

Effects of Monetary Policy on Private Investments in Ethiopia

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Abstract

The main objective of this study is to investigate the effect of monetary policy on private investments in Ethiopia for utilizes annual time-series data from 1980 to 2020. To achieve the goal of this study, Autoregressive Distributed Lag (ARDL) Approach to Bounds test and Error Correction Model are applied in order to investigate the long-run and short run relationship between the dependent variable and explanatory variables. Data was collected from National Bank of Ethiopia (NBE). The monetary policy we used as indicators are Money Supply (M_2), gross domestic saving (GDS), Bank credit (BC), Inflation rate (IR), and Real effective exchange rate (REER). The finding of the Bounds test shows that there is a stable long run relationship in all variables. The empirical results suggest that money supply exerts a positive and statistically significant effect on private investments, in the long run, gross domestic saving a positive and statistically significant effect on private investment in the long run, and bank credit a positive and statistically significant effect on private investment in the long-run. But inflation rate and real effective exchange rate are insignificant effects in the long run as well. The estimate of the speed of adjustment coefficient found in this study indicates that about 121 percent of the variation in the private investment from its equilibrium level is corrected within a year. Based on the findings of the empirical analysis, the study recommends that monetary policy have a positive effect on private investment; an important policy implication emerging from this study is to facilitate the establishment of financial institutions to increase credit delivery to the private sector to enhance private investment.

Keywords: *Monetary Policy, private investment; ARDL Co-Integration, Ethiopia*

INTRODUCTION

1.1. Background of the Study

Investment is an important component of aggregate demand and a critical resource for economic growth because it contributes to the growth of the economy's productive potential. Investment has been regarded as one of the primary engines of growth (Wade, R. (1989) and the proposed solutions to SSA's economic and geographic disadvantages (Bajpai, N., Dholakia, R. H., & Sachs, J. D. (2005). It seems that almost all countries are seeking to inspire internal investment and attract foreign investment. Meanwhile, investment plans are important to meet future demands as well as ensuring financial goals. Strong investment capacity, on the whole, will ensure fast and sustainable economic development. Investments in banks and financial services continue to stimulate the circulation of funds and help the economy work. Financial independence, economic prosperity, and personal goals could be achieved through investments. How domestic investment fosters economic growth has been discussed in the study of De Long and Summers(1991). Specifically, by encouraging technological advancements, the investment could raise capital for the economy, direct or indirect. Furthermore, they also stressed the importance of the investment climate in the process of moving capital, especially about private investment. Furthermore, they also stressed the importance of the investment climate in the process of moving capital, especially with regard to private investment. According to the World Bank (2003), a favorable investment climate may create opportunities and incentives for investors to conduct the large-scale operation, create employment and increase output, thus sustaining private investment and economic growth. As noted by Agrawal and Khan (2011), in the context of fierce competition in the attraction of investment, the majority of countries would focus their best efforts on improving the environment and institutions for investment. In line with the market-oriented economic policy of 1992, the investment regime has also liberalized since then. The Ethiopian Investment Agency (EIA), which is an autonomous government body, serves as a one-stop-shop for issuing investment licenses and investment facilitation. The New Market-Oriented Economic Policy embraces wide reforms which include foreign private investments. Consequently, the private sector is encouraged to invest in most areas of the economy. Areas that were exclusively restricted to the government such as defense, industries, hydropower generation,telecommunications services are now open for private as well as foreign investors. With an improved investment climate, Ethiopia has steadily continued to attract and expand domestic and foreign investment. In all, a total of 25,835 investment projects were licensed during the 1992/93-2006/07 period.

Several factors work in Ethiopia's favor as an emerging destination for investment. These include the existence of a one-stop service for new investment approvals, a large domestic market of over 84 million people, a liberalized economy, a strong growth record in recent years, fiscal stability, democratic government, high employer satisfaction with labor, and the prevalence of peace and stability. Ethiopia has maintained strong investor interest as one of the top investor destinations in Africa. The country's FDI inflows have increased substantially throughout the years: from US\$288m in 2010 to a record high of US\$2.52bn in 2019. This has made Ethiopia the second largest FDI recipient in Africa, with China being the largest investor. Since 2013, FDI inflows have doubled, primarily boosted by investments in manufacturing, industrial parks, and large infrastructural projects such as the Great Renaissance Dam and the Modjo-Hawassa highway. Investments can be expected to remain inflated considering the country's infrastructural plans and the creation of multiple special economic zones (SEZs). Another factor that is expected to fuel investments is the recent launch of the African Continental Free Trade Area (AFCFTA) which aims to boost economic integration and intra-Africa trade by 60% within three years.

Monetary policy is the mechanism by which a country's government, central bank, or monetary authority regulates. (i) The supply of money, (ii) the price of money, and (ii) the cost of interest rate money in order to achieve a set of goals geared towards economic growth and stability. Monetary theory offers insight into how optimal monetary policy can be crafted. Either an expansionary policy or a contractionary policy is referred to as monetary policy. Where the total supply of money in the economy is raised by an expansionary policy, the contractionary policy lowers the total supply of money in the economy. Expansionary policy is usually used by reducing interest rates to reduce unemployment in a recession, while contractionary policy means increasing interest rates in order to control inflation. In contrast to fiscal policy, monetary policy applies to government borrowing, spending and expenditure and taxation. Monetary policy is focused on the link between an economy's interest rates, that is, the price at which money can be borrowed, and the total supply of money. In order to affect outcomes such as economic growth (investment), exchange rates with other currencies and employment, monetary policy uses a number of instruments to regulate one or both of these. The system authority has the power to alter the money supply and thus control the interest rate (in order to achieve 'policy goals).

The efficiency of state macroeconomic policies, namely fiscal policy and monetary policy, is an essential aspect of this issue. Monetary policy tends, compared to fiscal policy, to overcome issues resulting from economic uncertainty. Traditionally monetary policy is visible as influencing private sector investment through three routes; specifically the interest rate channel, the demand for money,

and the credit channel. In much less developed countries Kahn G.A(2010) avers that underdeveloped economic structures and susceptible interest rate responsiveness inhibit using the interest rate and demand for money channels because of restrained applicability, while he argues that monetary policy is powerful at the asset aspect of the financial intermediary balance sheet (the credit channel view) where it has a tendency to have more impact. Bernanke and Gertler (1995) classify three channels of monetary policy because the stability sheet channel, the financial institution-lending channel, and the credit channel. The balance sheet channel specializes in monetary policy effects on the liability side of the borrowers' balance sheets and income statements, including variables consisting of borrowers' net worth, cash flow, and liquid assets at the same time as the financial institution lending channel facilitates the feasible impact of monetary policy actions at the supply of loans by depository institutions.

Monetary policy effects on private sector can be observed through the balance sheet; the cost of capital, its effect on investment decisions and the internal rate of return aver (Olweny, T., & Chiluwe, M. (2012). Therefore, a monetary policy that encourages credit for private sector investment will encourage private investment growth, while a tight monetary policy that restricts credit to businesses will hamper private sector growth.

Hare, P., Fofie, F. O., & Six, N. F. (2010) assume that countries where investment accounts for only 5% to 10% of their GDP are unlikely to grow rapidly, because the investment rate of the most successful economies in recent decades is usually at least 25% of GDP, sometimes equal high. Countries such as India can cite evidence that investment is positively correlated with supportive monetary policies. In these countries, Mohan (2008) attributed the critical point of low growth to current high growth, such as the steady increase in total domestic savings. Another example is Bangladesh, which maintains low public debt while funding development expenditures through taxation. Therefore, monetary policy is the main pillar to promote the growth of private sector investment in an enabling environment

The financial reforms created a new monetary regime introducing both challenges and opportunities for private sector investment to operate in that subsequently witnessed the collapse of several private sector firms including commercial banks and non-bank financial institutions due to both internal and external factors.

1.2. Statement of the Problem

The monetary policy plays an active role in a country's economic growth if it is applied successfully to ensure price stability and to keep inflation rate at minimum level. Through a mechanism by which a country's monetary authority controls the supply of money and the cost of money or interest rate, such objectives are achieved. Monetary policy depends on the relationship between interest rate in an economy and the total money supply. Monetary authority uses variety of tools to control one or both of these variables to influence outcomes, such as economic growth, inflation, exchange rate with other countries and unemployment (Hameed, D. 2010).

Monetary policy is one of the most potent and powerful policy tools available to an economy from which it is possible to influence macro-economic and financial structures. Private-sector-driven investment is considered a catalyst for achieving the broad-based dual goals of sustainable economic development and poverty reduction, because investment can provide the poor and the rich with entrepreneurial and income-increasing jobs. Investment is created through internally generated funds, such as income, retained earnings, and shareholder financing, or external funds generated through private placements or public offerings in the stock market (IPO).

The major objective of Ethiopian monetary policy is stabilization of economic growth and increase economic growth rate, stable inflation rate and decrease unemployment rate. Government has adopted various monetary policies through National Banks over years to achieve economic growth. Despite the increasing emphasis on manipulation of monetary policy such problems include high unemployment rate, low investment and high rate of inflation.

Previous studies dealt with monetary policy and private sector investment separately, but did not link them in a dynamic framework. Previous close studies, such as Christensen, M. (2005), in the research using panel series data from different countries, focused on how various monetary and fiscal components can replace the private sector, while Ryan, T., & Maana, I. (2014) the government's domestic debt influences Private sector investment in Kenya. Different from studies that focus on one aspect of the impact of monetary or fiscal policy on private sector investment, this study uses a dynamic method to study the effects of monetary policy on private investment. This is achieved by specifying a multivariate framework using an autoregressive distributed lag model (ARDL), where the dependent variable (PI) is determined by an endogenous variable system including its lag and other variables. Based on this

understanding, it is clear that there are gaps in the literature on understanding the dynamics of the effects of monetary policy on private investment, which indicates that research is needed to decompose and analyze the policy aspects that support private investment. This is achieved by exploring the short-term adjustment process while estimating the long-term relationship to emphasize the influence of the money supply, domestic saving, bank credit, inflation rate, and the real effective exchange rate. The key question posed in the study is whether monetary policy can be held responsible for the performance of private investment or the lack of investment performance.

1.3. Research Questions

This study tries to answer the following questions:

- i. Does a monetary policy have a significant long-run and short-run effect on private investment in Ethiopia?

1.4. Objectives

1.4.1. General Objective

The general objective of this study is to examine the effects of monetary policy on private investment in Ethiopia.

1.4.2. Specific Objectives

- i. To empirically analyze the effects of monetary policy on private investment in Ethiopia, both in the short-run and in the long-run.
- ii. To draw policy implications arising from the study findings.

1.5. Scope of the Study

The study explores the effects of monetary policy on private investment in Ethiopia. To achieve this objective the period 1980 to 2020 are chosen based on availability of data for variables used in the study. In particular, the findings of this study will provide policymakers with insight into whether monetary policy is an effective policy tool for fostering private investment. This research will also add to the current literature by examining the effects of monetary policy on private investment in Ethiopia and looking at its influence by using the latest data to integrate other related macroeconomic variables.

1.6. Organization of the Study

This thesis contains five chapters. The first chapter is an introduction which consists of a background of the study, statement of the problem, research questions, and objectives of the study, significance of the study, hypothesis and scope of the study. The second chapter deals about a review of related literature review of theoretical and empirical studies, and the third chapter is researching methodology. Method of data collection and system of analysis are presented and analyzed in the fourth chapter, and the last chapter is conclusions, recommendation and policy implications.

LETTERATURE REVIEW

The purpose of this chapter is to review the related literature on the area of the effects of monetary policy on private investment. This establishes a framework that guides the study. Theoretical and empirical literature will address the key sections of the section. The first part deals with theoretical literature, and empirical study is analyzed in the second part.

2.1 Conceptual Issues

2.1.1. Performance of private investment in Ethiopia

In this portion the status of private investment in Ethiopia investigated country base in different aspects. The Ethiopian Investment commission(EIC)and regional investment offices licensed a total of 84 projects during 2019/20,all ofwhich were operational. The projects started operation with investment capital of Birr 1.3 billion.All of the Private investment projects licensed wereprivate. Of the total investment projects, 47 (56 percent) were domestic with investment capital of Birr 675.5 million; whereas 37 projects were Foreign owned with total capital of Birr 644.9 million capital. Average capital per project for domestic investment projects was Birr 14.4million while that of foreign investment projects was Birr 17.4million, implying that the foreign investment projectswere more of capital intensive than domestic investment projects. Job opportunity created by these investment projects was estimated at 3,211 permanent and 1,634 casual (Table 1.1).

Table 1.1: Number of Projects,Capital and Jobs Created by Operational Investment (Capital in millions of Birr)

		2017/18	2018/19	2019/20		Percentage change	
		A	B	C	Share	C/A	C/B
1. Total Investment	Number	1,550	976	84	100.0	-94.6	-91.4
	Capital	25,876.3	8,951.7	1,320.3	100.0	-94.9	-85.3
	Permanent Workers	332,003	22,631	3,211	100.0	-99.0	-85.8
	Temporary Workers	36,214	10,541	1,634	100.0	-95.5	-84.5
1.1. Total Private	Number	1,550	976	84	100.0	-94.6	-91.4
	Capital	25,876.3	8,951.7	1,320.3	100.0	-94.9	-85.3
	Permanent Workers	332,003	22,631	3,211	100.0	-99.0	-85.8
	Temporary Workers	36,214	10,541	1,634	100.0	-95.5	-84.5
1.1.1. Domestic	Number	1,496	913	47	56.0	-96.9	-94.9
	Capital	20,698.2	7,836.4	675.5	51.2	-96.7	-91.4
	Permanent Workers	233,115	12,692	110	3.4	-100.0	-99.1
	Temporary Workers	14,044	6,896	272	16.6	-98.1	-96.1
1.1.2. Foreign	Number	54	63	37	44.0	-31.5	-41.3
	Capital	5,178.1	1,115.3	644.9	48.8	-87.5	-42.2
	Permanent Workers	98,888	9,939	3,101	96.6	-96.9	-68.8
	Temporary Workers	22,170	3,645	1,362	83.4	-93.9	-62.6
1.2.Public	Number	-	-	-	-	-	-
	Capital	-	-	-	-	-	-
	Permanent Workers	-	-	-	-	-	-
	Temporary Workers	-	-	-	-	-	-

Source: Ethiopian Investment Commission

2.1.2. Opportunities of private investment in Ethiopia

2.1.2.1 Strategic Sectors for Foreign Investment in Ethiopia

The strategic sectors for investment, as identified by the government, are agriculture, textile and apparel, leather and leather products, pharmaceuticals, agro-processing, ICT, power, mining, and tourism. Ethiopia’s natural and various riches such as vast arable land, favorable climate, diverse agro-ecological zones that make it possible to grow almost everything, cheapest electricity per kilo wat hours, and trained and affordable human power combine to make it an incredible hub for investment. The country has 74.3 million hectares of arable land, and over 3-million-hectares of land has been made

available for investment. Ethiopia offers one of the largest and most diverse agricultural investment opportunities in the continent.

In the path to industrialize Ethiopia, textile and garment industry are given prominent position in boosting export and creating job opportunities. The recent surge in Ethiopia's textile and apparel production and export to the global markets shows that the country has the potential to become one of the leading textiles and Apparel hubs of Africa, with the bold vision of transforming the country into compelling new apparel sourcing hub for brand, retails and their suppliers.

In agro-processing sector, investment opportunities include processing of meat and meat products, fish and fish products, fruits and vegetables, manufacturing of edible oil, processing of milk and/manufacturing of dairy products, baby food, animal feed, macaroni and pasta, alcohol and soft drinks, etc.

The country, as a Land of Origins, commands a large and untapped potential for the tourism and hospitality sectors. The potential for interested investors to tap into the construction of star rated hotels and lodges around the destinations will offer a wide opportunity as the tourism infrastructure has huge room to grow.

In sum, the sectorial varieties coupled with potential for backward and forward linkages, Key geographic location, and duty-free access to the EU and U.S. markets through the Everything but Arms (EBA) and African Growth and Opportunity Act (AGOA) respectively, Put Ethiopia as an attractive place for FDI(<https://perspectives-cblacp.eu/investment-opportunities-in-ethiopia/>).

2.1.2.2 Competitive Incentive Packages

Ethiopia offers a comprehensive set of incentives for the priority sectors. These include:

- ✓ Customs duty free privilege on capital goods and construction materials, and on spare parts whose value is not greater than 15% of the imported capital goods' total value.
- ✓ Investors have the right to redeem a refund of customs duty paid on inputs (raw materials and components) when buying capital goods or construction materials from local manufacturing industries.
- ✓ Income tax exemption of up to 6 years for manufacturing and agro-processing, and up to 9 years for agricultural investment.

- ✓ Additional 2-4 years income tax exemption for exporting investors located within industrial parks and 10-15 years exemption for industrial park developers.
- ✓ Loss Carry forward for half of the tax holiday period. Several export incentives, including Duty Draw-Back, Voucher, Bonded Factory, and Manufacturing Warehouse, and Export Credit Guarantee schemes (<https://perspectives-cblacp.eu/investment-opportunities-in-ethiopia/>).

2.1.3. Challenge of private investment in Ethiopia

2.1.3.1 Land Expropriation

Government of Ethiopia is providing land for investment with a variety of incentives such as repatriation of profits, hiring expats, custom duty exemption, income tax exemption and etc. It believes that investment is a crucial way to fight poverty among other approaches, is to make use of available natural resources. However, this exercise is not positively viewed in all corners and which benefits investors at the expense of the people. ([http://www.conscientiabeam.com/pdf-files/eco/35/JSER-2019-6\(2\)-150-168.pdf](http://www.conscientiabeam.com/pdf-files/eco/35/JSER-2019-6(2)-150-168.pdf)).

2.1.3.2 Environmental Pollution

Some industries generating liquid wastes, solid wastes (especially the under composed materials, plastics), etc. Polluting the environment is a serious problem in Sebeta town. During the field visit, I observed that animals drink Sebeta River which carries wastes of factories alongside to the river. One informant during focus group discussion said that “I lost one milking cow in 2018. It drank this river and passed away”. Other participant of the interview also share this problem and added that, had it not been the situation improving we could have lost many animals.

Most of the high water consuming industries in the Awashbasin area draw water for production purposes from water supply sources and discharge their by-product wastes in to streams and rivers without any kind of treatment. Besides this, there is no restriction on industrial plants discharging their waste water into the rivers and water courses. For example, Ayka Addis can be an example. ([http://www.conscientiabeam.com/pdf-files/eco/35/JSER-2019-6\(2\)-150-168.pdf](http://www.conscientiabeam.com/pdf-files/eco/35/JSER-2019-6(2)-150-168.pdf)).

2.1.3.3 Labor Exploitation

Most locals, according to the data obtained from focus group discussion, are employed as daily manual labor's and suffer problems related to the problem of their wages including not being paid on time. No local community member has been involved in the management or administration or

technical work of the companies. They imported managers from their country and Addis Ababa([http://www.conscientiabeam.com/pdf-files/eco/35/JSER-2019-6\(2\)-150-168.pdf](http://www.conscientiabeam.com/pdf-files/eco/35/JSER-2019-6(2)-150-168.pdf)).

2.1.3.4 Cause of Disability

In most studies, abrasions, cuts, burns, puncture and fracture were the common injury types among manufacturing industrial works (Aderaw, Z., Engdaw, D., & Tadesse, T. (2011). According to data obtained from focus group discussion with workers of companies, several manufacturing did not give proper training for new employees on the operation of different machines. An accident caused by machine is common in factories. Electric shock is also another cause of disability in several factories. Hence, leg and hand/finger are injured commonly with these causative conditions. As a result of these factors causing incidents in different investment projects, disability is suffering the employees of some companies. The causes of disability in industries have been attributed to many factors. These are lack of training, heavy chemicals, working position standing, working position sitting, guarding on machinery, working more than expected time are few([http://www.conscientiabeam.com/pdf-files/eco/35/JSER-2019-6\(2\)-150-168.pdf](http://www.conscientiabeam.com/pdf-files/eco/35/JSER-2019-6(2)-150-168.pdf)).

2.2. Theoretical Review

2.2.1 Theoretical Framework, the IS-LM Model

The IS-LM model offers an effective model for exploring the effects of monetary policy, thus capturing the interaction of variables in which investments in the private sector are determined by five main variables: money supply, interest rate, gross domestic savings, inflation and gross domestic debt. The IS curve shows interest rate combinations and output levels where expected investment is equivalent to profits. Similarly the LM curve shows a set of all income levels (GDP) and interest rates at which the supply of money equals the demand for money (liquidity). As higher income levels (GDP) induce increased demand to hold money balances for transactions, the LM curve slopes upwards, which requires a higher interest rate to keep money supply and liquidity demand in equilibrium. Along the LM curve, the money market is in equilibrium, Calvo, G. A., Dornbusch, R., & Obstfeld, M. (Eds.). (2004). The IS curve is downwards sloping implying that a decrease in the interest rate increases the amount of investment spending resulting in increased aggregate demand and the level of output.

The increase in government expenditure would increase the level of aggregate demand at equilibrium, which will increase output to meet increased demand. When demand for investment funds rises, the new

equilibrium boosts production from an increase in interest rates; as a result, interest rates rise in response. At this point the increase in government spending has resulted to a rise in interest rates which decreases the amount of investment spending by the private sector; hence the increase in government spending has crowded out private sector investment (Furceri, and Sousa, 2009). If interest rates remain unchanged, then government expenditure would result in increased productivity and a new level of equilibrium. The money market is not because revenue has risen and the amount of money demanded is higher, resulting in excess demand, as the goods market is at equilibrium.

Unless there is a corresponding increase in the supply of money, interest rates would be forced to increase. Monetary policy is supportive to fiscal policy in the sense that, in order to avoid interest rates from increasing, the money supply rises.

In addition, when an element of policy uncertainty is integrated as a factor that drives private investment, Alesina and Rodrik (1994) stated that when a policy change is introduced, the private sector is very unlikely to see it as 100% effective. A variety of explanations can be speculated, including the assumption that the political-economic structure that sustained the previous policies will re-emerge. The concern that unexpected results can lead to a reversal is also present.

Again, the limitations on investment financing are delaying private investment. Ghosal and Loungani (2000) argued that, in general, small and medium-sized companies are unable to finance their operations directly by open market debt. They, therefore, resort heavily to bank credit markets, which are often marked by imperfections due to the asymmetry of information between lenders and borrowers.

Owing to the lack of a potential demand and limited access to long-term financing, developing countries are usually faced with the challenge of accessing credit.

2.1.2 Classical Theory on Private Sector Investment

From the classical viewpoint private sector investment is negatively influenced by changes in monetary policy specially government domestic debt that is considered in competition with the private sector for limited loan able funds available in the economy. Increases in government spending financed by monetary policy changes tend to reduce the private sector's ability to access funds for investment. The crowding out effect refers to the displacement of private sector investment by government borrowing. Barro, R. J. (1997) distinguishes the two ways in which private sector investment can be displaced as arising from a tax cut or an increase in government consumption spending. This induces

increased public debt which he describes as; “the decline in private investment that may result from a tax cut financed by a government budget deficit and the decrease in private consumption and investment that results from an increase in government consumption respectively”.

Several other factors, like as the structure of public debt, its maturity, and the composition of ownership, are believed to influence the behaviour of private sector investment in the classical framework. According to Maana, I., Owino, R., &Mutai, N. (2008, July) the composition of the public domestic debt portfolio has an impact on how private-sector investment can obtain financing According to Christensen (2005), a small investor base dominated by commercial banks increases the risk that private companies dependent on commercial bank funding will lose out as government securities are sold due to a lack of nonbank investors, such as pension funds and retirement funds, to whom the government may sell its debt without necessarily displacing private sector investment.

The role of interest rates is pivotal to understanding how private sector investments are affected by monetary policy. Olweny, T., &Chiluwe, M. (2012)submit that the neoclassical school infers that balancing of savings and investment will be solved by the interest rate mechanism.

Interest rates must rise to put the capital market back to equilibrium when government spending increases are funded by domestic debt, dampening private sector investment. The major assumption that the money supply remains constant heads up that statement. Interest rates may remain constant or decline if the money supply grows or becomes more accommodating to government spending, depending on the expansion of the money supply and thus liquidity in the economy.

2.1.3 Keynesian Theory on Private Sector Investment

The Keynesians believe that governments are justified in implementing deficit-causing fiscal policy to foster economic growth. They presume that the economy is not at full employment and that investment is not interest rate sensitive. Increased government spending in this case results in a low increase in the interest rate while increasing output and income. Their argument is based on the multiplier principle, which states that a change in government spending causes a larger change in output. Barro, R. J. (1999) demonstrates this argument by stating that in the Keynesian model, a rise in aggregate demand leads to an increase in output, which in turn leads to a rise in real income, which leads to yet another increase in aggregate demand. This change results in increase in output and, as a result, increased demand. The process is not infinite because each consecutive rise in output is smaller than the preceding one. According to Furceri and Sousa (2009), the conventional Real Business Cycle (RBC) model predicts

that an increase in government consumption will have a positive influence on investment: an increase in government consumption causes a rise in employment, which, if durable enough, leads to an increase in the expected return on capital, which, in turn, may drive an increase in investment. Only a part of the income is consumed or paid in taxes, thus savings are expected to grow.

2.1.4 Credit Channel Theory

Analysis of the relationship between monetary policy and output reveals that credit plays a significant role. Kahn, G. A. (2010) explains that conventionally changes in short-term interest rates brought about by the central bank, through an open-market operations change the cost of capital, that then changes the rate of fixed investment, (housing expenditures, inventories). The change in aggregate demand then leads to a change in output (GDP). According to Citing Bernanke and Gertler(1995), empirical data supporting the conventional view of monetary policy's impact on GDP is lacking, which led to the development of the credit channel theory, whose primary premise is that market frictions cause a spread between a firm's internal and external financing sources. They argue that changes in what Bernanke and Gertler (1995) call the "external finance premium" can better explain movements in investment and, therefore, overall output, than can interest rates.

According to Kahn, G. A. (2010), in the context of the credit transmission channel, monetary policy affects the supply or relative pricing (the external finance premium) of loans by banks. As tighter monetary policy causes banks to lose the use of some funds which cannot be replaced with other sources of funds (such as CDs or equity), then the relative cost of funds will increase, decreasing the supply of loans to bank-dependent borrowers who are squeezed out, due to an increase in the external finance premium. Firms in established financial markets typically have access to various sources of financing, whereas in SSA, financial markets are less developed, and only major corporations can borrow from external markets, leaving smaller businesses with just internal funding and bank borrowing options.

2.2 Empirical view

An enormous number of researchers have drawn attention to the effects of monetary policy on private investment, and there has been a wide and growing body of literature. Most studies indicate that critical monetary policy management instruments can be used to control private investment, including money supply, interest rates, exchange rates and credit limits.

Employing data of Malaysia, Greece, Thailand, Mexico and South Korea to explore the determinants of private investment, and Wong (1982) found that along with state investment, bank credit for the private

sector plays an important role in deciding private investment flows in developing countries. In a study on the case of Pakistan over the period of 1959–1963, Khan, M. S., & Montiel, P. J. (1988) concluded that an increase in bank credit to the private sector is likely to stimulate private investment. Besides, Syed and Majeed (2007) also found evidence of the positive impact of domestic credit on private investment in Pakistan.

Precious, C., & Makhetha-Kosi, P. (2014) the study shows that a long run relationship exists among the variables. Also, the core finding of this study shows that money supply, repo rate and exchange rate are insignificant monetary policy instruments that drive growth in South Africa whilst inflation is significant.

Ndikumana, L. (2016) the paper investigates the implications of monetary policy for domestic investment through its effects on bank lending to the private sector and interest rates in sub-Saharan African countries. The study argues that the pursuit of inflation control through contractionary monetary policy carries high costs in terms of reduced investment and ultimately slower economic growth. The econometric evidence based on a sample of 37 sub-Saharan African countries over 1980-2012 shows that contractionary monetary policy affects domestic investment negatively both indirectly through the bank lending or quantity channel as well as directly through the interest rate or cost of capital channel. The results suggest that policies that maintain a low interest rate regime would stimulate bank lending to the private sector, which in turn would boost domestic investment. The results have important policy implications for African countries in their efforts to achieve and sustain high growth rates as a means of reaching their national development goals notably employment creation and poverty reduction.

Alawneh, A. M., Al-Fawwaz, T. M., & Shawaqfeh, G. N. (2015) The study aims to demonstrate the impact of fiscal and the quantitative monetary policy on the domestic and Foreign Direct Investment in Jordan during the period (2000-2011), where the study used two models, the first model is to assess the impact of the fiscal and quantitative monetary policy on the domestic investment, the study found that there is a negative relationship between the re-discount rate and the domestic investment, but not statistically significant, while there is a positive relationship with a statistically significant between the mandatory cash reserve and domestic investment, due to the presence of excess cash reserves at banks in Jordan. The study also showed a negative relationship between taxes and domestic investment, and a positive relationship between governmental capital spending and the domestic investment, this means the political effectiveness of the fiscal impact is greater than the monetary policy effectiveness on the domestic investment. The second sample demonstrates the impact of the fiscal policy and the quantitative

monetary on Foreign Direct Investment, The study showed that there a presence of a statistically significant negative relationship between the re-discount rate and Foreign Direct Investment, while it showed a positive relationship between taxes and Foreign Direct Investment, the reason is that the government grant a tax exemptions to encourage Foreign Direct Investment.

Hailu, D. B., &Debele, F. (2015), Results suggest that private investment is positively and significantly influenced in the short-run by public investment, money supply, and a real output but negatively and significantly by real exchange rate while, real interest rate is found to have insignificant and has a negative sign in line with macro-economic theory. Moreover, in the long run, the result shows a positive and significant effect of public investment, real GDP and broad money supply while real exchange rate negatively and significantly influenced private investment. However, real interest rate is found to have a positive but insignificant effect in the long run as well.Using Nigeria's data covering 1970–2012, Agu, O. C. (2015) claims that the investment rate appears positively correlated with both the growth rate of disposable income and the real interest rate of bank deposits. Also, this research indicated that a sharp decline in investment in Nigeria between 1970 and 2012 was largely due to the rise of lending rates, the reduction of public spending and savings, political instability, and unsecured infrastructure.

Anastasia, O. C., Omade, S. I., &Osemen, E. J. (2011), the paper investigated the relationship between financial sector development and economic growth in Nigeria for the period 1980-2009. Functional monetary policy measure was used to empirically determine the long run relationship of private investment and economic growth in Nigeria. Applying Vector Auto-Regression Model technique to test the stationary series of variables and the result showed that money supply has a negative but GDP and others have positive significant impact on private investment in Nigeria in the short run but the variables became statistically significant in the long run. This implies that the monetary policy in Nigeria has positively affected the growth of private investment in the Nigeria economy.

Frimpong, J. M., &Marbuah, G. (2010),Results suggest that private investment is determined in the short-run by public investment, inflation, real interest rate, openness, real exchange rate and a regime of constitutional rule, while real output, inflation, external debt, real interest rate, openness and real exchange rate significantly influenced private investment response in the long-run. The findings and recommendations provide vital information relevant for policy formulation and implementation aimed at boosting private sector investment in Ghana.

Ajide, K. B. (2013), the paper sets out to investigate the role of governance on domestic private investment in Nigeria using Auto-Regressive Distributed Log (ARDL) Bounds Testing Approach to ascertain long-run association on an annual data covering the 1970 to 2010 period. Emanated from the estimated models are intriguing findings which showed clearly that difference exists between long and short run determinants of domestic private investment. In the former, degree of openness, previous value of inflation rates and governance indicators are the most important factors but political stability and voice and accountability indicators appear to dominate the governance indicators space as they are both negative and significantly affecting the private investment mobilization. In the latter, savings, real GDP, degree of openness, real interest rates, inflation rates and governance measures are strong determining variables on private investment mobilization. Of the governance indicators however, political stability stood out prominently. A few relatable implications for policy are highlighted for the attention of policymakers.

Erden, L., & Holcombe, R. G. (2005), the study finds that public investment complements private investment, and that, on average, a 10 percent increase in public investment is associated with a 2 percent increase in private investment. The results also indicate that private investment is constrained by the availability of bank credit in developing economies. The same empirical models are run on a panel of developed economies. In contrast to developing economies, public investment crowds out private investment in developed economies. The results show that in a number of important ways, private investment in developed economies is influenced by different factors than private investment in developing economies.

Lesotlho, P. (2006), Several studies in developing countries emphasize the importance of macroeconomic policy in explaining variations in investment, and in particular, identify the microeconomic determinants of private investment to include interest rates, output growth, public investment, bank credit to the private sector, inflation, real exchange rate, and the level of trade. This study evaluated the macroeconomic determinants of private investment in Botswana by means of a regression analysis based on the co-integration and Error Correction Model of Engle, R. F., & Granger, C. W. (1987).

Chen, K. M., Rau, H. H., & Lin, C. C. (2004), the paper examines the impact of exchange rate level and its volatility on outward foreign direct investment (FDI). The diversity in the motives for FDI is considered. Using a real options approach, we show that exchange rate uncertainty has a negative impact on a firm's outward FDI. In addition, while the depreciation of a host country's currency tends to

stimulate outward FDI activity of cost-oriented firms, the depreciation tends to deter outward FDI activity of market-oriented firms. With industry panel data on Taiwan's outward FDI into China over the period 1991-2002, our empirical findings indicate that the exchange rate level and its volatility in addition to the relative wage rate have had a significant impact on Taiwanese firms' outward FDI into China. In general, the empirical results are consistent with the prediction of the theory.

Dang, T. T., Pham, A. D., & Tran, D. N. (2020), the study sheds new light on the relationship between monetary policy and private investment using Vietnam's provincial data and a system generalized method of moment (GMM) framework. To capture monetary policy's effect, different indicators, viz. money supply, domestic credit to the private sector, interest rate and exchange rate are examined. We find that private investment is positively affected by respective monetary policies through broad money, domestic credit and interest rate channels, yet no credible evidence regarding the exchange rate's effect. In which, such a surprising co-movement between real interest rate and private investment was illuminated through analysis of the economy's distinctive characteristics over the two development stages (pre- and post-2012). Another notable finding is that economic development prospects of localities, which attract great attention and cause an intense competition between domestic and foreign investors, appear to be a major barrier to investment decisions of private firms.

Olweny, T., & Chilwe, M. (2012), the study utilizes quarterly macroeconomic data from 1996 to 2009 and the methodology draws upon unit roots and cointegration testing using a vector error correction model to explore the dynamic relationship of short run and long run effects of the variables due to an exogenous shock.

Abbas, S. M., & Christensen, J. (2007) in a study of domestic debt posit that compared to other forms of budgetary finance, market based domestic borrowing is seen to contribute more to macroeconomic stability, low inflation, reduced vulnerability to external real domestic monetary shocks and domestic savings generation.

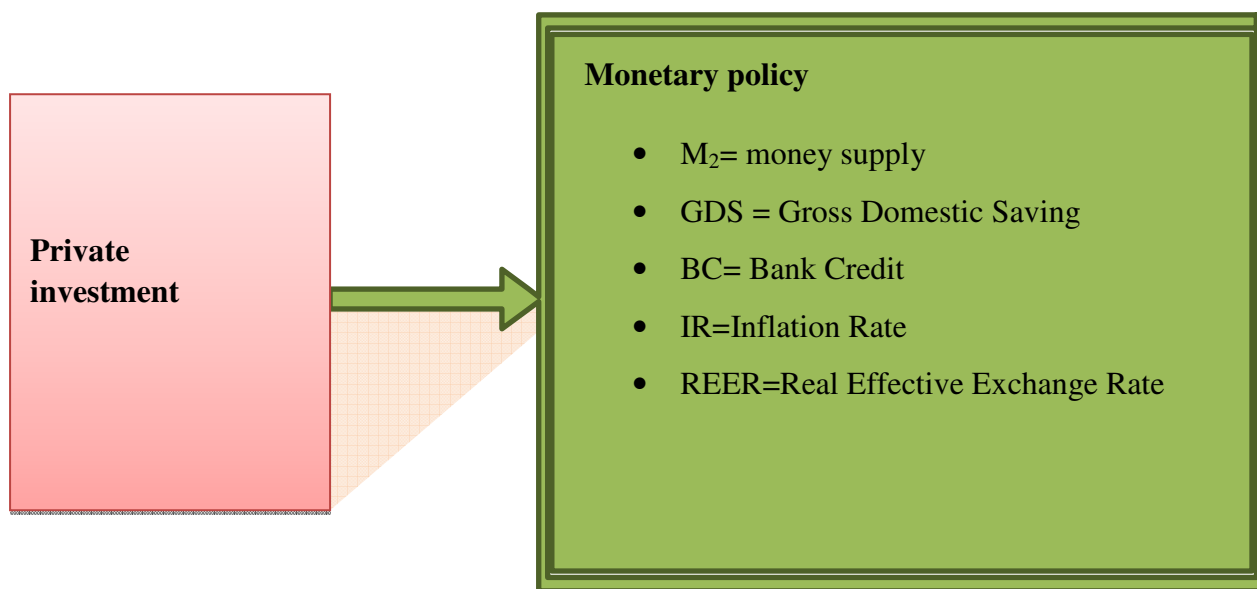
They argue that recent experiences by emerging countries such as China, India, and Chile, using domestic debt among other attributes have experienced faster growth while avoiding major financial or fiscal crises. The IMF (2001) cited in Abbas and Christensen, M. (2005) suggests that availability of domestic debt offers savers an alternative to capital flight as well as lure back savings from the non-monetary sector into the formal financial system. These conditions are applicable to countries that have

well developed financial systems. Mohan, R. (2008) identifies as part of India's long-term growth the fact that savings increased continuously as did the domestic investment rate over the same time and significantly, that the Indian economic growth was financed predominantly by domestic savings.

Vazakidis, A., & Adamopoulos, A. (2009) contend that financial liberalization in the form of an appropriate rate of return on real cash balances is a vehicle of promoting economic growth. They argue that a low or negative real interest rate discourages saving. Reduction in savings reduces the loanable funds in an economy for investment resulting in higher interest rates, low output in turn, lowering the rate of economic growth. Thus, the "McKinnon-Shaw" model posits that a more liberalized financial system will induce an increase in saving and investment and therefore, promote economic growth.

2.3 The Conceptual Framework

From both the theories and empirics we can infer that the monetary policy is the most important macroeconomic area where different scholars had paid attentions working on it. Based on these theoretical and empirical facts mentioned in the above, for this study this paper try to see the effects of monetary policy on private investment in Ethiopia by using annual data on six variables, such private investment, money supply, gross domestic saving, bank credit, real effective exchange rate and inflation rate to analyze.



Research Methodology

3. Introduction

The framework for evaluating the effects of monetary policy on private investment in Ethiopia is outlined in this chapter. In evaluating the effects of monetary policy on private investment in Ethiopia, various strategies and methods have been used. Consequently, the aim of this chapter is to provide reasons for the approaches taken by the researcher in the collection and processing of data in order to respond to research questions and objectives. This chapter explains the data types and sources and the techniques and methods used to approximate the models.

3.1. Data Source

Data for this empirical study are secondary data collect from the National Bank of Ethiopia (NBE) annual time series data over the period of 1980 to 2020.

3.2 The Model Specification

A simple accelerator model is convenient and appropriate for developing a model for private investment, different kinds of literature have argued. Also, Fikru, D. (2007) has argued that a simple accelerator model follows private investment. In so doing, the model follows a general form in the long run that illustrates how private investment transitions to the desired capital stock level. The current stock of private capital is therefore required to adapt to the difference between the desired stock of capital in period t and the actual stock in period t-1 previous section:

$$PI_t = K_t - K_{t-1} \dots \dots \dots 3.1$$

To Empirically Bruno, R. L., & Campos, N. F. (2013) reveal that the variables of most important in determining private investment levels are: domestic output, the real interest rate, public investment, credit available for investment, and exchange rate. Alawneh et al. (2015), Agu (2015), Anastasia et al (2011), Oshikoya's (1994), and Wai and Wong (1982): Required reserve ratio, growth rate of disposable income, real interest rate of bank deposit, output growth and bank credit for private sector.

Moreover, in one hand or other round, economists Such as, Maganga (2012), Ouattara (2010) and Karagoz (2010) argue that real GDP, public investment, domestic credit to private sector, real interest rate, real exchange rate and macroeconomic uncertainty variables are the major ones in determining

private investment empirically analyzed the long-run relationships and dynamic Interactions used an Autoregressive Distributed Lag (ARDL) bounds testing approach. Empirically based on, incorporating the aforementioned variables, the study is delimited on explanatory variables of: real GDP, Bank Credit, Real Effective Exchange Rate, Inflation Rate, Money Supply and Gross Domestic Saving as a control variable in this research paper estimate method effects of monetary policy on private investment in Ethiopia using an Autoregressive Distributed Lag (ARDL) bounds testing approach specified.

Based on economic theory and empirics, the effects of monetary policy on private investment the functional relationship of the private investments can be developed as;

$$PI_t = f(BC_t, GDS_t, MS_t, REER_t, IR_t) \dots \dots \dots 3.2$$

Where, PI_t =Private Investment

BC_t =Bank Credit

GDS_t =Gross Domestic Savings

MS_t =Money Supply (M_2)

$REER_t$ =Real Effective Exchange Rate

IR_t =Inflation Rate

The econometric model of monetary policy effects on private investment used in this study is based on Magnus, J. (2010) and shows similar private investment determinants. The model is rewritten by converting variables (in equation 3.2) to natural logarithmic form as follows;

$$\ln PI_t = \beta_0 + \beta_1 \ln MS_t + \beta_2 \ln GDS_t + \beta_3 \ln BC_t + \beta_4 IR_t + \beta_5 \ln REER_t + \varepsilon_t \dots \dots \dots 3.3$$

Where, \ln - denotes natural logarithm and all variables are in natural logarithm except inflation rate because, for inflation rate there are negative values and small values in the data set.

β - Measure impact response of private investment to each of explanatory variables

ε_t - Error term

Variables definition and expected signs

Inflation Rate (IR): Monetary policy should be tightened to achieve single digit inflation since investors both private and foreign may not be willing to invest in an environment with high inflation rate (Dobrinisky, 2006). Often expressed as a percentage, inflation thus indicates a decrease in the purchasing power of a nation's currency.

The framework envisages an inverse relationship between inflation and private investment as increase in the rate of inflation may discourage private investment. Therefore it can be expected that this is a negative relationship on private investment.

Money Supply (M_2): Are the entire stock of currency and other liquid instruments circulating in a country's economy as of a particular time. The money supply can include cash, coins, and balances held in checking and savings accounts, and other near money substitutes. Economists analyze the money supply as a key variable for understanding the macro economy and guiding macroeconomic policy. Government borrowing supposedly reduces the amount of available domestic savings bringing upward pressure on the level of interest rates as the sale of treasury bills and bonds reduces money supply in circulation while government spending places the money back in circulation Friedman, M. (1997). If Government spending equates borrowing it in effect reverts to the situation prior to the sale of treasury bills and bonds though with a higher domestic debt. Due in part to bureaucratic processes, government spending does not match the removal of money supply through the purchase of securities, prompting the growth of money supply from the central bank to cater for money demand from the public. Thus, the Money supply has a positive Expectation sign-on private investment.

Real Effective Exchange Rate (REER): is the weighted average of a country's currency in relation to an index or basket of other major currencies. The weights are determined by comparing the relative trade balance of a country's currency against each country within the index. FrJayaraman, T. K. (1996) in his cross-country study on the macroeconomic environment and private investment in six Pacific Island countries observed a statistically significant negative relationship between the variability in the real exchange rate and private investment. Thomas, A. H. (1997) in his study of 86 developing countries examined data on terms of trade, real exchange rates, and property rights and concluded that while factors including credit availability and the quality of physical and human infrastructure are important influences,

uncertainty in the foreign exchange rate was negatively related to private investment in sub-Saharan countries. Bakare, A. S. (2011) carried out an empirical analysis of the consequences of the foreign exchange rate reforms on the performances of private domestic investment in Nigeria adopting the ordinary least square multiple regression analytical method. The multiple regression results showed a significant but negative relationship between floating foreign exchange rate and private domestic investment in Nigeria. The findings and conclusion of the study support the need for the government to dump the floating exchange regime and adopt purchasing power parity which has been considered by researchers to be more appropriate in determining realistic exchange rate for naira and contribute positively to macroeconomic performances in Nigeria. Therefore it can be expected that this is a positive or negative relationship on private investment.

Gross Domestic Savings (GDS): Gross Domestic Saving is GDP minus final consumption expenditure. It is expressed as a percentage of GDP. Gross domestic savings provide the basis for sustained long-term private sector investment. Assuming no foreign inflows means that government savings and private sector savings determine the investment-savings nexus. Empirical studies are reviewed in a way to identify a suitable model for private sector investment for the period 1980-2014. Using recent econometric techniques, the results suggest that money supply and gross domestic saving exert positive and statistically significant effect on private sector investments whereas Treasury bill rate, inflation and gross domestic debt exert a negative effect. An important policy implication emerging from this study is to facilitate the establishment of financial institutions to increase credit delivery to the private sector so as to enhance private investment (Brima, S., & Brima, A. S. (2017). Therefore it can be expected that this is a positive relationship on private investment.

Bank Credit (BC): refers to the amount of credit available to a business or individual from a banking institution in the form of loans. Bank credit, therefore, is the total amount of money a person or business can borrow from a bank or other financial institution. Chang, K., Zeng, Y., Wang, W., & Wu, X. (2019) found that greater commercial bank credits, richer liquid assets, higher returns on assets and better investment opportunities may promote renewable energy firms' tangible investments, while more long-run debts and higher bank dependence may reduce their tangible investments. OKORIE, G. C., & Chikwendu, N. F. (2019) found that private sector credit have positive impact on private investment. Therefore it can be expected that this is a positive relationship on private investment.

3.3 Estimation Method

3.3.1 Unit Root Test

Before any time series data analysis the time series data stationarity will be tested. To examine whether a time series data will have a unit root problem or not, there are several ways of testing for the presence of unit root. These are Dickey-Fuller (DF), Phillips Perron test (PPT) and Augmented Dickey-Fuller (ADF). This study will employ ADF test in which lagged differences are included to make the residuals a white noise process. It is suggested to allow both an intercept and time trend in the regression model used to test for the presence of unit root problem. The hypothesis used to test unit root for the above tests was stated as follows:-

H_0 = there is unit root (non-stationary)

H_1 = there is no unit root (stationary)

The null hypothesis is that the variable is non-stationary against the alternative of stationarity. The null hypothesis is rejected only when there is strong evidence against it at the conventional levels of significance. ADF test estimates the following equation:-

$$\Delta Y_t = \delta + \beta_t + \alpha y_{t-1} + \sum_{i=2}^m \Delta y_{t-i} \varepsilon_t \dots\dots\dots 3.5$$

Where, δ and β are intercept and coefficient on trend respectively y_t is the relevant time series variable, Δ is a difference operator, t is a linear trend and ε_t is the error term.

3.3.2. The Autoregressive distributed lag Model (ARDL) bound test for co-integration

To overcome the short comings of Johansen co-integration this study adopted the bounds testing approach to co-integration to estimate the long run relationships. Pesaran and Shin (1997, 1999) and Pesaran *et al.* (2001), proposed an Autoregressive Distributed Lag (ARDL) bounds testing approach to investigating the existence of co-integration relationship among variables. This approach has specific advantages over Johansen maximum Likelihood (1988) co-integration approaches.

First, the ARDL model is the more statistically significant approach to determine the co-integration relation in small samples (Pesaran *et al.*, 2001) while the Johansen co-integration techniques require large data samples for validity. A second advantage of the ARDL approach is that while other co-integration

techniques require all of the regressors to be integrated of the same order; the ARDL approach can be applied whether the regressors are purely order zero [I(0)], purely order one [I(1)], or mixture of both. This means that the ARDL approach avoids the pre-testing problems associated with standard cointegration, which requires that the variables be already classified into I(1) or I(0) or mixture of both. Third, with the ARDL approach it is possible that different variables have different optimal numbers of lags, while in Johansen-type models this is not permitted. Forth, the other advantages of bound testing approach in the long run and short run parameters of the model in equations are determined simultaneously. Finally, Applying the ARDL technique we can obtain unbiased and efficient estimators of the model.

The generalized ARDL model can be specified as follows (Pesaran *et al.* (2001)

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^q \beta \Delta Y_{t-i} + \sum_{i=1}^p \alpha \Delta X_{t-i} + \delta_0 Y_{t-1} + \delta_1 X_{t-1} + \delta_2 X_{2t-1} + e_t \dots \dots \dots (3.6)$$

Where, Δ denotes for first difference operation, Y_t is for a vector of q dependent variables, X_t is a vector of p explanatory variable of Y_t regressors, e_t is the residual term which is assumed to be white noise.

In order to examine the long-run equilibrium relationship among the variables and the associated short-run dynamics, with in ARDL model for the private investment is specified as follow;

$$\Delta \ln PI_t = \alpha_0 + \sum_{i=1}^q \beta_0 \Delta \ln PI_{t-1} + \sum_{i=1}^p \beta_1 \Delta \ln MS_{t-1} + \sum_{i=1}^p \beta_2 \Delta \ln GDS_{t-1} + \sum_{i=1}^p \beta_3 \Delta \ln BC_{t-1} + \sum_{i=1}^p \beta_4 \Delta IR_{t-1} + \sum_{i=1}^p \beta_5 \Delta \ln REER_{t-1} + \delta_0 \ln PI_{t-1} + \delta_1 \ln MS_{t-1} + \delta_2 \ln GDS_{t-1} + \delta_3 \ln BC_{t-1} + \delta_4 IR_{t-1} + \delta_5 \ln REER_{t-1} + e_t \dots \dots \dots .3.7$$

Where, Δ denotes the first difference operator, e_t is the usual white noise residuals, $(\beta_1-\beta_5)$ on the right-hand side correspond to the short run relationship, $(\delta_1 - \delta_5)$ represent the long run dynamics of the model.

To investigate the existence of long-run relationship among the variables, we conduct a bound test based on the joint F -statistics test to observe the joint significance of the lagged level variables. To achieve this, the null hypothesis of no cointegration is state as: $H_0 = \delta_0 = \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = 0$ (no cointegration)

Against alternative,

$$H_1 \neq \delta_0 \neq \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq 0 \text{ (Cointegration)}$$

According to Pesaran *et al.* (2001), two asymptotic critical value bounds provide a test for co-integration when the independent variables are I(0) or I(1) a lower value assuming the regressors are I(0) and an upper value assuming purely I(1) regressors. If the *F*-statistic is above the upper critical value, the null hypothesis of no long run relationship can be rejected irrespective of the orders of integration for the time series the converse is also true.

In the presence of co-integration, short-run elasticity can be deriving by constructing an error correction model of the following form;

$$\Delta \ln PI_t = \alpha_0 + \sum_{i=1}^q \beta_0 \Delta \ln PI_{t-1} + \sum_{i=1}^p \beta_1 \Delta \ln MS_{t-1} + \sum_{i=1}^p \beta_2 \Delta \ln GDS_{t-1} + \sum_{i=1}^p \beta_3 \Delta \ln BC_{t-1} + \sum_{i=1}^p \beta_4 \Delta IR_{t-1} + \sum_{i=1}^p \beta_5 \Delta \ln REER_{t-1} + \gamma ECT(-1) + u_t \dots \dots \dots .3.8$$

Where,

ECT(-1) -the error correction term lagged for one period.

γ - The coefficients for measuring speed of adjustment

Δ - is the first difference operator;

β ' s- the coefficients relating to the short-run dynamics

3.3.3 Diagnostic Tests

The model that has been used for testing the long run relationship and coefficients is further checked with diagnostic tests of Serial autocorrelation, Heteroskedasticity and Normality tests.

Normality Test

An assessment of the normality of data is a prerequisite for many statistical tests because normal data is an underlying assumption in parametric testing. The Classical Linear Regression Model (CLRM) assumes that the error term is normally distributed with the mean of error being zero as positive error will offset the negative error. The normality of error term can be examined through two main methods of assessing normality: graphically and numerically. Using the graph to detect the pattern of the residual and numerically Jarque-Bera test statistics can applied. Jarque-Bera formalizes these ideas by testing whether the coefficient of skewness and the coefficient of excess kurtosis are zero and three respectively. Brooks (2008) also states that, if the residuals are normally distributed, the histogram should be bell-shaped and

the Bera-jarque statistic would not be significant at 5% significant level. Statistical tests have the advantage of making an objective judgment of normality, but are disadvantaged by sometimes not being sensitive enough at low sample sizes or overly sensitive to large sample sizes. As such, some statisticians prefer to use their experience to make a subjective judgment about the data from plots/graphs. Graphical interpretation has the advantage of allowing good judgment to assess normality in situations when numerical tests might be over or under sensitive, but graphical methods do lack objectivity. If you do not have a great deal of experience interpreting normality graphically, it is probably best to rely on the numerical methods. Generally, in null hypothesis the assumption will be the error term is normally distributed. So, if the p-value of JB-statistic is greater than $\alpha=0.05$, we should not reject the null hypothesis.

Serial Correlation Test

In time series analysis the selected model should satisfy the assumption of no serial correlation. To test will adopt the conventional Durbin Wastson test on checking for the presence of serial auto-correction. The null hypothesis stated here is that the residuals are not serially correlated against the alternative hypothesis of serial correlation.

Heteroscedasticity Test

This is used to test for the homoscedasticity of residuals in the model. The null hypothesis state that the residuals are homoscedastic against the alternative hypothesis of heteroskedasticity.

4. Estimated Results and Interpretation

4.1. Summary Statistics

Beforegoing to provide a complete econometric analysis, the study gives brief interpretation of statistical analysis. Descriptive statistics shows that basic feature of the data. They represent quantitative descriptions in a manageable form and provide simple summaries about the data. It differs from inferential statistics. Descriptive statistics describe what is or what the data shows while inferential statistics is used to reach conclusion that extend beyond the immediate data alone.

Table 4.1 Descriptive Statistics

	LPI	LM2	LGDS	LBC	IR	LREER
Mean	9.788	10.304	9.448	8.993	9.480	5.0223
Median	9.508	10.007	8.926	9.397	7.390	5.0126
Maximum	13.633	13.852	13.467	13.049	55.241	5.8421
Minimum	7.119	7.627	6.496	6.142	-11.823	4.5412
Std. Dev.	2.065	1.816	2.110	2.257	13.216	0.3071
Skewness	0.509	0.421	0.549	0.084	1.491	0.4565
Kurtosis	1.957	2.082	2.010	1.719	6.132	2.8213
Jarque-Bera	3.628	2.654	3.736	2.851	31.945	1.4784
Probability	0.163	0.265	0.154	0.240	0.00	0.4775
Sum	401.325	422.455	387.381	368.726	388.669	205.9139
Sum Sq. Dev.	170.533	131.941	178.167	203.777	6986.856	3.7727
Observations	41	41	41	41	41	41

Table 4.1 interprets the average of LPI, LM2, LGDS, LBC, IR and LREER as 9.788, 10.304, 9.448, 8.993, 9.480 and 5.0223 while standard deviation as 2.065, 1.816, 2.110, 2.257, 13.216 and 0.3071. Descriptive statistics shows that maximum value of LNPI, value of during sample period was 13.633 in 2020 and minimum value of LPI was 7.119 in 1980. Maximum value of LM2 during sample period was 13.852 in 2020 and minimum value of LNMS was 7.627 in 1980. Maximum value of LGDS during sample period was 13.467 in 2020 and minimum value of LGDS was 6.496 in 1980. Maximum value of LBC during sample period was 13.049 in 2020 and minimum value of LBC was 6.142 in 1980. Maximum value of IR during sample period was 55.241 in 2020 and minimum value of IR was -11.823 in 1980. Maximum value of LREER during sample period was 5.8421 in 2020 and minimum value of LREER was 4.5412 in 1980.

Skewness is a measure of departure from symmetry. The skewness of a symmetric distribution is zero. Therefore, according to the following table the data of private investment (LPI,**0.509**) money supply (LM2,**0.421**), gross domestic saving (LGDS, **0.549**), bank credit (LBC,**0.084**) and real effective exchange rate (LREER,**0.4565**) showed that these four variables are nearly normally distributed. And the variable inflation (IR) is positively skewed, and then we can say that their distribution has long right tail. Kurtosis measures the peakness or flatness of the data relative to the normal distribution. The kurtosis of normal distribution is 3 whereas the Kurtosis of private investment (LPI), money supply (LM2), gross domestic saving (GDS), and bank credit are less than three, which show platykurtic distribution this small kurtosis

is an indication for having a flatted curve distribution. The Kurtosis of real effective exchange rate is relatively almost 3 which is 2.82 this showed that REER have a relatively normal distribution this shows that the distribution is Mesokurtic curve distribution, in other hand inflation (IN,6.132) is more right value (peaked curve) so it has positive kurtosis which show leptokurtic distribution.

4.2. Unit Root Test

The first step in time series econometric analysis is to carry out a unit root test on the variables of interest. The test examines whether the data series is stationary or not. To conduct the test, the conventional Augmented Dickey-Fuller (ADF) test was employed with and without a trend. The results of the test for the variables at a level and first difference are presented in Table 4.2. As reported in Table 4.2 one variable with an intercept at the level is stationary at a 5% level of significance and two variables with intercept and trend at the level are stationary and six variables with intercept and with intercept and trend at first differences are stationary at 5% level of significance.

Table 4.2: Unit Root Tests of the Variables at Level and First Difference

Variables	Augmented Dickey Fuller (ADF)							
	With Intercept				With Intercept and trend			
	Level(I(0))		1's difference(I(1))		Level(I(0))		1's difference(I(1))	
	t-statistics	P-value	t-statistics	P-value	t-statistics	P-value	t-statistics	P-value
LPI	1.261538	0.9980	-9.579443	0.0000*	-2.387188	0.3803	-10.55745	0.0000*
LM ₂	2.053755	0.9998	-2.614910	0.0986	-0.615287	0.9724	-3.561795	0.0466*
IR	-5.648730	0.0000*	-6.363081	0.0000*	-6.053222	0.0001*	-6.266738	0.0000*
LGDS	0.516472	0.9853	-8.672363	0.0000*	-2.224174	0.4639	-9.136150	0.0000*
LREER	-1.774989	0.3871	-6.437199	0.0000*	-1.715274	0.7259	-6.387540	0.0000*
LBC	0.065933	0.9585	-5.250824	0.0002*	-3.711784	0.0365*	-5.040171	0.0017*

Denotes rejection of null hypothesis at 1, 5 and 10 percent level of significance.

Source: Researcher summarized from E-views 10 outputs.

4.3. Testing for Bounds Test or Co-Integration

In order to check for the existence of long run relationship, co integration, in the model bound co integration test was used to check whether have a long run relation among the variable's or not. The results of the ARDL bounds testing approach are also shown in Table 4.3

Table 4.3:ARDL Bounds Test for Cointegration

Test Statistic	Value	k
F-statistic	15.64	5
Critical Value Bounds		
	Lower Bound(I ₀)	Upper Bound (I ₁)
10% significance level	2.26	3.35
5% significance level	2.62	3.79
2.5% significance level	2.96	4.18
1% significance level	3.41	4.68

Source: Computed by authors using E-views 10 software

From Table 4.3, the calculated F statistics (15.64) is higher than both the Pesaran et al. (2001) and Narayan (2004) upper bound critical values at a 5% level of significance. This implies that the null hypothesis of no long-run relationship is rejected; rather accept the alternative hypothesis (there is a long-run relationship) based on the Pesaran et al. (2001) and Narayan (2004) critical values at a 5% level of significance. Therefore, there is a co-integration relationship among the variables in long run.

4.3. Diagnostic test Checking

Table 4.4: Serial correlation test

H₀: There is no serial correlation between model variables

H₁: There is serial correlation between model variables

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.091320	Prob. F(2,29)	0.9130
Obs*R-squared	0.244082	Prob. Chi-Square(2)	0.8851

As shown in Table 4.3, all versions of the Breusch-Godfrey serial correlation LM test statistic (F statistic, Chi-Square) gave the same conclusion that there was no evidence for the presence of autocorrelation in this particular study. Since the p-values of 0.9674 and 0.9522 for F-statistic and Chi-Square respectively were more than 0.05, the null hypothesis should not be rejected.

Table 4.5:Heteroskedasticity test

H₀: All model variables are homoscedastic

H₁: All model variables are heteroskedastic

Heteroskedasticity Test: Breusch-Pagan-Godfrey

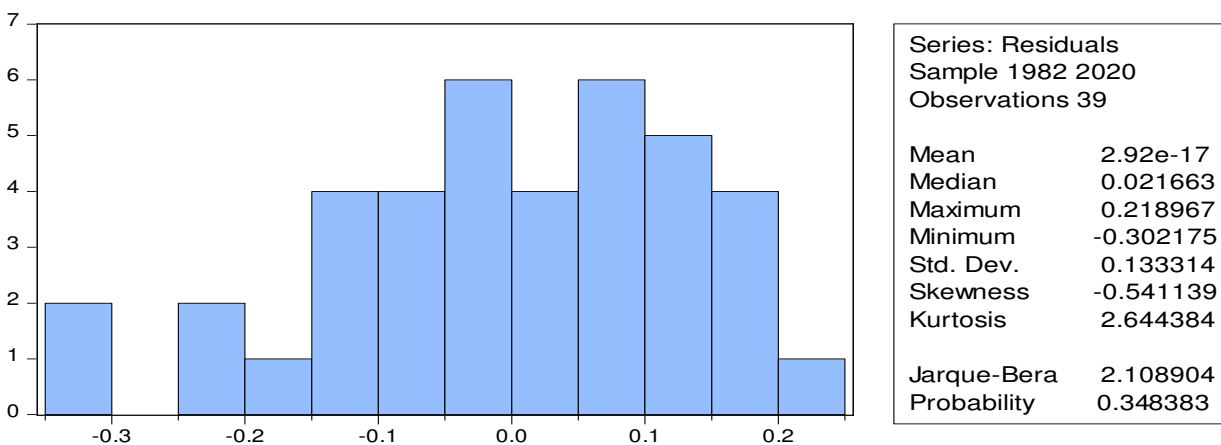
F-statistic	1.255351	Prob. F(7,31)	0.3041
Obs*R-squared	8.613537	Prob. Chi-Square(7)	0.2816
Scaled explained SS	4.474545	Prob. Chi-Square(7)	0.7238

As shown in Table 4.4, all versions of the white test statistic (F-statistic, Chi-Square and Scaled explained SS) gave the same conclusion that there was no evidence for the presence of heteroscedasticity in this particular study. Since the p-values of 0.3041, 0.2816, and 0.7238 for F-statistic, Chi-Square, and Scaled explained SS respectively were more than 0.05, the null hypothesis should not be rejected.

Figure 4.1:Normality test

H₀: all model variables are normal

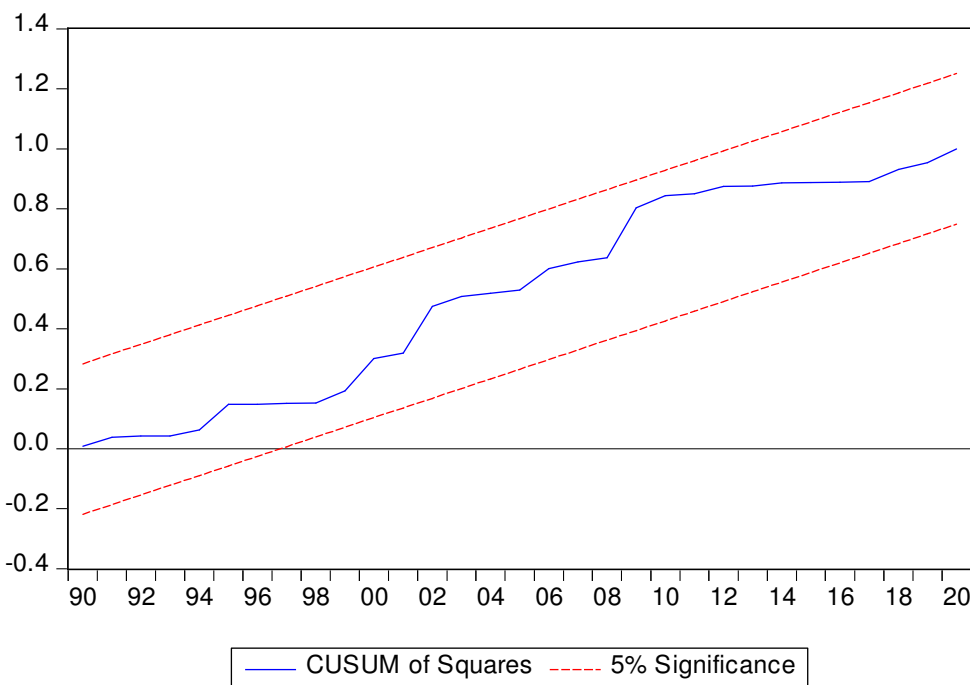
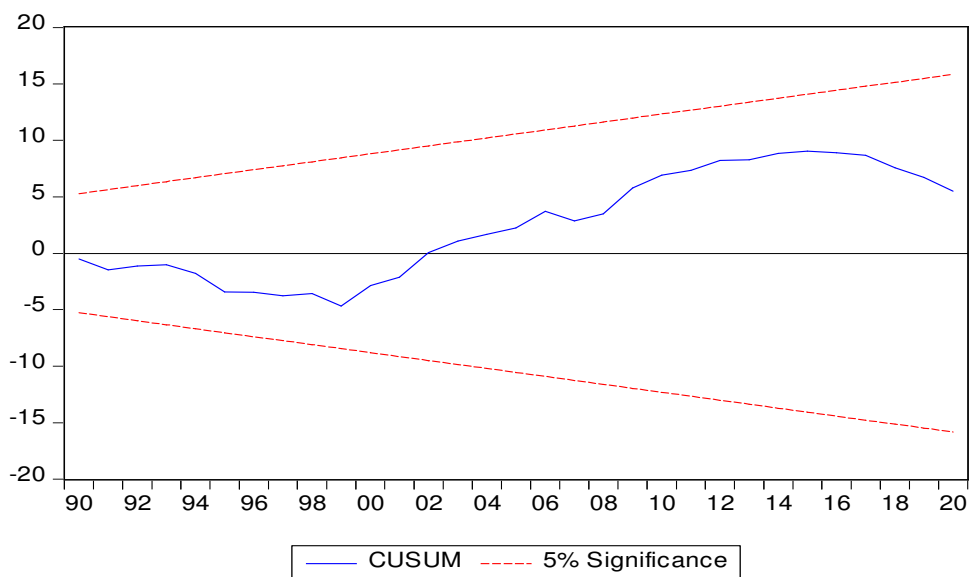
H₁: all model variables are not normal



Here we have the probability associated with the Jarque-Bera statistic has a P-value of normality test is 0.348383 which is greater than the 5% significance level so we cannot reject H₀ rather accept H₀ & conclude that the residuals are normally distributed.

Figure 4.2: CUSUM and CUSUMSQ test

The results of both **CUSUM** and **CUSUMSQ** test given below as depicted in the first figure; the plot of CUSUM test did not cross the critical limits. Similarly, the CUSUMSQ test shows that the graphs do not cross the lower and upper critical limits. Therefore, we can conclude that long and short runs estimates are stable and there is no any structural break. Hence, the results of the estimated model are reliable and efficient.



As shown from the above, the diagnostic test recommends good fit of the model. The model does not suffer from the problems of non-normality of the errors, serially correlated errors, heteroskedasticity and stability which further affirm that the estimation is BLUE. Therefore, the entire diagnostic test of the residual and as observed all test are pass the model we need.

4.4. Long run model

Table 4.6: Estimated Long Run Coefficients

Estimated long run coefficients for the selected ARDL model Selected Model: ARDL(2, 0, 0, 0, 0, 0) selected based on Akai information criterion.

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LM2	0.377283	0.128421	2.937862	0.0062*
LGDS	0.629662	0.090793	6.935172	0.0000*
LBC	0.200492	0.089807	2.232493	0.0329*
IR	-0.001065	0.001956	-0.544644	0.5899
LREER	0.216042	0.160769	1.343808	0.1888
C	-1.247644	0.726185	-1.718079	0.0958
Durbin-Watson stat	1.950764	F-statistic	1041.74	
Adjusted R-squared	0.994811	Prob(F-statistic)	0.000000	

Source: Computed by authors using E-views 10 software. The long-run model of the corresponding ARDL (1, 0, 1, 0, 1, 0, and 0) for the Private investment can be written as follows:

$$LPI = 0.3773 LM 2 + 0.63 LGDS + 0.2 LBC - 1.25$$

The result shows that money supply is positive and statistically significant at 5% level of significance, indicating that an increase in money supply by 1 percent will lead to increase private investment by 0.38%. This implies that the increase in long run money supply has a greater positive impact on private investment. As shown on the table 4.6, money supply has a positive impact on private investment, confirming the results of studies such as Gambacorta, L. (2001) that confirms the direct relationship

between private investment and monetary policy. Moreover, the result is also in line with the study of Kahn, G. A. (2010).

The coefficient of Bank Credit (BC) is positive and statistically significant at 5% level of significance, indicating that an increase in Bank Credit by 1 percent will lead to increase private investment by 0.2%. This implies that the increase in long run bank credit has a greater positive impact on private investment. As shown on the table 4.5, bank credit has a positive impact on private investment, confirming the results of (Blejer, M. I., & Khan, M. S. (1984) who argued that increase bank credit leads to high rates of investment and vice versa.

The coefficient of Gross Domestic Saving (GDS) is positive and statistically significant at 5% level of significance, indicating that an increase in Gross Domestic Saving by 1 percent will lead to increase private investment by 0.63%. This implies that the increase in long run Gross Domestic Saving has a greater positive impact on private investment. General by implication, an increase in gross domestic savings will enhance private sector investment. Gross domestic savings provide the basis for sustained long-term private sector investment. Assuming no foreign inflows means that government savings and private sector savings determine the investment-savings nexus. The growth of gross domestic savings is assumed to be responsible for capital accumulation and indirectly the productivity of labor, the real savings interest rate is further considered to be positively related to changes in gross domestic savings (Aghion, P., Comin, D., Howitt, P., & Tecu, I. (2016). It is assumed that the change in gross domestic savings will cause a change in private sector investment.

The explanatory power of the regressors as captured by the R-squared (0.994811) stood at 99.48 percent meaning that 99.48% of the variations in private investment can be explained by the explanatory variables in the model.

Final, the value of constant is equal to 1.245. It means the average impact of the explanatory variables from the model. That means the effect of all explanatory variables as holding constant, the average of the private investment becomes 1.245.

4.5 Short Run/Error Correction Model

Table 4.7: Estimated Short Run Coefficients (ECM)

Error correction representation for the selected ARDL model ARD(1, 0, 0, 2, 2, 0, 0) selected based on Akai information criterion.

Dependent Variable: D (LPI):

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
D(LM2)	0.639333	0.393876	1.623186	0.1166
D(LGDS)	0.576140	0.092345	6.239011	0.0000
D(LBC)	0.383908	0.162915	2.356488	0.0263
D(IR)	-0.003554	0.001718	-2.068752	0.0486
D(LREER)	0.121173	0.230039	0.526749	0.6028
ECM(-1)	-1.209741	0.214347	-5.643858	0.0000
C	-0.028625	0.061364	-0.466475	0.6448
Adjusted R-squared	0.822497	Durbin-Watson stat		1.955271
F-statistic	16.58612	Prob(F-statistic)		0.000000

Source: Computed by authors using E-views 10 software

Table 4.7 error correction model result represents the short run ARDL estimated model. The error correction coefficient, the estimated value at -1.2097 is highly significant and has the correct negative sign. The absolute value of the coefficient ECM (-1) 121% is high, and this imply a high speed of adjustment to equilibrium. The short run shocks about 121% of the disequilibrium, caused by previous period shocks, converge back to the long run equilibrium. Or the coefficient of the error term ECM(-1) implies that the deviation from long run equilibrium level of dependent variable private investment of the current period is corrected by 121 in the next period to bring back equilibrium.

Access to domestic bank credit is one of the explanatory variables which are expected to have a positive influence in the growth of private investment. Since bank credit is relevant to avail access to working capital for investors where there is capital shortage, the prevalence of good and efficient credit facilities has a positive role to promote private investment. Thus, as the researcher expectation the coefficient of the access to bank credit is positive shown in regression result that, 1% increase access to bank credit will

result increasing the development of private investment by 0.384 %per year where controlling other things remains constant.

This finding is supported by the study of Asante, Y. (2000).

On the other hand saving is a positive and significant effect on private investment in Ethiopia in the short run so based on the above result we can say that in short run a one percent expansion saving affects the Ethiopian private investment to increase by 0.58 percent per year where controlling other things remains constant. As we can see in the short run saving is positive and significant effect on private investment.

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

5.1 Introduction

This chapter is divided into four sections, section 5.2 presents the summary of the findings, and section 5.3 conclusion of the study and section 5.4 presents policy implications.

5.2 Conclusion

Private sector investment/development has become an increasingly significant engine for the government of Ethiopia in promoting economic growth and enhancing job creation, and monetary policy is one of the main economic management tools that governments use to shape of economic performance.

Based on the empirical findings obtained in the long-run and short run showed that there is no doubt that monetary policy is a key and can be considered as engine for the progress of private sector investment in Ethiopia. This paper employs the co-integrated ARDL model to examine the effects of monetary policy on private investment.

Before applying the ARDL model, all the variables are tested for their time series properties (stationarity properties) using the ADF tests. ADF tests results show us, Inflation Rate variable with intercept and with intercept and trend at level are stationary at 5% level of significance and bank credit with intercept and trend at level are stationary at 5% level of significance. private investment, Inflation rate, bank credit, gross domestic saving and real effective exchange rate variables with intercept and with intercept and trend at first differences are stationary at 5% level of significance except money supply. Next to testing for time series property, the model stability was done by testing the diagonal testing techniques. The result revealed that no evidence of serial correlation, the residual is normally distributed and no evidence of heteroscedasticity problem and no evidence of stability problem. As we discussed above, this study

applied the methodological approach called ARDL model also known as bound test approach. As the result indicted the bound test (F-statistic) value is larger than the upper bound critical value both for Pesaran et al. (2001) and Narayan (2004), which indicates there is a long run relationship between private investment and its determinants (money supply, gross domestic saving, bank credit, inflation rate and real effective exchange rate) in long run during the study period. In establishing a long-run analysis, money supply, bank credit and gross domestic saving for private investment turned out to be statistically significant in long-run relationship model and gross domestic saving and bank credit are significant in short run. Final, ECM coefficient is negative and significant, and this model represents the dynamic of the short-term to long-term, error correction process in terms of adjustment speed is 121%. The ECM coefficient shows how quickly variables converge to equilibrium and it should have a statistically significant coefficient with negative sign.

5.3 POLICY RECOMMENDATIONS

The findings of the study lead to the following policy recommendations necessary to ensure steady and sustainable increase in private investment. Based on the findings of the study the following policy implications are suggested:

- As for credit, there should be effort towards ensuring a fair distribution of credit among different sectors so that some sectors do not reap all the benefit or incentives alone. This implies that government should consist to control as distribute credit to sector where it is mostly need. This will enhance the less developed sector and enable them have a chance to avail themselves to credit for investment which will in turn stimulate economic growth.
- The Ethiopian government must analyze the impact of the exchange rate before devaluation or revaluation. Exchange rate fluctuations have a short-run and long-run impact on private investment. Therefore, a policy that stabilizes the exchange rate should be implemented to address the impact of exchange rate fluctuations on private investment. Encourage access to foreign aid and it should be used for manufacturing investment.
- Encourage savings as the much- hyped boost to investment, deposit rates need to be attractive particularly in the face of emerging options in investment portfolios.

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APPENDIXIES

APPENDIX-A

ARDL Bounds Test for Cointegration

Test Statistic	Value	k
F-statistic	15.64	5

Critical Value Bounds		
	Lower Bound(I ₀)	Upper Bound (I ₁)
10% significance level	2.26	3.35
5% significance level	2.62	3.79
2.5% significance level	2.96	4.18
1% significance level	3.41	4.68

Estimated Long Run Coefficients

Estimated long run coefficients for the selected ARDL model Selected Model: ARDL(2, 0, 0, 0, 0, 0)selected based on Akai information criterion

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LM2	0.377283	0.128421	2.937862	0.0062*
LGDS	0.629662	0.090793	6.935172	0.0000*
LBC	0.200492	0.089807	2.232493	0.0329*
IR	-0.001065	0.001956	-0.544644	0.5899
LREER	0.216042	0.160769	1.343808	0.1888
C	-1.247644	0.726185	-1.718079	0.0958

Durbin-Watson stat	1.950764	F-statistic	1041.74
Adjusted R-squared	0.994811	Prob(F-statistic)	0.000000

Estimated Short Run Coefficients (ECM)

Error correction representation for the selected ARDL model ARD(1, 0, 0, 2, 2, 0, 0) selected based on Akai information criterion.

Dependent Variable: D (LPI):

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
D(LM2)	0.639333	0.393876	1.623186	0.1166
D(LGDS)	0.576140	0.092345	6.239011	0.0000
D(LBC)	0.383908	0.162915	2.356488	0.0263
D(IR)	-0.003554	0.001718	-2.068752	0.0486
D(LREER)	0.121173	0.230039	0.526749	0.6028
ECM(-1)	-1.209741	0.214347	-5.643858	0.0000
C	-0.028625	0.061364	-0.466475	0.6448
Adjusted R-squared	0.822497	Durbin-Watson stat	1.955271	
F-statistic	16.58612	Prob(F-statistic)	0.000000	

APPENDIX-B

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.091320	Prob. F(2,29)	0.9130
Obs*R-squared	0.244082	Prob. Chi-Square(2)	0.8851

APPENDIX-C

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.255351	Prob. F(7,31)	0.3041
Obs*R-squared	8.613537	Prob. Chi-Square(7)	0.2816
Scaled explained SS	4.474545	Prob. Chi-Square(7)	0.7238