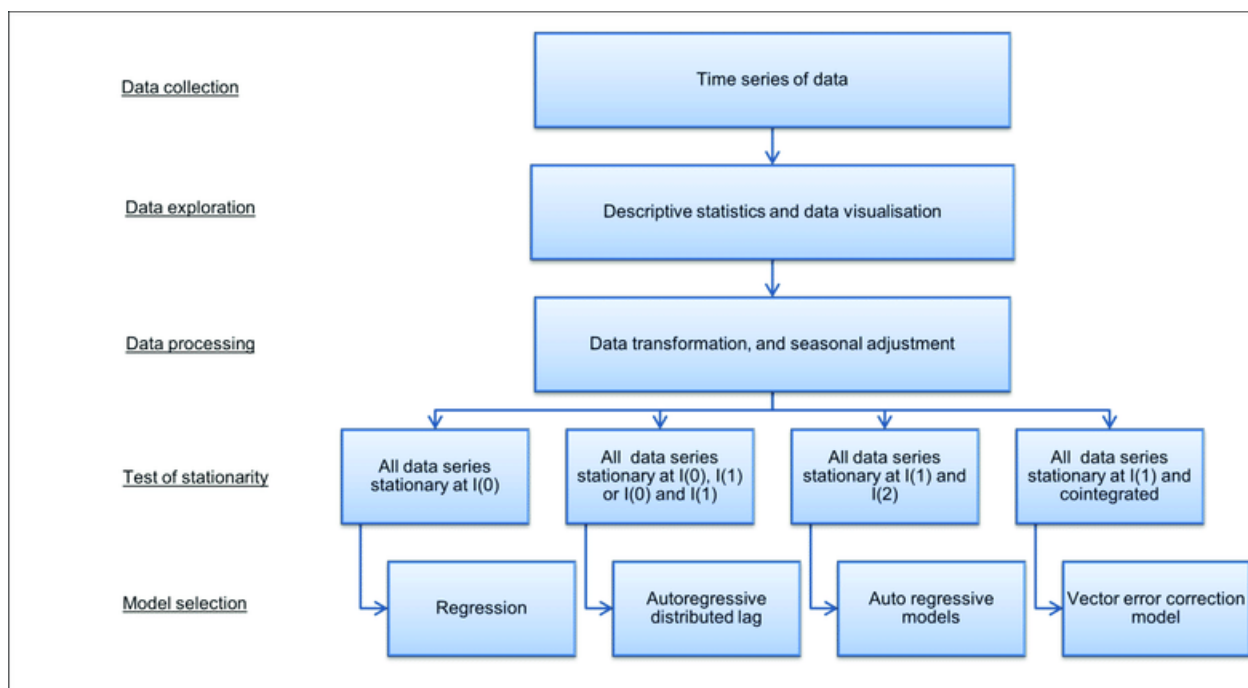


Figure 3.2. Summary of steps in time series model selection Source

3.6.1 Root tests

A unit root (also known as a unit root process or a difference stationary process) is a stochastic trend in a time series, often known as a "random walk with drift.

The cointegration test can be used to examine the relationship among time series variables. It is critical to evaluate each time series for stationarity before performing the cointegration test. If a time series is non-stationary, typical regression analysis will provide erroneous conclusions. As a result, the unit root test is performed first Shrestha and Chowdhury (2005).

According to Kleiber and Zeileis (2008), the augmented Dickey-Fuller (ADF) test (Dickey and Fuller 1981), which is the most extensively used by practitioners, is accessible in the function `adf.test()` from time series that may be used to create a package that contains a set of functions. The t test is implemented using this function of $H_0 : \theta = 0$ in the regression

$$\Delta y_t = \alpha + \delta t + \theta y_{t-1} + \sum_{j=1}^k \varphi \Delta y_{t-j} + \varepsilon_t \quad (3.4)$$

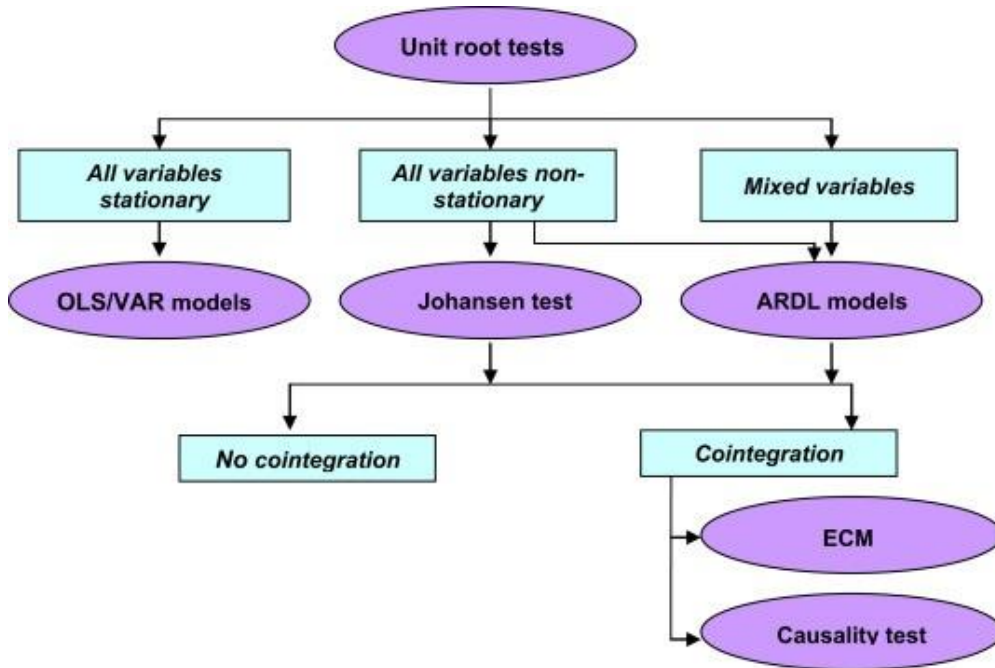


Figure 3.3. Unit root illustration of the method

Unit Root Test in the Presence of Structural Break in Data Regarding from this journal Shrestha and Chowdhury (2005) that tells us, Perron (1989) provides for a single structural change at time T_B ($1 < T_B < T$), where T denotes the number of observations.

Perron (1989) created the following models for three separate scenarios:

Null Hypothesis:

$$\text{Model (A)} \quad y_t = \mu + dD(TB)_t + y_{t-1} + e_t \quad (3.5)$$

$$\text{Model (B)} \quad y_t = \mu_1 + y_{t-1} + (\mu_2 - \mu_1)DU_t + e_t \quad (3.6)$$

$$\text{Model (C)} \quad y_t = \mu + dD(TB)_t + y_{t-1} + (\mu_2 - \mu_1)DU_t + e_t \quad (3.7)$$

where $D(TB)_t = 1$ if $t = T_B + 1, 0$ otherwise, and $DU_t = 1$ if $t > T_B, 0$ otherwise.

Alternative Hypothesis:

$$\text{Model (A)} \quad y_t = \mu_1 + \beta t + (\mu_2 - \mu_1)DU_t + e_t \quad (3.8)$$

$$\text{Model (B)} \quad y_t = \mu + \beta_1 t + (\beta_2 - \beta_1) DT_t^* + e_t \quad (3.9)$$

$$\text{Model (C)} \quad y_t = \mu + \beta_1 t + (\mu_2 - \mu_1) DU_t + (\beta_2 - \beta_1) DT_t + e_t \quad (3.10)$$

where $DT_t = t - T_B$, if $t > T_B$, and 0 otherwise.

Model A allows for an exogenous change in the series' level, while Model B allows for an exogenous change in the rate of growth. Both can be changed in Model C. One known structural break is included in Perron's (1989) models. These models can't be used in situations when such breaks aren't known. As a result, this approach is chastised for presuming a known break date, which presents the issue of pre-testing and data-mining in the break date selection (Maddala and Kim 2003). Furthermore, the date of the break might be seen as being linked to the data.

The AR(1) model

There is one difference between this equation and the standard basic linear regression equation. Although this isn't always the case, we assume that the x-variable isn't random and is instead something we can control in simple least squares regression.

$$x_t = \delta + \phi_1 x_{t-1} + w_t \quad (3.11)$$

Autocorrelation Function (ACF)

We found the following: x_t is the value of a time series at time t . The series' ACF provides correlations between x_t and x_{t-h} , for $h = 1, 2, 3, \dots$

$$\frac{\text{Cov}(x_t, x_{t-h})}{\text{Std.Dev}(x_t) * \text{Dev}(x_{t-h})} = \frac{\text{Cov}(x_t, x_{t-h})}{\text{Var}(x_t)} \quad (3.12)$$

The mean, variance, and ACF for a time series process using an AR(1) model are given below.

- The mean of X_t is

$$E(X_t) = \mu = \frac{\delta}{1 - \phi_1} \quad (3.13)$$

- The variance of x_t is

$$\sigma^2$$

$$VAR(X_t) = \frac{w}{1 - \phi_1^2} \quad (3.14)$$

- The correlation between observations h time periods apart is

$$x_t = \phi_1 x_{t-1} + w_t \quad (3.15)$$

$$(x_{t-h}, x_t) = x_{t-h} \cdot \phi_1 x_{t-1} + x_{t-h} \cdot w_t \quad (3.16)$$

$$E((x_{t-h}, x_t)) = E(x_{t-h} \cdot \phi_1 x_{t-1}) \quad (3.17)$$

$$\gamma_h = \phi_1^h \gamma_{h-1} \quad (3.18)$$

$$\rho_h = \frac{\gamma_h}{\gamma_0} = \frac{\phi_1^h \cdot Var(x_t)}{Var(x_t)}$$

$$\rho_h = \phi_1^h \quad (3.19)$$

$$\rho_h = \frac{\gamma_h}{\gamma_0} = \frac{Cov(x_t, x_{t-h})}{Var(x_t)}$$

With an AR(1) model, this calculates the theoretical ACF for a time series variable.

Differences of Time Series

The qualities of a stationary time series are independent of the time at which it is viewed. As a result, time series containing trends or seasonality are not stationary; the trend and seasonality will impact the time series' value at different times. The differenced series represents the difference in the original series' consecutive observations. The model for the original series can be expressed as if the differenced series were white noise.

$$x_t - x_{t-1} = \varepsilon_t \quad (3.20)$$

The first differences can be written as B and BhaNa (2015)

$$d_t^{(1)} = x_t - x_{t-1} \quad (3.21)$$

and the second differences d^2 may be computed from the first differences

$$d_t^{(2)} = d_t^{(1)} - d_{t-1}^{(1)} \quad (3.22)$$

The term used to describe order differences in general can be written as

$$d_t^{(m)} = d_t^{(m-1)} - d_{t-1}^{(m-1)} \quad (3.23)$$

Cointegration

For non-stationary time series, ordinary least square or other comparable algorithms may provide erroneous conclusions. In other words, regression test results may indicate that a significant link exists between two unrelated variables. This sort of regression is known as 'spurious regression,' and it occurs when the time series used in the regression model is non-stationary. Two or more variables, on the other hand, may create a long-term equilibrium connection, even if they diverge from it in the short run. Engle and Granger (1987) established the cointegration test method to assess the relationships among non-stationary variables as a result of these challenges. Two or more variables are said to be cointegrated if they are linked to establish an equilibrium relationship that spans the long run. In fact, one variable drags the other through time, so they both move in the same direction B and BhaNa (2015).

Let $\underline{Y}_t = (y_{1t}, y_{2t}, \dots, y_{nt})'$ denote an $(n \times 1)$ vector of $I(1)$ time series. \underline{Y}_t is cointegrated if there exists an $(n \times 1)$ vector $\beta = (\beta_1, \beta_2, \dots, \beta_n)'$ such that

$$\beta' \underline{Y}_t = \beta_1 y_{1t} + \beta_2 y_{2t} + \dots + \beta_n y_{nt} \sim I(0) \quad (3.24)$$

In other words, if there is a stationary linear combination of non-stationary time series in \underline{Y}_t , they are cointegrated.

- Economic theory frequently motivates the linear combination $\beta' \underline{Y}_t$, which is referred to as a long-run equilibrium connection.
- Intuition: An $I(1)$ time series with a long-run equilibrium connection cannot stray too far from the equilibrium since economic forces will intervene to recover it.

Multiple Cointegrating Relationships

In most of the previous cases, we were primarily interested in determining if two variables, y_{1t} and y_{2t} , were cointegrated. These ideas, tests, and models could easily be expanded to include more variables, especially if each of these variables is $I(1)$ B and BhaNa (2015).

Consider the case where $n = 2$ for the sake of simplicity.

$$Y_{1t} = \mu_1 + \pi_{11} Y_{1t-1} + \pi_{12} Y_{2t-1} + \varepsilon_{1t} \quad (3.25)$$

$$Y_{1t} = \mu_1 + \pi_{11}y_{1t-1} + y_{2t-1}\pi_{12} + \varepsilon_{1t} \quad (3.26)$$

$$Y_{2t} = \mu_2 + \pi_{21}y_{1t-1} + y_{2t-1}\pi_{22} + \varepsilon_{2t} \quad (3.27)$$

If this VAR(1) is stable, we'll proceed with inference as usual. The VAR is unstable if one or more of the eigenvalues have a modulus equal to or greater than one, as it is in the presence of non-stationary variables Shrestha and Chowdhury (2005).

3.6.2 The Autoregressive distributive lags model (ARDL)

The cointegration test can be performed using a variety of approaches. The residual-based Engle-Granger (1987) test, as well as the maximum likelihood-based Johansen (1991; 1995) and Johansen-Juselius (1990) tests, are the most widely used approaches. The OLS-based autoregressive distributed lag (ARDL) technique to cointegration has been popular in recent years because of the limited power and other issues associated with these test methods. The key benefit of ARDL modeling is that it is flexible enough to be used when the variables have varying integration orders Shrestha and Chowdhury (2005).

We summarize from the Bahmani-Oskooee and Fariditavana (2016) and B and BhaNa (2015) for the following:

ARDL(p, q, . . . , q) model:

$$y_t = c_1 + c_2t + \sum_{i=1}^b \phi_i y_{t-i} + \sum_{i=0}^q \hat{\beta}_i x_{t-i} + u_t \quad (3.28)$$

other way for formulation of the model:

$$y_t = c_1 + c_2t + \sum_{i=1}^b \phi_i y_{t-i} + \sum_{i=0}^q \hat{\beta}_i x_{t-i} + \lambda_1 y_{t-1} + \lambda_2 x_{t-1} + u_t \quad (3.29)$$

The model's short run dynamics are represented by the first portion of the equation with ϕ_i, β_i ,

c_1, c_2 and u_t . The qq in the second portion denotes a long-term partnership. ($\lambda_1, \lambda_2 = 0$) is the null hypothesis in the equation, implying that there is no long-run link.

In our research study The ARDL Model of Economic Growth is estimated as follows:

$$GPD = \beta_0 + \sum_{i=1}^p \phi_i GPD_{t-i} + \sum_{i=0}^q \phi_i EXCH_{t-i} + \sum_{i=0}^q \phi_i FDI_{t-i} + \sum_{i=0}^q \phi_i INFL_{t-i} + u_t \quad (3.30)$$

where

- p and q are the greatest lags of an independent variables from the ARDL model
- β_0 is the intercept and u_t is the error term
- The greatest lag of each independent variable (p) is maintained by minimizing the Akaike information Criteria in this model, which is computed using Stata.

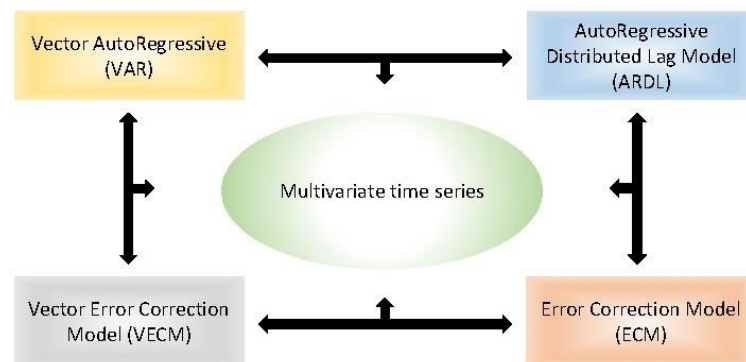


Figure 3.4. Multiple Time Series Model illustration for the research

3.6.3 Bound test

From the Saayman and Saayman (2015) we summarized that, according to Persaran and Shin (1999), the bound test depends on an ARDL specification that includes error correction. As a result, the calculated ARDL model might be applied to see if the factors are cointegrated or have a long-run relation.

Null Hypothesis: No Long-run relationship exists

If the produced Wald-test (F-statistic) is greater than the upper boundaries crucial values, the null hypothesis is rejected.

The null hypothesis is not rejected if the F-Statistic is below the lower limit critical values, and the test becomes inconclusive if F is among the crucial values' elevation angle. According to techniques to Cointegration, this one has the following advantages:

- l) Even if the order of integration of time-series variables is uncertain, the bounds approach can be used. That means that the method could be utilized where the

elements are either all I(0), all I(1), or a mix both of them. Others methods necessitate that the factors be built in the equal sequence.

- II) The method of Co-integrating was straightforward since it estimates both the short-run and long-run coefficients at the same time.

Akaike Information Criterion (AIC)

AIC is a single figure score that can be used to assess which of numerous models is most likely to be the best model for a given dataset. It evaluates models relative to other AIC scores for the same dataset, hence AIC scores are only helpful when compared to other AIC scores for the same dataset. It is preferable to have a smaller AIC score.

From the above web the AIC is most commonly employed in cases where traditional machine learning methodology makes it difficult to test the model's performance on a testset (small data, or time series). Since the most valuable data in time series analysis is frequently the most recent, which is locked in the validation and test sets, AIC is very useful. As a result, training on all data and utilizing AIC instead of standard train/validation/test model selection methods can result in better model selection.

$$AIC = -2\ln(L) + 2K \quad (3.31)$$

Where k = number of parameters estimated and L = likelihood other way or formula

$$AIC_c = \frac{2n}{n - k - 1} k - 2 \ln(L_{max}) \quad (3.32)$$

3.6.4 Long-run and short-run coefficients

According to the Bahmani-Oskooee and Fariditavana (2016), I found that the ARDL model is then used to evaluate both the long-run and short-run coefficients if the Bounds Test indicates a long-run link. The Cointegrating equation (which contains long-run coefficients) and the error correction model (which contains short-run coefficients) for the ARDL economic growth model would be as follows:

$$EC_t = GPD - (\beta_0 + \beta_1 FDI_t + \beta_2 INFL_t + \beta_3 EXCH_t) \quad (3.33)$$

where EC is indeed the Cointegrating equation's residual and the β' s denote long-run coefficients.

$$\Delta GDP = \beta_0 + \sum_{i=0}^k \varphi_i \Delta EXCH_{t-i} + \sum_{i=0}^k \varphi_i \Delta FDI_{t-i} + \sum_{i=0}^k \varphi_i \Delta INFL_{t-i} +$$

$$\lambda_1 EXCH + \lambda_2 FDI + \lambda_3 INFL + \lambda_3 GDP + \mu_t \quad (3.34)$$

where the first difference operator is denoted by Δ . EC_{t-1} was denoted by error correction generated for the Co-integration result, where β_0 is the intercept, and u_t is the error.

Equation 3.33 is just an error-correction model in which the lagged error component from 3.34 is replaced by the linear combination of lagged level variables. The short-run impacts are estimated using coefficients tied to first-differenced variables, and the long-run effects are appraised using estimates of λ_1 , λ_2 , and λ_3

4 Data Analysis And Interpretation Of The Results

4.1 Introduction

This chapter considers data analysis and interpretation of the results. The main purpose of this chapter is to reflect the objectives of the research study. However, the chapter presents an analysis which gives the result of the finding. The main variable we used is "unit root test". The results of the unit root test and Bounds test are shown for selecting models and variables. Nonetheless, the results of the Somalia economic growth regression examination provide a complete analysis of the data in this research.

4.2 Descriptive statistics

The factors of concern for the study were growth in domestic products (GDP), Exchange rates (EXR), inflation rates (IFR) and Foreign Direct Investments (FDI). The table 4.1 on the next page is the summary of descriptive statistics.

According to the table (4.1) on the next page, the descriptive statistics examine the number of observations in the variables, minimum and maximum value of the variables, measurement of central tendency of the variables, quartiles, skewness and kurtosis. To explain each value of the variables, we will use the above table. All variables have the same observations. According to the skewness, all the variables have a positive number less than one, except one variable (FDI). Therefore, all other variables are not skewed except the FDI variable. Although its skewness was 1.225, it is close to being symmetrical. There were no kurtosis for all variables since the number of kurtosis was less than 3 or greater than -3. The mean exchange rate was \$25580.2662, the mean interest rate was \$188.527407, the mean GDP was \$1675433976.9, and finally, the mean for foreign direct investment was \$303218541.

Table 4.1. Summary of descriptive statistics for all factors in out study

Descriptive statistics	EXR	INFR	GDP	FDI
Nobs	27.000000	27.000000	27.000000	27.000000
NAs	0.000000	0.000000	0.000000	0.000000
Minimum	19283.8000	117.050000	1083254546.	69005800.
Maximum	34597.5200	257.140000	2454779237	793000000
1. Quartile	22354.9150	140.785000	1253439038.	209000011.5
3. Quartile	30129.8450	241.400000	2052048477	332000000
Mean	25580.2662	188.527407	1675433976.9	303218541.1
Median	24098.670	189.340000	1535285669	258000000
Sum	690667.190	5090.240000	45236717378	8186900610
SE Mean	852.708224	9.893094	87830192.6	36560249
LCL Mean	23827.4994	168.191861	1494896430.6	228067872.5
UCL Mean	27333.0331	208.862954	1855971523.4	378369209.7
Variance	19632005.5	2642.579458	208281853569425856	36089599255797256
Stdev	4430.80190	51.406026	456379067.8	189972627.6
Skewness	0.435731	0.006733	0.225847	1.225398
Kurtosis	-1.198519	-1.689766	-1.450692	0.676390

According to the table (4.2) below, The inflation rate of Somalia had increased from 2010 up to 2012, while the neighboring countries had smooth recovery for their inflation rate expect the inflation rate of Malawi had increased constantly.

Table 4.2. Comparison of inflation between Somali and the neighboring countries

Country Name	2010	2011	2012
Somali	5.6%	12.8%	16.0%
Kenya	4.3%	14.0%	9.4%
Uganda	3.7%	15.01%	12.68%
Malawi	7.4%	7.62%	21.3%
Zambia	8.5%	8.66%	6.8%
Mozambique	12.43%	11.17%	2.6%

4.3 Data Analysing

4.3.1 The ADF result

Augment Dickey Fuller(ADF) Test for greatest lags of 4 was examined for knowing if the factors are stationary or non-stationary. The Unit root test was used for testing stationary of the factors. The table 4.3 below explained the factors names, test statistic of each factor, critical value at 5%, significant level of lag and the p-value.

As we can see the outcome of the table 4.3, the all the variables are stationarity at level (0) except the Foreign Direct Investment. Therefore, there is statistical evidence that adopting the Autoregressive distributed lags and it is recommended to use the ARDL model instead of the VEC model, which involves the equal integration order. At a 5% level of significance, the factors are significant.

Table 4.3. ADF unit root test results

Variables	test statistic	critical value at 5%	significant lag based On SIC	p-value
GDP	-3.776	-2.997	I(0)	0.0032
EX	-6.362	-3.596	I(0)	0.0000
INFR	-4.143	-3.596	I(0)	0.0055
FDI	-4.619	-1.711	I(1)	0.0001
P-value of all the variables <0.05				

4.3.2 Bounds Test

In the ARDL model, it's critical to figure out the best lag selection condition for the variables being studied. According to the table 4.4 on the next page, using varsoc command from stata, the maximum lag of Foreign Direct Investment was 4th considering AIC test, the Inflation rate maximum lag was 4th regarding to the AIC test, the maximum lag of Exchange rate was 2th and the maximum lag of GDP was 4th.

Table 4.4. greatest lag choosing

Selection-order criteria												
Sample: 1995 - 2017 Number of obs = 23												
ForeignDirectInvest				In ationrate			Exchangerate			GDP		
lag	Df	P	AIC	Df	P	AIC	Df	P	AIC	df	p	AIC
0			41.046			10.632			19.4936		2.0e+17	42.6885
1	1	0.635	41.124	1	0.027	10.505	1	0.798	19.5777	1	0.004	42.4076
2	1	0.710	41.205	1	0.072	10.451	1	0.004	19.3029	1	0.195	42.4216
3	1	0.274	41.240	1	0.098	10.421	1	0.189	19.3147	1	0.032	42.3074
4	1	0.361	41.029	1	0.012	10.25*	1	0.633	19.3918	1	0.105	42.2801*

So we can say the maximum lag of dependent variable (GDP) was 4th and the maximum lag of independent variables was 4th since we need maximum lags for both explanatory variables and dependent variable for estimating bound test in R studio command from the below figure (4.1).

```
time2=ardlBound(data = Timeseries, formula = GDP~Exchange.rate+Inflation.rate+  
Foreign.Direct.Investment, case=3, max.p = 4, max.q = 4)
```

Figure 4.1. ARDL and Bound test estimation

The purpose of the cointegration test at this level is to determine whether or not there is a long-term relationship between a collection of variables. Because components of the time series have a unit root and a stationary linear combination of these series exists, the series are categorized as cointegrated. As a result, using cointegration as an econometric notion should provide a foundation for determining the existence of a short-run equilibrium within underlying economic time series that converges over time. This provides a strong statistical and economic framework for empirical error correction model analysis, which generates both short- and long-term data in modeling factors. According to the figure

4.2 on the next page, the test yielded an F-statistic of 2.245. That was less than all of the lower limit values, implying the null hypothesis was no long-run association, so there was no evidence to reject at all critical values (1%, 5% and 10% level of significance). The variables in the model have a short-run relationship; hence, the short-run form of the ARDL model must be estimated.

```

-----
Shapiro-wilk test of normality of residuals:
      Shapiro-wilk normality test
data:  modelFull$model$residual
w = 0.96871, p-value = 0.6813
-----

PESARAN, SHIN AND SMITH (2001) COINTEGRATION TEST

Observations: 26
Number of Regressors (k): 3
Case: 3

-----
-                               F-test                               -
-----
10% critical value <----- I(0) ----- I(1) ----->
5% critical value      3.008                4.15
1% critical value      3.71                 5.018
                       5.333                7.063

F-statistic = 2.24566591334416
-----

```

Figure 4.2. co-integration test for ARDL model

4.3.3 ARDL model Selection

Regarding the tables (4.5) and ((4.6) bellow, from R studio and stata the p-value was very small according to the critical value or significant level at 0.05, the R-squared was 0.95 and greater that is very nice and Adjusted R-squared 0.90 and greater that means the explanatory variables were explaining 90% for variation of the dependent variable. Finally the Autoregressive Distributed lag (ARDL) model fits data well and it is properties predicts and interprets the discussion of results.

Table 4.5. ARDL (GDP Exchange rate Inflation rate Foreign Direct Investment) called ARDLModel

ARDL (3,1,3,3) regression	Number of observations = 23
Sample: 1995 ---2017	F(13, 9) = 15.60
	Prob > F = 0.0001
	R-squared = 0.9575
Log likelihood = -453.45285	Adj R-squared = 0.8961
	Root MSE = 1.412e+08
P-value of the model is less 0.05	

Table 4.6. Model significant using R Studio

Residual standard error: 77380000 on 5 degrees of freedom	
Multiple R-squared: 0.9924	Adjusted R-squared: 0.9682
F-statistic: 40.96 on 16 and 5 DF	p-value: 0.000325

4.3.4 Diagnostic tests

According to the table 4.7 on the next page, the p-value of homoscedasticity was 0.4756 that was the variation was constant over so there is no heteroskedasticity. Regarding to the autocorrelation, although the p-value was 0.04 that was less than the critical value 0.05 but it is close to it as we can see, that means there was no serial correlation in our data. Since the Shapiro-Wilk normality test of the full model was 0.96871 with degree of freedom equal one and p-value was 0.6813 that was righter than 0.05 failed for re-jecting our null-hypothesis therefore the data was normally distributed. The computed ADRL Model passed all of the major econometric diagnostic tests, demonstrating that heteroskedasticity and autocorrelation had no effect on the results and that the data was normally distributed.

Table 4.7. Model statistics for time series data

Breusch-Pagan Test for the homoskedasticity of residuals: studentized Breusch-Pagan test data: modelFull\$model BP = 18.709, df = 19, p-value = 0.4756
Breusch-Godfrey Test for the autocorrelation in residuals: Breusch-Godfrey test for serial correlation of order up to 1 data: modelFull\$model LM test = 331.14, df1 = 1, df2 = 1, p-value = 0.04
Shapiro-Wilk test of normality of residuals: Shapiro-Wilk normality test data: modelFull\$model\$residual W = 0.96871, p-value = 0.6813

From the picture (4.3) on the next page, the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) tests are also used to detect the model's stability for short run relationships. If the cumulative sum travels outside the region (never returned) between both the two crucial lines, the test detects substantial parameters instability.

The plot of the CUSUM test did not pass the crucial limitations, as shown in the first picture. The graph do not breach the lower and upper boundaries, according to the CUSUMSQ test. As a result, we can conclude that short-term estimates are steady and that no structural break exists. The regressors have explained 99.5% of the model, in addition to the model stability. As an outcome, the calculated model's outputs are dependable and efficient.

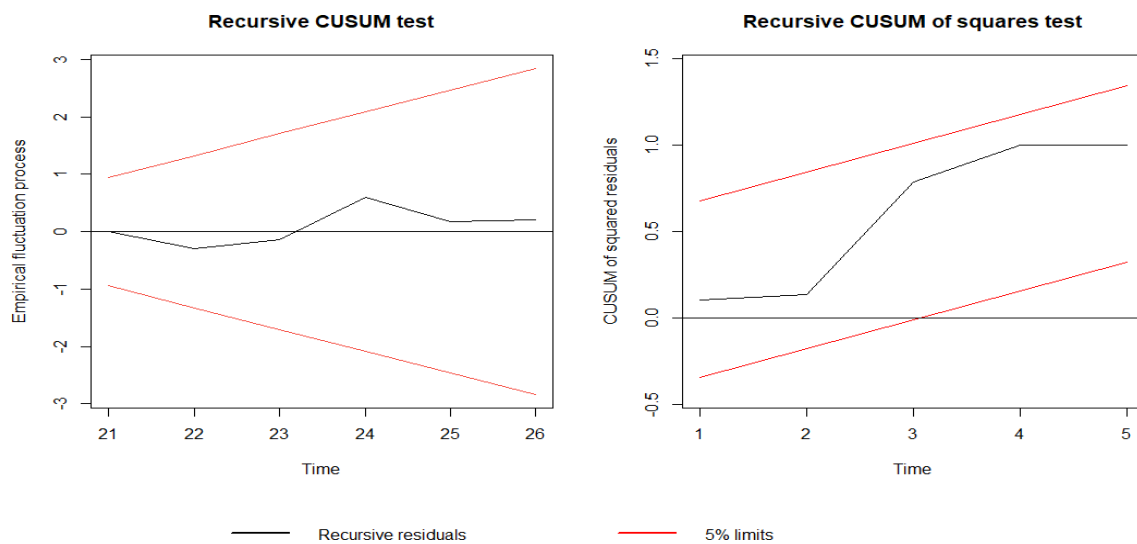


Figure 4.3. CUSUM and CUSUMSQ tests are used to check parameter stability

According to the picture (4.4) on the next page, the exchange rate, the inflation rate, and the GDP were stationary on $I(0)$ since they have a mean constant and the fluctuations were constant around the mean, but foreign direct investment was not stationary according to the picture on $I(0)$. As you can see, the average is going up each year and it is not taking a constant path, but after the first difference it becomes stationary.

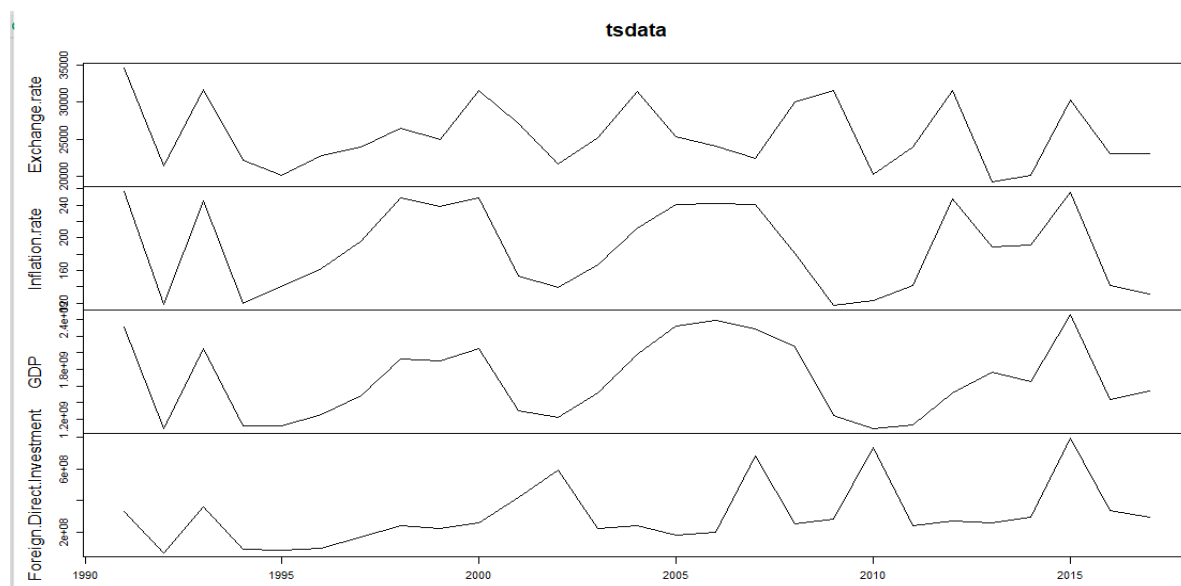


Figure 4.4. time series data graph in the research

4.3.5 ARDL Model Estimates

The table (4.8) on the next page, was executed using stata that the independent and dependent don't have first difference that we can interpret just variables and their lags and drift or constant term.

Table 4.8. the variables don't have first difference that we can interpret just variables and their lags and driP

ardl GDP Exchangerate In ationrate ForeignDirectInvestment					
ARDL (3,1,3,3) regression					
GDP	Coef.	Std. Err.	T	P> t 	[95% Conf. Inter- val]
GDP					
L1.	.4558785	.204636	2.23	0.053	-.0070403 .9187973
L2.	.6658813	.2220101	3.00	0.015	.1636595 1.168103
L3.	-.6586953	.2419869	-2.72	0.024	-1.206108 - .1112829
Exchange rate					
-.	3731.526	13957.3	0.27	0.795	-27842.08 35305.13
L1.	-27942.15	13232.38	-2.11	0.064	-57875.87 1991.568
In ationrate					
-.	6170313	1624964	3.80	0.004	2494389 9846237
L1.	-545666.6	2056942	-0.27	0.797	-5198794 4107461
L2.	-4030365	2085802	-1.93	0.085	-8748778 688048
L3.	3930552	1804147	2.18	0.057	-150712 8011816
Foreign Direct Investment					
-.	-.3116439	.2401817	-1.30	0.227	-.8549726 .2316848
L1.	.277147	.2127985	1.30	0.225	-.2042366 .7585306
L2.	-.1011957	.2485247	-0.41	0.693	-.6633977 .4610063
L3.	.744468	.2796317	2.66	0.026	.1118971 1.377039
_cons	2.97e+08	5.16e+08	0.58	0.579	-8.70e+08 1.46e+09

Also from the table (4.9) bellow, which is comparable to the last table in terms of short-run results using R studio, but has drifted with differences in terms of trend, the exchange rate has a favorable influence from Somalia's economic-growing, while foreign direct investment has a adverse influence. In the short term, all factors were statistically significant at the 1%, 5%, and 10% significance levels.

Table 4.9. short-run results using R studio has driPed with differences in terms of trend

Coe cients:				
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-1090950232.1	233498092.6	-4.672	0.00547 **
dExchange.rate.t	-41500.94	12769.58	-3.250	0.02270 *
dExchange.rate.1	51678.46	20394.44	2.534	0.05228 .
dExchange.rate.2	30081.09	11480.45	2.620	0.04709 *
dIn ation.rate.t	10167382.7	1828930.9	5.559	0.00259 **
dIn ation.rate.1	-12758112.9	3217791.7	-3.965	0.01069 *
dIn ation.rate.2	-16075216.8	2567616.4	-6.261	0.00152 **
dIn ation.rate.3	-4736987.3	2216420.2	-2.137	0.08562 .
dForeign.Direct.Investment.t	-0.4487	0.1866	-2.405	0.06122 .
dForeign.Direct.Investment.1	-1.5734	0.3881	-4.054	0.00979 **
dForeign.Direct.Investment.2	-1.1612	0.2678	-4.335	0.00746 **
dForeign.Direct.Investment.3	-0.8819	0.3226	-2.733	0.04112 *
dGDP.1	-0.3644	0.1777	-2.050	0.09562 .
dGDP.2	0.3915	0.1778	2.202	0.07891 .
dGDP.3	-0.6238	0.1824	-3.420	0.01883 *
dGDP.4	-0.5536	0.1343	-4.121	0.00916 **
—				
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				

4.4 objective 1:

Determine the association between economic growth and inflation rate in So- malia

From the table (4.10) below, the inflation rate mean was \$188.5 and its median was \$189.34. There is no difference between them, so it seems to be symmetric.

Table 4.10. Descriptive statistics for Inflation rate variable

Min	Q1	Mediar	Q3	Max	Mean	Sd	N	Missing
117.05	140.785	189.34	241.4	257.14	188.5274	51.40603	27	0

In ation rate (INFL) and an economic growth in Somalia

According to the table (4.11) bellow the short run equilibrium from ARDL model, this variable was statistically significant, the p-value was (0.004) that is less than 0.05, andalso the third lag was close to the significant its p-value was (0.057). Considering to thevariable and its third lag, the Somali's economic grows positively. Finally, taking into account all other variables constant if the variable increases one unit the GDP will growup 6170313 dollars, and if the third lag increases one unit the GDP will grow up 3930552 dollars.

Table 4.11. Inflation rate with their lags and driP

ARDL GDP and In ation rate					
In ation rate					
–.	6170313	1624964	3.80	0.004	2494389 9846237
L1.	-545666.6	2056942	-0.27	0.797	-5198794 4107461
L2.	-4030365	2085802	-1.93	0.085	-8748778 688048
L3.	3930552	1804147	2.18	0.057	-150712 8011816
_cons	2.97e+08	5.16e+08	0.58	0.579	-8.70e+08 1.46e+09

In ation rate for differences and an economic growth in Somalia:

Inflation trends demonstrate how inflation has changed over time. The reader will beable to grasp the change in inflation during the study periods by looking at the infla-

tion paNerns. However, despite a slight increase in economic growth from 2010 to 2017, according to the GDP, there was no significant reduction. Finally, if inflation trends increase, the GDP will increase, therefore the economy in Somalia will increase. Inflation trends were statistically significant at 1% significance level. According to the first, second and third lags were statistically significant at 5%, 1% and 10% significance levels respectively. The inflation lags have a negative impact since all of them are minus. That means if the lags increase over time, the GDP will decrease, therefore the economy will decrease according to the lags.

Table 4.12. short-run results using R studio has driPed with differences in terms of trend

Coe cients:				
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-1090950232.1	233498092.6	-4.672	0.00547 **
dIn ation.rate.t	10167382.7	1828930.9	5.559	0.00259 **
dIn ation.rate.1	-12758112.9	3217791.7	-3.965	0.01069 *
dIn ation.rate.2	-16075216.8	2567616.4	-6.261	0.00152 **
dIn ation.rate.3	-4736987.3	2216420.2	-2.137	0.08562 .

4.5 Objective 2:

Determine the incidences and extend of association between different foreign direct investment and economic growth economic

According to these the table (4.13) and the figure (4.5) below, the average foreign direct investment was 3×10^8 . This is a huge number since foreign investment invests large amounts of money in other countries, and finally it seems like the right Skewness.

Table 4.13. Descriptive of foreign direct investment

min	Q1	median	Q3	max	mean	sd	n	missing
7×10^7	2×10^8	2×10^8	3×10^8	8×10^8	3×10^8	2×10^8	27	0

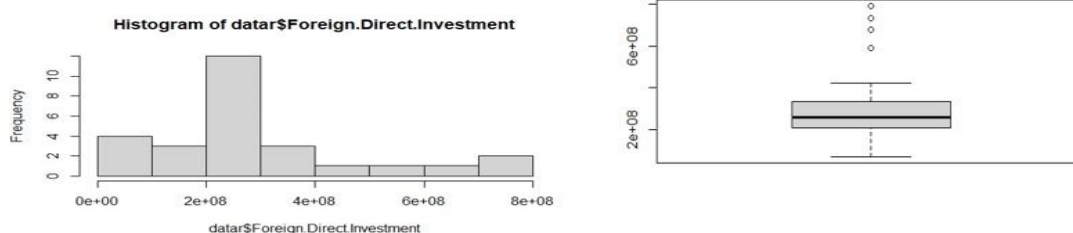


Figure 4.5. normality of foreign direct investment

Foreign Direct Investment (FDI) in US Dollar and an economic growth in Somalia

considering the table (4.14) below It is useful to explain the importance of direct investment in a country's total economic accounts, as well as in the context of the balance of payments and international investment situations. Obtaining a suitable vote force to populate such a direct investment, as good as the expanding figure of this institutions' acceptance of direct-investors in their own right, should be taken into account. Therefore, although the variable was not significant, but its lag was significant according to the p-value (0.026) less than (0.05). Finally, adjusting all other factors as constant, if the FDI increase one unit the GDP will decrease (-0.3116439), but if the third lag of FDI increase one unit the GDP will increase (0.744468) each year.

Table 4.14. the variables don't have first difference that we can interpret just variables and their lags and driP

ARDL GDP and Foreign Direct Investment					
Foreign Direct Investment					
–.	-.3116439	.2401817	-1.30	0.227	-.8549726 .2316848
L1.	.277147	.2127985	1.30	0.225	-.2042366 .7585306
L2.	-.1011957	.2485247	-0.41	0.693	-.6633977 .4610063
L3.	.744468	.2796317	2.66	0.026	.1118971 1.377039
_cons	2.97e+08	5.16e+08	0.58	0.579	-8.70e+08 1.46e+09

Foreign Direct Investment and an economic growth in Somalia:

From the table (4.15) on the next page, foreign direct investment with first, second, and third differences are statistically significant at 1%, 10% and 5% significance levels respectively, but foreign direct investment trend is significant at 10% significance level. The trend and all differences had minus sign that tells us foreign direct investment has negative impact on Somali's economic.

From the table (4.15) on the next page, that negative impact comes for the following problems: FDI can sometimes stifle domestic investment. As a result of FDI, domestic companies began to lose interest in investing in their own products. Foreign direct investments can occasionally influence exchange rates in one country's favor and to the other's disadvantage. When investors make investments in foreign countries, they may realize that the cost of items is higher than when they are exported. More money is frequently spent on machinery and intellectual property than on wages for local workers. Because foreign direct investments might be capital-intensive from the investor's perspective, they can

be hazardous or economically unviable at times. Many third-world countries, or at least those with a history of colonialism, worry that foreign direct investment would result in some kind of modern-day economic colonialism, which exposes host countries and leaves them vulnerable to foreign companies' exploitation.

Table 4.15. Foreign direct investment has driPed with differences in terms of trend

Coe cients:				
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-1090950232.1	233498092.6	-4.672	0.00547 **
dForeign.Direct.Investment.t	-0.4487	0.1866	-2.405	0.06122 .
dForeign.Direct.Investment.1	-1.5734	0.3881	-4.054	0.00979 **
dForeign.Direct.Investment.2	-1.1612	0.2678	-4.335	0.00746 **
dForeign.Direct.Investment.3	-0.8819	0.3226	-2.733	0.04112 *

4.6 Objective 3

Examine the impact of exchange rate on economic growth in Somalia

From the table (4.16) below The average exchange rate was \$25580.27, also It appears to be symmetric.

Table 4.16. Descriptive for exchange rate variable

Min	Q1	Median	Q3	Max	Mean	Sd	N	Missing
19283.8	22354.92	24098.67	30129.85	34597.52	25580.27	4430.802	27	0

Exchange rate in SOM S/US Dollar and an economic growth in Somalia

Regarding to the table (4.17) on the next page, to identify the factors of economic growth in Somalia. One of them was the exchange rate. This analysis used the results of the ARDL model for the equivalent short-run model. It is independent and it was not statistically significant for the variable and its first lag. Although the first lag was near to significant, the p-value was (0.064). Therefore, holding all other factors constant, if the variable was increased by one unit, the GDP would increase by (3731.526) each year, but according to the first lag of the variable, if it increased by one unit, the GDP would decrease by (-27942.15) roughly.

Table 4.17. Exchange rate variable and their lags and driP

ardl GDP Exchangerate In ationrate ForeignDirectInvestment						
ARDL (3,1,3,3) regression						
Exchange rate:						
–.	3731.526	13957.3	0.27	0.795	-27842.08	35305.13
L1.	-27942.15	13232.38	-2.11	0.064	-57875.87	1991.568
_cons	2.97e+08	5.16e+08	0.58	0.579	-8.70e+08	1.46e+09

The exchange rate for differences and an economic growth in Somalia:

According to the table (4.18) on the next page, despite the fact that the sign is negative, the exchange rate has a considerable impact on economic growth at a 5% significance level. While the exchange rate with first and second deference has a favorable influence for economic-growing of 10% and 5% significance levels, respectively, it does so without trend, which is why we said the exchange rate has a positive impact on economics. If the exchange rate without trend rises, the GDP will rise.

Table 4.18. Exchange rate has driPed with differences in terms of trend

Coe cients:				
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-1090950232.1	233498092.6	-4.672	0.00547 **
dExchange.rate.t	-41500.94	12769.58	-3.250	0.02270 *
dExchange.rate.1	51678.46	20394.44	2.534	0.05228 .
dExchange.rate.2	30081.09	11480.45	2.620	0.04709 *

4.7 Other factors effecting economic growth in Somalia

Gross Domestic Product (GDP) in US Dollar and an economic growth in Somalia

According to the table (4.19) on the next page, the ARDL model's findings suggest that Somalia's economic growing was normal. However, it should be emphasized that, if no intervention is taken, Somalia's economic development is currently positive according to the second lag (0.66588) and negative according to the third lag (-0.6586953) each year and both of them were statistically significant since p-value were less than 0.05. This underlines the importance of identifying macroeconomic growth variables in order to respond rapidly in the economy. Finally, taking into account all other variables constant, if the second lag of GDP grows one unite the GDP will grow positively 0.66588 each

year, and if third lag of the third log of the GDP increase one unite the GDP decrease (-0.6586953) each year.

Table 4.19. Lags and driP of the Growth Domestic Protect (GDP)

ardl GDP Exchangerate In ationrate ForeignDirectInvestment					
ARDL (3,1,3,3) regression					
GDP	Coef.	Std. Err.	T	P> t 	[95% Conf. Interval]
GDP					
L1.	.4558785	.204636	2.23	0.053	-.0070403 .9187973
L2.	.6658813	.2220101	3.00	0.015	.1636595 1.168103
L3.	-.6586953	.2419869	-2.72	0.024	-1.206108 -.1112829

Gross Domestic Product (GDP) and an economic growth in Somalia:

considering to the table (4.20) below, the Gross Domestic Product factor is representative as a dependent variable, but our data was time series data, although the GDP was a dependent variable, its lags and differences will include the independent variables. According to the table from the ARDL short run model, the first and second differences were statistically significant at 10% significance level. The third and fourth differences were statistically significant at 5% and 1% significance levels respectively. We will discuss the third and fourth differences only at 5% significance level. That means if the third and fourth differences increase, the GDP will decrease, then the economy in Somalia will decrease.

Table 4.20. Differences in the trend for domestic protect growth (GDP)

Coefficients:				
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-1090950232.1	233498092.6	-4.672	0.00547 **
dGDP.1	-0.3644	0.1777	-2.050	0.09562 .
dGDP.2	0.3915	0.1778	2.202	0.07891 .
dGDP.3	-0.6238	0.1824	-3.420	0.01883 *
dGDP.4	-0.5536	0.1343	-4.121	0.00916 **

4.8 Conclusion

In Somalia, the search for macroeconomic factors for economic growth has yielded a lot of results. It has been discovered that the exchange rate, inflation rate, and GDP lags are all positive short-run determinants of economic growth in Somalia. Also, Foreign Direct Investment has a negative impact on the economy in Somalia considering GDP as our dependent variable. This implies that these factors are to blame for economic growth fluctuations. Differences in these macroeconomic variables are directly responsible for the constant variations in economic growth. Furthermore, it has been demonstrated that the exchange rate, inflation rate, foreign direct investment, and GDP lags are the key short-run determinants of economic growth in Somalia.

5 Conclusion, Recommendation and policy maker of the finding

5.1 Conclusion

Before the civil war, Somalia had growth and stability in its economy. Since Somalia suffered a long time of civil war and instability, there was no major economic growth. But after Somalia got a government, the economy began to grow, although not more. It has many resources on land and sea. Somalia is located in the horn of east Africa.

Because most of the country's economic problems are attributed to outside shocks that are outside the government's control, this presumption has led to inaction on the part of the government. According to this study, the inflation rate, the exchange rate, and foreign direct investments are all key predictors of economic growth in Somalia, according to this study.

The major goal of this research is to look into the factors that influence economic growth in Somalia through time. The Autoregressive Distributed Lag (ARDL) model was used to evaluate the association between the factors. All factors are evaluated for time series features (stationarity features) using the ADF and bounds tests before being applied to the ARDL model. As a result, the GDP, Inflation rate (INFL), and Exchange rate (EXCH) variables are stationary (no unit root problem) at the level, whereas Foreign Direct Investment (FDI) is stationary at the first difference.

This chapter summarizes the outcome of the major research findings. However, the chapter concludes with some conclusions about the findings and discusses the policy implications for the Somali government in terms of macroeconomic determinants of economic growth in Somalia. The recommendations are given in response to different aspects of the findings. The findings point to a variety of opinions on Somalia's macroeconomic policy factors following financial reforms. The findings demonstrate a long-term link between Somalia's budget deficits and economic growth that is similar to that of Aworinde (2013).

5.2 Recommendation

The following recommendations have been made based on the results of this research:

- To improve the contribution of the exchange rate and foreign direct investment, the Somali government must implement policies that raise the exchange rate, which is thought to be the backbone of Somali economic growth, while decreasing foreign direct investment, which has a negative impact.
- Because most Somali people depend on money coming from abroad, the exchange rate has a big influence on Somalia's economic growth, so it is better to look very well at how we can manage the banks and the money.
- To boost the contribution of the inflation rate, Somalia's government has set aside sufficient funds to assist stabilize or regulate inflation, which is thought to be a spring-board for economic progress.
- Though there is inflation in Somalia, the federal government should seek to lower it if at all reasonable; else, it should keep the current inflation rate in the single digits by restricting foreign direct investment and maintaining the exchange rate.

5.3 policy maker of the finding

In this study, it was discovered that Somalia's economic-growth is on the decline in the short-run. This suggests that without guideline constancy and important transformation, the country's economic-growth rates will stay weak in the after-time. The Governments required by policy marks to plan for long-term economic growth while simultaneously intervening in the short term to solve the issue of economic growth.

5.3.1 The policy of economic growth

A. Foreign Direct Investment

Foreign Direct Investments in Somali is described to be positive over time if they maintain supporting by the government agencies, create a partnership of the private sectors and government manage the investment of the foreign government. All in all some departments that contribute to the growth of economy like manufacturing industry, mining and others get the greatest portions of Foreign Direct Investment as indicated by Utz in the year 2008. However, the apportionment of Foreign Direct Investments imports varies in different times leaving some places particularly those with no natural resources or better social services such as infrastructure.

B. Exchange rate

Somali currency trade rate downed as from SAP program and this has effect on economy in the short-run. Secondly, It was noted that the decrease in trade rate in Somalia led to decline in quality investment. The fall in value of currency has led to increase in domestic prices and also increase the pressure of inflation. There was a general growth in banking system which brought about remarkable changes in financial sector in the country. Foreign borrowing, domestic borrowing and monetization were some of the ways used to finance the budget deficits. Nevertheless, these finances were not sufficient as the country's growing economy had created a lot of effects. Solomon and Wet (2004) expound that the transparency and cooperation with financiers on microeconomic rule, which as help to mobilize support on finance. The budget deficit in Somali remains a difficulty making the country budget to heavily relying on even after different measures put in actions such as borrowing from inside the country and assist from other donors from different habitations, which scope at financing the budget deficits in Somalia.

Bibliography

- Abdulla, A. R., Othman, M. M., and Hongzhong, Z. (2012). An emperical study on the strategies to aNract foreign direct investments in tanzania. *Journal on Innovation andSustainability RISUS*, 3(1):43–52.
- Anyanwu, J. C. (2014). Factors affecting economic growth in africa: are there any lessons from china. *African Development Review*, 26(3):468–493.
- Ayuba, B. and Zubairu, M. (2015). Impact of banking sector credit on the growth of small and medium enterprises (sme’s) in nigeria. *constraints*, 15.
- B, M. and BhaNa, G. R. (2015). Selecting appropriate methodological framework for time series data analysis. *Finance and Data Science*, 13(25):457–473.
- Babu, J. O., Kiprop, S., Kalio, A. M., and Gisore, M. (2014). External debt and eco- nomic growth in the east africa community. *African journal of business management*, 8(21):1011–1018.
- Bahmani-Oskooee, M. and Fariditavana, H. (2016). Nonlinear ardl approach and the j-curve phenomenon. *Open Economies Review*, 27(1):51–70.
- Baramay, B. P. (2015). *Macroeconomic Determinants of Economic Growth afler financial sector in Tanzania*. PhD thesis, The Open University Of Tanzania.
- Drummond, M. P. and Liu, M. X. (2013). *Africa?s Rising Exposure to China: How Large Are Spillovers Through Trade*. International Monetary Fund.
- Dupasquier, C. and Osakwe, P. N. (2006). Foreign direct investment in africa: Perform-ance, challenges, and responsibilities. *Journal of Asian Economics*, 17(2):241–260.
- DuN, A. K. (2006). Aggregate demand, aggregate supply and economic growth. *Interna- tional review of applied economics*, 20(3):319–336.
- Feltenstein, A. and Sarangi, S. (2002). Macroeconomic stabilization and economic growth:analysis of reform policies in tanzania. *Journal of Policy Modeling*, 24(5):503–521.
- Gabagambi, D. M. (2013). Tanzania?s growth experience following economic reforms: Comparative perspectives with vietnam. *International Journal of Humanities and Social Science*, 3(9):97–106.
- Gwartney, J., Lawson, R., and Hall, J. (2011). 2011 economic freedom dataset, publicado en economic freedom of the world: 2011 annual report. *Economic Review*, 11(3):165–178.

- Iqbal, Z. and Zahid, G. M. (1998). Macroeconomic determinants of economic growth in pakistan. *The Pakistan Development Review*, pages 125–148.
- Kargbo, J. M. (2007). The effects of macroeconomic factors on south african agriculture. *Applied economics*, 39(17):2211–2230.
- Kasidi, F. and Said, A. M. (2013). Impact of external debt on economic growth: A casestudy of tanzania. *Advances in Management and Applied economics*, 3(4):59.
- Khamfula, Y. and Draft, F. (2004). Macroeconomic policies, shocks and economic growth in south africa. In *Global Development Network*. (<http://www.imf.org/external/np/res/seminars/2005/macro/pdf/khamfu.pdf>).
- Kira, A. R. (2013). The factors affecting gross domestic product (gdp) in developing countries: The case of tanzania.
- Kleiber, C. and Zeileis, A. (2008). *Applied econometrics with R*. Springer Science & BusinessMedia.
- Kraler, A., Fourer, M., John, A., Knudsen, J. K., Mielke, K., Noack, M., Tobin, S., and Wilson, C. (2020). Learning from the past. *Protracted displacement in the post-World War II period*.
- Levine, R., Carkovic, M., et al. (2002). Finance and growth: New evidence and policyanalyses for chile. *Central Bank of Chile*, 157:343–376.
- Mnali, J. M. (2012). The contribution of foreign direct investment to local economy in tanzania.
- Msuya, E. (2007). The impact of foreign direct investment on agricultural productivity and poverty reduction in tanzania.
- N.C, L. and Dimoso, R. (2011). Foreign direct investment and economic development in somali : The granger-causality analysis in uongozi. *Journal of Management and Development Dynamics*, 22(2):27–37.
- Nyamrunda, G. and Mbogela, C. (2014). Impacts of lower exchange rates on exports, imports and national outputs of tanzania. *ACRN Journal of Finance and Risk Perspectives*, 3(2):1–9.
- Odhiambo, N. M. (2011). Financial intermediaries versus financial markets: A south african experience. *International Business & Economics Research Journal (IBER)*, 10(2).
- Odhiambo, N. M. et al. (2012). Inflation dynamics and economic growth in tanzania: a multivariate time series model. *Journal of Applied Business Research (JABR)*, 28(3):317– 324.

-
- Oyebowale, A. Y. and Algarhi, A. S. (2020). Macroeconomic determinants of economic growth in africa. *International Review of Applied Economics*, 34(6):839–857.
- Petrakos and Pavleas (2012). The greek coastal cities: a multiple factor analysis of their spatial dynamics: 1960-2010. *Master thesis*.
- Saayman, A. and Saayman, M. (2015). An ardl bounds test approach to modelling tourist expenditure in south africa. *Tourism Economics*, 21(1):49–66.
- Sarris, A. H., Savastano, S., and Christiaensen, L. J. (2006). The role of agriculture in reducing poverty in tanzania: A household perspective from rural kilimanjaro and ruvuma. Technical report.
- Shrestha, M. B. and Chowdhury, K. (2005). Ardl modelling approach to testing the financial liberalisation hypothesis.
- Smarzynska Javorcik, B. (2004). Does foreign direct investment increase the productivity of domestic firms? in search of spillovers through backward linkages. *American economic review*, 94(3):605–627.
- Solomon, M. and De Wet, W. A. (2004). The effect of a budget deficit on inflation: The case of tanzania. *South African Journal of Economic and Management Sciences*, 7(1):100–116.
- Upreti, P. (2015). Factors affecting economic growth in developing countries. *Major Themes in Economics*, 17(1):37–54.