**REPUBLIC OF TURKEY**

**ISTANBUL GELISIM UNIVERSITY**

**INSTITUTE OF GRADUATE STUDIES**

Department of Economics and Finance

# RELATIONSHIP BETWEEN ECONOMIC GROWTH AND INFLATION: EVIDENCE OF ETHIOPIA

Master Thesis

**HIBO NUUH YUSUF**

Supervisor

Asst.Prof. Dr. Ebru Gül YILMAZ

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**DECLARATION**

I hereby declare that in the preparation of this thesis, scientific ethical rules have been followed, the works of other persons have been referenced in accordance with the scientific norms if used, there is no falsification in the used data, any part of the thesis has not been submitted to this university or any other university as another thesis.

Hibo Nuuh Yusuf

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The thesis study of Hibo Nuuh Yusuf titled as The Relationship between Economic Growth and Inflation: Evidence of Ethiopia has been accepted as MASTER THESIS in the department of Economics and Finance by out jury.

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| | *Signature* | |
| Director | *Asst. Prof. Dr. Ebru Gül YILMAZ* | |
| | (Supervisor) | |
| Member | *Signature* | |
| | *Asst. Prof. Dr. Hacer Neyir TEKELİ* | |
| | *Signature* | |
| Member | *Asst. Prof. Dr. Emrah DOĞAN* | |

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*Prof. Dr. İzzet GÜMÜŞ*

Director of the Institute

# SUMMARY

Since both inflation and GDP are not a brand new concepts rather their relationships are expected nonetheless now as a debatable point among macroeconomists financial experts, strategy creators, lawmakers, and even population giving their own examination by direct exploration and presumption based on trend as before. According to this paper, GDP is the dependent variable while inflation (deflator), foreign direct investment, trade openness and population growth are the independent variables of the model. Both the date of the dependent and independent variables are gathered directly from the World Bank. The researcher has selected a sample of 35 years' time collection records from 1985 to 2020 taken away the World Bank's Ethiopia Economic Data repository. Fundamentally, the purpose of this paper is to survey the relationship between inflation and economic growth as well as to test the causes, sources, determinants, and effects of Ethiopian inflation. The data Unit root test, ARDL model (ECM regression), model stability, LMS test, heteroskedasticity test, (Breusch Pagan Godfrey) Ramsey test and descriptive statistics test is applied.



**Keywords:** Inflation, economic growth, trade openness, foreign direct investment and population growth.

# ÖZET

Hem enflasyon hem de GSYİH yepyeni bir kavram olmadığından, ilişkilerinin artık makroekonomistler, finans uzmanları, strateji planlama uzmanları, milletvekilleri ve hatta daha önce olduğu gibi doğrudan keşif ve varsayıma dayalı kendi incelemelerini yapan nüfus arasında tartışmalı bir nokta olarak beklenmektedir. Bu makaleye göre GSYİH bağımlı değişken iken enflasyon (deflatör), doğrudan yabancı yatırım, ticarete açıklık ve nüfus artışı modelinin bağımsız değişkenleridir. Hem bağımlı hem de bağımsız değişkenlerin tarihi doğrudan Dünya Bankası'ndan alınmıştır. Araştırmacı, Dünya Bankası'nın Etiyopya Ekonomik Veri deposundan alınan 1985'ten 2020'ye kadar olan 35 yıllık zaman toplama kayıtlarından bir örnek seçilmiştir. Temel olarak, bu makalenin amacı, enflasyon ve ekonomik büyüme arasındaki ilişkiyi araştırmak ve aynı zamanda Etiyopya enflasyonunun nedenlerini, kaynaklarını, belirleyicilerini ve etkilerini test etmektir. Verilere Birim kök testi, ARDL modeli (ECM regresyon), model kararlılığı, LMS testi, değişen varyans testi, (Breusch Pagan Godfrey) Ramsey testi ve tanımlayıcı istatistik testi uygulanmıştır.

**Anahtar Kelimeler:** Enflasyon, ekonomik büyüme, ticari açıklık, doğrudan yabancı yatırım ve nüfus artışı

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# ABBREDIVATIONS

| | | |
|---|---|---|
| **GDP** | **:** | Growth Domestic product |
| **UIRP** | **:** | Uncovered interest rate parity |
| **OLS** | **:** | Ordinary Least Squares |
| **MLR** | **:** | multiple linear regression |
| **VIF** | **:** | Variance Inflation Factor |
| **TOL** | **:** | Tolerance |
| **CPI** | **:** | Consumer price index |
| **FDI** | **:** | Foreign Direct Investment |
| **NBE** | **:** | National Bank of Ethiopia. |

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# PREFACE

First and most important, I would favor to particular my gratitude to Allah, the almighty, for showering me together with his blessings as I worked on my research.

I might like to thank my adviser Asst. Prof Dr. Ebru Gül Yılmaz Especially for all her help and education over the path of this research. The economics and finance branch at Gelişim University, as pleasantly as everyone individuals who work there, and every individual who let me to run graduate degree and work on my proposition, really appreciated to all of you.

# CHAPTER ONE

# INTRODUCTION

The main motivation behind this study was to examine the relationship between economic growth and inflation rates and to estimate the edge level of inflation that is consistent with the economic growth of Ethiopia. Utilizing the autoregressive distributed lag model, the paper discovered that inflation harms economic growth in both short and long run in Ethiopia even as inflation uncertainty is a short-run phenomenon as it influences economic growth.

Inflation and inflation uncertainty are instrumental in the dedication of financial balance, and ultimately, economic growth. We explored the effect of inflation and inflation uncertainty on growth in Ethiopia through utilizing the autoregressive distributed lag bound test (ARDL procedures on yearly realities the length 1985 to 2020. Dislike past examinations on Ethiopia, we explored the joint effect of inflation and inflation vulnerability in Ethiopia and furthermore, spearheaded in assessing the effect of each variable on increase earlier than, and later, inflation focused on. This furnished a possibility to evaluate the effectiveness of inflation focused while additionally examining any changes within the conduct of the variables. We discovered that inflation negatively harms growth in both the short and long run, while inflation uncertainty is a brief run phenomenon in Ethiopia and not involving an orientation over the long run. To advance growth, policymakers must hold to seek policies that ensure expense balance.

## 1.1. Background of the study

The relationship between inflation and economic growth is one of the arguable issues also maximum significant macroeconomic discussion among macroeconomists, policymakers and, economic administrations in all nations. Specifically, whether inflation is essential or risky for worthwhile increase constitutes the base of count number in question (Eden 2012).

Before 1936, the rewarding proposition become informed through a concept says marketplace force plays a main component in changing the charge commodities and services. Consistent with this have a seen at (classical profitable thought), any surplus/ deficiency output reduces/increases price and continues stable charge.

However, this argument turned into criticized while economic system faced a fantastic melancholy. Then considering 1927, the Country skilled better price upward thrust (inflation), better unemployment price and surplus production. In 1936, the excessive authorities involvement turned into informed to regulate the market failure. One of the gadgets for the involvement of authorities became financial coverage this is better government spending to growth funding and employment possibility. This contention accepts that inflation and economic growth have excellent relationship. The better authorities spending in several sports investigates better intake funding spending which Attracts greater rate for objects and offerings inside the financial system.

The most fundamental goals of Ethiopian macroeconomic policy are to maintain strong economic growth and macroeconomic stability, with inflation being one of the numerous macroeconomic factors. One of the major areas of study in macroeconomics and monetary policy is the link between inflation and economic growth. Many researches have targeted on specific nations also nations groups, using various proxy variables and approaches to demonstrate the link between inflation and economic growth.

The empirical findings and policy suggestions are vastly diverse, and occasionally contradictory, different academicians have investigated on the relationship between inflation and economic growth and has had contrary conclusions. Some of them believe that inflation is necessary for economic progress, while others believe that it is harmful. This has sparked a substantial discussion, both empirically and philosophically. There are some agreements that macroeconomic stability, particular described as low inflation, favorably associated to good economic growth. These two economic variables are significantly reliant on the global economic situation. Following the Great Depression, and with the emergence of Keynesian economics, international locations have been fantastic in enforcing Keynesian policies. The increase in combination demand raised not just output but also the aggregate price level, which increased the country's inflation rate. Aside from that, inflation in the 1970s was not viewed as a threat to the economy, but rather as a source of economic inflation (Snowdon and Vane 2005).

Previous four years, the Ethiopian economy has followed many pathways in terms of inflation and growth. Prior to 2003/4, Ethiopia was a well-known country in terms of limited economic growth and low inflation. During this time, the average rate of growth was 2.6 percent, while inflation was 7.5 percent. As a result, rather than economic growth, inflation was not a concern throughout this

time period. This was mostly interpreted by realistic government budget surpluses and a tight monetary policy (Alemayehu and Kibrom, 2011). Inflation was outside the comfort zone when it was in the single digits; academicians, policymakers, and economists in the nation had been hanging around double digit inflation. After all, Ethiopia's economic growth, which is mostly influenced by governmental contribution in major base programs, averaged 10.7 percent during the same time (World Bank, 2014).

This phase of growth is the fastest that the nation has ever seen, and it likewise performs what low-income and Sub-Saharan African nations accomplished during that time period (World Bank, 2015).The world economic system grew at lower-than-expected rates of 3.2% in 2015 and 3.1 percent in 2016, according to the Ministry of Finance (2015/16). The initial growth forecast for 2015 and 2016 was 3.8 % and 3.7 percent, respectively. In 2015/16, Ethiopia's GDP grew at a pace of 3.1 percent, which was a positive sign. The inflation rate dropped to 0.9 percent, one of the lowest levels in previous decades. The Ethiopian economy's outstanding performance resulted in the unemployment rate falling to 7.4% for the quarter ending June 2016, from 7.8% for the same period in 2015.

In fiscal year 2015-2016, the country experienced a greater GDP growth rate of 3.4 %, related to 3.0 % in fiscal year 2014-2015. Inflation rate was very low at 0.9 percent as at June 2016, which is the lowest rate in greater than 25 years. According to National Bank of Ethiopia Annual Report (2016-17) a severe drought and the weak global environment have badly harmed during the past year 2015/16. As a result, output growth slowed to 6.5 percent in 2015/16, which was helped by efficient and timely policy responses to the drought, as well as manufacturing and services sectors. The broad money supply grew by 37.5 percent at the end of March 2017, according to the IMF's (2016/17) report, compared to a predicted rise of 24 percent. Such a major inflationary are might undo Ethiopia's significant progress in reducing poverty in rural regions and exacerbate the country's chronic food insecurity. Inflation is likely to remain in single digits in the medium term, as reserve money maintains in line with nominal GDP and government borrowing is consistent with monetary policy objectives. The Ethiopian National Bank is attempting to establish a secondary market for government assets in order to pursue indirect policy tools more efficiently in its monetary policy activities. To support its monetary policy context, the Economic 3 Modeling

and Statistical Analysis Directorate has formed a forecasting team to advance liquidity monitoring and forecasting. (International Monetary Fund, 2016).

Various empirical research have been conducted on the likely causes of Ethiopia's inflationary predicament. The literature discusses the following key sources of inflation: an increase in cash quantity unjustified beyond output growth, every nature about investment in the country, the spread of the national deficit and ways to finance it, inefficiency within government-controlled organizations, rising oil prices, and others. The government, although, denies that the country's rapid economic progress is to blame for the rising inflation. It also identified rising oil prices and global food prices as possible causes of inflation (Geda and Tafere, 2008).

Thus, as different countries of the area, one of the greatest fundamental goals of macroeconomic rules in Ethiopia is the continuation of high economic growth along with most excellent inflation, working on saving and selling funding. Subsequently, expertise the life and nature of seeking between inflation, saving and economic growth is likewise strategically significant for the progress of economic coverage or how appropriately the coverage establishments to modify the working ecosystem of the economy.

Inflation is economic phenomenon that is the outcome of a growth with in the cash deliver or velocity of money at a charge more than the price of increase in the economy (friedman, 1948). In this manner, the exact locating of the effect of an permanent inflation exchange to economic growth might be effective helping the Keynesian recommendation (mallik and Chowdhury, 2001), awful with the Argument that high inflation price increase the value of manufacturing and chance of destiny profitability of investment which may moreover power to divert funds to less useful ventures dodging contrary to inflation; and along with Controlled exchange costs bring about trade lopsided characteristics and theoretical capital surges influencing the economy's blast (edeme and ifelunini, 2015, chaturved et. Al., 2008, Paul et al., 1997 and chopra, 1988) or unimportant helping the lack of bias of cash (chari et al., 1996).

## 1.2. Statement of Problem

Analyzing the relationship between economic growth and inflation for the Ethiopian economy is the subject of this study. The literature on the inflation - growth nexus in the Ethiopian economy, as nicely as different African countries, is growing. The relationship between inflation and economic growth is no longer properly defined, regardless of the reality that there are numerous research on the subject. For both theoretical and empirical basis, there is a great difference in the link between inflation and economic growth. Due to the hugeness of the linear link, there is presently empirical dispute approximately the relationship between inflation and economic growth. No matter this disparity, modern-day lookup findings concur at the non-linear hyperlink among high-quality, negative, and stead inflation and growth, while excessive and volatile inflation has a dampening effect on economic growth.

Economists and also policymakers all over the world have studied relationship between two macroeconomic indicators of inflation and economic growth, and have come to different conclusions, some argue that there is a negative relationship; others discuses that there is a high relationship; and still others argue there is no relationship at all. The relationship between inflation and economic growth is a topic of controversy both philosophically as well as empirically around the world. Some, like Xiao (2009), think it's a good thing, while others, like Hossin (2015), think it's bad. The debate is also supported by a variety of hypotheses. Monetarists say higher inflation slows economic growth. Structuralism, on the other side, argues that economic growth requires inflation (Raj, Mukherjee, Mukherjee, Ghose& Nag, 2007).In the 1991 and 1992 periods, GDP growth was minus 7.2% and 9%, respectively, while inflation was in the single digits. H. 20.9% and 21% respectively. During these fiscal years, the Ethiopian financial system experienced a combination trajectory of both effective and poor actual GDP growth. (IMF, 2015). This shows that during the first period of the interim authority, the nation had a quietly excessive inflation rate without good economic performance. Then, from 1993 to 1997, GDP increase was positive, ranging from 3.5% to 13.4%, a little lower due to drought. However, in 1998, this could not be maintained due to the Ethiopian-Eritrean War, which caused a negative growth rate of 4%. However, inflation was relatively good between 1993 and 1998, with a maximum of 13.4% in 1995 and a minimum of minus 6.4% in 1997 compared to 1991 and 1992. After the Millennium Development Goals were applied from 1999 to 2001, economic growth and inflation averaged 6.4% and 1% annually, respectively (IMF, 2015).Some of the studies conducted on the correlation

enclosed inflation and growth have already investigated every existence based on connection between inflation and growth (NBE, 2013/14).

As pointed out by Alemayehu and Kibrom (2008), prior to 2002/2003, there was absolute relationship between inflation and economic growth. However, inflation and economic growth will no longer continue after 2003/2004, and vice versa.

As criticized in Rutaysire (2013), the main purpose of macroeconomic policy is to obtain great economic growth along small inflation, also it's far now believed that excessive inflation adversely influences economic growth. Extensively typical by means of various policy makers, macroeconomists and important banks, as human beings lose self-assurance inside the economy, efficient investments are like lenders seeking out better prices to hold themselves. Lower inside the manner. When inflation exceeds the edge, it has a big bad impact on welfare, increases the contemporary account deficit, and reduces funding with the aid of minimizing financial savings. Reason. As an end result, the Ethiopia's economic growth slows (raj et al., 2007).

Nonetheless, this study seeks to close the gap by eliminating the problem of data mixing between different regimes in the Ethiopian study area. Other studies have faced the problem of integrating data from one regime with other pure communist governments that did not have specific funding inside the economy and the present market-oriented monetary with private investment. Increase. The consequences of such a mixture of data can lead to false conclusions and therefore false political implications. This hassle overcome with the aid of focusing only on the post-socialist period. Alternative, the contradictory perspectives on the correspondence among inflation and growth in Ethiopia as well as in the entire literature are of interest to this study and have contributed to raising awareness in this field. Tertiary, the existence also omission of factors in each of the growth and inflation template is specified the characteristics of the Ethiopian economy.

## 1.3 Objective of the Study

### 1.3.1. General objective

The primary goal of this research is to analyze the relationship between inflation and economic growth in Ethiopia using the ARDL technique among 1985 and 2020.

### 1.3.2. Specific objectives

· To test the short-run and long run relationship between inflation and economic growth in Ethiopia.

· To investigate the position of trade openness in Ethiopia's economic growth

· To define the effect of FDI on economic growth in the long run

· To analyze the relationship between population growth and economic growth

## 1.4 Research Questions

The subsequent research questions that guide the research are;

·Is there a significant relationship between economic growth and inflation in Ethiopia?

· What is the direction of the relationship between inflation and economic growth in Ethiopia?

· What is the effect of FDI on economic growth in Ethiopia?

· Is there any significant relationship between population growth and economic growth?

## 1.5. Significance of the study

In recent years, economists, policymakers, and researchers have come to the conclusion that high inflation rates deteriorates the economy as a whole, not just for particular households. High inflation as well as sluggish economic growth are among the maximum significant difficulties confronting Ethiopia's economy and policymakers today.

The Ethiopian economy faces a commonplace hassle high inflation and sluggish economic growth. In the framework of the Ethiopian economy, this have a look at attempts to determine the relationship between inflation and economic growth.

The significance based on this debate is to offer policy help for the monetary coverage makers and researchers as regards to the relationship among inflation and economic growth in Ethiopia.

### 1.6 Hypothesis

The following hypothesis is tested;

H1: There is a significant and negative relationship between inflation and economic growth

H2: There is a significant and positive relationship between trade openness and economic growth

H3: There is a significant and positive relationship between FDI and economic growth

H4: There is a significant and positive relationship between population growth and economic growth.

### 1.7. Method of Study

**In this section data sources and the methodology will be described in detail.**

#### 1.7.1 Data Type and Sources

Secondary data of growth rate, deflator, population growth, trade openness and foreign direct investment is used this research. The sources of all secondary data is gathered from World Bank's data warehouse. Essays and working papers, manuscripts, related scientific books and related web sources are the ones that are utilized for the parts other than empirical sections of the research.

#### 1.7.2 Data Analysis

To accomplish the goals of the review, the analyst utilized the long run and short-run relations among inflation and economic growth for the Ethiopian economy by utilizing the model of autoregressive distributed lag bound test (ARDL).To analyze the relationship between inflation and economic growth the scientist utilized time series examination in econometrics. Co-integration displaying is for the most part utilized for determining relationships (Lin and Tsay 1996).

In addition, for estimating the short- and long-run relationships with economic growth and its contributing components, such as inflation both econometric estimations were performed out using STATA and Eviews, respectively.

### 1.8. Scope of the study

Only the years 1985 to 2020 are covered in the report, which includes all forms of foreign direct investment as well as other macroeconomic indicators. The most relevant sample time frame for the variables in the study is determined by data availability.

### 1.9. Structure of the study

The find out is broken down into five primary sections. The following is how the rest of the article is organized. The second chapter looks at the inflation theories and methodologies that can be used. The study's analysis approach is discussed in the third chapter, which covers subjects such as data classification and meaning, as well as model specifications. The performance of the expected growth model is discussed and analyzed in Chapter 4. The study concludes in Chapter 5 with a review of significant results and their administration implications, along with flaws in the inquiry and actions for future fact finding and conclusion.

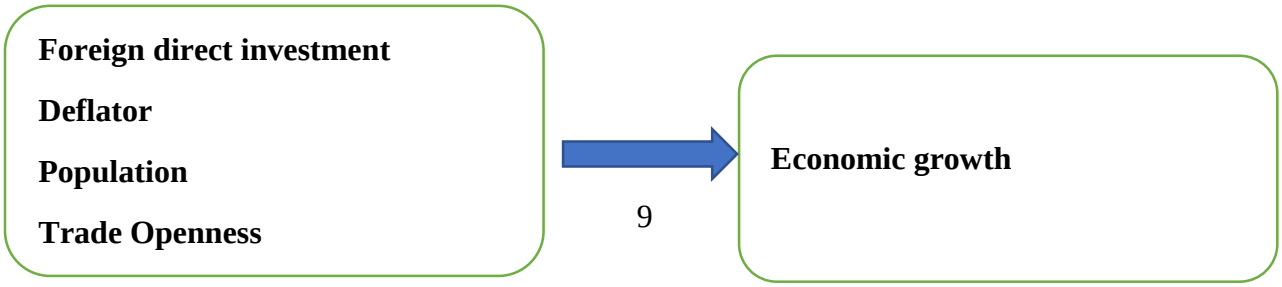
### 1.10 Conceptual frame work

The investigation acquire two master variables: One dependent variable (DV) and four independent variables (IV). The researcher will hypothesize that independent variable (IV) can be foreign direct investment, trade openness,population growth and inflation(deflator) also economic growth dependent variable (DV) as displayed in the reasonable casing work (Figure 1.1).

Theoritical model is mentioned as below:

Growth= $\alpha + \beta 0Inf + \beta 1Itr + \beta 2FDI + \beta 3Pop + \upsilon t$

**Figure 1.1 conceptual frame works**



# CHAPTER TWO

# LITERATURE REVIEW

Several studies show that greater inflation slows long-term growth. However, the factors that cause the relationship between inflation and poor growth are unknown. There is substantial evidence that inflation has a detrimental impact on economic activity. The impact of inflation on economy and economic growth is the subject of much of this research. While there is uncertainty that extremely high inflation is unfavorable for growth, empirical investigations on the exact relationship have been divided.

Inflation control has been the unquestionable goal of monetary policymakers all around the world since 1984. Monetary policymakers have expected that speedily, more practical development can occur in an environment where inflation is regulated, based in part on the macroeconomic distress witnessed through the Organization for Economic Cooperation and Development (OECD) nations from, when inflation collected normal of 13. Andres and Hernando examine the relationship between inflation and growth in OCED nations from 1960 to 1992 in an NBER working out document titled “Does inflation damage economic growth? “They find that really low or moderate inflation grades have an impermanent negative effect on growth rates promoting to huge and endless deductions in per capita income.

One-percentage decrease in inflation results in 0.5 percent to 2% gain in per-capita income. As the authors point out, there is limited opportunity for interpretation in their findings. Inflation isn't an impartial variable, and it does no longer assist rapid economic growth in any situation. In the medium and long run, which is the time-frame they look at, higher inflation never promotes more significant level of income. Even when other factors are considered, such as investment rate, population growth, and technological improvements, the bad link maintains. Even when the impacts of supply shocks typical of a portion of the investigated time are taken into account, there is still a strong negative association between inflation and growth.

Inflation effect not just the quantity of money invested in businesses, but additionally the efficiency with which production elements are used. Consistent with the authors, the benefit of lower inflation are significant, however they're additionally contingent at the rate of inflation The more grounded the useful impacts of a decrease, the lower the inflation rate; for instance, cutting inflation by one

rate moment that the rate is 20% may upgrade growth by 0.5 percent. Be that as it may, at a 5% inflation rate, yield increments may be just about as high as 1%. Subsequently, surrendering an extra mark of inflation is more costly for a low-inflation economy than it is for a higher-inflation country. Robert Barro's recent macro-panel research of roughly 100 nations over three decades is the most generally recognized debate the influence of inflation (GDP) (1997). Inflation rates exceeding 15%, according to Barro, are clearly damaging to economic growth. He did not discover any meaningful influence of inflation on real GDP for nations and intervals with frequent inflation charges under 15%. Other country-panel studies have come to the same conclusion. For instance, see Levine and Renelt (1992), Sarel (1996), and Sala-I-martin (1997).

In times of low to direct inflation, they neglect to reflect any statistically valid impact of inflation on real GDP. Feldstein's latest presentation is the most persuasive support of the concept that the expanse of inflation grows extremely quickly when the inflation become positive (1997). His research focused on the relationship among inflation and capital pay tax assessment on the economy. Feldstein creates a fractional partial-equilibrium model to imitate the impact of decreasing inflation from 2% to 0% on economic welfare. As an outcome, there is an enormous one-time long-lasting inflation in government assistance worth around 1% of GDP. 42 Kormendi and Maguire were among quick to concentrate on the inflation growth relationship (1985).

They added to the change from a positive to a negative normal exact comprehension about the effects of inflation on economic growth. They found that inflation adversely affected growth.De Gregorio (1993) found confirmation for a negative association among inflation and growth in pooled cross-region time series backslides for a wide number of countries. Barro confirmed this also (1995, 1996). As per Barro's exploration, the connection may not be immediate. Concentrates by Levine and Zervous (1993) and Sala-iMartin (1997) uncovered that expansion was not a solid indicator of monetary development. As additional molding factors were added, the pertinence of inflation diminished.

The other New Keynesian economist Stockman (1981) researched that Neoclassical growth model with inelastic labor force purify that the quality of inflation has not simply legislative goods along of per-capita income, as long as capitalist is held to be enough money in- advancement discipline for consumption. The assessment when inflation rate raise it destroys the purchasing power of capitalist. This potencies enterprises to fails to purchases of each cash goods and capital, panning

out in a decline in the constant state position of affair. Accordingly, Stockman (1981), plutocrat is excellent unprejudiced in the long run if only consumption is subject to the money in- advance. Contrary to Stockman ‟ s (1981) deduction, Zeria (1991) establish that truly cash in- advance restrain hold for consumption. According to Zeria ‟ s Cash in- advance model, high rate of inflation raise the quantity of inflation assessment businesses pay as enterprises hold moneybags as of overdue deposit. In summary, numerous New Keynesian economists advance that inflation will advocate the long run economic growth by adding the capital accumulation which assesses the appreciative relationship between inflation and growth. Still up rise in a inflation or the expectance inflation directly fails down the capital of people by diminishing the rate of payback on separate ‟ s real balance which encourage, people to save additionally by changing to wealth, adding their price tag, therefore running down the true claim quality. When people save more, further core collection would be accelerated which gives economic growth of one mother country (Khan, Senhadji 2001)

The relationship between inflation and economic growth has enlarged the interest of macroeconomists, policymakers, and national investors in both created and arising countries over the past several numerous years. Specifically, whether inflation is useful or damaging to economic growth is a subject of warmed conversation discussion, both philosophically and empirically. The problem stems from a debate between structuralisms and monetarists about the nature of money. Mundell (1965) and Tobin (1965) forecast a high-quality association among the charge of extension and the charge of basic growth that involve an effective link among the rate of economic growth and the scale of inflation. They claim that because cash and capital are interchangeable, enlarge in the rate of inflation boosts accumulation by transferring portfolios from cash to capital, inflicting monetary boom to speed up (Gregorio, 1996). Through, Fischer and Modigliani (1978) point out a bad and nonlinear link among the charge of inflation and economic growth (Malla, 1997).They state that inflation stifles economic growth with the aid about lowering financing efficiency relatively its stage. Despite the reality that the connection among the inflation and economic growth is still debated or ambiguous, broad empirical studies show that these two principal macroeconomic variables have either a positive or negative association. Normally, economists have categorized inflation into huge classes; demand pull inflation and cost push inflation(asari et al. 2011)The initial demand-pull inflation, Takes place once combination call for in extra to be had deliver (capability). This phenomenon is additionally called the Philips curve

inflation. The product hole may end outcome via growth in authority buys, increase in FDI, rather growth in real cash convey.

The second one is alluded to as cost-push expansion, "ware inflation" or "supply shocks" Inflation and occurs inside the event of an astonishing reduction in blend supply, on account of a growth Within the rate/charge of the item/producing wherein there are no fitting choices (Thomas,2006). This type of inflation is becoming more prominent ordinary these days than prior, as prominent inside the developing expense of lodging, power, and suppers. Its miles are in many cases considered in cost/wage twisting in partnerships, wherein representatives endeavor to hold up their wages with the change inside the cost stage and workers bypass at the weight of more exorbitant costs to customers through an increase in price costs.

Nathan (2015) researched the linkage between inflation and economic growth by applying panel data. The study plant that there's directional Granger cause between the two profitable variables inflation and growth. In this study inflation is negatively identified with economic growth as well with capital inflation by donating policy move and keep up the optimal economic growth with coincidentally of capital accumulation.

Wiza (2014) finds that the linkage between economic growth and inflation in the South African frugality. The study shows that there's a thought about the relationship between economic growth and inflation is meaningful for the conduction of financial policy. Depending on the applicability of the study, a big number of models and hypotheses in the macroeconomics literature anatomize. The study concludes that there's friendly relationship between inflation and growth in South African economy.

Martin and Veerachamy (2017) studied the smash of inflation on economic growth, which ambition was to reanalyze the academic as well the objective bump of inflation on growth. Thus, the theoretical literature point out that the interaction between inflation and economic growth can exist neutral, appreciative or negative. Also the existential consequences are mixed depending on the procedure assumed by the experimenters the variables conditions as freely as data applied, character of the review either cross section, panel data or nation specific and time period of the review equally the economic growth

Ethiopia Economic increase is set to ease this fiscal year (8 July 2021–7 July 2022), amid a much less favorable base effect. Next year, growth ought to be highly stable as the influence of the pandemic fades. However, the outlook is clouded through lingering security problems which threaten to derail the healing and in addition harm the economy. Focus economics panelists see the economic system developing 4.9% in FY 2022, which is down 0.1 percentage factors from last month's forecast, and 5.5% in FY 2023.

Just before the emergence of COVID-19 as a global epidemic, the Ethiopian government had launched on far handing profitable reform and liberalization through its reform plan nominated " Homegrown Economic Reform" that was running for about two years at the moment. The crucial point of this reform is a plan to enlarge the effectiveness of the government as well as to liberalize of the economy that includes privatization of crucial public firms. This reform is supported by significant contributor that included the World Bank (WB) and International Monetary Fund (IMF) that committed significant coffers ( estimated at$ 10 billion which is 3 times the position of current exports of the country) and specialized backing for the purpose ( see Geda, 2019). It's amidst this reform trouble that the COVID-19 epidemic broke out and began to hit the economy.

**2.1 Endogenous Growth Theory.**

Agreeing to Endogenous growth hypotheses numerous economic variables; among one is inflation which decreases the quality of return, by adding the capital collection and falls down the growth rate (Gillman, Harris and Matyas, 2002).

The endogenous growth proposition economists noted that when capitalist is presented in the budget constraint in a model of human capital assemblage, an upgrade in the grade of inflation negatively affects both consumption and force of labor. De Gregorio (1993) argued that inflation might have critical goods also on the accumulation of physical capital. In addition to that he maintained there exists an inhospitable relationship between inflation and growth (Gomme 1993).

The designated figures of endogenous growth economies catch on that every inflation grade consequences for development are little. The effective allocation of deficient resource is to assure the situation that the edge worth of the final value of conventional utilization equivalent the alteration in the value of the final of composition. The proliferation in inflation rate lowers the marginal value of moment ‟ s last unit of utilization which inspiring employees to do less. With

lower labor force, the borderline product of capital collection is completely limited, performing in a dallying amount based on capital accumulation. In this economy, barring a moderate inflation rate (for sample, unattached number percent) results in only a veritably small (lower than0.01 chance point) gain in the growth of production (Gomme1993). In consequence, agreeing to endogenous growth hypotheses there's negative relationship between inflation and economic growth.

The contemporary increase proposition commenced with a classic essay of British economists with the aid of Roy Harrod and Domar, “an article in energetic hypothesis”, now referred to as the Harrod-Domar growth model. This model described the profitable manner that similarly funding results in some other increase. In step with Harrod (1939, 1948) and Domar (1946) the industrial machine is innately unstable by means of using the product characteristic. Nonetheless, they defined how the mixture deliver expanded, which means that the investment has two outcomes, one at the aggregate call for side similar as business expends more, and the other on the aggregate pressure side wherein further funding will increase capital stock and produces similarly commercial enterprise.

**2.3 Inflation**

Inflation charge is estimated as the rate exchange inside the expense record (customer fee/value Index, discount rate index, producer rate list). Essien (2005) think that the (CPI), for instance, surveyed the amount of a delegate basket of product and service Bought through the normal buyer and determined on the possibility of annual overview of benefactor Fees. Due to the particular loads the basket, changes inside the charge of certain things and Offerings affect estimated expansion with different degrees. There are a few Hazards of the CPI as a level of degree. First it does now not reflect products and contributions Sold through organizations as well as specialists, comprehensive of hardware. Furthermore, it doesn't reflect the diversity inside the first rate of goods which could have happened to extra time. Thirdly, changes in the charge of Substitutable products aren't caught. Eventually, CPI ordinarily doesn't trade consistently. In spite of those boundaries, the CPI continues to be the most broadly used dimension of the overall charge degree.

This is due to the fact its miles used for indexation purposes for plenty salary and profits earners (consisting of Authorities personnel). Some other measure of expansion or rate movements is the

GDP deflator. That is reachable on an annual basis. But, it is not often used as a degree of inflation. That is Due to the truth the CPI represents the price of living and is, consequently, extra suitable for measuring the welfare of human beings. Moreover, due to the fact CPI is to be had on an extra everyday basis, it is far beneficial for financial coverage purposes.

The neo-Keynesians characterized inflation to decrease returns of production. This happens whilst there is a growth with inside the pace of cash and further of modern intake over funding. The structuralisms characteristic the purpose of expansion to structural elements underlying traits of a financial system (Adamson, 2000). Commonly, economists have distinguished expansion into wide classes; demand pull affectation and value push affectation (Asari etal. 2011). The first is the demand- pull, which happens whilst mixture demand is in overmuch of accessible supply (capacity). This miracle is alike called the Phillips curve affectation. The output hole can have an effect on from a raise in authorities' purchases, growth in, or growth in cash force.

The 2d is referred to as cost- push inflation, '' commodity inflation '' or '' supply shocks '' inflation and happens within side the occasion of a unexpected decline in combination deliver, because of an growth with inside price change of the output in which there aren't any qualified choices (Thomas, 2006). This form of inflation is growing extra not unusual place moment than ahead, as obvious with inside the price increase of casing, power and food. It's frequently imaged in fee pay spirals in companies, where in employees test to observe up their emolument within side price rank and works by skip at the burden of advanced expenses to consumers thru growth in prices.

Inflation can suggest both an increase inside the money supply or a growth in rate degrees. While we pay attention approximately inflation, we are listening to approximately an upward in expenses in comparison to a few benchmark. If the cash deliver has been elevated, this can generally appear itself in better rate stages—it is truly depend of time. For the reason of this dialogue, we can remember expansion as measured with the aid of using the (CPI), this is the same old measurement of expansion used inside the financial markets. Of greater importance is the size of core inflation. Center CPI excludes food and energy from its formulas due to the fact these items display extra price volatility than the rest of the CPI.

## 2.4 The Relationship between Economic Growth and Inflation

Because main goal of this study is to look at the relationship between inflation and growth in Ethiopia, it'll be crucial to look at the relationship between these factors therein context. The link between these variables is not as widely investigated within the country as it is elsewhere. The cause for this could be Ethiopia's long history of modest and stable macroeconomic conditions. This section will summarize the research that has been done so far. In Ethiopia Ayalew (2000) researched the compromise among inflation and unemployment. The review objective is to see whether there is a compromise among inflation and unemployment, the long-run determinants of inflation inside the nation if the Ethiopian monetary framework manages the cost of adjustment.

He utilized quarterly records from 1973 (Q2) through 1999 (Q3) (Q4). To show the compromise among inflation and unemployment, Ayalew determined joblessness by utilizing anticipating conceivable result and deducting it from the genuine result. To put it another way, the result hole determined fills in as an intermediary for unemployment. To ascertain the joblessness, inflation, and compromise. Inflation is characterized as a component of joblessness. The results of the assessment distributed that there is no compromise between the two factors beneath thought. Inflation ascends by 47% when the unemployment rate rises by 100%. As a result, the Phillips Curve as we know it does not apply to Ethiopia. In order to determine the country's long-term causes of inflation, explanatory variables such as inflation latency, cash supply, world cost record, joblessness, dry spell, and struggle are utilized. The assessment final product shows that primary factors, for example, asset in Ethiopia sufficiently give a clarification for inflationary tensions.

By and large, the review's principle finding is that as unemployment diminishes, inflation does as well. This shows that there is a good connection among economic growth and inflation in the Ethiopian setting, considering that diminished unemployment is matched by better economic growth. Michael (2008) took a key components that impact inflation rates as well as the long-and momentary connections among inflation and economic growth in Ethiopia. The review endeavored to appraise Ethiopia's inflation limit level. Michael involved yearly information for relevant elements from 1971 to 2006 to complete the exploration.

He utilized a co-incorporation and blunder amendment model to see the long-and short-run connections amongst inflation and growth. The method laid out by Khan and Senhadji is utilized to appraise the limit (2001). The review's discoveries uncover that the cash supply is the essential driver of inflation, and that an inflation in GDP brings down costs. According to the findings, there appears to be a negative association among inflation and economic growth. The co-integration test, on the other hand, indicates that inflation and growth in Ethiopia have a reliably remarkable long-run negative connection. Inflation is expected to reach a threshold of 16 percent. As a result, policymakers are advised to keep inflation under the 16 percent threshold. Asaminew (2010) calculated the inflation threshold. He employed Khan and Senhadji's (2001) technique, and the model incorporates explanatory variables including inflation, investment, loan access, and drought. The study's findings reveal that the threshold quantity of inflation in Ethiopia is between 8 and 10%. In order to keep inflation near the threshold, Asaminew advises a smooth interplay between fiscal and monetary measures. The variation in threshold findings between Michael (2008) and Asaminew is due to model definition and estimation technique error rather than methodological differences (because the methods utilized in both cases are comparable). In Ethiopia, Teshome (2011) looked at the connection among inflation and growth. Teshome contrasted Ethiopia's status to those of other Sub-Saharan African (SSA) countries in his research.

According to the author, Ethiopia's economic growth and inflation rate are 4.5 percent and 9 percent greater than the SSA countries, individually. Behind examining the character of the country's economic growth, he came to also conclusion that inflation had no impact on the country's economic growth due to the broad breadth of the inflation. He went on to say that Ethiopia's average economic growth rate between 2004 and 2010 was 11%, but the average rate of inflation was 16%. Inflation and economic growth have had a favorable association during the period under review.

Geda and Tafere (2008) looked into the factors that have contributed to Ethiopia's recent inflationary pressure. Following the recognizable proof of the co-combination vectors for the dinners and non-food inflation models, a solitary mistake amendment model is assessed for each models. The upward in income is identified as one of the motives of food inflation in this study. The low degree of profits amongst households is referred as the explanation behind this. Because of the low degree of income, an upward in profits leads to greater food inflation due to the fact households spend their more cash on food.

Writers advocate that policymakers use fiscal and monetary conservatism to slow economic development. Because food inflation has been the fundamental wellspring of ongoing expansion in the country, a rise in income has been discovered to be the most important basis of food inflation. As a result, it may be argued inflation and economic growth in Ethiopia have a negative relationship. Ethiopian studies, like global empirical evidence, have diverse discoveries on the relationship among inflation and economic growth. According to studies undertaken by Ayalew (2000), Geda and Tafere (2008), and Teshome (2011), economic growth and inflation have a positive association. Growth must be prioritized, according to Ayalew and Teshome, but macroeconomic stabilization is critical, according to Geda and Tafere. However, research like Michael's (2008) suggest that inflation and growth have a negative relationship. When inflation is below 11 percent, the relationship among inflation and growth is positive, but when inflation crosses this point, the relationship becomes negative, according to Assaminew (2010)'s threshold study. The model, approach, and data are all to blame for the major discrepancies in the conclusions of these investigations. In general, beliefs and actual verification on the connection among inflation and economic growth and are contradictory.

Both cross-section data and time series data have been used to investigate the link between these two macroeconomic variables. However, due to Ethiopia's steady macroeconomic history, the subject has not been thoroughly researched using formal modeling and appropriate econometric procedures. The subject turned out to be more famous around 2004/5, when the economy started to encounter fast development alongside higher inflation. Along these lines, two significant writing holes have been recognized in Ethiopian examination distributions. The principal blemish is that dry spell isn't calculated into the inflation condition. With the exception of Ayalew (2000), none of these examinations considered dry season while ascertaining inflation. Inflation is firmly connected with precipitation levels past to 2004/5, in light of straightforward information perception. This shows how the country's macroeconomic circumstance is emphatically dependent on downpour took care of horticulture, requiring the consideration of dry spell in the inflation condition. Ayalew's work was distributed 12 quite a while back, so the hour of quick development and high inflation is excluded from his examination. The subject of approach is the second featured hole in the writing. Just Michael (2008) has directed a co-incorporation assessment in Ethiopia to inspect the long-run connect among inflation and growth. To decide the long-run relationship, he utilized the Engle and Granger (1987) co-incorporation test. By incorporating dry season in the

inflation computation, the ebb and flow concentrate on endeavors to close these inconsistencies. The co-coordination method of Johansen and Juselius (1990) and the going with Vector Error Correction model will likewise be utilized, for all intents and purposes by Mallik and Chowdhury (2001). It likewise utilizes the Conditional Least Squares (CLS) approach to calculate the Ethiopian economy's inflation threshold. These approaches will be discussed in further depth in the following chapter.

### 2.5 What level of inflation is harmful to growth? Theory

Economic theories attain spread of conclusions approximately the responsiveness of output growth increase to inflation. Theories are help full as they represent for a few determined phenomenon. Historically, within the non-attendance of what is termed 'chronic inflation', the early inflation-increase theories have been constructed on cyclical observations, Persistent inflation is appeared as a put-up international World War II occurrence. Before then, at that point, episodes of inflation had been observed by bouts of inflation. Having confirmed no upward or downward fashion, inflation becomes stated to behave like a 'lazy dog'. It remains at a selected stage except and till there may be a disturbance. Thereafter, it moves to any other degree, at which it settles. Concept, consequently sought to account for a nice relationship amongst inflation and economic growth.

The aggregate, supply-aggregate demand (as-ad) framework additionally postulated a splendid relationship among inflation and growth in which, because the growth accelerated, so did inflation. In the Nineteen Seventies, but, the idea of stagflation received prominence, and the validity of the first-rate relationship have become questioned. Extensively trendy at that point, the Phillips curve relationship had seemed to no longer maintain. This have become evidenced with the aid of using manner of durations of low or poor output increase, and inflation rates which have been traditionally excessive. At a few level on this period, cost rose sharply, even as the economies spherical the subsequent sub-sections will talk classical, Keynesian, neo-Keynesian, monetarist, neo-classical, and endogenous growth theories, each with their respective contribution to the inflation-increase dating. Classical economics recollects deliver-facet theories, which emphasize the need for incentives to keep and invest if the country's economic system is to grow, linking it to land, capital and labor. Keynesian and neo-Keynesian concepts furnished a greater entire version for linking inflation to growth beneath neat the ad-as framework. Monetarism updated the amount

principle, reemphasizing the crucial feature of economic increase in identifying inflation, even as neoclassical and endogenous growth theories sought to account for the consequences of inflation on growth through its impact on funding and capital accumulation.

### 2.6 Trade openness

Any successful contemporary economy requires trade (both imports and exports). In the long run, trade is critical for Ethiopia's economic competitiveness. This is supported by a significant body of evidence. Firms and products are exposed to worldwide competition, which encourages economies to concentrate on areas where they have a competitive advantage. This ensures that scarce skills and resources are allocated to the most productive areas. Trade boosts productivity and creativity through increasing competition, allowing businesses to benefit from economies of scale gained from access to wider markets, and encouraging the transfer of skills, information, and innovation.

According to World Bank in 2019, Ethiopia exported $7.6 billion and imported $20.0 billion, resulting in a negative trade balance of -$12.4 billion. In 2015, Ethiopia's largest export sector was Vegetable, with 64.69% of total exports. Ethiopia exported 1,654 different products in 2015. Foreign direct investment was $2.5 billion or 2.62% of the GDP, as of 2019. Ethiopia's annual GDP growth was 8.36% per year in 2019. Its total investment rate was 35.26% of GDP in 2019. Inflation was 15.81, as of 2019.

In 2020, Ethiopia exported a total of $3.5B, making it the number 127 exporter in the world. During the last five reported years the exports of Ethiopia have changed by $484M from $3.02B in 2015 to $3.5B in 2020. The most recent exports are led by Coffee ($860M), Other Oily Seeds ($384M), Gas Turbines ($328M), Other Vegetables ($261M), and Gold ($194M). The most common destination for the exports of Ethiopia are United States ($409M), Somalia ($294M), Hong Kong ($253M), United Arab Emirates ($247M), and Saudi Arabia ($203M).

While, in 2020 Ethiopia imported $11.1B, making it the number 92 trade destination in the world. During the last five reported years the imports of Ethiopia changed by $2.65B from $13.7B in 2015 to $11.1B in 2020. The most recent imports of Ethiopia are led by Refined Petroleum ($1.24B), Gas Turbines ($532M), Planes, Helicopters, and/or Spacecraft ($406M), Wheat ($320M), and Packaged Medicaments ($317M). The most common import partners for Ethiopia are China

($2.75B), India ($903M), United Arab Emirates ($798M), United States ($554M), and Kuwait ($530M).

### 2.7. Foreign Direct Investment

FDI is explained using international trade theories based on comparative advantage and changes in factor endowments. Multinational firms are generally attracted to particular countries because of their comparative advantage. The process by which people from one country purchase wealth via other nations (the host nations) so as to gain financial blessing elsewhere (within side the nations in which the host nations are located) is known as foreign direct investment (FDI) (Morgan et al, 1997). It is also a method of transmitting funds and a movement. Financial and non-financial assets, such as management skills, advanced technology, and other physical and intangible assets, will be used to form a controlled subsidiary. FDIs, unlike portfolio investors, have a lot of control over the administration of foreign subsidiaries. If a direct investment is owned by someone who owns 10% or more of a company's stock or voting power, it must be deemed foreign direct investment (FDI).

Cross-border mergers, Greenfield investment, acquisitions and reinvested income are all examples of FDI choices. Greenfield investment is the creation of producing property in a brand new host country for a today's company. Most of the time, traders get their money from their personal countries. International or cross-border M&A refers to the sale of local productive assets over international borders. The cash that isn't always repatriated to the host country however is alternatively reinvested is referred to as reinvested profit (UNCTAD, 1998).

Foreign direct investment that is going to regional and local markets, organizations which can be targeted on worldwide export, and authority-led FDI are all examples of marketplace-in search of FDI and marketplace-in search of FDI pushed via way of means of market place demand (Accolley et al, 1997). There are 3wideclasses of foreign direct investment, simply as there are 3 huge classes of FDI within side the case of FDI: a radical research of marketplace situations in search of latest assets, in addition to a look for methods to get extra out of assets with a purpose to maximize productivity (UNCTAD, 2007) A enterprise have to be capable of communicate with the out of doors marketplace and foreign direct investment with a purpose to prosper in the international economy.

Internationalization (additionally referred to as cross-bowdlerization) occurs when interacting with a FDI market place is ineffective, according to the concept of internationalization (Harrison et al., 2000). Looked into Haymer's concept and located3characteristics that he dubbed "the 3 standard." He additionally said that these three conditions must be met before engaging in cross-border activity. Ownership, location, and internalization are all advantageous.

Natural resource endowment is a major influencer on the desirability of foreign direct investment, according to Basu and Srinivasan (2002) and Morisset (2000). Foreign direct investment inflows, on the other hand, are good when the Economy, society, and politics are stable (Root and Ahmed, 1979, Asiedu 2002). Root and Ahmed checked out some of factors, together with the proportion of human being swelling in cities, the extent of current infrastructure, GDP growth rate, and political stability, and found that nations which can be closely urbanized, have current infrastructure, have a better GDP in line with capita rate, and are challenge to political upheaval have acquired the maximum non-extractive direct funding. By 2021, there might be significant debate regarding the effect of foreign direct investment on economic growth.

Only if foreign direct investment (FDI) has a long-term and positive impact on technology, according to neoclassical economists like Robert Solow. As a result, they argue that increased

FDI results in short-time period economic growth 3situations are met: (1) the productiveness of capital within side the host financial system decreases; (2) the economic system movements to a constant state because of the decrease; and (3) improved FDI has no long-term impact on the host economic growth.

(FDI) has a significant role in human capital generation, technology distribution, new control techniques, advertising skills, and organizational enhancements, consistent with the Endogenous Growth Theory. Another issue of the brand new boom idea is that information's witch to rising countries foreign direct investment is critical. As indicated by the ideas of modernization and dependence, a hypothetical connection between unfamiliar direct venture and monetary development can be distinguished. Inflation in complete element efficiency can assist FDI with helping capital amassing and efficiency (Mamun and Nath, 2005). The dependence theory, then again, claims that a country's monetary achievement will be hampered assuming it depends on unfamiliar speculation. This is because of the way that foreign direct investment (FDI) makes imposing business models in the modern area, bringing about the underutilization of neighborhood

assets (Adams, 2009). Likewise, subsequently, the economy is viewed as generally constrained by unfamiliar financial backers, with insignificant development.

### 2.8. Deflator

A deflator is a determine expressing the change in expenses over a duration of time for a product or a hand basket of products, which is used to deflate (price acclimate) a measure of value changes for the same period (for illustration the deals of this product or hand basket), therefore removing the price increases or diminishments and leaving only volume changes.

A deflator compares a reference period to a base period, and it can be expressed either as an indicator or a chance change. A value which has been acclimated by way of a deflator is called deflated. Which deflator should be used for the elimination of prices changes depends on the nominal index. For illustration the deflator of deals is a price indicator which represents changes in retail prices and which allow the identification of changes in the real amounts of retail trade.

### 2.9 Population

With approximately 117 million people (2021), Ethiopia is the second one most populous country in Africa after Nigeria, and still the quickest developing economic system with inside the region, with 6.3percentage increase in FY2020/21. However, it's also one of the poorest, with a per capita gross national income. Ethiopia targets to attain lower-middle-earnings repute by 2025. Ethiopia is a country that has been exist by starvation and poverty for maximum of its lengthy history. A land where in child hunger and next loss of life had been standard for such a long term calls for help from the extra privileged and rich countries of the world. It is the duty of all individuals of the peaceful world wide network to step in with extra rigor and resolution to empower the Ethiopians. This populace has tested to be one of the most powerful at the face of the earth, having persisted large hardships. If it's far given a bit help, Ethiopia may be capable of construct at the energy of its population in order to increase the power of the country itself.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 Introduction

A bunch of regulations or a technique for overcoming a research difficulty is known as methodology. The researcher must select from a variety of techniques, models, and methods of research methodology in order to meet the objectives. As a result, during the sample period 1985-2020, this study utilizes yearly time series information from economic and social lookup as well as World Bank database. To establish correlations among the impartial variables and actual GDP because the established variable to assess economic growth, ARDL approach is used.

The subject of how to gather data, the reason for deciding on this approach of information collection, the methods used to evaluate facts sets, and any other questions will be addressed in this chapter. The preceding researcher has provided excellent techniques for gathering and reading information, allowing the researcher to select and make choices within side the most excellent manner in order to provide a compelling reply to the lookup issue. Aside from that, the upcoming subtopics will be discussed: lookup design, data gathering method, facts processing, and records analysis methodologies.

## 3.2 Research Design

In this discover approximately is to have examine the nexus among the described factors that is an economic growth and explanatory variables that are trade openness, deflator, population growth and FDI.

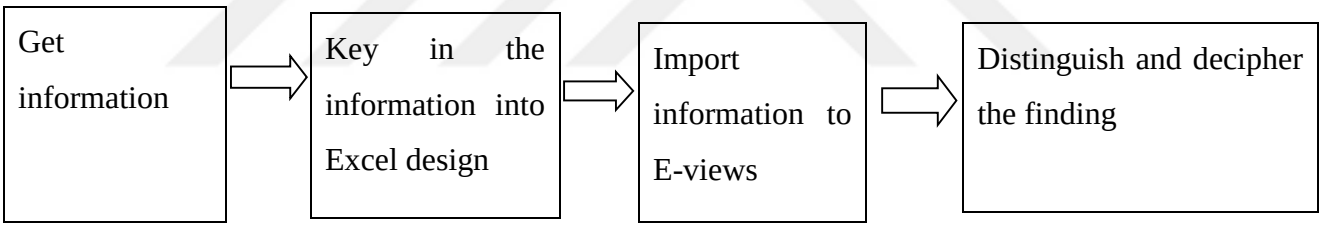
## 3.3 population of the study

The populace is the overall variety of possible observation gadgets or a set of them (Zikmund et al 2013.).The population refers to the overall variety of human beings in your study who can be sampled (MO, 1990, P.33). As a result, the researcher has selected a sample of 35 years' time collection records from 1985 to 2020 taken away the World Bank's Ethiopia Economic Data repository.

### 3.4 Data Collection Method

Time serial information is an assortment based information that is organized into annual, semiannual, quarterly, and monthly categories. The project's data is a time series, and our observation period in Ethiopia spans from 1985 to 2020. All of the information gathered is secondary. This type of data was employed by the researchers since it helped them save time and ensured that the study was completed on schedule and with high quality work. Furthermore, the World Bank gives reliable and full data to researchers so that they may readily access it while collecting second-hand data, which saves money. The researcher has gathered data from the World Bank database on variables for example, population, deflator, trade openness foreign direct investment that would affect Ethiopia's GDP. As a proxy for monetary growth, the every year GDP has been utilized. The quantitative investigation is now formally completed due to the data has been collected.

### 3.5 Data Processing




Information handling incorporates few essential stages. The initial step is specialist will accomplish the information wanted from World Bank. In the accompanying strengthen is specialists will enter records into Excel layout and import realities to E-views, a well-known econometric programming project to evaluate time-collection information.

### 3.6 E-Views

For instance, time-assortment investigation ,cross-sectional examination, panel information analysis, and anticipating, E-Views is utilized to to determine the econometric investigation. The E-Views focused on the use of spreadsheet and database technology in conjunction with statistical tools. It also aids in the support of undocumented data storage file formats.

According to (Schwert, 2010), data may be quickly developed into a factual relationship, and it can likewise be utilized to expect future data values utilizing E-Views. E-Views is utilized to estimate each simple and more than one regression, according to Startz 2009 Moreover, the specialist utilized E-Views for symptomatic purposes.

In the wake up running the test, the researcher can determine whether or not there is a problem with multicollinearity, autocorrelation, or heteroscedasticity. Furthermore, the researcher does a model particular test to see if the model is appropriately or mistakenly stated. Using E-Views.The scientist furthermore plays out an ordinariness test to see if the mistake term is consistently disseminated.

### 3.7 Data Analysis

In this exploration, computerized Views (E-views) is applied to run and actually look at the regression examination.

#### 3.7.1 Unit root test

To prevent the problem of false regression, the variables are verified for stationary in the time series before estimating the equation. The data series can be integrated into one or more orders if they are distinguished and found to be stationary; otherwise, they are non-stationary. Enhanced Dickey-Fuller and Phillip-Perron checks are used to evaluate unit root checks, which might be primarily based at the null hypothesis of non-stationary and failing to deny 0, implying refuse and the requirement for adequate variations to set off stationary.

#### 3.7.2 The Augmented Dickey-Fuller (ADF) Test

Numerous scientists have advanced several strategies for the test of request combination Augmented Dickey Fuller test attributable to Dickey and Fuller (1979, 1981). The Augmented Dickey Fuller test relies upon the dismissing invalid speculation of unit root when the series are nonstationary for the elective theories of stationarity trial of the model.

Additionally, Dickey-Fuller test, the Augmented DF test is utilized to beat the autocorrelation issue in the series and the slacked adaptation of the reaction variable is added to the DF condition (Dickey and Fuller, 1979).

### 3.7.3 Autoregressive Distributed Lag (ARDL) model.

Auto-Regressive Distributed Lag (ARDL) of Pesaran et al. (2001) is ongoing single cointegration which turns into the most generally utilized approach by numerous analysts and researchers, because of the low power and different issues related with other test techniques.

This review utilized ARDL limits checking approach of cointegration which was created by Pesaran and Shin (1999),Pesaran (1997) and Pesaran (2001).The ARDL way to deal with cointegration incorporates two stages for assessing long run relationship (Pesara, 2001). The primary stage is to notice the presence of long run relationship among all factors in the situation under assessment.

The traditional "ARDL" model is specified as;

$$Yt = \alpha oi + \sum_{j=1}^{p}(\delta iyt - 1) + \sum_{j=1}^{q} \beta iXt - i + uit$$

In the model, $\alpha$ is constant, $\delta \; and \; \beta$ are coefficients, p and q are lag lengths; u is the vector of the error terms. The model allows both regressors and regress and have different integrated orders.

### 3.7.4 Bounds Testing Procedure

To check for the presence of co-incorporation affiliation the Bound test is utilized and the overall meaning of the coefficients are tried. The Bounds test sets upper and lower limits, accordingly assuming the figured F-measurements is a worth that is lower than the lower breaking point of the basic worth, the $H0$of no co-incorporation is acknowledged. Also for the situation where the figured F-measurements is a worth that is more prominent than the maximum furthest reaches of the basic esteem, then, at that point, the $H0$is dismissed and it said that the factors viable are cointegrated (Pesaran et al, 2001).

### 3.7.5 Stability of the model.

The steadiness of the model is estimated by the Cumulative amount of squares of recursive (CUSUM) as meant on the figure. For this situation, CUSUM test, which depends on the residuals from the recursive appraisals, gives such a test.

**Theory**: H0**:** the CUSUM dissemination is a symmetric appropriation focused at 0.

H1**:** The CUSUM dispersion isn't symmetric disseminated and no typical appropriation

**Choice rule**: The invalid speculation of ordinary conveyance is acknowledged when the chart of CUSUM insights lays between the limits of the basic locale for a test at 5% degree of importance and the other way around.

### 3.7.6 Model Specification and Normality test

Pesaran (1997), Pesaran and Shin (1999), established the (ARDL) model limits testing technique of cointegration, which was applied in this research (2001). The researcher chose the ARDL cointegration approach because of its numerous benefits.

The ARDL technique has several advantages, including the ability to be used whether or not the repressors are I (1) and/or I (0). Second, whereas other strategies require large data samples to be viable, the ARDL model offers a statistically stronger passage to determining the cointegration relationship between variables in small samples. Third, the ARDL procedure allows than the other models that the variables may have dissimilar optimal lags. Eventually, the ARDL procedure is applicable for just a single reduced form equation to assess the long-run connections inside a setting of framework conditions (Pesaran, 2001). Since heteroscedasticity and autocorrelation might be an implicit worry in misspecification models, version specification blunders refers to a version has been efficiently described. To ensure that the model specification is proper or logical, the experimenter should select the appropriate explanatory variables to include in the model Furthermore, the mistake term is unrelated to the selected independent variable. A suitable form of variables should also be chosen by the researcher. The importance of a steady estimated parameter value cannot be overstated.

### 3.7.7 Heteroscedasticity

The heteroscedasticity test is utilized to decide if mistake terms have a steady fluctuation. In this study, the heteroscedasticity problem is determined using the Breusch-pagan Godfrey test. Despite this, Gujarati and Porter (2009) found that when a model with inconstant variance error terms has a heteroscedasticity problem. While the quantities of some explanatory factors contribute more or less, there may be more volatility. As a result, the model's heteroscedasticity problem will no longer

have minimum variances, resulting in an inaccurate outcome. It will be difficult to address the problem if the model contains heteroscedasticity. Other side Heteroscedasticity is the situation by which the conveyance of blunder term around the mean isn't consistent (no steady change). Heteroscedasticity doesn't influence the unbiased attitude of the boundary however the consistency properties of OLS assessors are presently not least fluctuation or proficient.

### 3.7.8 Descriptive Statistics

In these review or examination we will run graphic measurements. As per this test, to put it plainly, help portray and comprehend the highlights of a particular informational collection by giving short outlines about the example and proportions of the information. The most perceived sorts of illustrative insights are proportions of focus: the mean, middle, and mode, which are utilized at practically all degrees of math and measurements. The mean, or the normal, is determined by adding every one of the figures inside the informational collection and afterward partitioning by the quantity of figures inside the set.

### 3.7.9 Diagnostic test

The analyst makes use of different hypothesis checking out to test the model due to the fact it may have an econometric issue. Initially, test the model is liberated from multicollinearity, autocorrelation, and heteroscedasticity issues. Besides the specialist additionally wishes to check the model determination and normality test.

### 3.7.10 F and T-test Statistic

Additionally, the t-check measurement is the most well-known factual information assessment techniques for theory or hypothesis testing. Two logical examples are utilized to test the methodologies (Lucey, 2002). The T-test measurement furthermore decides whether the varieties ineffectss between the two examples are because of possibility. Beside that, the example populaces are considered to have comparative fluctuations and to follow a conventional circulation. As far as information gathering, Lucey (2002) states that stretch or proportion records is fundamental in the T-test measurement. Measurements T-test examines the insights obtained the use of the t-test to decide a P-esteem that shows a likelihood that people will come by the result via possibility.

Subsequently, while the P-worth of a T-check falls under 0.01, 0.05, or 0.1, the analysts reject invalid speculations and presume that the free and based factors are significantly associated.

One the measurable techniques for determining the overall significance of regression is the F-test statistic. Under the null hypothesis, the test measurement has an F-distribution. When there are more than three or many parameters in a model, the F-test statistic is used. It is generally relevant whenever a comparison between statistical models is made, provided that the models fit the data set, with the goal of selecting the best-fit model for the population. In particular, it examines the data gathered by analysts using the F-test statistic to determine the cost of probability, which reflects likelihood that one may want to reach the end result by way of chance. As a result, if the likelihood esteem is significantly less than 0.01, 0.05, or 0.10, analysts will think about elective speculations and infer that the endogenous variable can be widely characterized through the whole model. Whenever the likelihood esteem goes under 0.01, 0.05, or 0.10, scientists will think about substitute speculations and presume that the endogenous variable can be characterized essentially by the entire model.

### 3.8 Quality control

#### 3.8.1 Reliability

The degree to which a research instrument will produce similar result under similar conditions is known as its reliability. As a result, the researcher in this study relied on secondary data, which is the most credible in the examination range or field.

### 3.9 Ethical considerations

This examine changed into completely performed ethically and all copyrights have been discovered in which permission changed into required reproducing substances can have sought.

The records used on this examine obtained from World Bank database and the records is unfastened from any underestimation and over estimation.

# CHAPTER FOUR

# DATA ANALYSIS AND METHODOLOGY

In this chapter, data used for the research will be given in detail and also the methodology used to test the effects on inflation, economic growth will be given step by step in the methodology section.

## 4.1. Data

Economic growth as dependent variable and population growth, trade openness, foreign direct investments, inflation as independent variables are gathered directly from the World Bank database as shown at table 4.1.

**Table 4.1 Data Details**

| Abbreviation | Data | Sources |
|---|---|---|
| Growth | GDP Growth (%) | World Bank |
| Pop | Population Growth Rate (%) | World Bank |
| Itr | (Exports + Imports) to GDP (%) | World Bank |
| Fdi | Foreign Direct Investment/GDP (%) | World Bank |
| Inf | GDP Deflator (%) | World Bank |

**Growth:** Gross domestic product is the dependent variable for the model considered in this review, which is a total proportion of the size of an economy adapted to cost changes throughout a period. The market worth of GDP relies upon the genuine amount of products and services delivered in a given timeframe and their relative cost.

**Population Growth**: Ethiopia has a land of 1,100,000 square kilometers (420,000 sq. Mi.) and more than 117 million citizens and is the twelfth most crowded country on the planet and the second most crowded in Africa. Populace normally point to the quantity of individuals in a particular region, whether it be a city or town, area, nation, landmass, or the world. In this research population growth rate is used as a candidate triggering factor on economic growth.

**Trade openness:** The total amount of products exported and imported as an extent of growth domestic product.

**FDI:** FDI is investment of a companies in commodity market for production out of its' own country's custom territory.

**Inflation:** Inflation is steady increase in price level of goods and service groups that are used in common by households.

It is preferred to use deflator as the indicator of the inflation because it includes all good and service groups unlike consumer price index and producer price index.

### 4.2. Descriptive Statistics

This part presents a brief analysis of the data utilized in this research. In the first place, unmistakable measurements are introduced, trailed by a relationship lattice. At first, unmistakable measurements are completed and given rundown insights of the mean, standard deviation, minimum and maximum for the factors utilized in the review. Then, connection examination shows regardless of whether a significant affiliation exists among the variables. Assuming there is a significant relationship exists among variables, this might demonstrate the presence of multicollinearity, which again influences the result of the relapse model.

**Table 4.1: Descriptive statistics**

| | **FDI** | **GROWTH** | **IN** | **ITR** | **POP** |
|---|---|---|---|---|---|
| Mean | 2.279498 | 6.222354 | 91.75431 | 34.73888 | 2.976391 |
| Median | 2.383924 | 8.505949 | 36.72775 | 31.72672 | 2.859155 |
| Maximum | 5.576213 | 13.85933 | 398.6500 | 49.91158 | 3.590509 |
| Minimum | 0.001620 | -11.14435 | 15.26471 | 23.38600 | 2.541386 |
| Std. Dev. | 1.762625 | 6.476884 | 98.83887 | 8.735265 | 0.299453 |
| Skewness | 0.218861 | -1.111134 | 1.497433 | 0.423283 | 0.698836 |

| | | | | | |
|---|---|---|---|---|---|
| Kurtosis | 1.856705 | 3.437883 | 4.354830 | 1.808360 | 2.288334 |
| | | | | | |
| Jarque-Bera | 2.248086 | 7.695323 | 16.20717 | 3.205020 | 3.689937 |
| Probability | 0.324963 | 0.021330 | 0.000302 | 0.201390 | 0.158030 |
| | | | | | |
| Sum | 82.06194 | 224.0047 | 3303.155 | 1250.600 | 107.1501 |
| Sum Sq. Dev. | 108.7396 | 1468.251 | 341919.3 | 2670.670 | 3.138531 |
| | | | | | |
| Observations | 36 | 36 | 36 | 36 | 36 |

As above table (4.2) indicates, the study had 36 observations. One dependent variable GDP and four independent variables (GDP, FDI, inflation, international trade (trade openness) and population growth). GDP Growth rate has a range between 13.85933percent and -11.14435%. . The average of GDP growth is 6.22%. This indicates an economy with high levels of volatility.

FDI has a range between 5.576213percent and 0.001620% while the average of FDI is 2.27% and every observation is deviated by the value of 0.218861.The average of population growth is 2.97%, as the pop has a range between 3.590509percent and 2.541386. The inflation range is between 398.6500per and 15.26471percent while the average of INF is 91.7%.Trade openness has a range between 49.91158% and 23.38600percent. The mean value or the average of trade openness if 34.6%.

### 4.3 Methodology.

In order to test the effects of inflation on economic growth, first of all the model was set, then diagnostic tests were made after then that stationary of the variables were analyzed, then long-run and short run forms of ARDL implied and error correction form of the test were implied. At the last stage CUSUM tests were applied.

**Unit Root Test:** in this study the variables are verified for stationary in the time series before estimating the equation. The data series can be integrated into one or more orders if they are distinguished and found to be stationary; otherwise, they are non-stationary. Augmented Dickey-Fuller and Phillip-Perron tests are used to evaluate unit root checks, which might be primarily based at the null hypothesis of non-stationary and failing to deny 0, implying refuse and the requirement for adequate variations to set off stationary.

**ARDL:**This review utilized ARDL limits checking approach of cointegration which was created by Pesaran and Shin (1999),Pesaran (1997) and Pesaran (2001).The ARDL way to deal with cointegration incorporates two stages for assessing long run relationship (Pesaran, 2001). The primary stage is to notice the presence of long run relationship among all factors in the situation under assessment.

**Descriptive statistics:**In these review or examination we will run graphic measurements. As per this test, to put it plainly, help portray and comprehend the highlights of a particular informational collection by giving short outlines about the example and proportions of the information.

**Bound test:**this test is running accourding this study to check for the presence of co-incorporation affiliation the Bound test is utilized and the overall meaning of the coefficients are tried.

**Stability test:** The invalid speculation of ordinary conveyance is acknowledged when the chart of CUSUM insights lays between the limits of the basic locale for a test at 5% degree of importance and the other way around.

**Heteroscedasticity:** This test is utilized to decide if mistake terms have a steady fluctuation. In this study, the heteroscedasticity problem is determined using the Breusch-pagan Godfrey test.

Also other tests like LM test and Ramsey text is utilized in this study to justify and check the hypothesis.

### 4.3.1. Unit root test

Augmented Dickey-Fuller and Philip-Peron tests are applied to check the stationary of the series, and the table 4.1 shows the results and significance levels.

A unit root test is generally used to decide whether or not or a time series is stationary and has a unit root, The researcher of this look at carried out Augmented Dickey-Fuller and Philip-Peron exams to test the stationary of the collection, and the under table indicates the outcomes and significance levels.

**Table 4.2: ADF-PP Unit Root Test Results**

| | ADF | | | PP | | |
|---|---|---|---|---|---|---|
| **Variables** | **Level Intercept and Trend** | **First Difference Intercept and Trend** | **Decision** | **Level Intercept and Trend** | **First Difference Intercept and Trend** | **Decision** |
| **Growth** | -5.564459 (0.0003) | -9.059687 (0.0000) | Level | -5.573072 (0.0003) | -7.681742 (0.0000) | Level |
| **Inf** | -5.664997 (0.0002) | -8.889600 (0.0000) | Level | -5.638070 (0.0003) | -10.79142 (0.0000) | Level |
| **Itr** | -0.350039 (0.9857) | -5.997888 (0.0000) | 1st Difference | -0.350039 (0.9857) | -5.997481 (0.0001) | 1st Difference |
| **FDI** | -3.069198 (0.1292) | -6.568623 (0.0000) | 1st Difference | -3.114511 (0.1187) | -6.576510 (0.0000) | 1st Difference |
| **Pop** | -4.945164 (0.0022) | -3.709791 (0.0383) | Level | -1.074497 (0.2501) | -2.089530 (0.0369) | 1st Difference |

* Table 4.3 is organized according to 5% significance level and Schwarz criteria.

After applying ADF and PP test it is concluded that growth and inflation is stationary at level and trade openness, FDI and population growth is stationary at first difference.

### 4.3.2. ARDL Bounds test.

Bounds testing procedure is an important statistical instrument in the evaluation of position connections when the beginning property of time series is entirely I (0), entirely I (1) or concertedly cointegrated. A univariate frame for sampling the actuality of single level association between growth, inflation rate in Ethiopia was supposed using ARDL model in this paper. To check for the presence of co-incorporation affiliation the Bound test is utilized and the overall meaning of the coefficients are tried.

Bound testing as an inflation of ARDL displaying utilizes F and t-insights to test the meaning of the slacked levels of the factors in a univariate harmony adjustment framework when it is indistinct assuming the information creating process fundamental a period series is pattern or first distinction fixed.

**Table 4.3: ARDL Bound Testing Results**

| **Model** | **Optimal Lag*** | **F Statistics**** | **Bound Test Critical Values** | |
|---|---|---|---|---|
| | | | **Lower** | **Upper** |
| F(pop, inf, itr, fdi ) | (4,4,4,3) | 7.774671 | 3.29 | 4.37 |

Bound test is applied to check whether there is a long run relationship between dependent variable and independent variables or not. Table 4.3.2indicates that F-statistic (7.774671) is greater than the upper critical value (4.37) at 5% significance level, and it suggests that there is a long run relationship between economic growth and independent variables.

After proving the long-run relationship between variables of the model diagnostic tests are applied (Table 4.3)

### 4.3.3. Diagnostic Checking Tests

**Table 4.4: Diagnostic Checks**

| Test | Statistics | Probability |
|---|---|---|
| Breusch-Godfrey Serial Correlation LM Test | 0.664300 | 0.5548 |
| Heteroskedasticity Test: Breusch-Pagan-Godfrey | 0.905033 | 0.6070 |
| Ramsey Reset Test | 1.077756 | 0.3392 |

**Breusch-Godfrey Serial Correlation LM Test**

We concede the null hypothesis H0 if p-worth of chi-squared more noteworthy than 0.05, demonstrating that there is no autocorrelation problem, Otherwise, we deny H1 if p-worth of the chi-square more than 0.05, showing that there is an autocorrelation problem (Stock and Watson, 2006).

The invalid hypothesis of no sequential connection (Breush and Godfrey LM test) is neglected to dismiss or reject for the explanation that p-value related with test measurement is more noteworthy than the standard significant level (0.5548 > 0.05). It is concluded that there isn't any autocorrelation problem.

**Breusch Pagan Heteroskedasticity Test**

The result of the test recommends that the null hypothesis of no heteroscedasticity is accepted or standard at a 5% significance level for the explanation that the P-value related with the Breusch-Pagan-Godfrey heteroscedasticity test (0.6070) is a lot more noteworthy than the typical significance limit. (0.05).

**Ramsey RESET Test**

Hypothesis of the Ramsey Reset test is as follows**:**

H0: The model is accurately indicated.

H1: The model is nor accurately indicated.

H0 is substantial to accept whether P-value of F-stat more than 0.05, it is accurately determined to show that the model is correctly specified. Any other way Acquirement to reject if p-value of F-stat less than 0.05 indicating that the model isn't accurately determined (Gujarati and Porter, 2009) since the probability value of F-measurement is 0.3392 which is more than 0.05. Thus, we have sufficient proof to presume that the model is accurately indicated at the significant level of 0.05.

**Table 4.5: Long-Term Coefficients**

Under the specific check of long term co-coordination, its miles showed that all factors GDP, DEF, FDI, POP and Trade openness are co consolidated with inside the long run. After the long run relationship is checked, the normal long term coefficients in the wake of normalizing on GDP are referenced in as follows.

| Levels Equation | | | | |
|---|---|---|---|---|
| Case 2: Restricted Constant and No Trend | | | | |
| | | | | |
| | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| | | | | |
| | | | | |
| POP | -8.404470 | 1.059116 | -7.935360 | 0.0001 |
| DEF | 0.321806 | 0.060046 | 5.359344 | 0.0011 |
| D(ITR) | 0.378746 | 0.200922 | 1.885039 | 0.1014 |
| D(FDI) | 0.905019 | 0.607934 | 1.488681 | 0.1802 |
| C | 28.35328 | 3.664692 | 7.736878 | 0.0001 |

| | |
|---|---|
| EC = GROWTH - (-8.4045*POP + 0.3218*DEF + 0.3787*D(ITR) + 0.9050 | |
| *D(FDI) + 28.3533 ) | |

The above outcome (table4.6) infers, two factors fundamentally influence the monetary development of Ethiopia over the long run, as their likelihood is under 5% significant level.

Population growth has negative effect on economic growth and inflation as the indicator of inflation is found out as the significant supporter of economic growth according to the results of ARDL test. 1% increase in the population rate causes -8.4% decrease in GDP growth rate and 1 % increase in inflation causes 0.32% increase in the economic growth. The results gathered in terms of population growth supported the Mankiw's theory (1998) which tells that population growth diminishes GDP per capita in terms of both quality of quantity so it has a negative effect on GDP growth. And also the results related with inflation is parallel to the literature. There are research in the literature concluded that inflation has a positive effect on economic growth. As it is mentioned in the literature part of the research.

### 4.3.5. Error Correction form for ARDL

**Table 4.6: ECM Regression**

| | | | | |
|---|---|---|---|---|
| ARDL Error Correction Regression | | | | |
| Dependent Variable: D(GROWTH) | | | | |
| Selected Model: ARDL(4, 4, 4, 4, 3) | | | | |
| Case 2: Restricted Constant and No Trend | | | | |
| Date: 04/23/22 Time: 22:15 | | | | |
| Sample: 1985 2020 | | | | |
| Included observations: 31 | | | | |
| | | | | |
| ECM Regression | | | | |
| Case 2: Restricted Constant and No Trend | | | | |
| | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |

| | | | | |
|---|---|---|---|---|
| D(GROWTH(-1)) | 2.010533 | 0.314483 | 6.393144 | 0.0004 |
| D(GROWTH(-2)) | 0.956932 | 0.204156 | 4.687256 | 0.0022 |
| D(GROWTH(-3)) | 0.419241 | 0.120015 | 3.493229 | 0.0101 |
| D(POP) | -54.79586 | 70.33482 | -0.779072 | 0.4615 |
| D(POP(-1)) | 359.5885 | 176.7886 | 2.034003 | 0.0814 |
| D(POP(-2)) | -612.4392 | 178.6766 | -3.427642 | 0.0110 |
| D(POP(-3)) | 328.5016 | 72.50228 | 4.530914 | 0.0027 |
| D(DEF) | 0.092423 | 0.073602 | 1.255711 | 0.2495 |
| D(DEF(-1)) | -0.865767 | 0.137283 | -6.306461 | 0.0004 |
| D(DEF(-2)) | -0.478797 | 0.098594 | -4.856254 | 0.0018 |
| D(DEF(-3)) | -0.147966 | 0.067927 | -2.178302 | 0.0658 |
| D(ITR, 2) | -0.625180 | 0.170948 | -3.657128 | 0.0081 |
| D(ITR(-1), 2) | -1.787777 | 0.287867 | -6.210420 | 0.0004 |
| D(ITR(-2), 2) | -1.287257 | 0.264656 | -4.863892 | 0.0018 |
| D(ITR(-3), 2) | -1.258540 | 0.219201 | -5.741492 | 0.0007 |
| D(FDI, 2) | -0.103824 | 0.405238 | -0.256205 | 0.8052 |
| D(FDI(-1), 2) | -1.702920 | 0.510761 | -3.334082 | 0.0125 |
| D(FDI(-2), 2) | -0.845151 | 0.391315 | -2.159771 | 0.0676 |
| CointEq(-1)* | -3.514201 | 0.392978 | -8.942485 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.950435 | Mean dependent var | 0.207021 |
| Adjusted R-squared | 0.876089 | S.D. dependent var | 6.581261 |

| | | | | |
|---|---|---|---|---|
| S.E. of regression | 2.316673 | Akaike info criterion | | 4.794867 |
| Sum squared resid | 64.40369 | Schwarz criterion | | 5.673763 |
| Log likelihood | -55.32044 | Hannan-Quinn criter. | | 5.081365 |
| | | | | |
| Durbin-Watson stat | 2.364336 | | | |

Table 4.5 suggests the short run dynamics coefficients of the model. As above it can be observed by taking adjusted $R^2$ into consideration from the table that the variables used in the model defines 88% of the dependent variable. ECt-1 coefficient explains that if there occurs a shock in the economy, within 1 year 35% of the economic growth comes to its equilibrium point. If the coefficient value of the error correction term is between 0 and -1, there is a unidirectional convergence towards the value for the long-term equilibrium. The coefficient value takes a positive value If it is less than or -2, it indicates that the equilibrium has been moved away. Finally bug fix If the coefficient value is between -1 and -2, the long-term equilibrium values of the error correction term indicates that it has reached equilibrium, with ripples shrinking in size around it. According to our results (-3,51) it can be told that results show that there is not significant relationship for long-term.

**Table 4.7: Stability Tests**

The balance of the version is measured through the Cumulative sum of squares of recursive residuals (CUSUM) as denoted at the figure. In this case, CUSUM test, that's primarily based totally at the residuals from the recursive estimates, affords this type of test.

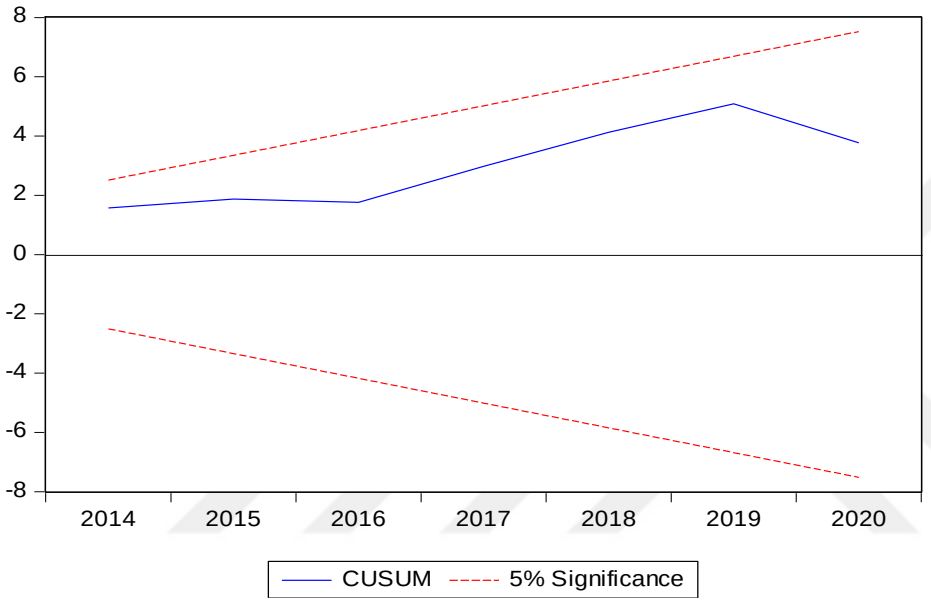
**Hypothesis1:**

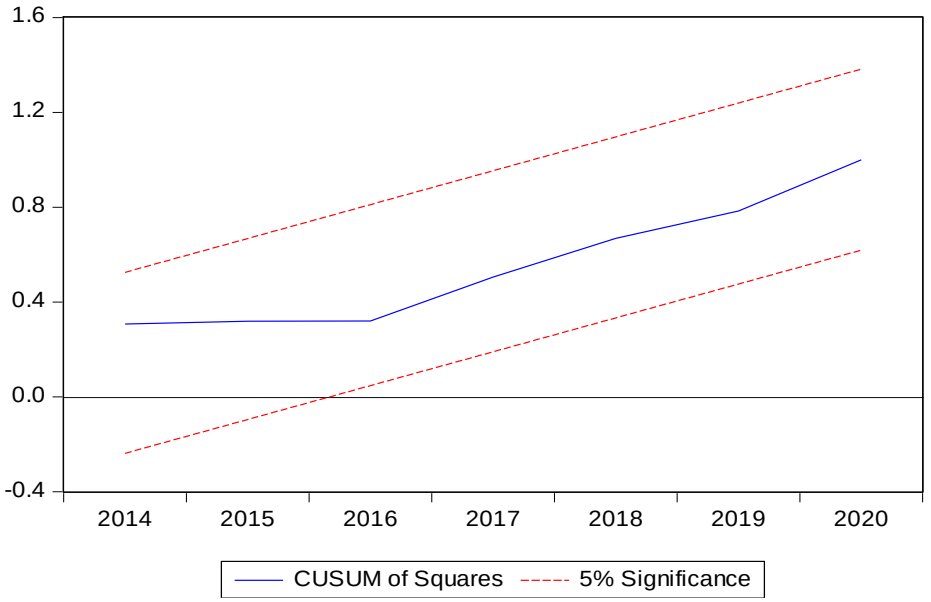
H0: The CUSUM distribution is a symmetric distribution targeted at 0.

H1: The CUSUM distribution isn't always symmetric distributed and no normal distribution.

**Decision rule.**

The null hypothesis of normal distribution is accepted while the graph of CUSUM information lays among the bounds of the critical area for a check at 5% degree of significance and vice versa. Based at the end result of the study the graph of CUSUM information lays among the boundaries of the crucial area as follows.




**Graphic 1.** Stability test

As the above figure shows the model has not developed any stability problem.

# CHAPTER FIVE

# CONCLUSION AND RECOMMENDATION

Having a qualified data and handling the variables carried in the model is compulsory for not just empirical anatomy but also for validity of the examination theory. The methodology and variables involved in this study are elected taking into consideration their relative significance on the empirical and theoretical base. The data covers the period from 1985/2020.

## 5.1 Conclusion

Inflation is still an indicator that many researchers are working on it. Under differ bet circumstances it is accepted as a necessary fact to increase growth and employment level but for some countries in other circumstances it is found as an indicator that diminishes the welfare level of countries. The GDP, foreign direct investments, deflator, population growth and trade openness Variables have been examined in this research about the usage of annual statistics from 1985 to 2020. A unit root was once seen in the factors stationary at the level, while the factors stayed fixed at the 1stdifference. There are long run relationship between these factors dependent absolutely upon the cointegration check study. In these review we will run graphic measurements. As per this test, to put it plainly, help portray and comprehend the highlights of a particular informational collection by giving short outlines about the example and proportions of the information.

The Autoregressive Distributed Lag model demonstrates that 1% increase in the population rate causes -8.4% decrease in GDP growth rate and 1 % increase in inflation causes 0.32% increase in the economic growth. The results gathered in terms of population growth supported the Mankiw's theory (1998) which tells that population growth diminishes GDP per capita in terms of both quality of quantity so it has a negative effect on GDP growth. And also the results related with inflation is parallel to the literature. These outcomes are recognition with a few examinations inspected in the writing which uncover that inflation has a positive effect to economic growth. The maximum outstanding end result of my discoveries is, economic growth does not assist to read the unborn inflation, having taken under consideration the data handed through economic growth itself. By understanding the history values of increase in actual GDP, we can't forecast what the inflation might been the upcoming times. On the obverse, it is an inflation that enables examine the destiny

charge of actual GDP increase. Hence, the look at indicates that, given the present state of affairs in Ethiopia, authorities ought to provide attention on inflation decrease as a goal.

Thinking about each inflation and economic growth aren't a contemporary idea as an alternative their connection are still willing as a controversial trouble amongst economists, insurance builders, inclusion examiners, legislators, surprisingly, the general population itself with the aid of giving their private evaluation via the use of conduct a studies and assumption primarily based at the style as in advance than. Essentially, the goals of this paper are to test the relationship amongst inflation and economic growth as properly as to study the motives, resources and influence of Ethiopian inflation.

### 5.2. Limitations of the Study and for Future Research

The research have been a hit at penetrating the relationship between inflation and Growth in Ethiopia. Still, this has not been done without its own limitations. Originally, the data used in the study is at all sensitive to different modeling.

However, as is regular for research in developing nations, there were crucial problems and facts shortages on some of the maximum essential variables that went into building the boom version. Despite the fact that the researcher forced to rely on costly international sources which includes Wold Bank and other international organizations instead local data warehouses because of the lackness.

### 5.3 Recommendations

- It is essential for the Ethiopian authorities to build strong establishments and keep away from relying on foreign assistance with the aid of organizing well-established home valuable asset activation packages as well as sufficient commitment with the contributor local area
- The country's financial method must give attention more to structural improvement and industrialization rather than large agricultural confidence.
- the look at suggests the authorities ought to energy the monitoring and assessment of the projects, and beef up the control of country-owned businesses to improve the failure of mega-projects (megaprojects include precise monetary zones, public homes, energy flora,

dams, airports, seaports, bridges, highways, tunnels, railways) that causes the budget deficit. The authorities/ policymakers ought to be worried about the life of a finances deficit, as it hurts monetary increase ultimately, and should have to take into consideration each brief-run and lengthy-run effects.

- Partners ought to have likewise consider the impact of downgrading truly and set a re-average strategy that energizes yield development and contain the consequences for other full scale factors interlinked with the debasement prior to making a depreciation of the local cash.
- The public authority ought to need to outline more exchange open strategies to create a gain by incorporating the country's economy with the territorial/world economy as it applies an apparent positive issue on the financial advancement of the nation.

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# APPENDICES

**Appendix A:** Descriptive statistics.

Descriptive statistics table4.2.

| | **FDI** | **GROWTH** | **IN** | **ITR** | **POP** |
|---|---|---|---|---|---|
| Mean | 2.279498 | 6.222354 | 91.75431 | 34.73888 | 2.976391 |
| Median | 2.383924 | 8.505949 | 36.72775 | 31.72672 | 2.859155 |
| Maximum | 5.576213 | 13.85933 | 398.6500 | 49.91158 | 3.590509 |
| Minimum | 0.001620 | -11.14435 | 15.26471 | 23.38600 | 2.541386 |
| Std. Dev. | 1.762625 | 6.476884 | 98.83887 | 8.735265 | 0.299453 |
| Skewness | 0.218861 | -1.111134 | 1.497433 | 0.423283 | 0.698836 |
| Kurtosis | 1.856705 | 3.437883 | 4.354830 | 1.808360 | 2.288334 |
| | | | | | |
| Jarque-Bera | 2.248086 | 7.695323 | 16.20717 | 3.205020 | 3.689937 |
| Probability | 0.324963 | 0.021330 | 0.000302 | 0.201390 | 0.158030 |
| | | | | | |
| Sum | 82.06194 | 224.0047 | 3303.155 | 1250.600 | 107.1501 |
| Sum Sq. Dev. | 108.7396 | 1468.251 | 341919.3 | 2670.670 | 3.138531 |
| | | | | | |
| Observations | 36 | 36 | 36 | 36 | 36 |

**Appendix B:** ARDL Bound Test.

Table 4.3.2 ARDL Bound Testing Results

| **Model** | **Optimal Lag*** | **F Statistics**** | **Bound Test Critical Values** | |
|---|---|---|---|---|
| | | | **Lower** | **Upper** |
| F(pop, inf, itr, fdi ) | (4,4,4,3) | 7.774671 | 3.29 | 4.37 |

**Appendix C:** Diagnostic checks.

Table 4.3.3 Diagnostic Checks

| **Test** | **Statistics** | **Probability** |
|---|---|---|
| Breusch-Godfrey Serial Correlation LM Test | 0.664300 | 0.5548 |
| Heteroskedasticity Test: Breusch-Pagan-Godfrey | 0.905033 | 0.6070 |
| Ramsey Reset Test | 1.077756 | 0.3392 |

**Appendix D:** Unit root test.

**Table 4.8: ADF-PP Unit Root Test Results**

| | ADF | | | PP | | |
|---|---|---|---|---|---|---|
| **Variables** | **Level Intercept and Trend** | **First Difference Intercept and Trend** | **Decision** | **Level Intercept and Trend** | **First Difference Intercept and Trend** | **Decision** |
| **Growth** | -5.564459 (0.0003) | -9.059687 (0.0000) | Level | -5.573072 (0.0003) | -7.681742 (0.0000) | Level |
| **Inf** | -5.664997 (0.0002) | -8.889600 (0.0000) | Level | -5.638070 (0.0003) | -10.79142 (0.0000) | Level |
| **Itr** | -0.350039 (0.9857) | -5.997888 (0.0000) | 1st Difference | -0.350039 (0.9857) | -5.997481 (0.0001) | 1st Difference |
| **FDI** | -3.069198 (0.1292) | -6.568623 (0.0000) | 1st Difference | -3.114511 (0.1187) | -6.576510 (0.0000) | 1st Difference |
| **Pop** | -4.945164 (0.0022) | -3.709791 (0.0383) | Level | -1.074497 (0.2501) | -2.089530 (0.0369) | 1st Difference |

* Table 4.3 is organized according to 5% significance level and Schwarz criteria.