
**ST. MARY'S UNIVERSITY**

**SCHOOL OF GRADUATE STUDIES**

# DYNAMICS OF INFLATION AND ITS IMPLICATION ECONOMIC GROWTH IN EAST AFRICA: CASE STUDY FROM SUDAN, KENYA, AND ETHIOPIA

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**ADDIS ABABA, ETHIOPIA**

# Dynamics of Inflation and its Implication on Economic Growth in East Africa: A case study from Sudan, Kenya, and Ethiopia

**BY**

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# DECLARATION

I, the undersigned, declare that this research is my original work, prepared under the guidance of Sisay Debebe (Ph.D.). The sources of the materials used in this Thesis duly acknowledged. The Researcher further confirms that the Thesis has not been submitted either in part or in full to any other learning institution to earn any degree.

Name: Abdelkreem Yousef

Signatu

Date: June 2020

# ENDORSEMENT

This Thesis has been thoroughly advised by me, fulfills the requirement, and hence suggested to St. Mary's University, School of Graduate Studies for online examination with my approval as a university advisor.

Sisay Debebe (PhD) 

Advisor Signature

St. Mary's University, Addis Ababa June 2020

# APPROVAL SHEET

As members of the board of examining of the final MSc thesis open defense, we certify that we have read and evaluated the Thesis prepared by Abdelkreem Yousef under the title "Dynamics of inflation and its Implications on Economic Growth in East Africa we recommend that this Thesis be accepted as satisfying the thesis requirement for the Degree of Master of Science in Development Economics

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# ACRONYMS

| | |
|---|---|
| AD | Aggregate Demand |
| ADF | Augmented Dickey-Fuller |
| ADLI | Agricultural Development Led Industrialization |
| AfDB | African Development Bank |
| ARDL | Autoregressive-Distributed Lag" |
| AS | Aggregate Resource |
| ASEAN | Association of Southeast Asian Nations |
| CMC | Central Bank Musharaka certificates |
| CPI | Consumer Price Index |
| ECM | Error Static Correction Model |
| EPRDF | Ethiopian People's Revolutionary Democratic Front |
| GMC | Government Musharaka Certificates |
| GTP-I | first Growth and Transformation Plan |
| GTP-II | Second Growth and Transformation Strategy |
| HIPCs | Heavily Indebted Poor Countries |
| IMF | International Monetary Fund |
| IPRSP | Interim Poverty Reduction Strategy Paper |
| LDCs | Least Development Countries |
| MTP II | 2nd Medium Term Plan |
| PP | Philip-Perron |
| RSDP | Road Sector Development Program |
| SAPs | Structural Adjustment Programs |
| VAR | Vector auto regression |
| VECM | Vector Error Static Correction Model |

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# ABSTRACT

*The inconclusiveness of many empirical studies on inflation and economic growth relationship whether a positive or perhaps negative is always pressurize the Policymakers to develop relevant guidelines to understand these two macroeconomic economic indicators. Many researchers investigated the relationship between inflation and economic growth in Ethiopia, Kenya, and Sudan using different tools and approaches. This study will contribute to the lack of literature by analyzing and comparing the dynamics of Inflation and its Implications on economic growth in Ethiopia, Kenya, and Sudan. this study will contribute to how these countries can learn from each other to improve policies related to Inflation and Economic Growth. Secondary time-series data for the period 1991-2017 were collected on variables such as real GDP, inflation, FDI, Exchange rate, Population growth, and real per capita GDP, from African Development Bank and other official data sources. The study used the Autoregressive Distributed Lag (ARDL) bounds testing procedure to examine the presence of co-integration and long-run relationship among the variables. The Error Correction Model to investigate the short-run dynamics was used. All variables attained stationary after level I (0) or the first difference of I (1). The bounds tests found that the variables of interest are bound together in the long-run when taken as a dependent variable. The estimated F-statistics was above the upper Kripfganz and Schneider (2018) critical values at five percent significant level for all variables confirming the occurrence of a long-run relationship among all the. Empirical results further showed that in Ethiopia, Kenya and Sudan there was a significant long-run equilibrium real GDP has a Statistically, significant long-run relationship with the inflation. The coefficient of ECt-1 was negative and statistically significant. The stability of the coefficients was confirmed using the cumulative sum of residuals (CUSUM) that showed that the coefficients were stable at a 5 percent level of significance. Governments Officials and policymakers need to priorities to sound Macroeconomic policies to address the interactions between growth and inflation. Policies on the introduction of new technologies, building capacities in both public and private sectors, youth and gender parity, mobilizing domestic resources, and public participation are recommended for the Governments of Ethiopia, Kenya, and Sudan.*



**Keywords**: Inflation Dynamics, *ARDL* model, Ethiopia, *Kenya, and Sudan*

# CHAPTER 1

# INTRODUCTION

## 1.1 Background of the Study

The economic growth of a nation is the result of fiscal, monetary, and various other economic policies performed by policymakers. Several factors affect economic growth. Indeed, inflation and economic Growth relationships complicated. The sophistication of the link has been explored in many studies. Empirical studies executed for professional and developed countries identified a negative relationship between Inflation and Economic Growth.

On the contrary, analyses focusing on developing countries' sample found a positive relationship between Inflation and Economic Growth. The relationships involving Inflation and economic growth have been studied substantially. Nevertheless, the specific connection is not very well defined (Fikerte and Mario, 2012).

The empirical outcomes and policy recommendations differ and sometimes will conflict. Earlier studies happen to be inconclusive when it comes to providing any policy recommendations which can be applied regularly across countries. These variations seem to be a direct result of different data sets, particular country characteristics, as well as the various techniques employed. Although much recent research affirms the school of thought that all inflation remises and adversely influences economic Growth, earlier analyses asserted that inflation encourages Growth. Scientific findings on this subject matter in the existing literature fall into four groups: inflation will not have any influence upon economic growth Wai (1959) Dorrance (1966), Sidrauski (1967), and Cameron et al.(1996); inflation has an impact on economic development Mallik and Chowdhury (2001); Rapach(2003), Benhabib and Spiegel (2009); inflation has an unfavorable influence about economic growth Friedman,(1956), Stockman (1981), Fischer (1983), Barro (1995), and Valdovinos,(2003); and inflation impacts economic Growth in terms of certain thresholds Aydin et approach (2016), Ghosh and Philips (1998), Moro and Easterly (1998), Khan et al.(2001), Drukker et al.(2005), Kremer et al.(2009) and Vinayagathasan (2013).

Based on the African Development Bank (AfDB), East Africa Economic outlook 2017, an average real GDP intended for the Region progressed at an approximated 5 percent, with

considerable country variations. Ethiopia has regularly grown above eight percent, whereas countries involved in civil conflict and insecurity have become much more steadily. Inflation in the Fiscal year 2017 continued to be in a single digit, even though the end of year inflation increased by 1.3 percentage as compared to the fiscal Year 2016.

During the past, inflation has been lowered in Ethiopia because the authorities controlled the price, and the Government was providing products at a set price towards the public. Even more, the lower exchange rate also has a lower inflation rate. Likewise, the inflation level has been reduced in the earlier years of the present Government (Sisay, 2008). However, recently inflation continues to be high in Ethiopia. Inflation increased in Ethiopia averaged 18.69 percent from 2006 until 2015, reaching the highest all-time, a lot of 64.20% in 2008, and a record low of -4.10 % in 2009(Teamrat,2017).

In Sudan, from 1999 to 2011, Sudan had a period where it benefited from extensive discoveries of natural wealth through oil. During the "oil economy," economic Growth exceeded the historical average of 4.9 and reached 6.1 percent on average per year. As a result of the secession of South Sudan in 2011, the country lost about 75 percent of its revenues and most of its predominant economic activity: crude oil exports. However, Growth for 2014 was 3.1 percent and showed some continuation of a recovery that started in 2013. Growth in 2015 was around 3.5 percent (WB, 2015).

In Kenya, during the period 1995 to 2010, the growth rate of the overall economy did not display a steady or perhaps regular pattern. In the years 1995 and 1996, the real GDP growth rate was 4.3 percent and 4.0 percent, respectively. Nevertheless, in the year 1997, the growth rate decreased considerably to a depressing level of 0.2 percent. The growth charge rose to 4.6 percent and 7.0 percent in 2004 and 2007, correspondingly (Bank of Tanzania, 2015).

The calculation and the unclear relationship between inflation and economic Growth are exceedingly motivated by the Researcher to measure the Implication of inflation on economic growth in East Africa selected countries (Ethiopia, Kenya, and Sudan) due to its controversial nature. Moreover, Inflation rates in the chosen countries are among the highest in the Region. Such a phenomenon also makes the Researcher more interested to see the Implications of inflation on the economic growth of Ethiopia, Kenya, and Sudan.

## 1.2 Statement of the Problem

The Policymakers need to develop relevant guidelines to understand the Dynamics of Inflation and its Implications on Economic Growth. It is necessary to policymakers to answer questions as many kinds of research on the relationship between inflation, and Economic Growth continues to be inconclusive, many empirical analyses confirm the presence of whether a positive or perhaps negative marriage between both of these macroeconomic factors. Low and steady inflation promotes economic Growth and vice versa (Mubarik,2005)

Mubarik (2005) discovered that low and steady inflation encourages economic development and the other way round. Also, the research carried by Shitundu and Luvanda, (2000) on the result of inflation upon economic Growth in Tanzania concluded that inflation has been damaging to economic growth in Tanzania. Still, they would not show the level of responsiveness of Economic Development growth level to modifications in our general prices. This research examined the effect of inflation on economic growth by showing the level of responsiveness of change in Economic Growth because of change in standard price levels and therefore filling the present knowledge gap.

Motivated by Fischer (1993), several studies have got found proof of non-linearities inside the inflation-growth nexus using different estimation methods. Some are -specific studies, for example, Fabayo and Ajilore (2006), Ajideand (2012) and others will be panel info studies, for example, Khan and Senhadji (2001), Bick (2010) Seletenget approach (2013), and Ibarra and Trupkin (2016). Nevertheless, as Espinoza et approach (2010) Speak about, panel info techniques happen to be better in capturing the inflation-growth relationship than country- specific studies. Existing panel research shows mixed facts on the level of inflation limit. For instance, about developing countries, an increased threshold of 10% is obtained simply by Espinoza et al. (2010), 11% by merely Khan and Senhadji (2001), 17. 2% by Kremer et al. (2013), and 19.1% by Ibarra and Trupkin (2016). Vinayagathasan (2013) locates the level of inflation threshold for 5. 43% for a group of Parts of Asia, while Thanh (2015) sees it at 7.78% for ASEAN-5 countries. The difference in estimation approaches used can easily explain the in the numbers of inflation tolerance. Indeed, analyses use distinct estimation tactics; Bick (2010) uses non-dynamic panel limit regression, Espinoza et al. (2010), Seleteng et al. (2013), Thanh (2015), and Ibarra and Trupkin (2016) apply - panel smooth change regression. However, Kremer et al. (2013) and Vinayagathasan (2013)

use dynamic plank threshold regression. As Seleteng et al. (2013) state, the choice of an excellent estimation approach plays a significant role in examining non-linearities in the inflation-growth nexus.Khan and Senhadji (2001), Bick (2010), and Seletenget al. (2013), all contain initial income among the control variables inside the growth equation, but employ methodologies that do not adequately account for the endogeneity trouble created. Additionally, the blended evidence telling the truth of the inflation threshold could also depend on the sample of nations considered. Analyses on the developing countries, for example, Khan and Senhadji (2001), Bick (2010), Kremer et al. (2013), Ibarra and Trupkin (2016) association in their selections, countries by Africa, South America and Asian which may have different levels of Growth. According to Moshiri and

Sepehri (2004), this can result in a biased idea of the inflation threshold. Additionally, it is unacceptable to "set a single policy target appropriate to all developing countries."

Even though various Researchers investigate the relationship between inflation and economic growth in Ethiopia, Kenya, and Sudan using different approaches. Still, there is a lack of literature on the relationship between inflation and economic growth. This study will contribute to the literature by analyzing the Implication of inflation on Growth in Ethiopia, Kenya, and Sudan.

In doing so, the study compares the Implication of inflation on economic Growth between Ethiopia, Kenya, and Sudan, which showed the highest inflation rates in the East African Region. Besides, conducting a comparative study is beneficial since it helps to notice the differences and similarities to share experiences and what kind of policies that the three countries can exchange in the views to reduce poverty

This research examines the Implication of inflation on Economic Growth in selected countries from Eastern Africa Member States, namely Ethiopia, Kenya, and Sudan, and analyses the causality relationship between inflation and economic growth. Therefore, in the end, this study will contribute to how these countries can learn from each other to improve policies related to Inflation and Economic Growth.

### 1.3 Research Hypotheses

Hypotheses 1

H0 = inflation has no implications on Economic Growth in Ethiopia

H1 = Inflation affects economic growth in Ethiopia

Hypotheses 2

H0 = inflation has no implications on Economic Growth in Kenya

H1 = Inflation affects economic growth in Kenya

Hypotheses 3

H0 = inflation has no implications on Economic Growth in Sudan.

H1 = Inflation affects economic Growth in Sudan

## 1.4 Objectives of the Study

### 1.4.1 The General Objective

The objective of this study is to analyze the implications of Inflation on Economic Growth in selected East African Countries (Ethiopia, Kenya and Sudan).

### 1.4.2 The Specific Objective

The specific objectives of the study are

i. To assess the status and trends of inflation and economic growth in Ethiopia, Kenya, and Sudan.

ii. To find the effect of inflation on economic growth in Ethiopia, Kenya, and Sudan

iii. To compare the growth-inflation relationships between Ethiopia, Kenya, and Sudan

## 1.5 Significance of the Study

Limitations of the recent studies dictate that additional empirical assessment in the relationship between Inflation and Economic Growth be performed, allowing for possible causality effects, that is, to get both none, unidirectional or perhaps bi-directional. The analysis conclusions may also complement in affecting making decisions, specifically, equally fiscal and monetary policy development in Eastern Africa selected countries (Ethiopia, Kenya, and Sudan). This sort of Study having besides increasing the supplies of economic Growth, may benefit mostly Analysts, Policymakers, and People of Ethiopia, Kenya, and Sudan.

Furthermore, the selected countries are the perfect Region to undertake the empirical examination between Inflation and Economic Growth mainly because very little analysis on

the subject relating to these countries has been taken on to date, despite the fact that the Region has some of the maximum inflation countries in the developing world.

The proposed review differs through the previously done empirical examination on the relationship between Inflation and Economic growth people. It will check out all possible directions and patterns of causality, as opposed to previous research, which presumed causality to get unidirectional, as well as It will be one of the initial studies of its kind to be performed in the Region.

## 1.6 Scope and Limitation of the Study

In assessing the relationship between inflation and Economic Growth, there are 47 countries in Sub Sahara Africa (SSA) countries. The Study is focused on three countries of East Africa Region, namely, Ethiopia, Kenya, and Sudan. The data set goes over from 1990- 2017 the period 1990 - 2018 was picked mainly because in the desire to consider data over the last 20 year to have available evidence of the direction and pattern of causality within the relationship between Inflation and Economic Growth since this review is initially its kind in Region.

This Study will enjoy the benefit of drawing from the experiences and challenges encountered by other researchers undertaking similar research. Further, some of the East Africa countries' economic shocks started a long time, which leads to the near dysfunctional of the critical Government institutions like the National Statistics Office and the Central Bank. It may not be possible to get accurate data for some of the years.

## 1.7 Organization of the study

This dissertation shows the dynamics of inflation and economic growth in selected countries from East Africa, namely Ethiopia, Kenya, and Sudan. It's organized in five Chapters. Chapter 1 introduces the necessary study information, the Background of the Study, Statement of the Problem, the Objective of the Study, the Scope, Significance and Limitation of the Study as well as the Research Hypotheses. Chapter 2 focuses on the Literature Review on economic Growth and inflation by exploring the different theories on Growth and inflation and providing empirical reviews on Ethiopia, Kenya, and Sudan. The last part of this Chapter provides some insights on Selected economic Policies in Ethiopia, Kenya, and Sudan.

Chapter 3 provides a brief description of the Research Methodology. This included the description of the study area and Research design and how data will be collected, the Sources, types, and Methods of collections. Also, it provides information on the Econometrics Model Specification and definition of variables. Chapter 4 presents the results and discussions in terms of Descriptive Statistics, Econometrics model result, the relationship analysis of variables under study in Ethiopia, Kenya, and Sudan.

Chapter 5, this last part of the paper, provides the Conclusion and Policy Recommendations following the study findings, and it summarizes the recommendations and outcomes for policymakers.

# CHAPTER 2

# LITERATURE REVIEW

## 2.1 Definition of terms and concepts

**Theory**

A theory is a group of ideas to explain a particular phenomenon, and it is developed through the use of contemplative (looking at thoughtfully, reflecting deeply on a subject, or observe deep in thought) and rational forms of abstract and generalized thinking

**Classical economic theory**

Classical economics is a broad term that identifies the dominating school of thought intended for economics in the 18th and 19th centuries. Most consider Scottish economist Adam Smith as the father of the classical economic theory. In 1776 he released the "Wealth of Nations" that highlights some of the most prominent developments in classical economics. However, The Spanish language scholastics and French physiocrats made contributions previously. Additional notable contributors consist of David Ricardo, Thomas Malthus, Anne Robert Jacques Turgot, John Stuart Mill, Jean-Baptiste Say, and Eugen Böhm von Bawerk.

Factors of production Factors of production are the inputs desired for the creation of a good or service. The elements of production include land, labor, entrepreneurship, and capital.

**Economic policies**

A sequence of actions that may be intended to impact or control the behavior of the economy. Economic policies are usually implemented and administered by the Government.

**Aggregate Demand (AD)**

Aggregate demand is an economic dimension of the total amount of demand for all complete goods and services produced in an economy. It is the total quantity of money exchanged for those goods and services at a specific price level and point in time.

**Aggregate Supply (AS)**

Aggregate supply, sometimes identified as total output, the over-all supply of all goods and services produced within an economy at a given overall price in a given period. It is characterized by the aggregate supply curve, which defines the association among price

levels and the amount of output that companies are keen to offer. Typically, there is a real affiliation amongst aggregate supply and the price level.

**The Phillips curves**

The Phillips curve is an economic concept advanced by A. Watts. Phillips the curve shows the relationship between unemployment and inflation in an economy. The curve suggested that changes in the level of unemployment have a direct and predictable effect on the level of price inflation. An increase in the demand for labor as government spending generates growth.

**Technological change**

Technology changes as knowledge of the new and more efficient method of production become available.

**Endogenous**

An endogenous variable is a variable in a statistical model that's changed or determined by its relationship with other variables within the model.

**Monetarism**

Monetarism is a macroeconomic concept, which usually states that governments may foster economic stability by merely targeting the growth rate of the money supply.

**Unemployment**

Stated as redundancy, happens when people are short of work and positively looking for work.

**Solow and Swan**

The Solow-Swan model of economic Growth assumes a continuous production purpose linking output to the inputs of capital and labor, which leads to the steady-state equilibrium of the economy.

## 2.2 Theories of Economic Growth and Inflation

Analysts have been learning about Inflation and its influence on economic growth, starting from the classical economic theory to modern economic theories. This section is about the views of economic theories (i.e., classical, Keynesian, monetarist, neo-classical, and endogenous) on the relationship between increase and economic growth.

**Classical Growth Theory**

Adam Smith founded the classical theory. He documented three factors of production, such as land, labor, and capital. His production function can be expressed as:

$$Y = f(L, K, T)$$

Where Y is output, L is labor, K is capital, and T is land.

Smith thought about the essentials of saving aspects affecting the growth rate. In classical theories, there is no immediate explanation among Inflation as well as its tax influence on output level. Nevertheless, the relationship between the two factors is bad by the lowering of firms' revenue levels and saving over higher wage costs (Gokal and Harfi, 2004).

**Keynesian Theory**

In 1936, Frank Maynard Keynes wrote the book "The General Principles of job, Interest and Money," which established the inspiration of Keynesianism. Keynesians think about the involvement of the Government to succeed in incomplete creation. Consider that treatment in the economy only by the Government through expansionary economic policies may boost buy and improve demand to realize full advancement. The Keynesian model depends on Combination Aggregate Demand (AD) and Get worse Aggregate Supply (AS) shape. With this style, AS shape increased sloping within the short run, so the change in the need side throughout the economy influences the two values as well as a result (Dornbusch, ou approach, 1996).

However, the truth is that overall rates have improved. Therefore, the producer carries on more and more outcomes. Moreover, Blanchard and Kiyotaki (1987) explained that Inflation and economic growth are related due to agreement of firms to offer on arranged price. Thus, the firm must also produce at an elevated price. Down the road, the relationship turns into negative. This describes trends of stagflation that is productivity decreases or perhaps remains precisely the same when the value rises (Gokal and Hanif, 2004).

Also, Blanchard and Kiyotaki (1987) explained that Inflation and economic growth would be related because of the agreement of firms to provide on established price. So, the firm should also produce an elevated value. Down the road, the partnership turns into adverse. This details trends of stagflation that may be productivity lower or perhaps is still precisely the same when the price rises (Gokal and Hanif, 2004).

**Monetarism**

Milton Friedman recommended monetarism. In this school, a cash supply is the only aspect that establishes price levels within an economy. They argued that government involvement manages the growth rate involving money supply to harmonize the growth rate of output, in the end, monetarists believe Inflation can occur the moment money supply rises more quickly than the amount regarding national income. Nevertheless, the result of the money supply is different in the long run and short run. In the short term, money supply gets the dominant effect on the real variables (i.e., real GDP and employment) and price level. But in the future, the impact of the variant in the money supply is primarily in price level and on various other nominal parameters but not upon real variables like real output and employment (Richard Froyen, 1998).

Monetarism appears the concept of concern into the Phillips curve and divides Phillips curve directly into the short run and long run. Because of this theory, the Phillips curve will host in the short-run but not eventually. In the long term, predicted Inflation would probably be consistent with actual Inflation. Thus, Inflation is not going to influence unemployment, output, and also other real economic variables. The idea is called the neutrality of money. Gokal and Hanif (2004) discussed the concept of neutrality and super-neutrality. Since neutrality retains if the sense of equilibrium values of real factors, including the level of GDP will be independent of the higher level the money supply in the long run and super-neutrality holds once real parameters including the rate of GDP, happen to be independent of the pace of growth in the money supply in the long run. Inflation will be harmless in the case of neutrality and super neutrality. Nevertheless, this may not be authentic in reality. Inflation is unfavorable to the economy as it affects capital accumulation, investment, and export and hence influences output.

**Neo-Classical Growth Theory**

The neoclassical growth model was devised by Solow and Swan. They developed a growth model that scientific advancement or technological change substituted investment (Growth of capital) as the principal factor describes long term growth, and a higher level of technological modification is determined exogenously, which is self-employed of all elements with inflation. Gokal and Hanif (2004) said that in neoclassical economics, the theory of Growth is created on a notion of diminishing returns to labor and capital separately

and constant profits to equally factors mutually. The determinants of output growth to get neoclassical growth theory are technology, labor, and capital.

Analysts in neoclassical Growth gave their particular explanation regarding the relationship between Inflation and Economic Growth. Mudell (1963) has discussed the effect of Inflation on Economic Growth. According to him, Inflation might forever increase productivity growth rate by stimulating capital accumulation, because reacting to inflation households will hold significantly less in money balance and even more in other property. Tobin (1965) also reinforced Mundell's proven the fact that Inflation can be positively linked to economic growth. His debate is that Inflation causes individuals to change the money into various other assets, leading to the better capital intensity and stimulates economic growth.

Contrary to Mundell and Tobin's idea, Stockman (1981) produced a model that shows a negative relationship between Inflation and Economic Growth. Stockman's model shows that a rise in the inflation rate brings about a lower steady-state level of output people's welfare diminishes. In Stockman's model, money is a supplement to capital, accounting to get a negative relationship between the steady-state higher level of output and the inflation rate. However, it is undoubtedly substituting goods for Mundell and Tobin.

In this theory, there are proponents of zero relationships among Inflation and Economic Growth. Sidrauskin (1967) said that a rise in the inflation rate would not change the steady capital stock and economic growth.

Generally, theoretical analysis in neoclassical growth theory displays mixed-effects regarding the relationship between Inflation and Economic Growth.

**Endogenous Growth Theory**

This model presumes that technical progress is endogenous. This kind of assumption can be contrary to the neoclassical growth theory. The other fundamental difference between endogenous growth models as well as neoclassical economics is the fact in the neoclassical growth theory capital is thought to be reducing on the returns. In contrast, endogenous growth basic principle assumes that the marginal product of capital is constant.

In endogenous growth theory, the rate of return on capital, i.e., human capital and physical capital, determine the growth rate. A tax about either type of capital stimulates a lower return. Macallum and Goodfriend (1987) said that the inflation rate reduces both the return on almost all capital plus the growth rate.

## Theories of inflation

There are numerous classifications of inflation. World Bank (2007) describes the inflation rate as "a total annual increase in the cost of a container of goods and services which can be purchased simply by consumers within an economy." In contrast, the London oxford economic dictionary (2009) identifies inflation "the constant tendency intended for nominal rates to increase that leads to a decrease in the purchasing power within a country's currency."

Basu (2011), in the paper "understanding inflation and controlling it, " defines inflation as "The continual rise in price rates across the board instead of a relative within the price of goods and services "It identifies a trend where the typical price of products is upon rising flying for a while. In economics, some peculiarities are particular to different regions—moreover, nations based on their phases of advancement. Inflation could be ascribed into a general increase in money source, excess demand, rises in public expenditure, within the labor marketplace, changes in costs, and essential oil price raises also result in inflation.

There are seven essential theories of inflation:

### The cost-push theory of inflation

The cost-push theory is the wage push or the profit-push theory of inflation. In every process of inflation, wages and prices increase, and they reinforce the rise in each other, whatever the cause of inflation. If the cost-push theory is lawful, then they both should not be the typical consequence of some third force, which may be an escalation in total demand or money supply or whatnot, and the start of inflation should have been made by an autonomous rise in wages or profits.

For cost-push inflation to take place, concerning the influenced product, need to remain continuous during the time the availability cost adjustments are happening. To compensate intended for the improved cost of production, producers increase the price towards the consumer to keep profit amounts while keeping pace with expected demand.

### The demand-pull theory

Under this theory, it is not the push of cost coming from behind; however, the pull of demand from the front that sources inflation, i.e., the wage-rise and the price- rise - both are the

consequences of rising total demand. Total demand for products in the economy may rise possibly on account of the rise in the cash stock or perhaps increase in the velocity of money.

Demand-pull inflation occurs when aggregate demand for a good or service exceeds aggregate supply. It starts with a rise in consumer demand. Sellers meet such an increase with more supply. Nevertheless, when extra supply is absent, sellers raise their prices. That results in demand-pull inflation.

**Keynesian theory of inflation**

Keynesian theory of inflation functions through the investment-saving mechanism. It is incredible to note there are two Keynesian theories of inflation, the first is a demand-pull theory, and the second is the cost-push theory. It could be declared that the demand-pull theory was expressed in the form of a significant "inflationary gap" by Keynes in his publication "How to pay for War1" (Keynes, 1940) as well as the cost-push theory was found in his "General Theory" (Keynes and Meters, 1936).

Keynes did not highlight the excess money supply because the cause of extra demand, since in U. S. A. during the 1930s, it was broadly believed the Federal Reserve System was expanding the money supply throughout the activation of monetary policy and still economy was not reacting. The successful demand had not been reviving. Therefore, experienced a financial policy is not able to deliver the products. Hence, this individual advocated the fact that fiscal coverage should be activated as well as the Government ought to increase public expenditure and minimize taxes, therefore, ushering into the budget loss. Budget debt implied the expansion money supply, yet he would not emphasize the expansion in money supply, which might take the place of hoarded inactive money and thus might help in refreshing demand.

Following Keynes, excess of investment over saving gives rise to a tremendous inflationary gap, which outcomes into inflation. Thus, it is inflation by which saving is usually increased to make equal to investment. Therefore, a tremendous inflationary means a deficit of saving on aiding investment. Saving is the launch of consumer goods which may be utilized, so why the individuals who will be busy with capital formation, i.e., an investment.

Bent Hansen's dynamic model of demand inflation

Danish economist Bent Hansen accurately criticizes that the Keynesian theory of inflation is not a clear case of demand inflation. His unique contribution in this respect is his emphasis

on the dynamic role of the factor gap. So, to explain inflation, he lays stress on the inflationary gap in the labor market and their mutual linter action (Bent Hansen, i957).

**Schultze's sectoral demand-shift theory**

Schultze could not discover any excess demand in the economy in the US A inside the early 50s though the prices were found to be increasing. He would not accept the cost-push theory of inflation. So, in the efforts to reconcile the demand-pull theory with the truth of the rising price level without any primary apparent excess demand, He developed this kind of theory. He showed that in a dynamic economy, demand is diminishing in some industries and moving to extra sectors so the sector or maybe the industry in whose favor, demand from customers has shifted will certainly register an increase in the cost of that product produced in that sector which will also permit the employers to grant the rise in money wages towards the employees doing work in that sector. Still, the sectors in which, demand has fallen, can fail to record a fall in prices and money-wages, on the downward solidity of money wages and hence the overall price-level is going to rise (Charles L. Sehultze, 1959).

**The Mark-up theory**

If all companies add up a particular mark up (by the method of overhead costs and profits) towards the costs of direct materials and labor, to be able to fix up the costs of their particular commodities if the laborers also cost their services by adding a specific, definite mark up to their particular cost of living and if these two do not tally, then inflation can result.

Markup inflation may be the result of efforts of the companies and the laborers to maintain particular, fair relationships between buying prices (which include the cost of living) and selling prices (which include wage rates). These types of classes did not merely want to keep good relationships; however, they sometimes try to increase their share in the name of fairness when the efficiency is increasing or otherwise. If the fair shares of all of the classes equal to more than 100 percent from the total nationwide output, inflation results.

**The money-stock theory**

The monetary theory of inflation asserts that money supply growth is the cause of inflation. The faster the money supply grows, the causes faster inflation. In particular, 1% faster money supply growth causes 1% more inflation with other things constant; the price level is proportional to the money supply. Doubling the money supply would double prices.

Institutional theories of inflation describe the process of inflation rather than explain the cause of inflation. Some institutional factors carry forward the impact of the rising money-stock, and some institutional factors bring pressure for the increase in the money stock. In the circumstances of the increasing money-stock, they create pressure for a further rise in money- stock.

Institutional factors do not explain inflation; instead, they explain the pressures for the increase in the money stock. The fact of the rising money-stock can only explain inflation. Pressure for increasing money-stock is not itself the increase in money-stock; they are not identical.

## 2.3 Empirical Literature Review General Overview

Empirical findings on this subject matter in the existing literature fall under four classes: Inflation would not have fundamentally any influence in economic Growth (Wai late 1950s, Dorrance 1966, Sidrauski 1967, Cameron, Sound & Simpson 1996); Inflation has a positive impact on economic Growth (Mallik & Chowdhury 2001, Rapach 2003, Benhabib& Spiegel 2009); Inflation contains a negative effect on economic Growth (Friedman 1956, Stockman 1981, Fischer 1983, Limo 1995, Valdovinos 2003); and Inflation influences economic Growth in terms of certain thresholds (Aydin et approach. 2016, Ghosh & Philips 1998, Moro & Easterly 1998, Khan, Semlali& Johnson 2001, Drukker, Gomis-Porqueras&Hernandez-Verrue 2005, Kremer, Bick &Nautz 2009, Vinayagathasan 2013).

This section contains divergent empirical analyses that demonstrate the relationship between Inflation and Economic Growth. The concern of previous studies was not merely finding the straightforward relationship among Inflation and economic Growth but as well finding perhaps the relationship retains in the long run or maybe a short function phenomenon, the motive direction in the relationship, regardless of if the relationship is linear or perhaps non-linear, etc.

Fisher (1993) provides studies regarding the relationship between Inflation and Economic Growth, entitled “role of a macroeconomic factor in growth.” In his research, the data established consists of some macroeconomic parameters, including Inflation for 93 countries. He applied a straightforward alternative to blended regression. The effect of the research has shown the fact that channel whereby Inflation influence economic growth and Inflation negatively influences Growth by merely reducing investment, and by lowering the rate of productivity growth. Fisher, as well argues that Inflation distorts price mechanisms,

and this can affect the efficiency of resource allocation, thus negatively influence economic growth. Barro (1997) also researched the relationship between Inflation and Economic Growth. He applied 30 years of data from 1960 to 1990 of 100 countries. He included various other determinants of economic growth, additional to Inflation. A system of regression equation had been used to analyze the data. The regression effects indicated that the increase in standard Inflation by merely 10% each year leads to a discount of the growth rate of real capita GDP by 0.2%-0.3% annually and a decrease in the ratio of investment to GDP only by 0.4%-0.6%.

Nevertheless, the result is starting to become statistically significant only when substantial inflation activities are within the sample. Moltey (1994) involves Inflation in the model to measure the effect of Inflation within the growth rate of real GDP. He extends the model of Mankiw, Romer, and Weil (1992), which was based upon the Solow growth model by simply allowing for the chance that Inflation is likely to reduce the rate of technological change. The effect indicates a weak relationship between Inflation and the growth rate of real GDP.

Khan and Senhadji (2001) examined the relationship between Inflation and Economic Growth

separately intended for industrial and developing countries. They have utilized new econometric techniques at the beginning developed by Chan and Tsay (1998) and Hansen (1999), to show the presence of threshold results in the relationship between Inflation and Economic Growth. The authors possess used out of balance panels data containing a hundred and forty countries for the period 1960-1998. The approximated value of the threshold is usually 1-3 % and 11-12 %about developed countries and developing countries correspondingly. The result suggested that the tolerance for developing countries is leaner than industrial countries. Additionally, it indicated that the inflation level below the limit level of limit has no impact on Growth. Inflation rates above the tolerance level have got a significant unfavorable effect on Growth.

Mubarik (2005) likewise tried to calculate the threshold level of Inflation intended for Pakistan. He found that being an unfaithful %of (9%) tolerance level of Inflation and Inflation above this kind of level impact economic growth negatively. Inflation under the estimated level is beneficial for Economic Growth.

You will find empirical evidence that assists the results of Mundell (1963) and Tobin (1965) of a significant relationship between economic Growth and Inflation. Mallik and Chowdhury (2001) are among the list of supporters of positive associations between the two variables. To achieve this summary, they utilized the co-integration and error modification model to assess data gathered from 4 south Asian countries (Bangladesh, India, Pakistan, and Srilanka) and found a long-run positive relationship between Inflation and Economic Growth. They concluded that modest Inflation is useful to quicker Economic Growth.

Empirical literature as well shows a positive relationship between Inflation and Economic Growth below the limit level of Inflation. Ghosh and Phillips (1998) found that at meagre inflation rate (less than2-3 %), inflation and Growth are favorably related. Likewise, Fabayo and Ajilore (2006) examined the presence of threshold impact in inflation growth relationship in Nigeria using data for the time of 1970-2003. They discovered a 6 % level of Inflation as a tolerance. Inflation includes a positive impact on economic Growth below the tolerance level of Inflation. Moreover, Wang Zhiyong (2008) studies suggested that economic Growth relates to Inflation with over three quarters' lag. He used the co-integration and error correction model to detect the result.

Furthermore, some empirical studies identified no relationship between Inflation and Economic Growth. One Study by Sidrauski (1967) indicates that Inflation does not have any relationship with Growth over time. Moreover, he testifies the super-neutrality of money in the model. Additionally, Sidrauski, Bruno, and Easterly (1995) have shown the minor relationship between Inflation and Economic Growth. They found this effect after removing high observation of Inflation. There is also research that shows an insignificant relationship between the two variables under the threshold amount of Inflation. Such as Christoffersen and Doyel (1998) detected a 13 % threshold level of Inflation below, which usually no significant relationship among Inflation and Economic Growth, but over a level, there is a negative connection.

### 2.3.1 An empirical review of Inflation and Economic Growth

Mubarik (2005) examined the relationship between Inflation and Economic Growth. The testing effect indicated the causality between two factors is unidirectional, i.e., the Inflation is usually causing GDP growth; however, not vice versa. Odhiambo (2011) likewise examined the short run and long run motive relationship between Inflation, investment, and economic growth in Tanzania. He used the ARDL-bounding testing strategy and found that

the unidirectional motive flow was coming starting Inflation to Economic Growth. By using the VAR granger causality test, Chimobi (2010) analyzed the Inflation and Economic Growth in Nigeria and found a unidirectional connection from Inflation to Growth. Another research which is worked well in the case of Hungary and Belgium by Gillman and Nakov (2003) suggested that a motive relationship with direction by Inflation to Growth and from money to Inflation. Moreover, Erbaykal and Okuyan (2008) assessed the motive relationship between Inflation and Economic Growth in the framework of the connection test produced by Toda Yamamoto (1995). The result indicated simply no causal relationship from economic Growth to Inflation while there is a connection relationship via Inflation to Economic Growth.

ChuanYeh (2009) approximated the motive interrelationships among Inflation and economic growth within a simultaneous equation framework. They used cross-sectional data of a hundred and forty countries within the 1970-2005 periods. The result mentioned that a bilateral causal relationship between Growth and Inflation. It also demonstrated that increase is damaging to Growth while the effect out of Growth to Inflation is helpful. In their evaluation, they arranged the data into high income, low income, and developing countries, and the outcomes indicated the fact that the harmful effect of the Inflation on Growth in low-income countries is more than in developing countries and high-income countries.

Additionally, to unidirectional causality right from Inflation to economic Growth and bilateral causality, you will find studies that usually indicated unidirectional causality coming from Growth to Inflation. Gokal and Hanif (2004) researched about the Inflation and Economic Growth in Fiji. Obtained that granger causality runs one of the ways, from Growth to Inflation but not by Inflation to Growth, means that it is unidirectional. Datta (2011) examined the relationship between Inflation and Economic Growth in Malaysia with all the data masking from the year 1971 to 2007. The results show that there can be found a short-run connection between the factors and path of connection is via Inflation to Economic Growth. In the long term, economic growth Granger triggers Inflation.

Finally, there as well studies signify, no connection relationship between Inflation and Economic Growth. Kigume (2011) studies regarding inflation and economic growth in Kenya from 1963-2000. The Granger causality check of this research revealed that zero causality connection between both of these variables.

### 2.3.2 Empirical Analysis on Ethiopia, Kenya, and Sudan Ethiopia

Before 2003, other than in the many years of supply shock absorbers and battle, Ethiopia was shown a low inflation country with a single-digit level of the inflation rate, for instance, coming from 1971 - 2003 inflation averaged 5%. The Study of the past developments of inflation and Growth in Ethiopia over the last decades shows that the Ethiopian economy has gone through different phases of economic growth and inflation.

Influences attributed to the high inflation include accommodating monetary policy, agricultural supply shock, and imported inflation due to the rise in international prices, (Durevall el. 2013) However, inflation started to increase speedily, and general inflation rose to 17.7%, with the maximum inflation rate of 39.5% in 2008.

Eden (2012) patterned inflation unpredictability and investigated its impact on economic growth in Ethiopia. Cointegrated VAR model and granger causality test had been used to see the relationship between inflation, inflation, uncertainty, and Growth. From the cointegrated VAR model, the conclusion is that the Growth rate of GDP impacts inflation efficiently in the long run and negatively inside the short term. The granger causality result likewise indicates that inflation granger causes inflation, uncertainty confidently, and inflation uncertainty granger causes result growth adversely.

Teshome (2011) says higher inflation did not considerably reduce the economic growth in Ethiopia. Conforming the significant troubles for our economy was talked about to be cheaper agricultural efficiency, slow sectoral transformation, low tax collection capacity, imperfect market, resource side restrictions, and external shocks. Nevertheless, the limitation of the Study is the fact it utilized a detailed approach to review the relationship between inflation and growth that makes it difficult to find your causal relationship and the specifications of the result.

Kenya experienced low inflation prices, with a relatively stable economic growth rate until the inflation level in the year the mid-1970s and 1975 rose to 16. 3% and 17.8 %, respectively (Economic Survey, 1975). The highest inflation price ever documented in Kenya was in 1993 at 46%. The large inflation price was related to the extreme money supply, low aggregated demand, depreciation of the Kenyan shilling having low trader (Economic Study, 1994).

The year 1994 however, was categorized by a GDP growth rate of 3% tied with a deterioration in the inflation rate to 28.8% as the Government adopted a tight monetary policy, relaxed foreign exchange rate and trade managements with de-regularized cereal marketing activity and the oil business further led to a reduction in inflation in 1994 (Economic Survey, 1995).

The overall Sudanese economy has frequently been gone through as a conflict economy in whose Growth continues to be impeded simply by economic sanctions. This has been amplified since 2011 and South Sudan's separation and following oil shutdown (before which development was at least positive), which usually drastically modified Sudan's economic growth potential.

The shutdown in South Sudanese oil production strictly affected Sudan's economic indicators. Further worsening matters, economic sanctions remain in place on Sudan, while aid and external economic activity are inadequate. The structural economic shift caused by South Sudan's secession has adversely affected virtually all of the country's economic growth prospects.

The real GDP growth was projected to 4.1% in 2018, as of 3.3% in 2017. On the supply mining (Growth of 6.3%), agriculture (3.7%), and manufacturing (1.5%) were the primary providers of Growth. By the demand side, private consumption was the main contributor to Growth, while the current account shortage, an estimated 2.4% of GDP in 2018, diminished from Growth. Superior inflation, as well as the phasing away of energy tax assistance, hindered Growth.

Significant challenges involve institutional and human capability weaknesses, youth being out of work, a high external debt burden, and weather conditions change. Sudan remains in a transitional status faced with institutional and human resources capacity insufficiencies. External debt stock which heightened from $18 billion in 1995 to $53.6 billion in 2016 and also to $56 million in 2018- is unsustainable and thus constrains the country's economic restoration prospects.

### 2.3.3 Selected economic Policies in Ethiopia, Kenya, and Sudan Ethiopia

The nationalization of personal enterprises, as well as the proliferation of government restrictions around the private sector (such because of investment caps, credit restrictions,

price regulates, and the deficit of imported intermediated inputs), created significant disincentives for entrepreneurship, productivity growth, and introduction of new products.

Unfortunately, economic Growth was prolonged under the Derg because of misguided guidelines, inadequate supply of public goods, and civil war. Attempts to introduce a mixed economy in the last days of the Derg were in its final stages and considered inadequate to support the demand intended for change. The prolonged civil war in northern Ethiopia and frequent droughts exacerbated economic uncertainty, which choked investment and innovation in the modern sector.

The Transitional Government of Ethiopia implemented many economic reconstructs in cooperation with its partners to bring back macroeconomic stability, rationalize the role of the state, and boost private-sector participation. The Emergency Restoration and Renovation Program, matched by the World Bank, helped to restore war-damaged facilities, including highways, schools, and health centers.

There is certainly some proof that the Road Sector Development Program (RSDP), for instance, offers significantly improved the rate of entry of producing firms in cities that previously are not important places of manufacturing (Shiferaw et ing.2015). The first policy reconstructs under the EPRDF aimed at refreshing the economy by merely lifting fancy restrictions around the private sector, reinstating marketplace forces, minimizing tariffs, and devaluing the currency.

The 1992 investment law, as well as subsequent iterations, offered bonuses to domestic and international private traders in the form of tax holidays, duty-free imports of capital products, duty disadvantages for exporters. As the Government's change agenda, the financial sector remains extremely regulated, owned by state-owned banks, and guarded against the overseas competition despite pressure from your World Bank and IMF since the early on the 1990s.

Beyond the macroeconomic environment outlined earlier, the Government actively adopted the Agricultural Development Led Industrialization (ADLI) strategy coming from 1993. ADLI aimed at improving productivity development in smallholder farming through better access to contemporary agricultural inputs, extension solutions and services, and road connectivity, with all the ultimate goal of industrial Growth.

Throughout the first Growth and Transformation Plan (GTP-I), Ethiopia's monetary plan continued to pay attention to maintaining cost and exchange rate balance, thereby creating a favorable macroeconomic environment that promotes quick and lasting economic growth. Despite inflationary challenges throughout the first two years of the GTP I period, the Government been successful in backing inflation through the last three years of the GTP I period.

The second Growth and Transformation Strategy (GTP-II) intended for the period 2015-2019 has large hopes of the robust overall performance in manufacturing to fulfill its driven goals. This is partly in recognition that manufacturers during GTP-I and under ADLI the question were why the share of manufacturing remained at 5 % of GDP for such a long time.

The economic diplomacy contributed to bringing in foreign direct aid investment and enhancing the participation from the Ethiopian diaspora in investment activities in the country. The country's role in regional and international dialogue board has been improved. Bilateral relationships with neighboring countries and also other African countries, relations with permanent users of the Un Security Authorities, the European Union, and EU affiliate countries, Middle East, Asia, and Oceania, have been increased during the GTP I period.

Kenya's economic plan framework could be traced to the Seasonal Paper Number 10 of 1965 upon African Socialism and its bid to planning in Kenya. The paper emphasized quick economic advancement and social progress for all Kenyan's. This placed focus on the promotion and protection of domestic sectors based on that which was referred to as transfer substitution policy. The policy was a significant influence around the development of the country's trade regime within the first two decades of self-reliance.

The second primary stage in the development of economic policy in Kenya was through the Structural Adjustment Programs (SAPs) launched by Seasonal Paper No.1 of 1986 upon Economic Management for Renewed Growth. This emphasized a significant change from dependence on transfer substitution and protectionism toward a policy that led to sectors being motivated to produce for foreign trade with change programs targeted at improving effectiveness, stimulating personal investment, and increasing the sector's forex earnings. Additionally, it meant economic liberalization getting to an end the central role from the public sector institutions, which usually had formerly managed and coordinated operate distribution systems and related trade aide. The current economic policy is led by the procedures of the new Constitution 2010, which identify the contingency jurisdiction from

the national and county government authorities concerning trade matters. The policy is usually founded on the economic, social, and political-legal rights of the residents as provided. These legal rights are enshrined in the Kenya Vision 2030 policy blueprint, which usually envisages a middle-income society by 2030. under this basis, the Region Governments will be the center for development and support delivery as the National Authorities shall support and provide nationwide policy path and guidance.

National transformation policy: The 2nd Medium Term Plan 2013-2017 (MTP II) lays focus on 'enablers' which will facilitate development and change of the economic climate, social sectors, and political and governance systems. The Enablers of foundations intended for national modification contained in MTP II will be; infrastructure; ICT; science, technology, and innovations; land reconstructs; public sector reforms; labor and employment; national ideals and integrity; ending drought emergencies; protection, peacebuilding and resolve conflicts.

Industrialization Policy: The Kenya industrialization Policy platform 2012- 2030 whose theme is "Transforming Kenya right into a Global Competitive Regional Commercial Hub" is always to align Kenya Vision 2030, which plans to transform Kenya into a middle income industrializing country, into a globally competitive and prosperous nation, providing a high quality of life to any or all its residents in a protected and healthful environment.

Sudan's economy has observed significant changes during the last 30 years, full Government control over financial activities characterized the period from the 1960s, while an inward-looking strategy centered development plan during the early on the 1970s and mid-1980s.

Financial difficulties thought crisis proportions during the second half of the 1970s, following the ambitious development program released early in the 1970s. The failure in the investment boom to increase the economy's productive capacity offers accelerated the crisis (Ali, 1985).

More than three decades ago, Sudan started to be one of the first countries to adopt the World Monetary Fund and World Bank macro-economic stabilization and structural adjusting programs. Nevertheless, the economy continuing to slip further throughout 1978-1984, which usually witnessed extremely active realignment operations. The economy collapsed during this period to a typical annual price of -1. 7% per capita, while macroeconomic guidelines continued to worsen. Inflation shot to more than 27%, and for the first time, inflation tax (at 6. 2% of GDP) exceeded seigniorage revenue only by more

than 1% age point, indicating the increasing ineffectiveness of financial policy. The reforms stressed two central policies: effective devaluation and trade liberalization measures that shifted imports (and for some extend exports) from the recognized market towards the free marketplace. The emerging part of Sudan likewise motivated these reconstruct as a central labor-exporting nation to the oil surplus economies from the Middle-East. Remittance from Sudanese nationals operating abroad uses more than three times the Buck value of official foreign trade during 1983-84.

Throughout the first half of the 1990s, an enormous fiscal growth financed primarily through domestic borrowing resulted in sharp rises in money supply and a three-digit inflation price as well as considerable unprecedented damage in the exchange rate. Tightening and reorienting financial policy to reduce the rate of inflation, removal of most credit rating controls, and the introduction of new instruments intended for indirect economic control. The massive inflation was absorbed through two instruments: Government Musharaka Certificates (GMC) and Central Bank Musharaka certificates (CMC).

Sudan also is one of the groups of heavily Indebted Poor Countries (HIPCs). The country failed to qualify for support and debt settlement under the HIPC Initiative, which launched by IMF and World Bank in 1996 to deal with the unsustainable external debt in the world's weakest and most greatly indebted countries.

In 1992 the government committed itself for a liberalization package. the considerable inflow of foreign direct investment (FDI) related to the commercial exploitation of oil, the Exploration and of oil have drawn a total of US$1.3 billion in FDI during 1996-2000, which usually amounts to 10 % of GDP. (World Bank, 2003, Volume. I: 19). Furthermore, because of oil, the foreign exchange scenario of Sudan has increased considerably because of oil-related international direct investment, oil foreign trade earnings, and reduced transfer bills intended for crude and petroleum items.

# CHAPTER 3

# RESEARCH METHODOLOGY

## 3.1 Description of the study area

Ethiopia is the eldest nation in the world. With a strategic location dominance as a connecting point in Africa, close to the Middle East and its markets. It is ranked as the second most populated country in Sub-Saharan Africa, With more than 100 million people. In the Growth and Transformation Plan (GTP II) Ethiopia, which aims to expand the physical infrastructure and public investments toward the country to be a manufacturing hub. Sustaining the 11% GDP, Ethiopia aims to reach lower-middle-income status by 2025, according to the GTP II.

Kenya is located on the Equator with a land area of 569,137 km2, with a great diversity of landforms ranging from glaciated mountain peaks, through a flight of plateaus to the coastal plain. Kenya has one of the biggest and diverse economies in the East Africa region. The annual growth rate averaged to over 5% for the last decade. In terms of the Human Development Index, Kenya ranks highest in the region. Kenya continues a highly unequal society by income, gender, and geographical location. Rapid population growth and high unemployment rates, especially among the youth, deforestation, and inequitable patterns of land ownership, are major challenges for the country.

Sudan located at the crossroads of Sub-Saharan Africa and the Middle East and bordered by seven countries. Since its independent history, the country has been affected by conflicts. The separation and creation of the Republic of South Sudan in 2011put the country in the most significant and immediate economic shock by the loss of the oil revenue that amounted to more than 70% of Sudan's government revenue and 95% of its exports. This has compact economic growth and resulted in double-digit inflation. The All-inclusive U.S. sanctions on Sudan, imposed in 1997 and extended in 2006, were lifted in October 2017. Trade and financial transactions between Sudan and the World economy are still very imperfect and limited as Sudan continues still under the U.S. as a state sponsor of terrorism.

## 3.2 Research design

Towards achieving the objectives of the study, empirical evidence from time-series data for the three countries Ethiopia, Kenya, and Sudan, were sourced from the African Development Bank (AfDB) throughout the period 1991 – 2017. The twenty-seven years of

time-series data were used because of the challenges of data availability. Economic growth is used as a dependent variable and inflation as independent. Other variables FDI, Exchange rate, Population growth, and real per capita GDP as explanatory variables. Different statistical techniques were used to summarize and present the data. Then the econometric method of ARDL is used to check the relation and effect in Ethiopia, Kenya, and Sudan.

**Data Sources, Types and Method of Collections**

The data will be collected from the African Development Bank (AfDB) Socio-Economic Database for the ease of the papers and to have a harmonized and common data set. The dataset covers the time from 1991 to 2017;

According to Uma Sekaran (2005), Data collection strategies are an essential part of study design. Data can be gotten from primary or secondary resources. Concerning the required end, result or Data needed methods of data collection can vary as well as be mixed to achieve the required results. Data collection is a way of acquiring information use with various research or making decisions situations.

It is based on the information accumulated for the purpose besides solving the situation at hand (Malhotra, 1999). The previous research reviews, books, catalog, and content articles are essential resources to understand the problems. Secondary Data helped the Researcher to get additional information regarding the study. The Researcher, first of all, studies the whole journal from an online newspaper, collection, and other related press to comprehend the economic growth and inflation.

**Methods of Data Analysis**

This study employed both descriptive and econometric analysis in the analysis. The real GDP used as the dependent variable and its inflation rate as the independent variable on a series of dates between the years 1991 to 2017. The data was published by the AfDB Socio-Economic Database, using the AfDB Socio-Economic Database will ensure the harmonization of statistics in the three countries. Other variables like FDI, Exchange rate, Population growth, and real per capita GDP are also used as explanatory variables. The descriptive strategy is used, showing the current and variability of Inflation and Growth to provide a vibrant look at the way the factors change through time for the three countries. STATA software version 16 was used in the analysis of the time-series data. An autoregressive distributed lag model (ARDL) was used to determine the relationship of

variables. The p-value of each variable is calculated to establish the significance in the model for rejecting the null hypothesis is set.

**Descriptive Statistical methods**

The detailed approach is utilized to summarize the entire trends and variability in inflation and economic growth in Ethiopia, Kenya, and Sudan. Percentage and graphic methods are employed to explain the styles in Inflation and Growth in the three countries. Besides, the Coefficient of variation and t-test are approximated for inflation and GDP to discuss and compare the variability of inflation and growth in Ethiopia, Kenya, and Sudan.

## 3.3 Econometrics Model Specification

Econometric modelling explains how to examine the dynamics between inflation and economic growth. To achieve the objective of the study, six variables, including real GDP, inflation, FDI, Exchange rate, Population growth, and real per capita GDP included in the model, as shown in equation (1) and then the Augmented Dickey-Fuller ADF test conducted to evaluate for unit root and Stationarity in the variables a generalized ADRL (p, q) model is used to perform the Bounds Test for cointegration and to confirm the existence of co-integration between variables equation (2). After the presence of co-integrating parameters, the Error Correction Model (ECM) is used to look at the causal relationship between inflation and growth in the long and short run.

GDP = F (infl, FDI, Exchrate, Pop, pGDP) ----------(1)

Where

GDP = real GDP rate

Infl = inflation rate

FDI = Foreign Direct Investment

Exchrate = Exchange rate

Pop = Population growth

pGDP = real per capita GDP

$$Y_t = \gamma_{0i} + \sum_{i=1}^{p} \delta Y_{t-i} + \sum_{i=0}^{q} \beta' X_{t-1} + \varepsilon_{it} \text{ --------(2)}$$

Y't is a vector (dependent variable) and variables in (X't)- regressor variable

δ and $\boldsymbol{\beta}$ are coefficients

ϒ is a constant; i=1,,,,,,,,k,

P is the optimal lag orders for the dependent variable

q is the optimal lag orders for regressor variable

To empirically analyze and investigate the presence of the long-run relationships and short-run dynamic interactions among the variables of interest (GDP growth, Inflation, FDI, exchange rate, Population growth, and Per Capita GDP).A conditional ARDL (p, q1, q2, q3, q4, q5) model with six variables is constructed to estimate the existence of cointegration and short and long relationship between the variables. The optimal lag was selected by the Akaike Information Criterion (AIC) method because of the small sample size of this study. After estimation, the F-test conducted on the joint significance of the lagged variables in levels. In the Bounds Test, all variables tested as the dependent variable as specified below

$$\Delta gdp_t = a_{01} + b_{11}gdp + b_{21}inflation_{t-1} + b_{31}\,fdi_{t-1} + b_{41}exchrate_{t-1} + b_{51}\,pop_{t-1} + b_{61}\,pgdp_{t-1}$$
$$\sum_{i=1}^{p} a_{1i}\Delta gdp_{t-1} + \sum_{i=0}^{q} a_{2i}\Delta \inf lation_{t-1} + \sum_{i=0}^{q} a_{3i}\,fdi_{t-1} + \sum_{i=0}^{q} a_{4i}\Delta exchrate_{t-1} + \sum_{i=0}^{q} a_{5i}\Delta pop_{t-1} + \sum_{i=0}^{q} a_{6i}\Delta pgdp_{t-1} + \varepsilon_{1t} --(3)$$

$$\Delta inflation_t = a_{02} + b_{12}gdp + b_{22}inflation_{t-1} + b_{32}\,fdi_{t-1} + b_{42}exchrate_{t-1} + b_{52}\,pop_{t-1} + b_{62}\,pgdp_{t-1}$$
$$\sum_{i=1}^{p} a_{1i}\Delta \inf lation_{t-1} + \sum_{i=0}^{q} a_{2i}\Delta gdp_{t-1} + \sum_{i=0}^{q} a_{3i}\,fdi_{t-1} + \sum_{i=0}^{q} a_{4i}\Delta exchrate_{t-1} + \sum_{i=0}^{q} a_{5i}\Delta pop_{t-1} + \sum_{i=0}^{q} a_{6i}\Delta pgdp_{t-1} + \varepsilon_{2t} --(4)$$

$$\Delta fdi_t = a_{03} + b_{13}gdp + b_{23}inflation_{t-1} + b_{33}\,fdi_{t-1} + b_{43}exchrate_{t-1} + b_{53}\,pop_{t-1} + b_{63}\,pgdp_{t-1}$$
$$\sum_{i=1}^{p} a_{1i}\Delta fdi_{t-1} + \sum_{i=0}^{q} a_{2i}\Delta gdp_{t-1} + \sum_{i=0}^{q} a_{3i}inflation_{t-1} + \sum_{i=0}^{q} a_{4i}\Delta exchrate_{t-1} + \sum_{i=0}^{q} a_{5i}\Delta pop_{t-1} + \sum_{i=0}^{q} a_{6i}\Delta pgdp_{t-1} + \varepsilon_{3t} --(5)$$

$$\Delta exchrate_t = a_{04} + b_{14}gdp + b_{24}inflation_{t-1} + b_{34}\,fdi_{t-1} + b_{44}exchrate_{t-1} + b_{54}\,pop_{t-1} + b_{64}\,pgdp_{t-1}$$
$$\sum_{i=1}^{p} a_{1i}\Delta exchrate_{t-1} + \sum_{i=0}^{q} a_{2i}\Delta gdp_{t-1} + \sum_{i=0}^{q} a_{3i}inflation_{t-1} + \sum_{i=0}^{q} a_{4i}\Delta fdi_{t-1} + \sum_{i=0}^{q} a_{5i}\Delta pop_{t-1} + \sum_{i=0}^{q} a_{6i}\Delta pgdp_{t-1} + \varepsilon_{4t} --(6)$$

$$\Delta pop_t = a_{05} + b_{15}gdp + b_{25}inflation_{t-1} + b_{35}\,fdi_{t-1} + b_{45}exchrate_{t-1} + b_{55}\,pop_{t-1} + b_{65}\,pgdp_{t-1}$$
$$\sum_{i=1}^{p} a_{1i}\Delta pop_{t-1} + \sum_{i=0}^{q} a_{2i}\Delta gdp_{t-1} + \sum_{i=0}^{q} a_{3i}inflation_{t-1} + \sum_{i=0}^{q} a_{4i}\,fdi_{t-1} + \sum_{i=0}^{q} a_{5i}\Delta exchrate_{t-1} + \sum_{i=0}^{q} a_{6i}\Delta pgdp_{t-1} + \varepsilon_{5t} --(7)$$

$$\Delta pgdp_t = a_{06} + b_1gdp + b_{26}inflation_{t-1} + b_{36}\,fdi_{t-1} + b_{46}exchrate_{t-1} + b_{56}\,pop_{t-1} + b_{66}\,pgdp_{t-1}$$
$$\sum_{i=1}^{p} a_{1i}\Delta pgdp_{t-1} + \sum_{i=0}^{q} a_{2i}\Delta gdp_{t-1} + \sum_{i=0}^{q} a_{3i}inflation_{t-1} + \sum_{i=0}^{q} a_{4i}\,fdi_{t-1} + \sum_{i=0}^{q} a_{5i}\Delta exchrate_{t-1} + \sum_{i=0}^{q} a_{6i}\Delta pop_{t-1} + \varepsilon_{6t} --(8)$$

Where

P and q are the optimal lag length

$a_{1i}$, $a_{2i}$, $a_{3i}$, $a_{4i}$, $a_5$i, $a_{6i}$ are short-run dynamic coefficients of the ARDL model

$b_{1i}$, $b_{2i}$, $b_{3i}$, $b_{4i}$, $b_{5i}$, $b_{6i}$ are long-run multipliers

$\Delta\cdot$ is the first difference operator

$a_0$ a constant term, and $\varepsilon_t$ is error term

to estimate for the presence of long-run relationships among variables. The null hypothesis of no co-integration among variables the null hypothesis is H0: b1i= b2i= b3i=b4i=b5i=b6i=0 against the alternative hypothesis H1: b1i≠0 b2i≠0 b3i≠0b4i≠0b5i≠0b6i≠0.

Rejecting or accepting the null hypothesis (H0) depends on the value of the F-test is compared with critical value bounds. In contrast, if the computed F-statistic falls inside those bounds, the test is inconclusive As a result, if a computed F-statistic lies outside the critical value bounds, the null hypothesis, H0, is rejected, which means there exists a long-run relationship among the variables concerned regardless of the order of integration of the variables. The following equation is built up to test the long-run relationship among the variables based on the ARDL approach If a long-run relationship (co-integration) among variables is found, the next stage is to examine the long-run and short-run relationships among selected variables.

$$gdp_t = a_0 + \sum_{i=1}^{p} a_{1i}\Delta gdp_{t-1} + \sum_{i=0}^{q} a_{2i}\Delta \inf lation_{t-1} + \sum_{i=0}^{q} a_{3i}\, fdi_{t-1} + \sum_{i=0}^{q} a_{4i}\Delta exchrate_{t-1} + \sum_{i=0}^{q} a_{5i}\Delta pop_{t-1} + \sum_{i=0}^{q} a_{6i}\Delta pgdp_{t-1} + \Phi_t \quad --(9)$$

Moreover, to inspect the short-run dynamic forces from the ARDL model for, we estimate the error correction model, which is developed as follows:

$$\Delta gdp_t = a_0 + b_1 gdp + b_2 inflation_{t-1} + b_3\, fdi_{t-1} + b_4 exchrate_{t-1} + b_5\, pop_{t-1} + b_6\, pgdp_{t-1}$$
$$\sum_{i=1}^{p} a_{1i}\Delta gdp_{t-1} + \sum_{i=0}^{q} a_{2i}\Delta \inf lation_{t-1} + \sum_{i=0}^{q} a_{3i}\, fdi_{t-1} + \sum_{i=0}^{q} a_{4i}\Delta exchrate_{t-1} + \sum_{i=0}^{q} a_{5i}\Delta pop_{t-1} + \sum_{i=0}^{q} a_{6i}\Delta pgdp_{t-1} + \Psi ECM_{t-1} + \varepsilon_t \quad --(10)$$

The ECM coefficient of Equation (10) must be negative and significant, which mean the variables have a long-run relationship and represent the speed of adjustment to the equilibrium. More, to determine the consistency of the ARDL results, the test of the serial correlation, stationarity, and stability of the model was undertaken.

**Definition of Variables**

**Real GDP**

Real GDP measures an economy's total goods and services in a given year, taking into account changes in price levels. Real GDP is the dependent variable of the study. The data for this variable is taken from the AfDB database.

**Inflation**

Inflation defined as a sustained rise in the general level of prices. There is no clear-cut decision about the relationship between inflation and GDP rate. The data has been taken from the AfDB database.

**FDI rate**

A foreign direct investment (FDI) is an investment made by a firm or individual in one country into business interests located in another country. The data has been taken from the AfDB.

**The exchange**

an exchange rate is a rate at which one currency will be exchanged for another. It is also regarded as the value of one country's currency in relation to another currency.

**Population growth**

The population growth rate expresses the change in population size as a factor of time. The data is obtained from the AfDB database.

**per capita GDP**

GDP per capita is a measure of a country's economic output that accounts for its number of people. It divides the country's gross domestic product by its total population. That makes it a good measurement of a country's standard of living. It tells you how prosperous a country feels to each of its citizens. Barro (1997) has made known a negative connection between per capita GDP and economic growth. But Blomstrom (1996) has found a positive relationship between initial GDP and economic growth. The data on the initial per capita GDP is from the World Bank’s database.

**Stationarity**

In economic research involving time series data, before any statistical estimation takes place, the data of all variables in the model have to be tested for their stationarity (Gujirati, 2004). Stationarity is an essential concept; it means that the statistical properties of a time series do not change over time. It is crucial because many useful analytical tools and statistical tests and models rely on it.

**Co-integration Test**

If the variables confirmed to be stationary, the next step is to test the presence of a co-integration relationship between variables. The research uses the Bounds co-integration technique. The existence of co-integration between the variables suggests the presence of causality between them in at least one direction.

# CHAPTER 4

# RESULT AND DISCUSSIONS

## 4.1 Results of Descriptive Statistics

Table 1: Descriptive Statistics for Ethiopia, Kenya and Sudan over the period 1991-2017

| Variable | Ethiopia | | | | Kenya | | | | Sudan | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | Std Dev. | Min | Max | Mean | Std Dev. | Min | Max | Mean | Std Dev. | Min | Max |
| **GDP growth** | 5.85 | 15.44 | -62.02 | 16.15 | 4.45 | 2.92 | -0.94 | 10.00 | 6.46 | 3.57 | 1.11 | 18.80 |
| **Inflation** | 12.57 | 13.42 | -8.60 | 52.79 | 12.95 | 10.53 | 1.85 | 48.53 | 45.52 | 49.61 | 7.10 | 158.06 |
| **FDI** | 10.31 | 8.81 | 0.03 | 29.19 | 6.10 | 7.14 | 0.24 | 24.80 | 14.90 | 11.57 | -0.08 | 43.78 |
| **Exchange rate** | 3.60 | 2.41 | 1.54 | 9.02 | 25.29 | 11.63 | 8.15 | 50.42 | 1.05 | 1.25 | 0.00 | 4.90 |
| **Population growt** | 3.49 | 0.42 | 2.97 | 4.36 | 3.37 | 0.22 | 3.04 | 3.95 | 3.12 | 0.64 | 2.48 | 4.60 |
| **Per Capita GDP** | 2.32 | 15.15 | -63.97 | 12.39 | 1.05 | 2.96 | -4.65 | 6.52 | 3.25 | 3.58 | -3.25 | 15.55 |

Table (1) show the mean and the Standard Deviation. The maximum and minimum values of the series are also given for each series under the row maximum and minimum.

**Ethiopia**

**The real GDP growth rate in Ethiopia**

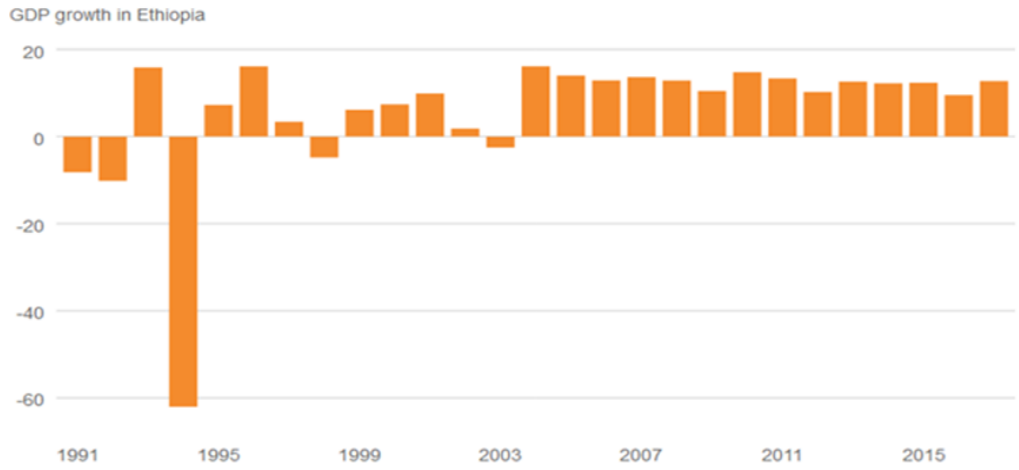



Figure 1: Trends of real GDP in Ethiopia from 1991-2017 Source: AFDB Socio-Economic Database (2020)

The records history of Ethiopia has always been like any African country dominated by wars and conflicts for reasons like religion, land, nationality, or combination of these factors, mainly aiming at power and country resource control. Consequently, the economic performance of the Ethiopian economy in history was ups and downs has a strong linkage to different regimes of ruling governments and their associated policies and objectives.

Alemayehu and Befekadu (2005) stated that "cyclical political processes and regime shifts were unpredictable and violent with negative consequences on the economic performance. Economic insecurity pervades the systems as the rule of law, and enforcement of contracts and property rights insecurity are configured on an unstable political base."

The EPRDF adopted the typical structural adjustment policies of market liberalization, which issued a new economic policy in 1991 to adopt a market-oriented economic policy Alemayehu and Befekadu (2005). Policies on engaging the private sector, improving the monetary and fiscal policy, restricting the Government's role, and stabilizing the macroeconomic environment were undertaken by the Government (Zerayehu, 2013).

During the fiscal year 2013/14, the real GDP revealed a remarkable growth of 10.3 percent compared to the 5.4 percent for sub-Saharan Africa countries for 2014. According to the National Bank of Ethiopia report (2012/13), real GDP continued to grow by 10.9 % for the period 2003-2013. The growth was mainly coming by the service sector (51.7 percent), the agricultural sector (21.9 percent), and the industrial sector (26.4 percent).

The trends in Ethiopia's economic growth during the study show that Economic performance in Ethiopia is highly correlated with the political process and regime change. The period before 1991, Ethiopia's economic growth, suffers from a very bad performance and inconsistency due to many reasons like conflicts and drought. For the past decade, Ethiopia led the world's fastest economic growth due to policy change and reforms introduced by the Government.

**Inflation trends in Ethiopia over the period 1991-2017**

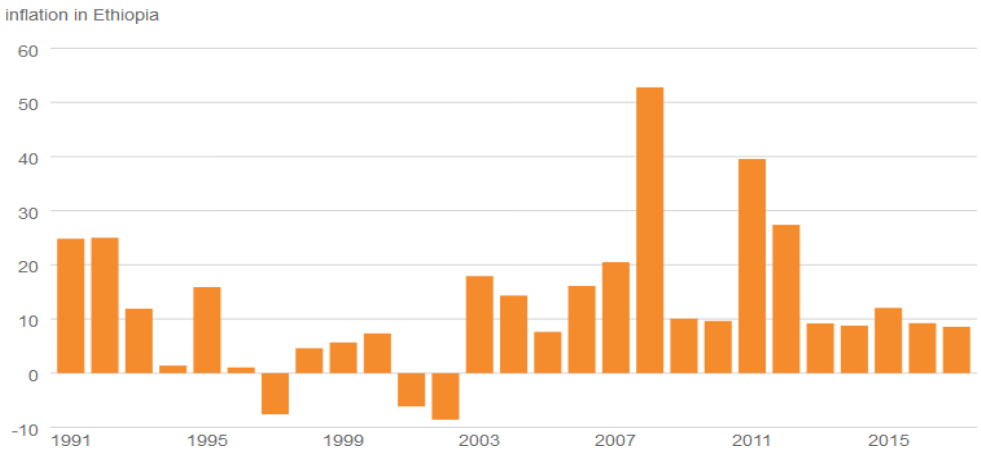



Figure 2: Trends of inflation in Ethiopia from 1991-2017 Source: AFDB Socio-Economic Database (2020)

Characterized by tight monetary and fiscal policies and fully controlled by the Government. According to Alemayehu and Kibrom (2008), the high increase of general inflation was caused mainly by food inflation, in response to food demand caused by an international food price hike. Inflation was running at a moderate rate until the year 2000, then Inflation jump from 3.3 percent in 2004/05 to 44.39 percent in 2008/09, which was the highest in the country's history (NBE, 2010), and recently the lowest was 10.4 percent in 2015.

As the National Bank of Ethiopia report indicates (2013/14), the general inflation declined from 13.5 percent in 2012/13 to 8.1 percent in 2013/14. The general inflation rate during 2008 mounted to 33 percent, with food inflation showing around 49 percent.

Historically, the major inflationary incidents occurred during conflict and drought periods.

**Trends of Growth and inflation in Ethiopia**

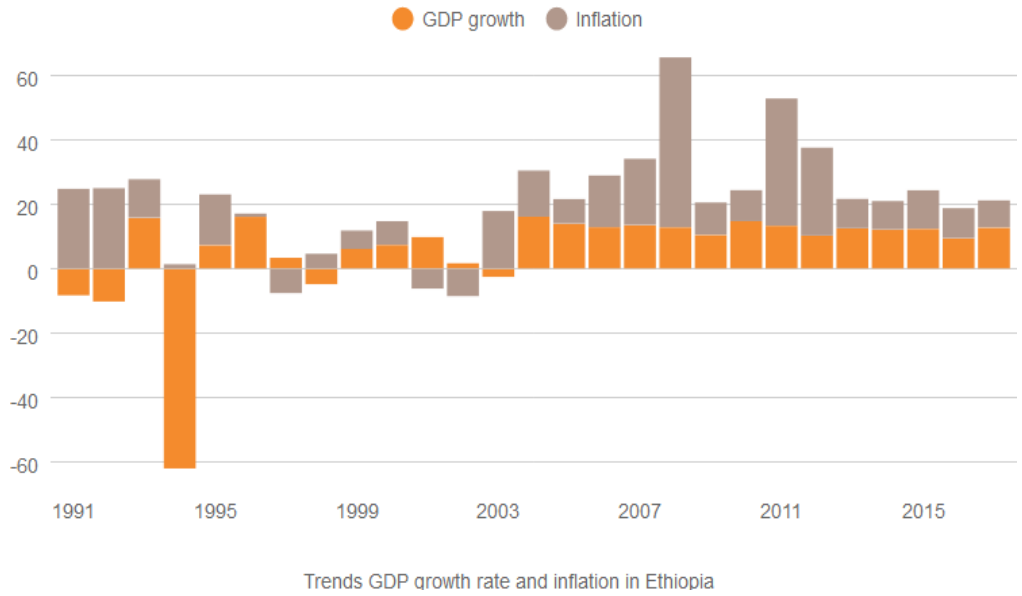



Figure 3: Trends of real GDP and inflation in Ethiopia from 1991-2017 Source: AFDB Socio-Economic Database (2020)

For decades the reduced inflation rate goes hand by hand with low economic or the other way around. Recently the high and continued growth progress goes together with continual inflationary problems. The level overall inflation rate rose by 32.0 percent in July 2012 in comparison with the one seen in a similar period a year ago. The level of non-food inflation rate increased by 21.5 percent in July 2012 when compared with 2011.

The major sources of inflation discussed in the literature are influenced by money supply, the level of the amount of output growth, investment, the lack of resource mobilization means, the oil prices, and others (Geda and Tafere, 2008; Goodo, 2008; Seid, 2008).

Over the period of the study, the Ethiopian economy has gone through different trails of inflation and growth relationship. From the graph in figure (3), before 2003, low inflation was the feature of the country with steady and small economic growth. During this period, the lowest GDP was - 62, while the highest inflation was 16.1 %. The situation was mainly explained by practical government budgets and restrictive monetary policy. From 2003 onward, inflation starts misbehaving and rise by double-digit inflation. However, Ethiopia's economic growth averaged 12% (FDB Socio-Economic Database). Ethiopia was Recording the fastest growth that the country has ever experienced, leading the low-income and Sub-Saharan African countries for a decade. These conditions seem to suggest that the GDP rate and inflation are related to Ethiopia.

Before 2003, low inflation was the feature of the country with steady and small economic growth. Over the period of the study, the Ethiopian economy has gone through different trails of inflation and growth relationship. Ethiopia was Recording the fastest growth that the country has ever experienced, leading the low-income and Sub-Saharan African countries for a decade.

**Foreign Direct Investment**

The liberalization and the establishment of the Ethiopian Investment Authority (EIA) in 1992 have motivated investment inflows in the country. The number of foreign direct investments (FDI) that entered the country in the last decade was inadequately small compared to that of other countries. The cumulative foreign direct investment (FDI) inflow during this period was equivalent to a total inflow of 0.2 percent to Sub-Saharan Africa. the amount of foreign investment in Ethiopia was less compared with other countries in the region; therefore, the total foreign direct investment (FDI) inflow in Ethiopia in the last has been insignificant. (Getnet Astatike,2006). FDI contribution to economic development, and therefore poverty reduction comes through its role as a conduit for:(Ikaria,2003).

According to the EIA, the areas with the most promising potential for investment are agriculture, gro-processing, textiles and garment, leather and leather products, tourism, mining, and hydropower (Amanuel 2014). Ethiopian Investment Commission (EIC) recently announced that the country’s FDI increased by 35 % on average over the first last six months of the fiscal year 2016/17 compared to the same period of 2015/2016. The FDI flows to the country continued to show a positive track of record in 2016/17 despite the recent unrest that occurred in some parts of the country (MOFC 2017).

**Exchange rate**

The figure explains the exchange rate trends. Shifting from a fixed exchange rate regime, the Government has full control over the determinant of the Exchange rate toa managed floating exchange rate, where there is a government intervention whenever necessary to stabilize the foreign exchange market.

**Population growth**

Ethiopia considered one of the populated nations in Sub-Saharan Africa in terms of population. The population growth rate was 4.2 in 1991. In the past and before the period of this study, the population rate was growing at a very fast rate until about 1995, and then the rate of growth dropped. This drop-down in the population growth rate has happened of many factors related to the Government policies on family planning, the level of the awareness created in the community in general, the raise on education level, and other environmental-related issues.

**Per Capita GDP Growth rate**

The value for GDP per capita growth (annual %) in Ethiopia was 9.5 in 2017. As shown in the graph, over the past 27 years, this indicator reached a maximum value of 11.8 in 1996 and a minimum value of -12 in 1991.

**Kenya**

**GDP growth trends in Kenya over the period 1991-2017**

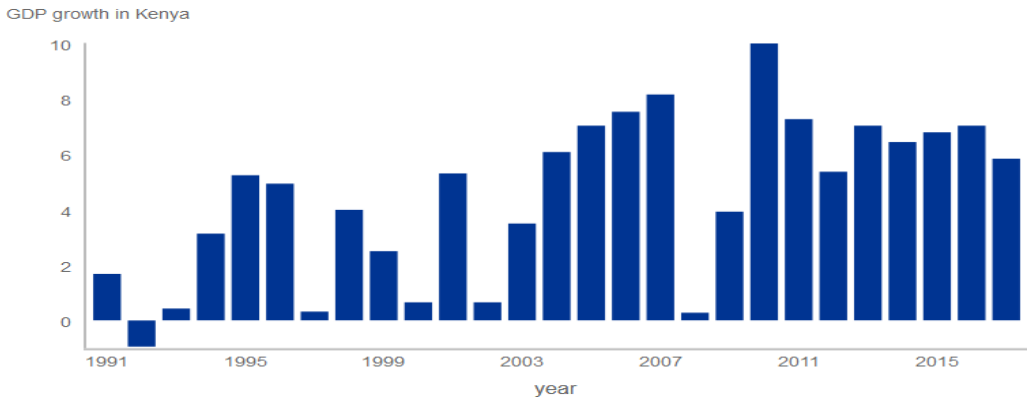



Figure 4: Graph of real GDP trends in Kenya from 1991-2017 Source: AFDB Socio-Economic Database (2020)

During the period 1995 to 2010, the growth rate of the overall economy did not display a steady or perhaps regular pattern. In the years 1995 and 1996, the real GDP growth rate was 4.3 percent and 4.0 percent, respectively. Nevertheless, in 1997, the growth rate decreased considerably to a depressing level of 0.2 percent. The growth charge rose to 4.6 percent and 7.0 percent in 2004 and 2007, correspondingly.

The lowest performance of -0.94% was recorded in 1992, and the highest was 10 % in 2010. However, the country has made significant political, structural, and economic reforms that have largely driven sustained economic growth, social development, and political gains in the period of this study. In 2008 the GDP growth was only 0.28 because of the global economic recession, which started in 2009. The growth restored reaching 5.8% in 2017, putting Kenya as one of the fastest-growing economies in Sub-Saharan Africa.

The GDP growth in Kenya expected to sustain and continue because of the new long-term development Vision 2030 in which the country announced the Big Four of prioritizing manufacturing, universal healthcare, affordable housing, and food security.

**Inflation trends in Kenya over the period 1991-2017**

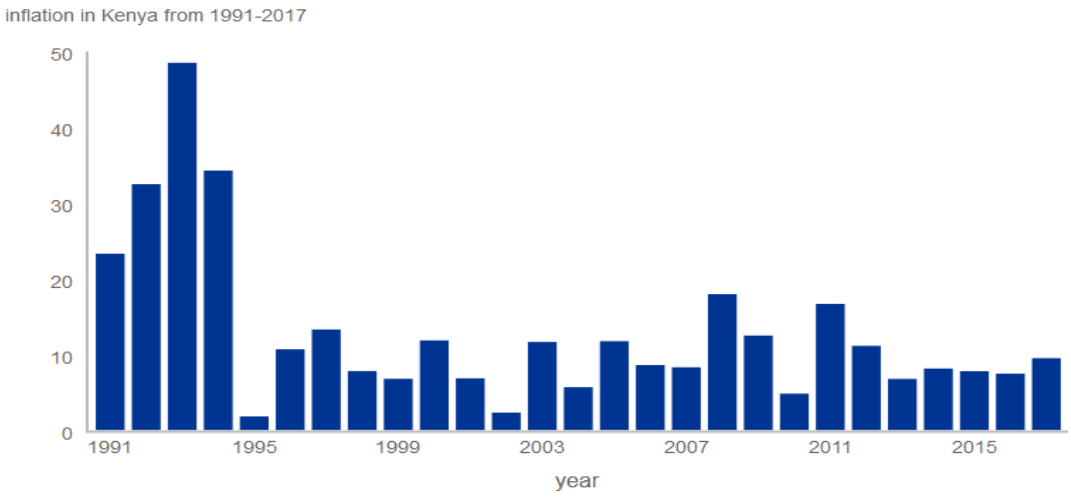



Figure 5: Trends of inflation in Kenya from 1991-2017 Source: AFDB Socio-Economic Database (2020)

Kenya has experienced large swings in inflation since its independence. The 1990s were characterized by rising inflation, as well as economic growth slowdown, the rapid rise in money growth and interest rates, and depreciation of the currency. The2000s were most affected by post-election violence followed by the worst drought in 60 years and the global economic meltdown in 2008. The effect was increased food insecurity, sharp oil price

fluctuations, weak shilling, expanding current account deficit, and slow economic growth. Overall, inflation accelerated from 2 percent in 2007 to a high of 18.70 percent by 2008 before falling back around 3 percent in 2010. At the end of 2011, overall inflation had rose to19.72 percent as food and oil prices escalated. The shilling dropped to a record low comparing with the dollar of Kes 105, prompting the CBK to increase interest rates to tame inflationary pressures. The CBK resolute in dealing with inflation yielded positively as the rates trended as low as 3.20 percent and an average of 6.99 percent recorded by December 2012. By the end of 2013, overall inflation stood at 7.15 percent, resulting in lower interest rates and a stronger shilling against the hard currencies. Below is a chart capturing the quarterly inflation rates trend for the past nine years. Inflation is still high, with slow declines in Kenya. The period 1991 to 1995 considered a period with high inflation. The highest inflation reached a record of 48.5 in, and the lowest inflation was 1.8 in 1995. In Kenya, the major inflationary incidents occurred during the conflict, political instability, and drought periods.

**Trends of Growth and inflation in Kenya**

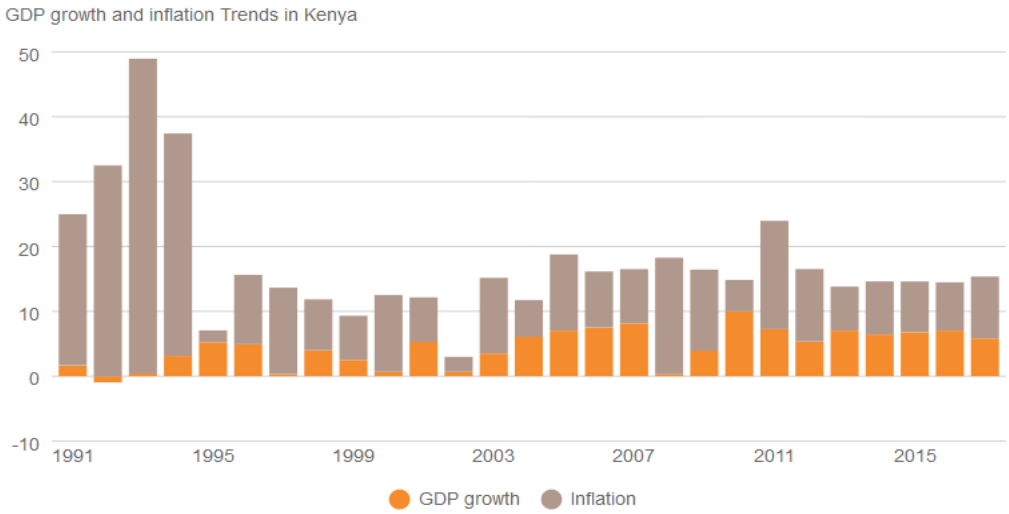



Figure 6: Trends of real GDP and inflation in Kenya from 1991-2017 Source: AFDB Socio-Economic Database (2020)

In Kenya, the GDP growth and development since independence the dynamics in growth–inflation development, pointing to many discrepancies. Generally, its implied, low inflation boosts GDP growth as in the initial decade while increasing inflation down pressurizes economic growth, and this has persisted to high unemployment rates. Tightening monetary policies that maintained inflation below the 4% central bank's target plausibly caused a 2.8%

GDP growth, which, according to Government reports, implemented reforms lowly trended unemployment. Contrary, the post-1970s inflation has continually trended at/over 7.5% and high above GDP growth, which has, on average, growing at 1.2%. Since the temporal period designates to the Great inflation (before 1984/5) and Great moderation coupled with financial crisis (the post-1990) periods, and in response, the many structural reforms (Subbo, 2007; Nyaranga et al., 2019; Ssali et al., 2019) had little to offer in trending inflation close to the target but they consequentially critically declined the inflation-growth trade-off also an unemployment-output trade-off. The higher unemployment due to weak labor markets rapidly down pressed economic growth.

From the figure, the trends of inflation and GDP growth have different tracks before 2000. High inflation was the feature of the country associated with small economic growth. During this period, the highest GDP was 5.2, while the lowest inflation rate was 23.3%. In the Kenyan case, the inflation was always taking over the GDP despite the Government Macroeconomic policy to stop the high inflation rates.

**Foreign Direct Investment in Kenya**

Kenya is one of the main beneficiaries of FDI in East Africa, with FDI inflows significantly increasing since 2010. FDI flows were only 0.23 in 1993 and increased to 6.2 in 2017. This rise is related to investments, mainly from China, in the mining and a railway created to connecting Rwanda, Uganda, South Sudan, and Kenya.

FDI inflows to the country have accelerated in recent years. However, the FDI was only 0.03 in 1992 this amount increased dramatically to 29 in 2003, FDI inflows continue fluctuating but with a big increase comparing the period before 1993 due to the government economic reforms and openness of the market.

**Exchange rate in Kenya**

Since 1990, Kenya introduced and implemented foreign exchange with an official dual exchange rate, and the exchange rate was fully liberalized comparing with the East Africa region. The exchange rate percentage varied from 8.15 in 1991 to 50.4 in 2017.

**Population growth in Kenya**

Kenya's population growth rate was dropped from a high rate to a moderate but still above the country's resources to manage the population growth to levels that are consistent with the country's socio-economic development.

**Per Capita GDP in Kenya**

The value for GDP per capita growth (annual %) in Kenya was 3.90in 2017. As shown in the graph, over the past 27 years, this indicator reached a maximum value of 6.5 in 2010 and a minimum value of -4.6 in 1991.

**Sudan**

**GDP growth trends in Sudan over the period 1991-2017**

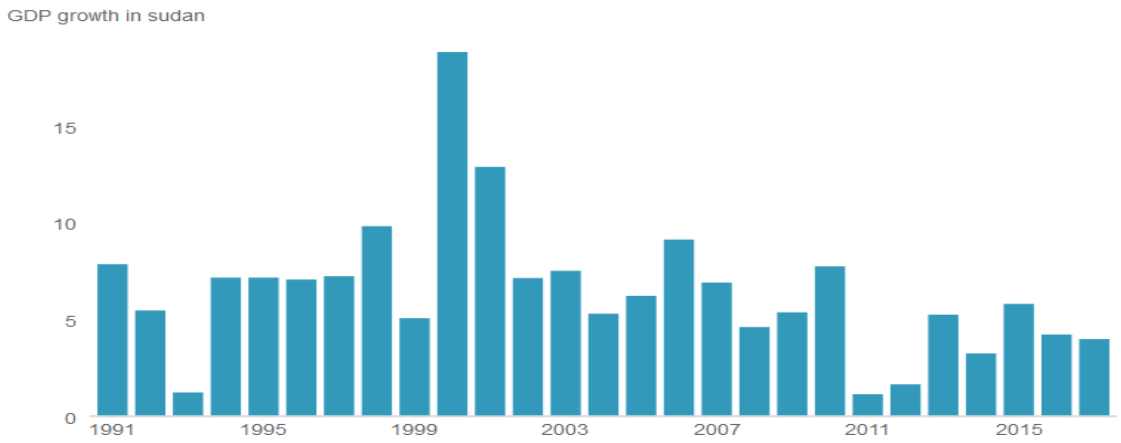



Figure 7: Trends of real GDP in Sudan from 1991-2017 Source: AFDB Socio-Economic Database (2020)

Since 2000, oil and related sectors have been driving GDP growth, despite their relatively smaller shares in GDP composition. Agriculture (composed of irrigated, traditional rain-fed and mechanized crops, livestock, and forestry sub-sectors) contributed more than 40% of GDP in the 1960s, 1970s, and 1980s. Still, it declined to more than 36.2% and 35.9% in 2007 and 2008, respectively. The industrial sector (including manufacturing and mining, water and electricity, building and construction and transport and communications) contributed 33% in 2007 and 31.4% in 2008, whereas services (private and Government) systematically contributed more than 30% for the whole period of 1980-2009, giving 30.8% in 2007 and 32.7% in 2008.

The pre-secession Sudan was one of the fastest-growing oil-led economies until the global financial and economic crisis in 2007. According to a recent study, conducted with the support of UNDP Sudan and the Ministry of Finance and National Economy, real GDP growth had been increasing at a decreasing rate, from its peak of 10.9 percent in 2007 to a low of about 5 percent in 2010. Since the advent of oil in 1999 up until 2010(the oil boom period), the service sector was expanding fast, surpassing agriculture, which was the leading sector of the economy within a framework of (SAPs)very tough self-imposed structural adjustment programs Sudan was able to achieve and sustain high growth rates in the 1990s and 2000s. The real gross domestic product (GDP) growth rate, on average, for the period 2000-2008, amounted to 7.7% annually, varying between a high of 10.2% in 2007 and a low of 6.1% in 2003. The Government was able to stabilize prices and sharply reduce inflation from a record high of 130.6% in 1996 to a single digit by the end of the 1990s.

The lowest growth performance of 1.2 % was recorded in 1993, and the highest was 18 % in 2000. This historical shift because of the oil discovery in the country. However, since independence, the country's political uncertainty that discouraged private investment reduced confidence and productivity in the manufacturing and other sectors. In 2011 the GDP growth was only 1.1 because of the secession and that the country divides into Sudan and South Sudan. By the separation of the country, the oil field was closed, and the production of the oil was postponed because of the disagreement between the two countries.

The GDP growth in Sudan is expected to drop down because of uncertainty, war, and the country transition period, which expected to take longer and create more damage and instability in the economy.

**Inflation trends in Sudan over the period 1991-2017**

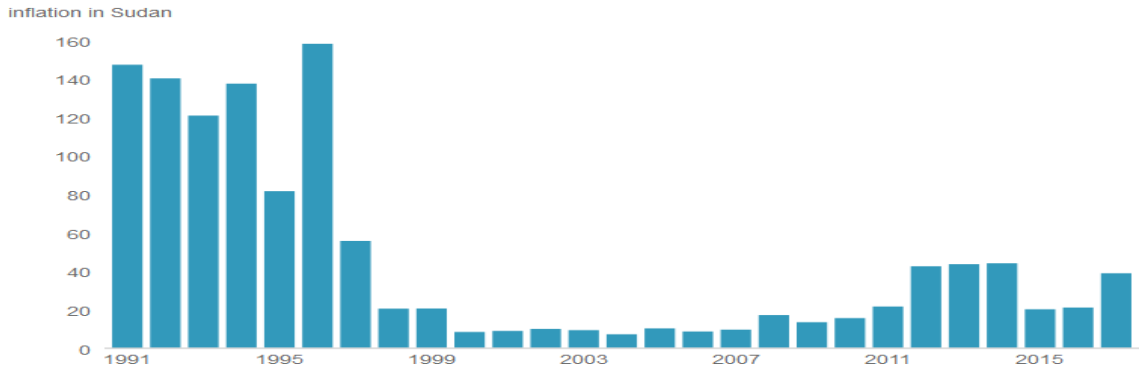


Figure 8: Trends of inflation in Sudan from 1991-2017 Source: AFDB Socio-Economic Database (2020)

The droughts during 1983–1984 and 1993–1994 show that agricultural supply was negatively significantly paid to inflation. Comparable results are obtained by studies on inflation experiences of other comparator countries (see, for example, Chhibber, 1992; Adam, 1995; Liu and Adedji, 2000; Durevall and Ndung' u, 2001; Nachega, 2001; Sacerdoti and Xiao, 2001).

General inflation has been on the rise since 2011 and reached 35.6 percent by the end of 2012. The food component, which accounted on average for 53 percent of household expenditure, drives overall inflation in Sudan Inflation developments in the country go through a period of modest to high inflation from 1970 to 1988, with an annual inflation rate flying around 20–30% excluding in 1973 and 1987, where it grew by 44% and 67% correspondingly The average inflation rate over the period 1997–2002 was 17%. The country is suffering from very high inflation from 2010 to date.

Inflation figures in Sudan are very scary during the period of study, and from 1991 to 1999, extreme inflation was hitting the country, as shown in the figure above. The highest inflation reached a record of 158 in 2006 because the country was in a war almost with all his neighboring countries and also the US sanctions on the country's economy. And the lowest inflation was 7.1 in 2004.

**Trends of Growth and inflation in Sudan**

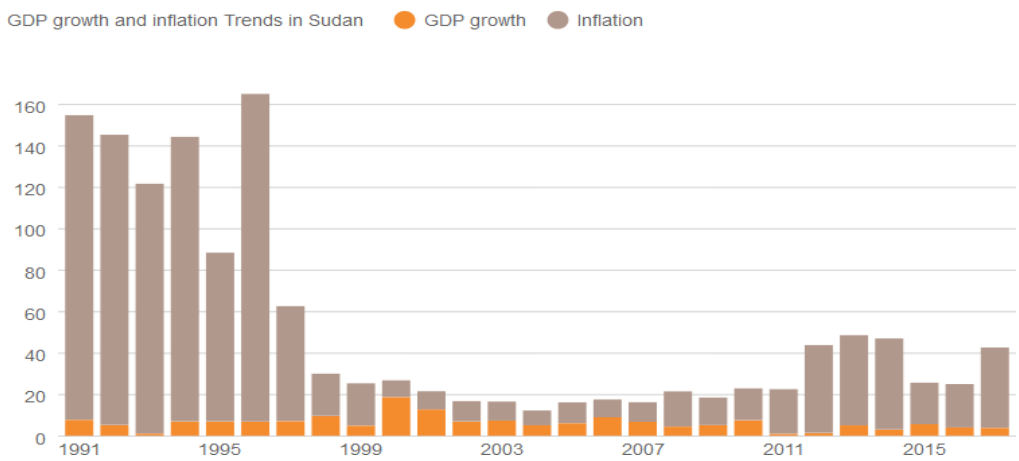



Figure 9: Trends of real GDP and inflation in Sudan from 1991-2017 Source: AFDB Socio-Economic Database (2020)

The main objectives of macroeconomic programs between1978-1981is to raise the rate of economic growth to about 4% per year and reduce the inflation rate to 10% through a range of measures aimed to reduce the government budget deficit and loans from local banks. GDP declined by about 6% in real terms. The central government budget deficit increases bout10% of the GDP, and the money supply grew at an average annual rate of more than40% in comparison with the target rate of 16% for the 1980 range. But from1980, inflation has risen to an average of about 35% annually. In 1992 the economic liberalization policy and adopting the market economy approach an economic system reduced the government economic role to be restricted to policy-making. In this framework, an extensive program converting of the institutions and government companies to the private sector was applied under the purpose of treating the economic stagnation by reducing the control of the public sector one economic activity. Liberalizing the economy of various restrictions, opening the door to the private sector to take over the wheel so economic initiative, and driving economic activity towards achieving then national economic objectives, at this stage, the economy has tested several negative and positive developments. Inflation was a challenge for Sudan during the whole period of study. High inflation was the feature of the country associated with moderate economic growth. During this period the study the highest GDP was 12, while the lowest inflation rate was 7.1%.

**Foreign Direct Investment in Sudan**

Foreign Direct Investment in Sudan averaged -0.08 in 1991 to 4.7 in 2017. After the Peace Agreement in 2005, the international community has taken positive steps to re-engage with Sudan. The Peace Agreement stressed the need for the construction of sound economic management, enhancing institutional capacity, addressing macroeconomic imbalances, and good governance. These aspects are essential prerequisites for socio-economic development. During the oil time, the FDI inflows to the country have accelerated, but it was challenged with US sanctions.

**Exchange rate in Sudan**

The exchange rates of Sudanese pounds were performing in good condition until 2005currently the country in a deficit period, and the exchange rate was flying in unbeatable rates. The Sudanese foreign exchange has almost exchange rates the official and market rates.

**Population growth in Sudan**

Sudan's population growth rate was fluctuating during the study period. It dropped from a high rate until before 2010 to a moderate rate and again rose to its highest as registered in 2.9 in 2017.

**per Capita GDP in Sudan**

The value for GDP per capita growth (annual %) in Sudan was 1.07 as of 2017. As the graph shows, over the past 27 years, this indicator reached a maximum value of 9.5 in 2001 and a minimum value of -3.2 in 1993l.

**Comparison of Ethiopia, Sudan, and Kenya**

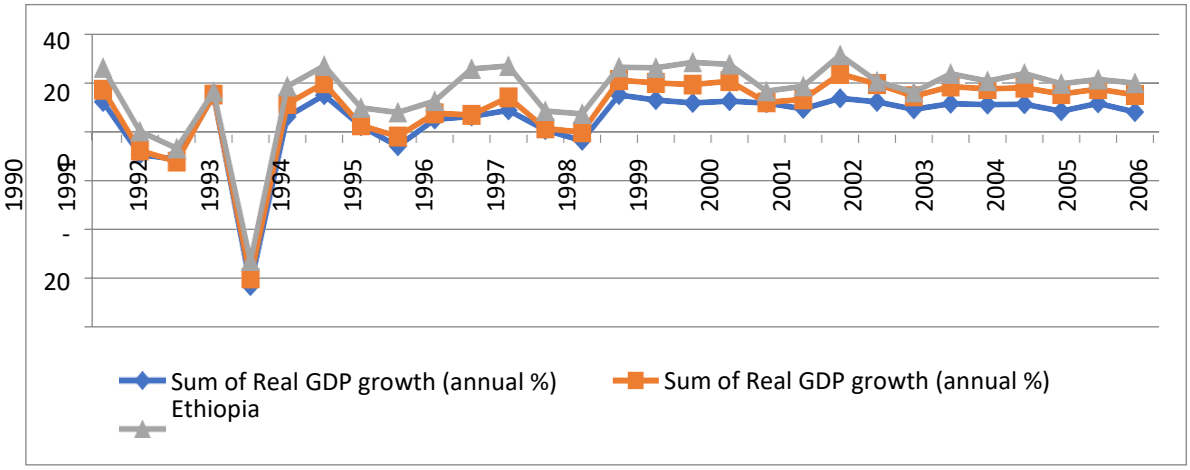



Figure 10: Trends of real GDP in Ethiopia, Kenya, and Sudan from 1991-2017 Source: AFDB Socio-Economic Database (2020)

According to the World Bank (2016), Ethiopia's GDP growth is estimated to have recovered to 10.9 percent in FY2017. The annual rate of economic growth, which averaged 10.3 percent over 200-2016 likened with the regional average of 5.4 percent, the reduction of 8 percent in FY2016 was due to drought and lower agricultural production. With agricultural recovery, gross domestic product (GDP) growth rebounded.

The government of Ethiopia in the national five-year development plan Growth and Transformation Plan (GTP I) promised to create an environment to improve the country's economic well-being and work towards eradicating poverty. One of the priority objectives of GTP I was maintaining at least an average real GDP growth rate of 11% per annum and attaining the Millennium Development Goals (MDGs) by 2014/15.

Towards realizing Ethiopia's vision of becoming a lower-middle-income country by 2025 and sustaining the growth, the Government committed herself to mobilize the necessary resources, including the capacity for implementation of the GTP II Plan.

In Sudan, the real GDP growth was projected to 4.1% in 2018, as of 3.3% in 2017. On the supply mining (growth of 6.3%), agriculture (3.7%), and manufacturing (1.5%) were the primary providers of growth. By the demand side, private consumption was the main contributor to growth, while the current account shortage, an estimated 2.4% of GDP in 2018, diminished from growth. Superior inflation, as well as the phasing away of energy tax assistance, hindered growth. Although unemployment rose to 18% resulting from quick exchange rate wear and tear and persistent inflation, poverty and inequality decreased between 2010 and 2015. Growth is expected to grow up, advancing from the ongoing macroeconomic policy and structural reforms, including removing tax immunities, dropping public expenditure, providing incentives to enhance exports, a rebound in industrial. The removal of the previous government and the peace talks to end the civil war.

The shutdown in South Sudanese oil production strictly affected Sudan's economic indicators. Further worsening matters, economic sanctions remain in place on Sudan, while aid and external economic activity are inadequate. The structural economic shift caused by South Sudan's secession has adversely affected virtually all of the country's economic growth prospects.

In Kenya, real GDP grew by around 5.9% in 2019, driven by household consumption and investment on the demand side and services on the supply side public administration, information technology, finance and insurance, and transport and storage). GDP was down from 6.5% in 2018, caused mainly by unfavorable weather and reduced government investment.

**The COVID-19** crisis has effects on the whole planet economy and that of Africa. Some key sectors of the African economy are already experiencing a slowdown due to the pandemic. Tourism, air transport, and the oil sector are visibly impacted. However, invisible impacts of COVID-19 are anticipated in 2020, whatever the duration of the pandemic.

The exogenous effects result from direct trade links between affected partner continents such as Asia, Europe, and America; tourism; the decline in remittances from African Diaspora; Foreign Direct Investment and Official Development Assistance; illicit financing flows and domestic financial market tightening, etc. The endogenous effects occur because

of the rapid spread of the virus in lots of African countries. Similarly, they are associated with morbidity and mortality. However, they result in a disruption of economic activities. This might cause a reduction in domestic demand in tax revenue because of the lack of oil and commodity prices in conjunction with a rise in public expenditure to guard human health insurance and support economic activities.

**Trends of inflation in Ethiopia, Kenya, and Sudan from 1991-2017**

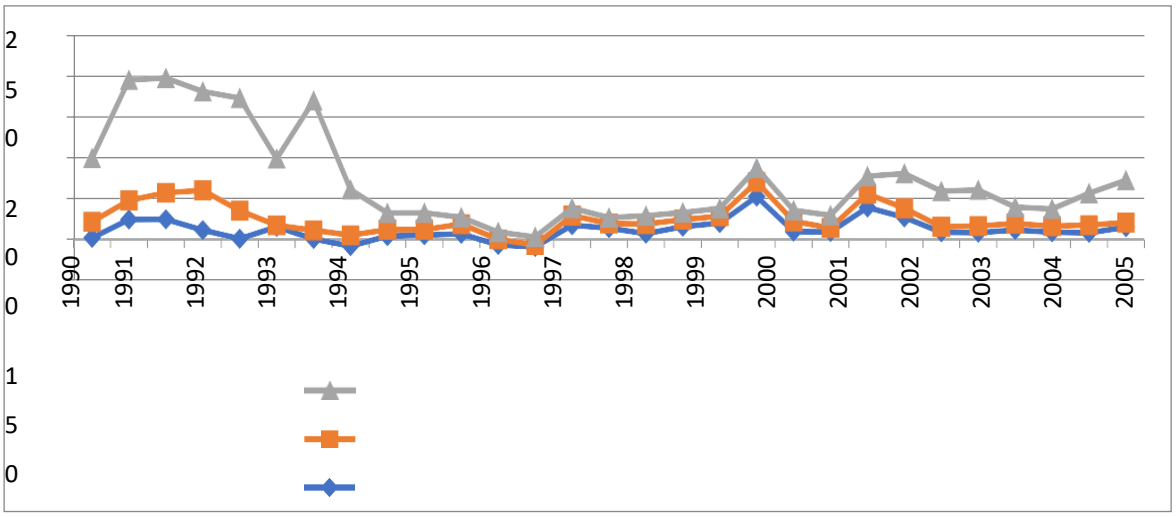



Figure 11: Trends of inflation in Ethiopia, Kenya, and Sudan from 1991-2017

The AFDB report on Inflation Dynamics in selected EastAfrican countries (2011) finds that the primary drivers of short-run inflation in Ethiopia is a rush in money supply, accounting for 40 percent. In Kenya, the oil prices appear to drive inflation, accounting for 20. However, money growth has made a substantial contribution to the recent increases in inflation. The difference in inflationary effects could be explained by differences in the intensity of expansionary monetary policies. Inflationary pressures in Ethiopia reflect the monetization of the fiscal deficit. Simultaneously, growth in private sector credit may be the main way to obtain broad money growth in Kenya, leading to an accumulated monetary expansion. Concerning world food prices, the estimates show that the result ranges from 9 percent at the low end to the upper limit of 13 percent in Ethiopia.

The Ethiopia inflation started to increase speedily towards 2004, and general inflation rose to 17.7%, with the maximum inflation rate of 39.5% in 2008. Influences causes of high inflation include accommodating monetary policy, agricultural supply shock, and imported inflation due to the rise in international prices, (Durevall el. al., 2013).

According to AFDB Socio-economic indicator (2020), Sudan scored 32.3, the highest inflation in 2017 5, and Kenya scored 8.01 while Ethiopia scored only 7.20, the lowest inflation. In general, the rends of inflation fluctuating in the three countries, but it's very inconsistent in Sudan due to the instability and war issues.

## 4.2 Econometrics model result

### Unit root test using Augmented Dickey-Fuller Test of Ethiopia, Kenya and Sudan

The ADF results show that all the variables considered in this study are integrated either at a level I (0) or of the first order I (1) and none of them are of order I(2) fulfilling the assumption of bounds test for cointegration

Table 2: ADF Unit Root Test Results of Ethiopia, Kenya and Sudan

| Ethiopia | | | | | | |
|---|---|---|---|---|---|---|
| **Variable** | **At level** | | | **At the first level difference** | | |
| | **T Statistic** | **5%** | **Status** | **T Statistic** | **5%** | **Status** |
| GDP growth | 4.62 | 3.596 | Stationary | - | - | |
| Inflation | 3.716 | 3.596 | Stationary | | | |
| FDI | 2.293 | 3.6 | Non-Stationary | 5.453 | 3.6 | Stationary |
| exchange rate | 0.093 | 3.596 | Non-Stationary | 3.929 | 3.6 | Stationary |
| Population growth | 9.688 | 3.596 | Stationary | - | - | - |
| per Capita GDP | 4.551 | 3.596 | Stationary | - | - | - |
| Kenya | | | | | | |
| GDP growth | 4.717 | 3.595 | Stationary | - | - | Stationary |
| Inflation | 2.952 | 3.587 | Non-Stationary | 7.857 | 3.603 | Stationary |
| FDI | 1.155 | 3.603 | Non-Stationary | 9.314 | 3.603 | Stationary |
| exchange rate | 0.405 | 3.587 | Non-Stationary | 3.697 | 3.595 | Stationary |
| Population growth | 4.79 | 3.595 | Stationary | - | - | Stationary |
| per Capita GDP | 4.79 | 3.595 | Stationary | - | - | Stationary |
| Sudan | | | | | | |
| GDP growth | 3.563 | 2.976 | Stationary | - | - | Stationary |
| Inflation | 2.376 | 2.981 | Non-Stationary | 7.696 | 3.595 | Stationary |
| FDI | 1.631 | 2.981 | Non-Stationary | 4.654056 | 2.981 | Stationary |
| exchange rate | 1.942 | 2.981 | Non-Stationary | 4.397596 | 2.981 | Stationary |
| Population growth | 7.783 | 2.981 | Stationary | - | - | Stationary |
| per Capita GDP | 3.443 | 2.976 | Stationary | - | - | Stationary |

### Bounds test for co-integration of Ethiopia

In the ARDL Bounds approach, the calculated F-statistics are reported in Table 2 when each variable is considered as a dependent variable. We choose a maximum lag order of 2 for the

conditional ARDL vector error correction model by using the Akaike information criteria (AIC).

Table 3: Bounds test for co-integration for Ethiopia, Kenya and Sudan

| Ethiopia | | | |
|---|---|---|---|
| variables | $F_{statistics}$ | [I_1] L_05 | Cointegration Status |
| GDP growth | 5.439 | 3.79 | yes |
| Inflation | 7.019 | 3.79 | yes |
| FDI | 8.237 | 3.79 | yes |
| exchange rate | 12.021 | 3.79 | yes |
| Population growth | 24.185 | 3.79 | yes |
| per Capita GDP | 5.431 | 3.79 | yes |
| Kenya | | | |
| GDP growth | 7.184 | 3.79 | yes |
| Inflation | 13.444 | 3.79 | yes |
| FDI | 5.015 | 3.79 | yes |
| exchange rate | 4.891 | 3.79 | yes |
| Population growth | 7.146 | 3.79 | yes |
| per Capita GDP | 7.195 | 3.79 | yes |
| Sudan | | | |
| GDP growth | 23.81 | 3.79 | yes |
| Inflation | 15.097 | 3.79 | yes |
| FDI | 4.903 | 3.79 | yes |
| exchange rate | 20.256 | 3.79 | yes |
| Population growth | 18.928 | 3.79 | yes |
| per Capita GDP | 23.765 | 3.79 | yes |

From Table (3), the F-calculated of real GDP, inflation, FDI, Exchange rate, Population growth, and real per capita GDP is higher than the upper bound of the F test at 5% percent significant level. Since the results from ARDL bounds tests indicated that there exists a long- run relationship among variables, the Error Correction Model (ECM) was employed to investigate the long-run relationship and the speed of adjustment to equilibrium state by using the ECM. Therefore, it concluded that there is a significant long-run relationship between the dependent and independent variables, which means rejecting the null hypothesis (H0: b1i= b2i= b3i=b4i=b5i=b6i=0) of no co-integration at 5% percent significance level and confirms the existence of long-run relationships among the variables by accepting the alternative hypothesis (H1:b1i≠0 b2i≠0 b3i≠0b4i≠0b5i≠0b6i≠0).

**Long-run ARDL Relationship Analysis of Ethiopia, Kenya and Sudan**

Table 4: Long-run ARDL Relationship Analysis of Ethiopia, Kenya and Sudan

| Ethiopia | | | | |
|---|---|---|---|---|
| Dependent variable | Coefficient | Standard Error | t-statistic | P-values |
| Inflation | -.0027 ** | 0.001 | -2.47 | 0.031 |
| FDI | 0.0007 | 0.0006 | 1.2 | 0.255 |
| exchange rate | -0.0047 | 0.0042 | -1.12 | 0.286 |
| Population growth | 1.111*** | 0.0261 | 42.48 | 0.000 |
| per Capita GDP | 1.034 *** | 0 | 1750.54 | 0.000 |
| Kenya | | | | |
| Inflation | 0.0003334 | 0.0001954 | 1.71 | 0.114 |
| FDI | .0006847*** | 0.0001367 | 5.01 | 0.000 |
| exchange rate | -.0012431*** | 0.0003309 | -3.76 | 0.003 |
| Population growth | .9334988*** | 0.0241138 | 38.71 | 0.000 |
| per Capita GDP | 1.029353 *** | 0.0004018 | 2561.99 | 0.000 |
| Sudan | | | | |
| Inflation | .0004612*** | 0.0000866 | 5.32 | 0.000 |
| FDI | .0009646*** | 0.0001904 | 5.07 | 0.000 |
| exchange rate | .0035141 *** | 0.001055 | 3.33 | 0.007 |
| Population growth | .9830015*** | 0.0055882 | 175.91 | 0.000 |
| per Capita GDP | 1.025894*** | 0.0005108 | 2008.26 | 0.000 |

Note: *, **, *** are significant at 10%, 5% and 1% significance level, respectively

The results in Table (4) show the long-run interactions between real GDP, inflation, FDI, Exchange rate, Population growth, and real per capita GDP.

In Ethiopia, the estimated long-run results reveal that the real GDP has a negative and statistically significant long-run relationship with the inflation and exchange rate. The long-run relationship between the variables shows that there is Granger-causality in at least one direction. Therefore, the null hypothesis that inflation has no significant influence on real GDP was rejected at a Five percent level of significance. This result confirms the adverse influences of inflation on economic growth, as in many recent research (Mallik & Chowdhury 2001, Rapach the year 2003, Benhabib& Spiegel 2009) mentioned that inflation has an impact on economic development. Also, the research carried by Shitundu and Luvanda, (2000) on the result of inflation upon economic Growth in Tanzania concluded that inflation has been damaging to economic growth in Tanzania.

Similarly, the estimated long-run result revealed a positive and significant relationship between real GDP, Real per capita GDP, and Population growth. Therefore, the null hypothesis was rejected at a Five percent significance level, which means that a one percent rise in real per capita GDP rate leads to an increase of 1.034 percent on real GDP. The FDI

had a positive but insignificant relationship with the real GDP. Therefore, the null hypothesis that foreign direct investment has no significant effect on real GDP was not rejected.

The long-run estimated model for Ethiopia is presented as follows

GDP Growth =-0.5785933-0.0027 inflation +.00007 FDI – 0.0047 exchange rate+1.111 population growth+1.043 per capita GDP.

The findings of the long negative relationship between inflation and economic growth in line with Fisher (1993) shown the fact that inflation influence economic growth negatively by reducing investment, and by lowering the rate of productivity growth. Various endogenous growth models indicate that inflation harms economic growth. Gregorio (1993) constructs endogenous growth models that show different ways through which inflation affects growth.

In Kenya, inflation has a positive insignificant show long-run interaction with real GDP. In contrast, FDI, Population growth, and real per capita GDP have a significant implication on the real GDP. The estimated long-run results reveal that the real GDP has a negative and statistically significant long-run relationship exchange rate. Therefore, the null hypothesis that inflation has no significant influence on real GDP was not rejected at a Five percent level of significance. The results in conformity with Wai (1959), Dorrance (1966), Sidrauski (1967), and opinions that inflation does not have any influence upon economic.

Similarly, the estimated long-run result revealed a negative and significant relationship between real GDP and the exchange rate. Therefore, the null hypothesis was rejected at a Five percent significance level.

The long-run estimated model for Kenya is presented as follows

GDP Growth = 0.3543642 +0.003334inflation +0.0006847FDI – 0.0012431 exchange rate+0.9334988 population growth+1.029353 per Capita GDP

The long-run in Sudan showed a significant positive relationship between all the variables of interest (real GDP, inflation, FDI, Exchange rate, Population growth, and real per capita GDP). The positive relation between real GDP and inflation was not as expected. Still, it conforms with some studies mentioned that inflation impacts economic growth in terms of certain thresholds (Aydin et approach. 2016; Ghosh & Philips 1998; Moro & Easterly 1998;

Khan, Semlali& Jones 2001; Drukkeret al., 2005; Kremer et al., 2009; and Vinayagathasan. 2013).

The long-run estimated model for Sudan is presented as follows

GDP Growth = 0.0166985+0.0004612inflation +0.0009646 FDI +0.0035141 exchange rate+.9830015 population growth+1.025894 per Capita GDP

Mallik and Chowdhury (2001) are among the list of supporters of positive associations between the two variables. Srilanka) found a long-run positive relationship between inflation and economic growth. They concluded that modest inflation is useful to quicker economic growth.

**Short-run ARDL Relationship Analysis of Ethiopia**

In Ethiopia, the results of the short-run dynamic coefficients linked with the long-run relationships obtained from the ECM demonstrates that there is a positive relationship between inflation and real GDP. The error correction term is negative (-1.412) and significant at the Five (0.000) percent level, thereby affirming the existence of co-integration among the variables.

The coefficient of the error correction Model (ECMt-1) of (-1.412 percent) is highly significant. It shows the speed of adjustment to equilibrium state within a year, as the frequency of the data is annual. Since the error correction term is significant and large, the speed of adjustment towards the long-run equilibrium is therefore high. The reported R squared presented in Table implies that the variables in the estimated model explain 100 percent of the variation in real GDP.

In Kenya, the results of the short-run dynamic coefficients associated with the long-run relationships obtained from the ECM illustrates that there is a negative relationship between inflation and real GDP. The error correction term is negative (-1.412) and significant at the Five (0.000) percent level, thereby affirming the existence of co-integration among the variables.

The coefficient of the error correction Model (ECMt-1) of -1.50 percent is highly significant. It shows the speed of adjustment to equilibrium within a year, as the frequency of the data is annual. Since the error correction term is significant and large, the speed of adjustment towards the long-run equilibrium is therefore high. The reported R squared presented in

Table implies that the variables in the estimated model explain 100 percent of the variation in real GDP.

In Sudan, the short-run the ECM shows that there is a negative effect from inflation, FDI, Population growth, and Per Capita GDP on real GDP.

The coefficient of the error correction Model (ECMt-1) of -2.148465 percent) is highly significant and shows the speed of adjustment to equilibrium state within a year. The error correction term is significant and large, the speed of adjustment towards the long-run equilibrium is therefore high. The reported R squared presented in Table implies that the variables in the estimated model explain 100 percent of the variation in real GDP.

**Diagnostic test result and stability of the Models**

The models of Ethiopia, Kenya and Sudan were tested for serial correlation using the Post-estimation Diagnostic Tests and Durbin-Watson d-statistic as in Annex B (Stata Output). The null hypothesis of no serial correlation tested against the alternative hypothesis of the existence of serial correlation. Both Durbin-Watson d-statistic (2.191283, 2.231842, 2.275814) and Breusch-Godfrey LM test for autocorrelation (0.2201, 0.0172, 0.3633) are higher than 5% failing to reject the null hypothesis (H0: no serial correlation) implying that the three models were not serially correlated.

The White's test was used to test if the model is homoscedastic or not, the null hypothesis being homoscedastic against the alternative hypothesis of heteroscedastic. Therefore, the test for Ethiopia, Kenya and Sudan scored 0.4058, 0.4058, 0.4058, respectively. The null hypothesis (Ho: homoskedasticity) was rejected, confirming that there is no problem of heteroskedasticity in the model. The model also tested to check for stability, and the CUSOM figure shows that the model is within the 5% boundary.

The models also tested to check for stability, and the CUSOM figure shows that the models are within the 5% boundary.

# CHAPTER 5

# SUMMARY, CONCLUSION AND RECOMMENDATIONS

## 5.1 Summary and Conclusion

This study investigated the Dynamics of Inflation and its Implications on Economic Growth in East Africa. Variables of real GDP, inflation, FDI, Exchange rate, Population growth, and real per capita GDP for Ethiopia, Kenya, and Sudan, using time series data for the period 1991- 2017. The study used the Autoregressive distributed lag (ARDL) bounds testing procedure to examine the presence of a long-run relationship among the variables, and the Error Correction Model to investigate the short-run dynamics.

First, the variables were tested for multicollinearity using Vector Integrating Factor (VIF), and multicollinearity was confirmed absent for all the variables. Therefore, the variables were retained in the model. Correlation analysis showed the existence of a positive correlation between service exports, manufactured exports, and foreign direct investment.

Empirical results of Stationarity analysis revealed that all the variables attained Stationarity after at level I (0) or the first difference of I (1). The estimated F-statistics was above the upper Kripfganz and Schneider (2018) critical values at five percent significant level of real GDP, inflation, FDI, Exchange rate, Population growth and real per capita GDP confirming the occurrence of a long-run relationship among the variables for Ethiopia when all variable considered as dependent. In Kenya and Sudan, all variable shows the cointegration and the long-run relationship. Empirical results further showed that in Ethiopia, there was a significant long-run equilibrium relationship real GDP has a negative and statistically significant long-run relationship with the inflation and exchange rateat five percent level of significance. While a positive and significant relationship between real GDP, Real per capita GDP, and Population growth. On the other hand, in Table inflation has insignificant positive shows long-run interaction with real GDP. In contrast, FDI, Population growth, and real per capita GDP have a significant effect on the real GDP.

Further, in the long run, showed a significant positive relationship between all the variable of interest (real GDP, inflation, FDI, Exchange rate, Population growth, and real per capita GDP).

The coefficient of ECt-1 was negative and statistically significant. This confirmed the existence of long-run relationships among the variables in the three countries Ethiopia,

Kenya, and Sudan. The stability of the coefficients was confirmed using the cumulative sum of residuals (CUSUM) that showed that the coefficients were stable at a 5 percent level of significance.

## 5.2 Recommendation

From the results, Economic Growth and inflation play significant contributions in each economy. Hence, governments and policymakers need to implement policies and prioritize benefits from the interactions between growth and inflation. The long-run relationship proposes that governments in the three countries should emphasize Macroeconomic policies that take into account the nature and the effect of inflation on GDP growth. Hence, the empirical data used in the study showed that the low inflation goes hand by hand with low GDP growth and vis-versa the policymakers in the three countries to develop policies to sustain the high growth while lowering the inflation by improving the mainly their intervention on monetary policies. Also, the implications of inflation on the real GDP growth in Ethiopia and Sudan, suggesting that further studies are needed to investigate how much inflation is harmful or good for Growth. Further, there is a demand for more research to identify factors that affect inflation and Growth.

# REFERENCES


Ahmed, Md Shoaib, An Empirical Study on Inflation and Economic Growth in Bangladesh (2010). OIDA International Journal of Sustainable Development, Vol. 2, No. 3, pp. 41-48, 2010.

Javier Andrés & Ignacio Hernando, (1999). "Does Inflation Harm Economic Growth? Evidence from the OECD," NBER Chapters, pages 315-348.

Arcade Ndoricimpa (2017) Threshold Effects of Inflation on Economic Growth: Is Africa Different?, International Economic Journal, 31:4, 599-620, DOI: 10.1080/10168737.2017.1380679

Barro, R. J., 1995. Inflation and economic growth. NBER Working Paper No. 5326

Barro R. J. (1997). Determinants of Economic Growth : a Cross-Country Empirical Study. NBER Working Paper 5698

Behera, Jaganath. (2014). Inflation and its Impact on Economic Growth: Evidence from Six South Asian Countries. Journal of Economics and Sustainable Development. 5. 145- 154

Datta, K., 2011. Relationship between Inflation and economic growth in Malaysia. IPEDR, Vol. 4.

Datta, K. and Kumar, C. (2011)' Relationship between Inflation and Economic Growth in Malaysia'. International Conference on Economics and Finance Research IPEDR Vol. 4, No. 2, pp. 415-16.

De Gregorio, J. (1992). The effects of inflation on economic growth. European Economic Review 36

Fekadu Dereje (2012) Relationship between Inflation and Economic Growth in Ethiopia: An Empirical Analysis, 1980-2011 University of Oslo

Global Journal of Management and Business Research. (2014): B Economics and Commerce Volume 13 Issue 5 Version 1.0

Government Spending and Economic Growth: Econometric Evidence from South-Eastern Europe (SEE). Journal of Economic & Social Research 11(1): 1-16.

Hasanov, F. (2011), “Relationship between inflation and economic growth in Azerbaijani economy: is there any threshold effect?” Asian Journal of Business and Management Sciences, 1(1), 1-11.

Kilindo, A. (1997). Fiscal operations, Money supply, and Inflation in Tanzania. African Economic

Mankiw NG. Macroeconomics, 7th Edition. Worth Publishers; 2010.

Marbuah, G. (2010) The Inflation-Growth Nexus: Testing for Optimal Inflation for Ghana, Journal of Monetary and Economic Integration, Vol. 11, No. 2, pp. 71-72.

Shamim Ahmed & M. Golam Mortaza, 2010. "Inflation and Economic Growth in Bangladesh: 1981-2005," Working Papers id:3033, eSocialSciences.

Peter Doyle and Peter Christoffersen, (1998), From Inflation to Growth; Eight Years of Transition, No 98/100, IMF Working Papers, International Monetary Fund

Vikesh Gokal (2004) RELATIONSHIP BETWEEN INFLATION AND ECONOMIC

GROWTH, Reserve Bank of Fiji

W. Robert J. Alexander (1997) Inflation and economic growth: evidence from a growth equation, Applied Economics, 29:2, 233-238

Patel, Sulekha. (2009). World development indicators 2009 (English). World development indicators. Washington, DC: World Bank.

# APPENDIX

Appendix A: Time-series Data used in the study

Ethiopia

| year | GDP growth | Inflation | Foreign Direct Investment | exchange rate | Population growth | per Capita GDP |
|---|---|---|---|---|---|---|
| 1991 | -8.26 | 24.83 | 0.74 | 1.54 | 4.29 | -12.11 |
| 1992 | -10.18 | 25.01 | 0.03 | 1.75 | 4.36 | -14.03 |
| 1993 | 15.89 | 11.89 | 0.55 | 1.93 | 4.34 | 11.14 |
| 1994 | -62.02 | 1.39 | 2.61 | 1.94 | 4.22 | -63.97 |
| 1995 | 7.28 | 15.89 | 1.21 | 2.14 | 4.03 | 3.14 |
| 1996 | 16.10 | 1.09 | 1.86 | 2.09 | 3.83 | 11.89 |
| 1997 | 3.38 | -7.62 | 21.90 | 2.07 | 3.66 | -0.28 |
| 1998 | -4.81 | 4.64 | 20.52 | 2.05 | 3.55 | -8.12 |
| 1999 | 6.14 | 5.71 | 5.57 | 2.04 | 3.50 | 2.57 |
| 2000 | 7.38 | 7.38 | 10.49 | 2.04 | 3.49 | 3.77 |
| 2001 | 9.88 | -6.19 | 27.00 | 1.90 | 3.50 | 6.20 |
| 2002 | 1.80 | -8.60 | 16.14 | 1.80 | 3.48 | -1.63 |
| 2003 | -2.57 | 17.92 | 29.19 | 1.99 | 3.46 | -5.86 |
| 2004 | 16.15 | 14.33 | 24.38 | 2.05 | 3.41 | 12.39 |
| 2005 | 14.06 | 7.62 | 8.65 | 2.16 | 3.35 | 10.42 |
| 2006 | 12.89 | 16.13 | 18.12 | 2.33 | 3.29 | 9.34 |
| 2007 | 13.63 | 20.51 | 5.35 | 2.65 | 3.24 | 10.11 |
| 2008 | 12.84 | 52.79 | 1.64 | 3.37 | 3.21 | 9.38 |
| 2009 | 10.46 | 10.11 | 3.03 | 4.10 | 3.19 | 7.08 |
| 2010 | 14.79 | 9.68 | 5.23 | 4.19 | 3.19 | 11.30 |
| 2011 | 13.33 | 39.54 | 7.62 | 4.92 | 3.18 | 9.88 |
| 2012 | 10.29 | 27.39 | 2.12 | 6.45 | 3.17 | 6.94 |
| 2013 | 12.59 | 9.20 | 10.08 | 6.70 | 3.15 | 9.20 |
| 2014 | 12.21 | 8.80 | 10.73 | 7.30 | 3.11 | 8.87 |
| 2015 | 12.36 | 12.05 | 12.57 | 8.00 | 3.06 | 9.06 |
| 2016 | 9.52 | 9.28 | 17.61 | 8.69 | 3.01 | 6.34 |
| 2017 | 12.73 | 8.57 | 13.53 | 9.02 | 2.97 | 9.53 |

**Kenya**

| year | GDP growth | Inflation | Foreign Direct Investment | exchange rate | Population growth | per Capita GDP |
|---|---|---|---|---|---|---|
| 1991 | 1.68 | 23.32 | 1.31 | 8.15 | 3.95 | -2.20 |
| 1992 | -0.94 | 32.49 | 0.51 | 9.28 | 3.86 | -4.65 |
| 1993 | 0.43 | 48.53 | 0.23 | 11.37 | 3.77 | -3.24 |
| 1994 | 3.13 | 34.29 | 0.37 | 12.56 | 3.67 | -0.53 |
| 1995 | 5.24 | 1.85 | 1.99 | 13.72 | 3.58 | 1.62 |
| 1996 | 4.93 | 10.71 | 0.69 | 16.32 | 3.49 | 1.40 |
| 1997 | 0.32 | 13.33 | 3.18 | 17.87 | 3.41 | -3.00 |
| 1998 | 3.99 | 7.86 | 0.58 | 18.83 | 3.35 | 0.62 |
| 1999 | 2.50 | 6.82 | 0.82 | 19.27 | 3.32 | -0.79 |
| 2000 | 0.66 | 11.90 | 5.96 | 20.04 | 3.31 | -2.57 |
| 2001 | 5.30 | 6.90 | 0.26 | 19.98 | 3.30 | 1.95 |
| 2002 | 0.66 | 2.37 | 1.65 | 19.94 | 3.29 | -2.55 |
| 2003 | 3.50 | 11.67 | 3.96 | 20.83 | 3.28 | 0.21 |
| 2004 | 6.07 | 5.71 | 1.99 | 21.72 | 3.29 | 2.71 |
| 2005 | 7.02 | 11.78 | 0.80 | 22.10 | 3.30 | 3.62 |
| 2006 | 7.52 | 8.63 | 1.25 | 23.77 | 3.31 | 4.09 |
| 2007 | 8.15 | 8.36 | 20.16 | 25.04 | 3.32 | 4.70 |
| 2008 | 0.28 | 17.99 | 8.25 | 28.27 | 3.32 | -2.96 |
| 2009 | 3.93 | 12.54 | 24.79 | 31.33 | 3.31 | 0.60 |
| 2010 | 10.00 | 4.86 | 17.05 | 31.60 | 3.29 | 6.52 |
| 2011 | 7.26 | 16.69 | 19.09 | 34.30 | 3.27 | 3.88 |
| 2012 | 5.36 | 11.16 | 15.17 | 36.84 | 3.25 | 2.05 |
| 2013 | 7.02 | 6.80 | 12.02 | 38.12 | 3.22 | 3.70 |
| 2014 | 6.43 | 8.19 | 7.09 | 40.47 | 3.18 | 3.16 |
| 2015 | 6.78 | 7.83 | 5.36 | 43.89 | 3.13 | 3.56 |
| 2016 | 7.02 | 7.49 | 3.86 | 46.82 | 3.09 | 3.83 |
| 2017 | 5.83 | 9.53 | 6.23 | 50.42 | 3.04 | 2.72 |

**Sudan**

| year | GDP growth | Inflation | Foreign Direct Investment | exchange rate | Population growth | per Capita GDP |
|---|---|---|---|---|---|---|
| 1991 | 7.83 | 147.06 | -0.08 | 0.00 | 4.41 | 3.30 |
| 1992 | 5.44 | 139.97 | 0.01 | 0.01 | 4.60 | 0.80 |
| 1993 | 1.20 | 120.64 | -0.02 | 0.02 | 4.58 | -3.25 |
| 1994 | 7.14 | 137.32 | 8.02 | 0.04 | 4.29 | 2.75 |
| 1995 | 7.14 | 81.37 | 0.98 | 0.08 | 3.85 | 3.18 |
| 1996 | 7.04 | 158.06 | 0.04 | 0.19 | 3.37 | 3.57 |
| 1997 | 7.21 | 55.57 | 6.33 | 0.29 | 3.00 | 4.11 |
| 1998 | 9.81 | 20.35 | 21.70 | 0.33 | 2.78 | 6.87 |
| 1999 | 5.04 | 20.43 | 24.48 | 0.37 | 2.76 | 2.23 |
| 2000 | 18.80 | 8.24 | 20.57 | 0.41 | 2.88 | 15.55 |
| 2001 | 12.86 | 8.78 | 28.98 | 0.44 | 3.03 | 9.58 |
| 2002 | 7.13 | 9.83 | 29.13 | 0.48 | 3.13 | 3.90 |
| 2003 | 7.49 | 9.18 | 43.78 | 0.52 | 3.14 | 4.24 |
| 2004 | 5.27 | 7.10 | 35.01 | 0.59 | 3.03 | 2.18 |
| 2005 | 6.20 | 10.10 | 28.01 | 0.68 | 2.86 | 3.26 |
| 2006 | 9.11 | 8.57 | 18.84 | 0.71 | 2.68 | 6.29 |
| 2007 | 6.89 | 9.52 | 13.25 | 0.79 | 2.54 | 4.25 |
| 2008 | 4.58 | 17.00 | 15.38 | 0.85 | 2.48 | 2.06 |
| 2009 | 5.35 | 13.40 | 16.54 | 0.88 | 2.51 | 2.79 |
| 2010 | 7.72 | 15.44 | 16.27 | 1.03 | 2.60 | 5.01 |
| 2011 | 1.11 | 21.53 | 11.84 | 1.22 | 2.70 | -1.56 |
| 2012 | 1.62 | 42.36 | 19.08 | 1.62 | 2.78 | -1.14 |
| 2013 | 5.22 | 43.44 | 14.14 | 2.14 | 2.84 | 2.33 |
| 2014 | 3.22 | 43.91 | 9.42 | 2.77 | 2.87 | 0.34 |
| 2015 | 5.78 | 20.11 | 10.56 | 3.18 | 2.87 | 2.85 |
| 2016 | 4.20 | 20.94 | 5.60 | 3.71 | 2.87 | 1.30 |
| 2017 | 3.96 | 38.79 | 4.47 | 4.90 | 2.87 | 1.07 |

Appendix B: Stata Output for Ethiopia, Kenya, and Sudan

ECM Models for Ethiopia

ARDL (1,2,0,2,2,1) regression

```
Sample:     1993 -     2017                 Number of obs     =         25
                                            R-squared         =     1.0000
                                            Adj R-squared     =     1.0000
Log likelihood = 68.931949                  Root MSE          =     0.0232
------------------------------------------------------------------------------
      D.gdp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
ADJ         |
        gdp |
        L1. | -1.412998   .2903193    -4.87   0.000    -2.051987   -.7740096
------------+-----------------------------------------------------------------
LR          |
  inflation | -.0027059   .0010948    -2.47   0.031    -.0051155   -.0002963
        fdi |   .0007723   .0006427     1.20   0.255    -.0006422    .0021869
   exchrate | -.0047483   .0042348    -1.12   0.286    -.0140691    .0045724
        pop |   1.111428   .0261639    42.48   0.000     1.053841    1.169014
       pgdp |   1.034574    .000591 1750.54   0.000     1.033273    1.035875
------------+-----------------------------------------------------------------
SR          |
  inflation |
         D1. |    .002772   .0012247     2.26   0.045     .0000765    .0054676
         LD. |    .000987   .0007111     1.39   0.193     -.000578     .002552
             |
   exchrate |
         D1. |   .0705372   .0350867     2.01   0.070     -.006688    .1477625
         LD. |    .052184    .034726     1.50   0.161    -.0242475    .1286154
             |
         pop |
         D1. |   .3392139   .2825403     1.20   0.255    -.2826531     .961081
         LD. | -.5785933   .2187505    -2.64   0.023     -1.06006   -.0971268
             |
        pgdp |
         D1. | -.4270854   .3003569    -1.42   0.183    -1.088166    .2339956
             |
       _cons | -.5605682   .1552465    -3.61   0.004    -.9022635    -.218873
------------------------------------------------------------------------------
Durbin-Watson d-statistic (14, 25) = 2.191283
Heterdasity
White's test for Ho: homoskedasticity
 against Ha: unrestricted heteroskedasticity
         chi2(24)     =     25.00
         Prob > chi2 =    0.4058
```

ECM Models for Kenya
ARDL (1,1,1,1,2,1) regression

Sample: 1993 - 2017 Number of obs = 25
R-squared = 1.0000
Adj R-squared = 1.0000
Log likelihood = 112.53427 Root MSE = 0.0039

| D.gdp | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| ADJ | | | | | | |
| gdp | | | | | | |
| L1. | -1.50313 | .2945102 | -5.10 | 0.000 | -2.144812 | -.8614473 |
| LR | | | | | | |
| inflation | .0003334 | .0001954 | 1.71 | 0.114 | -.0000924 | .0007592 |
| fdi | .0006847 | .0001367 | 5.01 | 0.000 | .0003868 | .0009826 |
| exchrate | -.0012431 | .0003309 | -3.76 | 0.003 | -.0019641 | -.0005221 |
| pop | .9334988 | .0241138 | 38.71 | 0.000 | .8809593 | .9860383 |
| pgdp | 1.029353 | 0004018 | 2561.99 | 0.000 | 1.028478 | 1.030229 |
| SR | | | | | | |
| inflation | | | | | | |
| D1. | -.0004084 | .000179 | -2.28 | 0.042 | -.0007984 | -.0000185 |
| fdi | | | | | | |
| D1. | -.0005909 | .0001736 | -3.40 | 0.005 | -.0009691 | -.0002127 |
| exchrate | | | | | | |
| D1. | .0040396 | .0014702 | 2.75 | 0.018 | .0008362 | .0072429 |
| pop | | | | | | |
| D1. | -.706547 | .2966609 | -2.38 | 0.035 | -1.352916 | -.0601785 |
| LD. | .1298012 | .0959261 | 1.35 | 0.201 | -.0792039 | .3388063 |
| pgdp | | | | | | |
| D1. | -.5177111 | .3030591 | -1.71 | 0.113 | -1.17802 | .142598 |
| _cons | .3543642 | .1237402 | 2.86 | 0.014 | .0847575 | .6239708 |

Serial Correlation
Durbin-Watson d-statistic (13, 25) = 2.231842
Heterdasity
White's test for Ho: homoskedasticity
against Ha: unrestricted heteroskedasticity
chi2(24) = 25.00
Prob > chi2 = 0.4058

ECM Models for Sudan
ARDL (2,1,1,0,2,2) regression

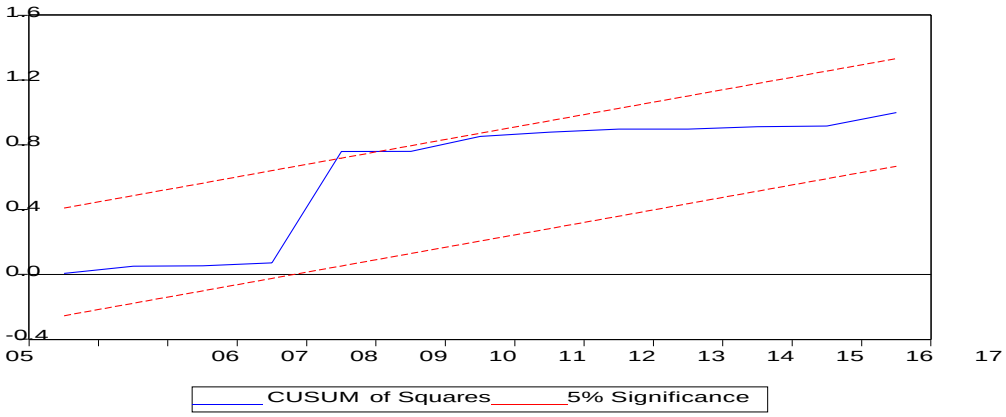
Sample: 1993 - 2017 Number of obs = 25
R-squared = 1.0000
Adj R-squared = 1.0000
Log likelihood = 94.603347 Root MSE = 0.0083

| D.gdp | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| ADJ | | | | | | |
| gdp | | | | | | |
| L1. | -2.148465 | .1991503 | -10.79 | 0.000 | -2.586792 | -1.710138 |
| LR | | | | | | |
| inflation | .0004612 | .0000866 | 5.32 | 0.000 | .0002705 | .0006518 |
| fdi | .0009646 | .0001904 | 5.07 | 0.000 | .0005455 | .0013837 |
| exchrate | .0035141 | .001055 | 3.33 | 0.007 | .001192 | .0058363 |
| pop | .9830015 | .0055882 | 175.91 | 0.000 | .9707019 | .9953011 |
| pgdp | 1.025894 | .0005108 | 2008.26 | 0.000 | 1.024769 | 1.027018 |
| SR | | | | | | |
| gdp | | | | | | |
| LD. | .6972188 | .118005 | 5.91 | 0.000 | .4374915 | .9569461 |
| inflation | | | | | | |
| D1. | -.0003645 | .0001214 | -3.00 | 0.012 | -.0006317 | -.0000974 |
| fdi | | | | | | |
| D1. | -.0004868 | .000425 | -1.15 | 0.276 | -.0014223 | .0004486 |
| pop | | | | | | |
| D1. | -1.238996 | .1940681 | -6.38 | 0.000 | -1.666137 | -.8118547 |
| LD. | -.6326829 | .1322238 | -4.78 | 0.001 | -.9237055 | -.3416604 |
| pgdp | | | | | | |
| D1. | -1.17893 | .2043943 | -5.77 | 0.000 | -1.628799 | -.7290612 |
| LD. | -.7145171 | .1210258 | -5.90 | 0.000 | -.980893 | -.4481412 |
| _cons | .0166985 | .0320234 | 0.52 | 0.612 | -.0537845 | .0871815 |

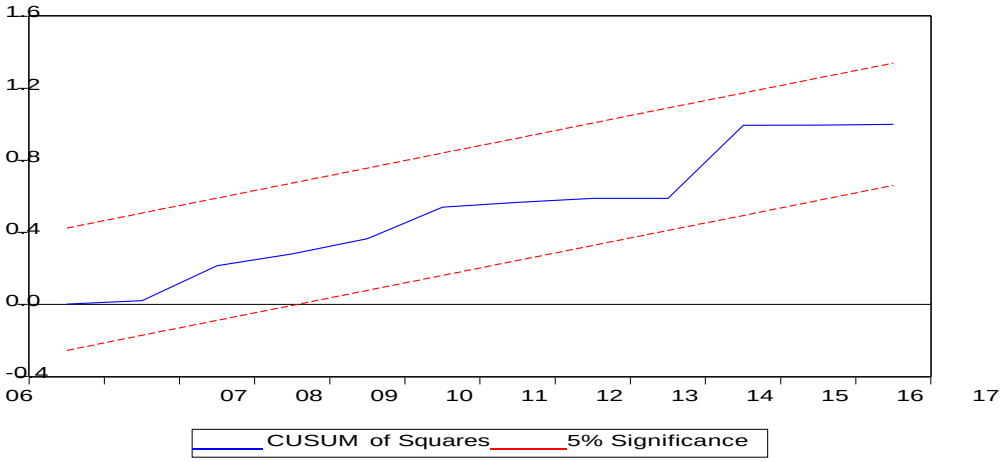
Serial Correlation
Durbin-Watson d-statistic (14, 25) = 2.275814
White's test for Ho: homoskedasticity
against Ha: unrestricted heteroskedasticity
chi2(24) = 25.00
Prob > chi2 = 0.4058

Appendix C: Stability Test

## Ethiopia




Kenya




Sudan