

***Determinants of Domestic Private Investment in Ethiopia: -an
Auto-Regressive Distributed Lag (ARDL) approach***

*A Thesis Submitted to The School of Graduate Studies of Jimma University in
Partial Fulfillment of The Requirement for the Degree of Master of Science in
Accounting And Finance.*

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BY:-

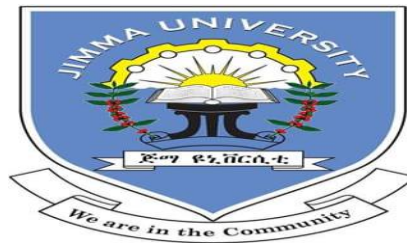
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COLLEGE OF BUSINESS AND ECONOMICS

SCHOOL OF POST GRADUATE STUDIES

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JIMMA, ETHIOPIA

DECLARATION

I hereby declare that this thesis entitled “*The Determinants of Private Domestic Investment in Ethiopia: - An Auto-Regressive Distributed Lag (ARDL) approach*”, has been Carried out by MedhanitGetnet under the guidance and supervision of Dr. Eshetu Yadecha and Mr. Ganfure Tarekegn. The thesis is original and has not been submitted for the award of degree or diploma in any university or instructions.

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This is to certify that the thesis entitled “The Determinants of Private Domestic Investment in Ethiopia:- an Auto-Regressive Distributed Lag (ARDL) approach”, Submitted to Jimma University for the award of the Degree of Master of science in accounting and finance and is a record of Valuable research work carried out by Medhanit Getnet , under our guidance and supervision.

Therefore we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree of qualification.

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Abstract

In the growth literature, investment has been regarded as one of the primary engines of growth. Growth theories stress the importance of investment in determining the level of income (neoclassical) and the pace of economic growth (endogenous growth model). However, the Ethiopian private investment performance has been weak for long time. Yet, the reasons behind the weak performance has not been well studied. Hence, this study have been done with the objective of investigating the determinants of private domestic investment in Ethiopia by taking annual data set of 32 years spanning from 1986-2018. Variables identified for the study includes private investment, foreign direct investment, inflation rate, access to credit, GDP per capita, lending interest rate, human capital, exchange rate, public investment, taxation and political stability. The analysis have been made using ARDL model after the data sets were transformed to log form except political stability. And, to account for inherent problems of time series data, different tests such as pre-estimation test of stationary test, post estimation diagnostic test and bound test of co-integration have been applied. The regression results show that GDP per-capital, political stability and public investment have significant positive long run effect on private investment, while lending interest rare, exchange rate, and access to bank credit have negative long run effect. Public investment and political stability have positive significant effect while lending interest rate, access to bank credits and exchange rate have negative significant effect in the short run and in the long run. Finally expansion of infrastructure, increasing income generation mechanism for citizens, appreciation of domestic currency and creating fertile investment climate are some of the recommendation forwarded.

Keywords: *Domestic Private Investment, bound test, Time-Series, ARDL*

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Acronyms

ADF: -Augmented Dickey-Fuller

AR: -Auto Regressive

ARDL: -Autoregressive-Distributed Lag

CPI: - Consumer price index

EIC: -Ethiopia Investment Commission

FDI: - Foreign Direct Investment

FDRE: -The Federal Democratic Republic of Ethiopia

GDP: -Gross Domestic Product

GTP: -Growth and Transformation Plan

HC: - Human capital

IMF: - International Monetary Fund

IR: -Lending Interest Rate

LDCs: -Least Developed Countries

MOFED: - FDRE Ministry of Finance and Economic Development

NBE: -National Bank of Ethiopia

NPC: -FDRE National Plan Commission

OECD: -The Organization for Economic Co-operation and Development

OLS: - Ordinary Least Square

PI: -Private Investment

PP: - Phillips-Perron

PS: -Political stability

PuI: - Public Investment

RIR: -real interest rate

RGDP: - Real Gross Domestic Product

SSA: - Sub Saharan Africa

UNDP: - United Nations Development Program

WB: - World Bank

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Investment has been defined variously by different authors. Reilly and Keith (2009) defined investment as the current commitment of money for a period of time in order to derive future payments or benefit that will compensate the investor (Asante, 2000). Without doubt, investment is one of the primary engines of growth in all economies (Khan, 2005).

However, its effectiveness rests on strong complementarities with other elements in the growth process, most notably technological progress, skills acquisition and the development of innovative capability. These elements make investment a natural point of departure for Governments seeking to formulate a robust development strategy. The link between investment and these other determinants of growth, however, is not an automatic process. It requires among other things a favorable macro policy environment and specific policies and institutions aimed at encouraging savings and attracting and directing investment to key sectors in the economy thereby enhancing the contributions of investment to skills formation, technological change, competitiveness and economic growth (Workie, 1997).

Investment is spending on the factor of production like capital, spending on goods bought for future use Includes: *business fixed investment, residential fixed investment, inventory investment*. In other words Investment can be defined as the accumulation of newly produced physical entities, such as factories, machinery, houses, goods, and inventories. Investments can also be defined as putting money into an asset with the expectation of capital appreciation, dividends, and/or interest earnings. Investment is an act of current spending for expected future return. It expands the productive capacity of a nation and plays a crucial role in the economic growth and development process, (G.Mankiw, 2007).

Investment, generally classified into four major components: private domestic investment, public domestic investment, FDI and portfolio investment. Private domestic investment refers to gross

fixed capital formation plus net changes in the level of inventories whereas public investment includes investments made by the government and public enterprises on social and economic infrastructures, real estate and tangible assets. The combination of private investment and public investment is normally referred to as gross fixed capital formation and this is distinctive from their counterpart – foreign investment. When foreign investment is on a tangible asset, it is referred to as a direct foreign investment; when it is in shares, bonds, securities, etc., it is called portfolio investment (Bakare, 2011).

A rate of investment is one of the key factors that differentiate developed countries from developing countries. In high-growth countries investment is high, where as it is low in low growth countries. The implication of low investment is that the productive capacity of the economy fails to increase. This in turn leads to lower rates of growth and job creation, and fewer opportunities for the poor to improve their livelihoods (White, 2012). According to Sackey(2010,)countries with high standards of living are those who have shifted the economic structure from traditional and less diversified to a more diversified one. Commitment to investment is the central issue in the process of structural diversification.

According to Keynes (1964) cited in Olga Kosma, (2015), investment is volatile because it is determined by the “animal spirits” of investors (optimism and pessimism). Furthermore, investment creates new capital goods so it is a very important determinant of an economy’s long run productive capacity, in the sense that a higher investment rate suggests that capital stock is growing rapidly.

The private investment has shown different trends of growth and performance in the case of Ethiopia due to shifts in the regimes and political processes. During the Imperial era (1960/61-1973/74), private investment as a percent of GDP at market price was about 10.5 percent and growing by about 6 percent per annum on average. The reasons for a relatively good performance of private investment in this period include the existence of import substitution strategy, market-oriented financial sector policies, a developing share market, the free market where prices were determined purely by supply and demand (Alemayehu and Befekadu, 2002).

However, this promising trend was reversed due to the socialist ideology persuaded by the military government that replaced the monarchy in 1974. Thus, the period 1974/75-1990/91

witnessed centralized economic system, where the state was given a significant role in all sphere of the economy. The private investment was given little rooms due to the ideology. During this period (1974-1991), the ratio of private investment as a percent of GDP declined to 4.5 percent. This ratio is far below the Sub Saharan African (SSA) countries where the average rate of private investment to GDP was 10.6 percent (IMF, 1995). Between the periods 1992/3-2004/05, the share of private investment rose to around 8 percent of GDP at Market Price. Despite this achievement, the performance the private sector has not been considered adequate in light of twelve years of adjustment efforts and policy incentives directed toward making the private investment take the lead in initiating economic growth. As indication of this inadequate performance could be seen vis-à-vis the average shares of private investment of SSA countries (12.5 %), IMF (2012). And the average real private capital formation as a share of real gross capital formation in Ethiopia over 2004/05- 2013/14 was 4.21 percent whereas real public capital formation account for 3.43 percent. This is an indication of the low share of private sector investment from the total investment which requires efforts to extend its share from the current stage (Addis Ababa Chamber of Commerce Report, 2013).

Recently, economists have developed a common opinion about the constructive effect of sustainable investment on economic growth. Moreover, the sustainability of investment depends on the investment climate (World Bank (WB), 2004). In general, the investment climate refers to the totality of macroeconomic, political, policy, and institutional conditions in a country that, together with structural forces, determines the performance of private investment and economic growth (WB, 2004a). According to the United Nation (UN, 2005), investment climate can be explained further as access to basic physical infrastructure such as electricity, telephone, water and roads; access to information and advisory services; higher labor productivity; efficient tax administration and tax rates; access to finance; availability and affordability of urban land; business regulations and trade facilitation services, among other elements, Tadesse (2011).

Investment is the source of manufactured goods that will be used to produce other goods. It is the major foundation of enhancement in the level of literacy, improvement in technology and increase in the capital stock (Hashmi et al 2012). For developing countries like Ethiopia the basic question in their economy is increase the production and hence improve the standard of living of their people so that there will be dramatic change in their economic, political and social

conditions. For this purpose different alternatives are on the table. Investment promotion is one key instrument and primary engine of economic growth (Mustafa, 2014). As a result due attention has been given to development of private sector in developing countries to help improve economic growth (Ouattara, 2004). Reliable and continuous increase in domestic private investment also helps in reduction of poverty.

In Ethiopia Private Investment is a key to long-term economic growth (Adugna, 2013). However, private sector investment has shown improvement following the 1996 economic reform it still have a fluctuating feature (Alemayehu, 2004). Declining investment ratios and levels are a problem, firstly because investment matters for growth, and secondly because low investment increase vulnerability in the economy (Oshikoya, 2001). One of the key challenges facing the country with the regard to private investment is lack of awareness among the investors about the modern business system (Adugna, 2013). In the case of Ethiopian context, although private sector investment has shown improvement following the 1995 economic reform it still has a fluctuating feature (Alemayehu, 2004). Additionally, the role of private sector in the economy is minimum compared with that of the public sector (Agenor, 2005).

1.2, Statement of the problem.

The private investment has shown different trends of growth and performance in the case of Ethiopia due to shifts in the regimes and political processes. During the Imperial era (1960/61-1973/74), private investment as a percent of GDP at market price was about 10.5 percent and growing by about 6 percent per annum on average. The reasons for a relatively good performance of private investment in this period include the existence of import substitution strategy, market-oriented financial sector policies, a developing share market, the free market where prices were determined purely by supply and demand (Alemayehu and Befekadu, 2002). However, this promising trend was reversed due to the socialist ideology persuaded by the military government that replaced the monarchy in 1974.

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investment from the total investment which requires efforts to extend its share from the current stage (Addis Ababa Chamber of Commerce Report, 2013).

Private sector development involve the improvement of the investment climate which is crucial for sustaining and expanding businesses, stimulating economic growth, and has been the backbone of most developed and developing economies. The private sector is recognized as a critical stakeholder and partner in economic development, by helping people escape poverty through the provision of jobs and income, as well as the availability of necessary goods and services needed to enhance people's standard of living (International Finance Corporation, 2011). Private investment is thus a powerful catalyst for economic growth and innovation as well as a poverty reduction facilitator and hence its role is important both in terms of its contribution to GDP and its ability to allocate and employ resources efficiently.

Some economists argue that when studying investment in developing countries, special features not accounted for in traditional theories of investment should be considered. Agénor and Montiel (1999, pp. 97–99) list six of those factors. *First*, financial variables may influence private investment because of underdeveloped financial systems and financial repression. *Second*, foreign exchange rationing and the exchange rate in the free market may influence investment decisions because of the importance of imported capital goods. *Third*, due to their importance in the production process in developing countries, imported intermediate goods should be taken into account in the specification of relative prices. *Fourth*, debt overhang inhibits investment because of the possibility of higher taxes to finance future debt service. *Fifth*, public investment has played an important role in the process of capital formation in developing countries. It may have a positive or negative effect on private investment depending on whether public investment is complementary to or a substitute for private investment. And *sixth*, macroeconomic instability and its resulting uncertainty, which have characterized developing countries, may have an important effect on private investment. Despite the understanding that all these elements may be important determinants of investment,

Developing countries, including Ethiopia have a high degree of uncertainty in the macroeconomic variables. In this group of countries, growth, inflation, exchange rate and other key

macroeconomic variables are more vulnerable to volatility compared with industrial countries'economies.

Kazeem et al (2012) in the study which covered the period 1970 to 2010 used an advanced econometric technique of ARDL bounds testing approach in modeling long run determinants of domestic private investment. Findings from the study showed clearly that difference exists between long and short run determinants. The interest rate, real GDP, exchange rate, terms of trade, external debts, public investments, credit to the private investment and reforms dummy are the key long-run determinants of domestic private investment while real GDP, public investment and terms of trade are statistically significant in the short run. Kazeem et al (2012) recommended that necessary infrastructures to complement domestic private investment should be put in place and that external debts reduced to the barest minimum and negative effects of external shocks endangered by foreign direct investment uncertainty and deficit terms of trade should be prevented all together.

Frimpon and Marbuah (2010) carried out a study seeking to present an empirical assessment of factors that have either stimulated or dampened private sector investment in Ghana using ARDL framework covering the period 1970 to 2002. From the results it emerges 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 GDP, inflation, external debt, real interest rate, real exchange rate and openness significantly influenced private investment response in the long-run. On the policy front, the study indicates that improving the productivity of sectors such as agriculture and manufacturing by providing more efficient advanced technologies as input subsidies could go a long way to increasing private investment levels and growth in output. A study by Bakare (2011) on the impact of corruption on investment showed that corruption was among the most significant obstacles facing investment cited by Afghan business people.

Esubalew (2014) carried on studies on the macroeconomic determinants of private investment in east Africa region with panel data set from the period of 2000-2012. According to his studies macroeconomic factors such as variation in the output and real per capita growth fiscal and monetary policy as well as exchange rate are the most determinant factors for the variation of private investment in eastern African countries over the study period. His study confirmed that

domestic private investment is positively influenced by real GDP growth, financial availability as measured by credit to the private sector as the percentage of GDP and the development of human capital as measured by school enrolment has significant positive influence on the private investment of the region. On the other hand variable such as unstable macroeconomic environment, as measured by the inflationary situation, high external debt, fluctuation in the terms of trade, real exchange movement, public investment and real interest rate are found to hinder private investment significantly in East Africa.

Adugna (2013) studied determinants of private investment using time series data over the period from 1981-2010 employing OLS methods and came up with a positive and statistically significant impact of public investment, economic growth and interest rate upon the performance of private investment. Hailu and Debele (2015) studied the effects of monetary policy on the private investment on in the case of Ethiopia using the time series data from 1975-2011 and applied autoregressive distributed lag models and co integration based on ECM. The main findings of their study were that economic growth, exchange rate and public investment has significant long run impacts on the private investment in Ethiopia. This study used OLS regression Model to estimate the relationship between private investment and the determinant variables.

Recently a study conducted by Woldemariam (2017) on determinants of private investment using OLS regressions model reveals that public investment, real GDP, external debt servicing , and access to bank credit have significant positive effect on private investment, while lending interest rate and foreign direct investment have significant negative effect on performance of private investment under the study period.

The motivation of this research is to the best of my knowledge Ethiopian investment and its constraints have not been well researched. There for this study attempts to contribute to the investigation of the trend and main determinant of investment in Ethiopia and try to address the question of what measure should be taken to promote investment in Ethiopia?. The fore as its objectives the study focuses on assessing the trend and identifying the main determinant of private investment. As per the researcher knowledge in Ethiopia few or possible to say finger countered studies were made related to the determinant of private investment but most of them are in consistence in finding so the one intention of the researcher is to fill the gap.

However, one may asked that what makes this study different from the aforementioned studies. Of course this study is different in that most of the previously done papers have tried to investigate the determinants of private investment in Ethiopia with few variables and similar methodology of data analysis. Unlike the aforementioned studies this study have tried to include more challenging and important variable like institutional and structural variables such as political stability and absence of violence and access to credit, macro variables such as gross domestic product (GDP), inflation and human capital, fiscal policy variables such as taxation and public investment, monetary policy variable such as interest rate and finally the foreign variables like real exchange rate and foreign direct investment. Unlike the previous done papers the researcher tried to assess the trends of private investment in Ethiopia. The other reason that motivated the researcher to undertake this study is in terms of methodology that is most previous studies have employed OLS method of regression and ECM method of estimation but this study employs a new approach called ‘Autoregressive Distributed Lag (ARDL)’ model. Mostly the limitation of other model is mainly applied for stationery variable at level or at order (0).so variable that are stationery at first level are not incorporated.

1.3, Research questions

The study has aimed to answer the following core research questions:

- ✓ What is the trend of private domestic investment in Ethiopia?
- ✓ What are the significant macroeconomic specific determinants of private domestic investment in Ethiopia?
- ✓ What are the significant structural and institutional specific determinant variables of private domestic investment?

1.4, Objectives of the Study

1.4.1, General objective

The general Objective of the study has been to identify the determinants of private investment in Ethiopia for the period ranging from 1986 to 2018.

1.4.2, Specific objective

More specifically, the study have attempted to;

1. To assess the trend of private investment in Ethiopia.
2. To identify the macroeconomic determinant of private domestic investment in Ethiopia for the period of 1986-2018.
3. To identify the structural and institutional determinants of private domestic investment in Ethiopia for the period 1986-2018.

1.5, Significance of the study

A number of studies on the investment especially in developing countries have been carried out. Nevertheless, empirical evidence on the determinants of private investment growth has been limited (Khan and Kumar, 1997 and Siraj, 2014). In Ethiopia, the presence of little empirical analysis in this context makes this study vital to show the determinants of the private investment in the economy and to help design informed and prudent policy in the endeavor to promote private sector development.

This study can be useful for policy makers in designing and formulating policies that would create an enabling environment for the flourishing of private sectors investment so as to boost growth of the economy. Moreover, the study can also help to initiate other researchers to carry on further and deep rooted studies in the endeavor to remove bottlenecks for private investment flow and thereby enhance their contribution for economic growth process. The study has helped me, when I go to investigate the subject matter, by relating the theoretical knowledge that I has learned to practical world of the work environment. Finally it enhances other scholars to carry on further study through providing relevant evidence on the determinants of private investment in Ethiopia.

1.6, Scope of the study

This study has been delimited to assess the determinants of private investment in Ethiopia over the period between 1986 and 2018. The study period was selected based on the availability of data about the private investment and by considering the time serious assumption. The length of time series can vary, but are generally at least 20 observations long, and many models require at least 50 observations for accurate estimation (*McCleary et al., 1980, p. 20*) but for ARDL model

the minimum requirement is 30 years observation so the base to fix the study period. This study have employed real interest rate, access to bank credit, human capital, public investment, FDI, foreign exchange rate, political stability and absence of violence, GDP and inflation as determinants of private investment in this study.

1.7. Organization of the Study.

The research paper have been organized and classified in to five chapters the first chapter have been the introduction part which contains the back ground of the study, the statement of the problem, objective of the study, research questions, significance of the study, Limitation of the study and organization of the paper .Chapter two have been dealt with the theoretical and empirical reviews related to the title. Chapter three contain methodology of the study, data sources, Econometric model specification, methods of data analysis .Whereas Chapter four have been dealt with data analysis and discussion of result and finally chapter five have been dealt with conclusion and policy recommendation.

CHAPTER TWO

LITERATURE REVIEW

2.1. Theoretical Literature Review

2.1.1. Definition of Investment

Investment has been defined variously by different authors. Reilly and Keith (2009) defined investment as the current commitment of money for a period of time in order to derive future payments or benefit that will compensate the investor (Asante, 2000). In Economics class the term refers to the purchase of a physical asset while in a Corporate Finance course the term could apply to any asset including market securities. Private Investment therefore, is in investment by individual people or firms as opposed to the government as an entity (Fabozzi, 2009).

According to Dornbusch and fisher (2011), investment spending is important since contribute too much of the movement in the business cycle. When expenditure for good and service fall during

recession, much is due to drop investment spending. Development theories have long regarded the accumulation of physical capital as an engine for growth. Certainly, the notion that raising the investment rate is key to increase long run growth has been at the heart of growth thinking since the time David Ricardo (bank of Botswana). In Economics investment defined as the act of incurring an immediate cost in the expectation of future rewards. Firms that construct plants and install equipment, merchants who lay in a stock of goods for sale, and persons who spend time on vocational education are all investors in this sense. The word investment can be defined in many ways according to different theories and principles. It is a term that can be used in a number of contexts. However, the different meanings of “investment” are more alike than dissimilar. According to economics, investment is the utilization of resources in order to increase income or production output in the future or the purchase of goods that are not consumed today but are used in the future to create wealth. Investment is spending on the factor of production like capital, spending on goods bought for future use Includes: *business fixed investment, residential fixed investment, inventory investment (Mankiw, 2010)*.

Investment is change in the stock of capital. The terms also refer to the expenditure of fund for capital good such item as factories, for equipment, livestock and machinery. Investment is key to economic growth. It is also an instrument which has aggregate role in the development of an economy especially in less developed countries like Ethiopia. This is because investment has the key to many close doors like employment opportunities, largest of production, domestic resource mobilization, specialization and like whose opportunities can be created incomes can grow and living condition of people can improve. Thus, ultimately lead to alleviation of poverty (Fredrik, 2000).finally, investment is the application of money for earning more money.

2.2. Basic Theories of Investment

There are different theories of investment and there exists a considerable variation among Economists as to what determines investment behavior. Therefore, in this section the study Review some of widely discussed theories of investment.

2.2.1. Classical Theory of Investment

The classical school generated that capitalist make investment because they expect to earn profit in the future depends on the good deal on what profit are now. For example, Adam

smith in his book, the “wealth of the nation” explain this fact, by arguing that, investment were made because the capitalist expected to earn profit on them and the future expectation with regard to profit depend up on present climate of investment as well as the actual profit. However, this rate of profit tends to fall with economic progress, when the rate of capital accumulation increased competition among capitalist, and tend to lower profit, and hence lower Investment (Jhingan, 1988).

2.2.2. Keynesian Theory of Investment

The Keynesian theory of investment places emphasis on the importance of interest rate in the investment decisions. But other factors also enter in to the model Changes in interest rate should have an effect on level of planned investment under taken by private sector businesses in the economy. A fall in interest rate should decrease the cost of investment relative to the potential yield and as a result planned capital investment project on the margin may become worthwhile. A firm will only invest if the discounted yield exceeds the cost of the project. According to him expectation of future demand for firm’s output, velocity of investment, uncertainty and other non-economic variable political, socioeconomic variables and human instincts are possible determinants of investment (Bethlehem, 2010).

Keynesians pointed out the importance of human instincts in investment decision making, owing to the intractable problem surrounding the computation of future return to investment in the world of uncertainty. Investment is worth under taking if the present value of the future stream of return is greater than or equal to the initial cost of capital. Keynes observed that investment spending is highly volatile due to uncertainty associated with the return of investment. According to him, this explains the business cycle. He further asserts the government expenditure in infrastructure and education has a positive effect on investment, but if government involves directly in the productive activities, that will discourage private investment (Gemechu, 2017).

2.2.3. Accelerator Theory of Investment

After Keynes the accelerator principle was the dominate theory of investment during 1950s and 1960s. The accelerator theory asserts that investment spending proportional to change in output and is not affected by the cost of capital, $I_t = \alpha (Y_t - Y_{t-1})$ (Dornbush and Fisher, 2011). The

model begins with the assumption that a firm's desired capital output ratio is roughly constant. This implies that the desired capital stock for any period "t" is proportional to the level of output in "t", $K^*_t = \delta y_t$ where δ is the desired capital level of output ratio. Suppose that firms Invest in period "t" in order to bring their capital stocks to the desired level K^*_{t+1} in period "t+1". Then if depreciation is zero for simplicity, $I_t = K_{t+1} - K_t$. But since $K_t = K^*_t$ then $I_t = \delta (Y_{t+1} - Y_t)$. Thus the simplest accelerator model predicts that investment is proportional to the increase in output in the coming period.

2.2.4. The Neo-classical Theory of Investment

The underlying restrictive assumption of the accelerator theory initiated Jorgenson (1969) and, Hall and Jorgenson (1971) to suggest the neo-classical theory of business of fixed investment in which net investment is proportional to the gap between actual and desired capital stock. This Model combines the user cost of capital and the accelerator effect to explain the investment behavior (Seyoum, 2007).

The neo-classical theory of business fixed investment considers the rate of investment to be determined by the speed with which firms adjust their capital stocks towards the desired level. The desired capital stock is bigger than the larger expected output the firm plans to produce and the smaller the rental user cost of capital (Dornbusch and Fisher, 2011). This theory suggests that net investment is proportional to the gap between actual and desired capital stock. The relation given by $I_t = K_t - K_{t-1} = \delta (K^* - K_{t-1})$ Where $I_t =$ net investment at time "t".

- ✓ K_t = the existing capital stock at the end of the period "t".
- ✓ K_{t-1} = the capital stock at the preceding period
- ✓ K^* = the desired level of capital stock.
- ✓ δ = Measure the fraction of gap between the actual and desired level of capital stock that is closed to each period.

From the above equation, the desired capital stock (K^*) is positively related to the level of expected output and negatively related with the user cost of capital, which in turn depends on real interest rate, expected rate of inflation, and depreciation rate. The basic notion behind this theory is that the larger the gap between the existing capital stock and the desired capital stock,

the more rapid a firm's rate of investment. But this theory is criticized due to the assumption of perfect competition, exogenously given output, static expectation about future price, output and interest rate (Serven and Solimano, 1992).

2.2.5. The Disequilibrium Model of Investment

This theory is based up on the idea that investment depends on profitability and output demand Condition. In this model investment decision have two stages. First it is decision to expand the Level of production capacity, and second; it is the decision about the capacity intensity of the additional capacity (Serven and Solimano, 1992). In the words of Serven and Solimano (1992), the first decision depends on expected degree of capacity utilization in the economy, which provides an indicator of demand conditions. Which the second decision depend on relative prices Such as the cost of capital and labor, the investment decision takes place in a setting in which firms may facing current and expected sales constraint. Therefore, investment depends both on profitability and on prevailing sales constraints which determines the rate capacity utilization.

2.2.6. Tobin's q Theory of Investment

James Tobin, one of the Noble-prize winners, formulated an investment theory based on financial Markets. Tobin argued that firm's investment level should depend on the ratio of the Present value of installed capital to the replacement cost of capital. This ratio is called Tobin's Q $q = \text{market value of installed capital} / \text{replacement cost of installed capital}$. The market value of installed capital is priced in the stock market and is the number of shares outstanding times their market price. The replacement cost of installed capital depends on the situation in the capital goods sectors. If the demand for capital goods is strong, the price of capital goods will rise. If $q > 1$, then firms have an incentive to increase their capital stock because capital once installed and producing goods and services is priced more highly than its cost. If $q < 1$, then firms should reduce the capital stock, close plants. Hence, investment decision is clearly risky since it is dependent up on estimates of the future which, are by their nature subjective and uncertain (Burningham2001).

As quoted by Solimano and serven (1992) economists pointed out problem in using the Q-ratio. If for instance, firms enjoy economies of scale or market power or if they cannot sell all they

want the ratio will systematically differ. Here it has to be noted that all the above theories of investment behavior best suit the institutional and economic features of developed countries. As a result, they cannot directly be applied for economies of developing countries. So before undertaking a study on investment in developing countries some sort of amendments to theories or models will be necessary to account for the unique features of a country's economy. In the Tobin's Q theory of investment, the ratio of the market value of the existing capital stock to its replacement cost (the ratio) is the main force driving investment (Chirinko, 1993; Ghura and Goodwin, 2000). That is to say, an enterprise will want to invest if the increase in the market value of an additional unit exceeds the replacement cost.

2.3. Investment and Economic Development

One of the indisputable stylized facts of economic development has been the wide disparity in economic performance across countries of the world. Over the past 40 years, economic performance of a small number of countries has been remarkable; with per capita GDP increasing fivefold. At the same time a number of countries have experienced a starting decline in per capita GDP (Boston and Sumlinski, 2000). Investment is considered as one of the principal and important factors in economic development of a nation. Investment as it brings about fuller utilization of available resources; it paves the way for large scale production and technical progress, increases specialization, creates employment opportunities, helps to have a more diversified economy, etc. and also, it can be considered as a source and mechanism to bring about economic growth. Due to this fact many economists agree on the fact that every nation should invest in order to achieve sustainable economic growth. As Nurkse (1984) stated, the vicious circle of poverty in LDC's can be broken through capital formation or investment. Due to low level of income in such countries demand, production and investment are in deficit. This results in the deficiency of capital goods that is removed by capital formation. Thus, the supply of machinery increases the scale of production and creates social and economic overheads (ibid).

As stated by classical and new classical economists and by the market of Keynes, investments in capital equipment not only increase production but also employment opportunities (Fisher 1972). According to them the importance of investment is twofold. First, output in the future depends upon the maintenance of production. The second one is the maintenance of full employment or

full utilization of the available of resource, requires, that aggregate investment plus aggregate consumption equal to the total output that would be produced if all individual who wished to work could find employment (ibid). Salaries work in 1956 introduced a different perspective on the role of investment in economic growth. The production function he postulated has a long tradition in economic-output is produced by combining capital and labor under constant returns to scale. According to his model positive level of investment is needed to the labor force. Countries with higher level of capital investment and higher level of capital per workers will have higher level of capital output.

2.3.1. Source of Private Investment

It is obvious that increasing investment or capital accumulation is a necessary condition for economic growth as well as economic development. So the need for increasing the level and rate of investment is unquestionable. The question is “how can investment financed?” that is what are real source coming to support investment. Therefore without increasing the level and rate of investment, bringing sustainable economic development is unthinkable, in any developing economy the accumulation of capital requires mobilization of economic surplus which can be financed from internal or external sources. Basically, the source of investment can be categorized into: domestic (internal) and foreign (external) source Roomer (1990).

A. Domestic Source of Private Investment

The accumulation of capital in any developing economy requires the mobilization economic surplus, in the case of private investment from domestic source there must be growing surplus above current consumption that can be tapped and directed into productive investment channels. This involves abstinence from present consumption for the future use. The importance of financial institutional in this case lies in their making available the means to utilize saving. It means the existence of a more developed capital market and financial intermediaries will in the collection and distribution of inevitable funds (merrier, 1995). However, in most developing countries an increase in voluntary private saving through a self-imposed cut in current consumption is unlikely because of the low level of income and the high average and marginal propensity to consume. Moreover, much of the low level of saving are seldom channeled in to productive investment activates. This low level of saving in these counters result in the low level

of investment. As a result, instead of relying on involuntary domestic private investment these counters will normally have to look for foreign sources.

B. External source private investment

Mobilization of resource form external source is needed when domestic resources are not enough to finance investment. Capital from such source can be used to raise the level economic activities in developing counters, and hence economic development. From external source, the inadequate domestic source of capital formation can be supplemented by the capital assistance from foreign economic aid and the private investment of foreign capital.

The imports of foreign capital from developed countries could be in the form of loan and grants without; string; but according to Jhingan (1988) the best course is to start joint ventures where by foreign investor bring technical knowhow along with capital, and they train local labor. However, capital from official source is the only transition arrangement and that foreign economic aid should be gradually replaced by private foreign investment.

2.4. Theoretical Determinates of Private Investment

Investment is a risky venture that requires conducive environment in which investment activities undertaken and a higher return is realized. Investment spending depends on economic, social, and political situation of country that affects the rate of return. But such favorable condition is often lost for most developing countries. In realizing this, there is a growing interest in the countries on the factors that influence the pattern and level of private investment. Many research works are undertaken as to what determines private investment activities same factors identified here. At this section of the literature on the determinants of private investments are grouped in to two, in accordance to their behavior, macroeconomic determinants and institutional and structural determinants.

2.4.1. Macroeconomic Determinants of Private Investments

From a theoretical point of view, many macroeconomic variables influence private investments some of those variables are government's fiscal deficits, monetary policy, credits policy, exchanges rates policy, inflation rate external debts burden, real per capital GDP and financial

intermediation. But most of the literature shows that monetary and fiscal policies aimed at correcting imbalances are the most important factors that affect investments.

Monetary Policy

Monetary policies are policies of the central bank of a country that aimed to affect money demand and supply of the economy. Among the instruments of monetary policy interest rate is the major one. Real interest rates can have either positive or negative effects on private investments. According to the Mankiw-Shapiro hypothesis, these two variables are positively correlated. This is because higher interest rate induces saving and as a result makes funds available for investment. By contrast, higher interest rate increases the cost of capital which will subsequently lead to a decline in investment (Akpalu, 1997). On the other hand, according to Sachs and Larraine (1993), restrictive monetary and credit policy included in the stabilization packages affects investments in two ways: they raise the real cost of bank credit, and by raising interest rate they increase the opportunity cost of increased earnings. Both it has to be noted that the transition process is effective if money demand is sensitive to interest rate.

Exchange Rates Policy

Exchange rates policy is frequently used by governments to correct external imbalances. The objectives of exchange rates devaluation are to reduce expenditure on imports and increase exports. This expenditure switching policy may have conflicting effects on private investments. For example, devaluation reduces the relative price of non-tradables which results in the shift of resources towards tradables. Hence, investment in tradables increases as compared to non-tradables. However, devaluation also increases the burden of foreign debt and thereby reduces the creditworthiness of private investments in the short run, it has a positive effect on the medium and long run. For instance, according to Servén and Solimón (1992), devaluation tends to dampen investment early on by raising the price of capital goods imported and intermediary's inputs, which acts like an adverse supply shock on the production of investment goods. However, as the economy responds to its competitiveness with higher exports, the longer run effects on private investments can be favorable.

Fiscal Policy

Expansionary government spending crowded out private investment if it competes with the private investors in the input, output or financial markets. This is because the public sector has all the power to compete the private sector in the financial market of developing economics. According to Chibber and Dailami (1990) the private sector is also excluded from using resources of non-banking financial institutions, such as insurance companies. Accesses to these resources are reserved exclusively to public sector companies and often at subsidized rates. In the developing countries, the government is still the predominant actor in the economy. Hence the level of government consumption can be an important determinant of private investment for these countries. When government spending is used to finance projects which increase the profitability of the private investments (like health and education services and industrial parks) then the effects of these factors on private investments will be positive. Government spending is expected to have positive effects on governance. For example the improvements in the living standards of the bureaucrats caused by the increase in wages can induce them to form better governance institutions.

Taxation

Taxation is one of the major and most instruments of fiscal policy through which the government directs resources from the public and increases the budgetary surplus. It reduces private consumption and transfers resources to the government for productive investment. Taxation could have two possible effects on the private sectors. First, if there is adequate incentive for private investment, a fair level of tax will have positive impacts on the development of the sector. That is, the tax provides incentive for private investors to increase production by including them to produce consumption and increase saving. Such taxes help investment activities, which could otherwise be idle (Meier, 1995). Second, high rates of tax levied on private sectors has adverse effect on the incentives to work, save and invest. Such taxes directly reduce production or funds from the private sector to governments.

Inflation Rate

High domestic inflation rate will have an adverse effect on private investment by enhancing the riskiness of longer-term investment projects, reducing the average maturity of commercial loans

and distorting the information conveyed by price in the economy. Also high inflation rate are a signal of macroeconomic instability. However, according to Tobin-mundell effect, higher anticipated inflation leads to a lower real interest rate and Causes portfolio adjustment away from real money balance towards real capital. Hence higher anticipated inflation would leads to an increase in real investment. This implies that a fisher effect is not at work (Nowark et al, 1996).

2.4.2. Institutional and Structural Constraints of private investment

A good investment climate provides opportunity and incentive for firms to invest profitably, Create jobs and expand output, thereby increasing private investment and growth. However, in the developing countries, business frequently operate investment climate that Undermine their incentive to invest and grow. Investment climate constraint serves to depress the Potential rate of return soon it offers. The literature high lights seven investment climate constraints that affects the rate of private investment and the survival and growth of firms (Ignacio Fiestas and Sunilsinha, 2011).

Macro level, Stability: (economic, social and political) deters Investment by making future rewards more uncertain or undermines the value of assets. Studies show that grater the level of instability, the lower rate of private investment and grow the instability also increase the risk of firms going bankrupt, suffering slower grow thorn contracting if political conflict ensues. Fiscal and monetary policies that reduce inflation, policies that help to establish a competitive exchange rate, political and social stability are needed to sustain high rate of investment and growth.

Crime and Corruption: represent a substantial risk to earning attractive returns to Investment and increase the cost of doing business, whether through the payment of bribes, the direct loss of goods or crime prevention. There is strong evidence, that at macro level, these factors reduce the rate of private investment, job creation and growth. At the fir level; there is some evidence to show that these factors reduce the growth of output, investment and job creation. Greater transparency and accountability, simply action of administrative procedures and merit based human resource movement in the public administration make it possible to curb corruption.

Business Regulation and Licensing: whereas firms need to be regulated and licensed, if the cost they incur in complying with regulation are unnecessarily high, businesses entry and fir growth will be lower. The literature points enter growth when countries improve their run in the

World Bank's doing business index spatially if they move from being one of the worst performers to being amounts the best.

Inadequate infrastructural and human capital: Investors, both domestic and foreign, are naturally hesitant about investing in countries where basic requirements, such as roads, health services and utilities are inadequate. Because of the lack of adequate infrastructure, as stated above, it is common for investors to provide their own back-up generators, medical care and access roads, even in industrial estates provided by governments. These increase the costs of doing business and reduce the rate of return on investment; thus turning away both types of investors. Human capital investment on health and education, including institutional and on-the-job training, as well as adult literacy programmers, could overcome obstacles to productivity and higher earnings by the labor force and ill health, lack of illiteracy, lack of skills and adaptation to technology, poor incentives and immobility could be reduced.

Institutions and the legal system: -There is strong cross country evidence in the literature that weak institutions, particularly for the protection of property rights, and an ineffective judiciary that is unable to enforce contracts, reduce investment and growth. This is supported by firm level evidence which shows that secure property rights and better contract enforcement enable firms to grow: increasing their incentive to invest longer term, feel secure in trying out new suppliers, and enter into more complex contracts. Better systems of registering property, improved security of land tenure and reforms that reduce the cost of contract enforcement, such as promoting alternative dispute resolution, are policies that support better institutions and legal systems.

Taxation: -Excessively high rates of tax exact a high cost in terms of lower private investment and growth. They reduce the incentive to invest because the after tax returns to investors are lower. In addition, the cost of compliance with the administration of taxes can be high. The literature shows that lower rates of tax can increase investment and growth. Higher rates of tax can decrease business entry and the growth of established firms, with the medium sized firms hit hardest, as the small can trade informally, and the large avoid taxes. As well as reducing tax rates, policies that broaden the tax base, simplify the tax structure, improve administration and give greater autonomy to tax agencies help to reduce this constraint.

Financial Constraints: -Firms need to be able to access external finance to invest more. Moreover, the higher the cost of capital the lower the expected rate of return to the entrepreneur. There is a robust body of literature that shows that financial deepening, measured by the ratio of private credit to GDP, results in higher rates of growth and faster growth in the incomes of the poor, especially in the poorer countries with less well developed financial sectors. Studies show that firms able to access external finance are more likely to survive, invest and grow than those denied access.

2.5. Trends of private investment in Ethiopia

2.5.1. Pre 1974 (The Imperial Era)

The economic strategy of the counters during the period was export trade development aiming to earn more foreign currency to finance the import of more capital good to accelerate the overall development process. As a result of this economic strategy the participation of the private sectors both domestic and foreign investors grow up. In connection to that the private investment was highly recognized by the government policy makers as supporting hands of the public development efforts. In realization of this situation, the agricultural and industrial expansion program of the 1954 and later on three-five years development plans starting from 1995 has been introduced. These policy measure, in effect, were able to attract both domestic and foreign investors to participate in various industrial and agricultural activates .For instance, during the 1950-1955, the FDI (foreign direct investments) inflow to the counters was about 63million birr, In the later period during the 1955-60 and 1960-65, however, the amount of foreign capital inflow to the country was 86.5 and 128.5million birr respectively.

Since the second half of the 1950, the participation of the private investment and the role the private sectors have grown up steadily. To this effect the gross domestic investment (GDP) of the country including the investment made by the public sectors were registered \$690million birr in 1960-65 respectively (Workie, 1997).such a good investment performance of the imperial period has been mainly attributed to the market friendly economic principle and the regime. As a result of the liberalized policy of investment. It was in the last years of the regime that the country has achieved the highest rate, about 13% domestic saving in the county.

Despite, the development efforts made by the private and public sectors, the overall performance of the economy in the imperial regime had been at low level. Among other the main reasons responsible for that were; the policy was in favor of foreign investors. This was because the government expected much from foreign investors, but this was likely to create dependence on foreign capital, it encouraged capital-intensive technology, which does not go together with country's endowment, and the proportion of conspicuous consumption of the ruling class was very large which would have been used for product investments (Gemechu, 2017).

2.5.2. The Dergue Era (1974-1991)

The economic principal and direction of the country has totally diverted to the socialist oriented economic this regime. For instance, proclamation no.26/1975 and 76/1975 stated that resource and privately owned economic, social and financial institutional were nationalized and operation of private activities were restricted to a few lines and imposed capital ceiling on them. As a result of such proclamation, the role of domestic as well as the foreign private sectors in the development of the country was exhibited minimal. The import and export activities, the FDI, joint venture business operation and other economic exposure to the international market were limited. During this period the economic performance of the country has been declining; for instance, in the period 1975-79 a condition of economic stagnation and even in the same years an economic regression has been registered. The growth rate of real GDP was -6.3% and 9.7% in the year 1983 and 1984/85 respectively (Economic focus: 1999).

The bad performance of the national economy during this regime may be attributed to a number of reasons. For example, the low levels of saving and investment rate of the period were the major factor responsible for that. The average saving registered during the year 1980-1990 was 7.2% and the rate of gross fixed capital formation in the same period was 14.3% of the GDP during 1974-1980 to 25% GDP during 1988-1990. This was due to the drastic military spending and expansion of government bureaucracy. Parallel with rise in the government consumption from 79.8% of GDP during 1974-1978 to 70.8% of GDP during 1988-90 (Eshetu and Mekonnen, 1992). Because of the above mentioned problem this period was characterized as having very less or no private investment.

2.5.3. Post 1991

No doubt, the country's investment climate is getting friendlier with industrialist and investors in the new economic era. The investment climate of the country has changed radically since the market economy policy back in 1991. Ethiopia's abundant resources, diverse climate, huge labor force as well as security and peace plus other investment incentive have created good opportunities for domestic and foreign investors. Other incentive includes tax holiday, exemption from taxes on remittance of capital, loss forwards and customs duty exemption. Also on the list of incentive are improve infrastructure, easy access to law, public private sectors partnership forum and on e-stop shopping system of investment approval. Little wonder the Ethiopia investment agency and regional office licensed about 34,796 with aggregate capital of birr 200 billion. The authorities are opening-up the field for 4,913 of the projects, with capital of birr 4,913 of investors through privatization programmers that has sold off 247 public enterprises to private investors between 1994 and 2007.

Currently, government is up for-far-reaching measure to accelerate the privatization exercises. And some efforts are geared towards this direction. The former Ethiopia privatization Agency (EPA) merged with the previous public Enterprise Supervising Authority (PPESA), a body saddled with the task of improving the efficiency of decision making in the privatization process. The autonomous body is also to assist state owned enterprise to become commercially viable before selling or leasing them to private investors, 2007/2008 fiscal years, PPESA successfully transferred 16enterprise to the private sectors in industry,12 enterprise in agro-industry, and 4 enterprise in the service industry.

Despite these positive effects, in the present government where a very good and attractive policy is formulated, though there is significant change in private investment, as compared to past time there is still fluctuation overtime. And according to statistical reports a considerable proportion of total approved investments projects fail to be implemented due to several reasons in which many of them are attributed to the negative effects of determinate of private investments.

2.6. Empirical Literature

The empirical studies that are related with the determinants of private investment are essential to develop hypothesis for the study. Furthermore, the researcher reviewed some studies made on the impact of private investment on the economic development. To make it more attractive for readers, empirical evidences were revealed on two perspectives; *related empirical studies in the rest of the world and related empirical studies in Ethiopia.*

2.6.1. Empirical Literature in the rest of the world

By focusing on different variables that determine private investment, many researchers have studied private investment from different perspectives. The researcher provides an overview of empirical studies on private investment and this is presented as the following.

Ronge and Kimuyu (1997) suggested that some agents, typically small and medium enterprises (SMEs), are unable to get financing directly from open market debt. Hence, these agents are strongly dependent on bank credit, a market that is usually characterized by imperfections due to asymmetric information between lenders and borrowers. In developing countries, this problem of access to credit is critical, due to the absence of markets and poor access to long-term financing. The evolution of the credit amounts destined for the private sector would be a good indicator of the restrictions operating in the domestic financing of investment.

Ronge and Kimuyu (1997) examined the determinants of private sector investment for Kenya using data over the period 1964-1996. A double-logarithmic form of the investment equation was estimated using ordinary least squares (OLS). The results indicated that both the availability of credit and foreign exchange effects on, private investment confirm in the results in most empirical studies. Private investment, however, was adversely affected by the stock of debt. Specifically, a one percent increase in the lagged debt to GDP ratio reduced private investment by 0.3 percent. The study also establishes a negative effect of exchange rate depreciation on investment while public investment positively affect private investment, contrasting the results of Kazeem et al (2012) where crowding-out was found. The interest rate was also found to be less important in determining the level of private investment in Kenya.

Haroon and Nasser (2011) using consumer price index to refer inflation rate, they examine the determinants of investment in Pakistan. The methodology aims to formulate a linear regression model for private investment after testing multicollinearity between independent variables. The Augmented Dickey-Fuller and Phillips-Perron tests would be utilized to investigate stationarity of the variables. They found that, private investment is a function of inflation rate, indirect taxes, subsidies given by the government, discount rate, and gross domestic product, domestic savings, government development expenditures, amount of debt servicing, and past private investment (investment experience).

Ang (2010) carried out a study by Applying OLS model and independent variable like public investment, gross domestic product, trade openness, external debt and credit to private sector are integrated in the model. Empirical results of the study show that availability of financial resources and a greater level of aggregate output have a strong positive impact on private investment, while macroeconomic uncertainty has a negative influence. Both foreign direct and public investments have a complementary effect on private investment.

Matwanga (2012), found a positive influence of savings, GDP growth and public investment on the behavior of private investors in Kenya. The purpose of this section is to review related studies in Ethiopia and elsewhere to have a deeper understanding of the factors contributing for private sector investment growth.

Sakr (2016) carried studies on the private investment behavior in Kenya and found a positive influence of savings, GDP growth and public investment on the behavior of private investors. He also indicated that output growth did not affect private investment while monetary policy played a less significant role. Further, the paper found that credit provided to the private sector, public investment and GDP growth had a significant impact on private investment. Restrictions on investment financing are a problem broadly documented in the literature on the determinants of investment.

Foreign direct investment (FDI) in any economy brings with it technology, income through taxes, reduces unemployment and if the products it produces are meant for export it earns foreign exchange to the country. Mutenyo et al. (2010) examined the link between FDI and private investment using a panel level of 34 Sub-Saharan African (SSA) countries from 1990-2003 and

accounted for the endogeneity of variables using two-stage least squares (TSLS) econometric technique. The study incorporated FDI as one of the variables assess its effects if any in the behavior of private investment in Kenya (Kazeem et al, 2012).

Asante (2000) investigated the determinants of private investment in Ghana using time series and cross-section data. The survey data comprised of 116 manufacturing firms in Ghana sought to capture the determinants of private investment that are not captured in time series analysis, for example, political instability and policy uncertainties. The study had nine variables in total which included GDP growth rate, Balance of Payment, Credit to the private sector, Public investment as a percentage of GDP, Private investment as a percentage of GDP, Inflation rate, Budget Deficits as a percentage of GDP, Real Exchange Rate and Foreign Direct Investment which is also a percentage of GDP.

The study found that public investment had a crowd in effect on private investment while credit to the private sector has a positive influence on private investment. Further, the study found coefficients of the proxies for macroeconomic instability, the real exchange rate, the debt burden, the black market premium, and the inflation rate to be statistically insignificant in explaining private investment. However, the overall indicator of instability was found negative in private investment in Ghana (Asante, 2000).

Osmond (2014) studied the determinants of private investment in Nigeria for the period from 1970- 2012 by estimating the investment rate function derived from life cycle hypothesis while taking into account the structural distinctiveness of developing country. The study employed error correction model (ECM) to avoid for the problem of spurious relations. The results of the study confirmed that investment rate is positively influenced by the growth rate of disposable income and the real interest rate on bank deposits. Investment rate in Nigeria is found to be influenced negatively due to low public infrastructure, high lending rate, low saving rate and political insatiability.

Asiedu and Freeman (2009) studied three important economic areas transition countries, Sub-Saharan Africa, and Latin America and the Caribbean. They found that corruption has an adverse effect on investment growth in transition countries, but has no significant effect in Latin America and the Caribbean, and Sub-Saharan Africa. Furthermore, among the variables (firm size, firm

ownership, trade orientation, GDP growth, inflation and openness to trade) corruption is the most important determinant of investment growth for transition countries. This shows that the overall effect of corruption on investment is negative.

The survey made by *Seruvatu and Jayaraman (2010)* on determinants of private investment in Fiji indicated that the principal factors hindering investment are largely policy-related issues. This suggested that while investment incentive schemes might go some way in promoting investment, the key to improving the investment climate is clear policy direction and simple bureaucracy and regulation.

The top major obstacles to investment were government policy uncertainty, bureaucratic red tape, government regulations, finding skilled labour, volatile political situations, land issues, law and order instability, a lack of infrastructure, and high utility costs like water and electricity. Consumer confidence, interest rates, shipping costs, profitability, bank fees and charges, price controls, tax rates, racial issues, medical/education facilities, finding suitable land/premises, availability of work/sales, lack of bank lending, wages, cash flow, contract security, and exchange controls were relatively less important. Other impediments to investment include expatriate permits, a lack the Board of Directors 'support and interest, lack of management focus and prioritizing, trade union issues, lack of local equity, labor rigidity, trade relations, lack of raw material, international tax treaties, and coups and crime.

Ndikumana (2014) domestic savings appear to be an important driver of domestic investment. Similarly, bank credit to the private sector has a positive and statistically significant effect on domestic investment. The effect is nonlinear, suggesting that beyond a certain threshold of the credit to GDP ratio, the relationship between credit and investment turns negative. However, in this particular sample, the threshold implied by the regression results is high, implying that there is plenty of room for credit to increase in the range where the relationship between domestic investment and credit to the private sector is positive. The effect of credit on investment is quantitatively much larger than that of domestic savings.

2.6.2. Related studies in Ethiopia on determinants of Private investment.

Ambachew, (2010) study on the determinants of domestic private investment in Ethiopia. The empirical investigation employs multivariate single equation ECM estimation methodology on

integrated of order one I (1), variable using annual time series data sets for 1950-2003. According to the estimation results, private investment in Ethiopia is influenced positively by domestic market, return to capital, trade openness and liberalization measures, infrastructural facilities and FDI ; but negatively by government activities, macroeconomic uncertainties and , political instability.

Ambachew, (2010) study on the determinants of domestic private investment in Ethiopia identified there is negative relation between domestic credit given to the private sector and private investment. Credit to the private sector reduces domestic private investment because the credit may be diverted to non-productive activities.

Hence enhancing demand augmenting and trade liberalization policies, improving infrastructural facilities and maintaining macro-economic and political stabilities are the major recommendation of the researcher. The study further identifies that the appreciation of the real exchange rate discourages domestic private investment and vice versa. In short, the high value of local currency constrains domestic investment.

A study by Workie (1996) on constraints to entry, operation and expansion of private investment in Ethiopia using investor level information showed that bureaucratic procedures, a lack of infrastructure, power supply problems and access to finance were the leading constraints for operations. The other areas of the business environment (such as political/policy uncertainty and labor regulations) were relatively less important. The survey ultimately confirmed that the availability of finance rather than the interest rate is a crucial determinant of private investment in Ethiopia. Macroeconomic instability and political/policy uncertainty were not found to be significant determinants of private investment.

Adujna (2013) undertook a study covering the period 1981-2010 using Ordinary Least Square (OLS) regression to model the determinants of private investment in Ethiopia. Findings from the study showed that public investments in basic infrastructures and social overheads are essential for private investment. In addition, the rising real per-capital income of the people has a crucial positive effect on private investment by way of increasing market demand for goods and services. These in turn trigger private investment. Likewise, external debt has a favorable effect on private investment in countries like Ethiopia where there is a serious shortage of finance.

A study by Admasu (2013) on the macro and microeconomic determinants of private investment both at national and regional levels in Ethiopia showed that at the micro level the probability of individual's to invest is significantly and positively influenced by the level of education, access to land and investment incentives. The influence of bureaucratic red tape was also found to be negative and significant.

Getachew (2010) studied the determinants of private industrial investment in Ethiopia using descriptive statistics to analyze micro-level determinants. He found that the real interest rate did not have a significant impact on private investment in Ethiopia. The study revealed that private investment was positively affected by credit disbursement to the private sector in Ethiopia. It also found that severe constraining factors to private manufacturing investment were market, financial, infrastructure, policy, technology, and input related ones.

Sisay(2010) carried on the study of the determinants of private investment in Ethiopia over the period ranging from 1950-2003 motivated by modified flexible accelerator model by applying multivariate single equation ECM estimation methodology. According to his study private investment in Ethiopia is positively influenced by the domestic market, infrastructural facilities and FDI and negatively by macroeconomic uncertainty.

Siraj (2014) tried to evaluate the inter-relationship between private investment and economic growth both in the long and short run. He argued that there is evidence of unia-directional causality between economic growth and private investment. The findings showed that both private and public sector investment have a positive significant impact on real output/economic growth while in the short run public investment has a negative impact on growth and private investment has a positive impact on private investment.

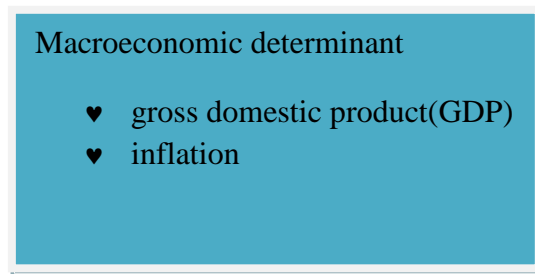
Esubalew (2014) carried on studies on the macroeconomic determinants of private investment in east Africa region with panel data set from the period of 2000-2012. According to his studies macroeconomic factors such as variation in the output and real per capita growth fiscal and monetary policy as well as exchange rate are the most determinant factors for the variation of private investment in eastern African countries over the study period. His study confirmed that domestic private investment is positively influenced by real GDP growth, financial availability as measured by credit to the private sector as the percentage of GDP and the development of

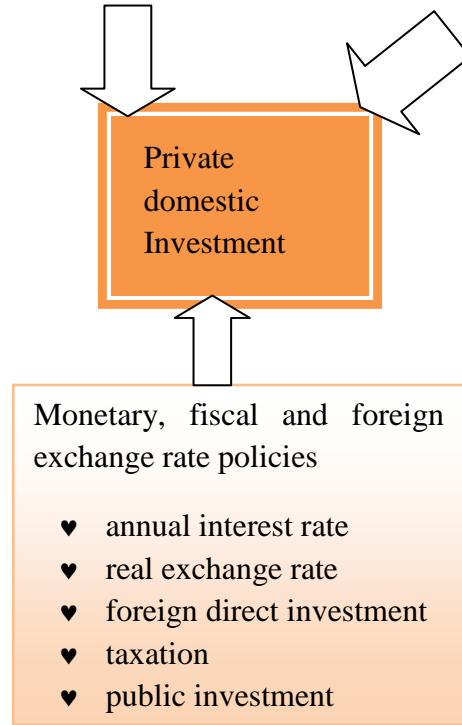
human capital as measured by school enrolment has significant positive influence on the private investment of the region. On the other hand variable such as unstable macroeconomic environment, as measured by the inflationary situation, high external debt, fluctuation in the terms of trade, real exchange movement, public investment and real interest rate are found to hinder private investment significantly in East Africa.

Abduishu (2013) the impact of inflation on private investment is moderate in Ethiopia as he stated from the estimation results. These results have confirmed that inflation in Ethiopia in comparison to other Sub-Sahara African Countries and transitional economies was moderate. whereas, the estimation results has confirmed that resource constraints which captured by real GDP, credit availability and foreign reserve availability to private sector highly and significantly influence private investment .The sets of findings in the foregoing analysis of the various relevant literatures reveal numerous disparities especially in the empirical component. These may be associated to, among other things, the different settings of respective studies. It may additionally point to the imperfections of the methods used or quality of the data employed in the studies. Evaluation of this topic, therefore, becomes even more important as efforts continue towards consistent or conclusive results.

2.7. Conceptual frame works.

The conceptual framework of the study include real private investment as a dependent variable and the explanatory variables such as Real GDP, inflation rate, interest rate, taxation, public investment, human capital, political stability and absence of violence, access to credit and exchange rate. Based on the hypotheses that are developed from the empirical evidence, the researcher developed the following conceptual frame work.





Source: own construction (by taking the theoretical and empirical review)

Private Investment (PI): is the dependent variable, which refers to the flow of spending that adds to outlays, buildings and construction by domestic private investors. It is measured as a ratio of the amount of private investment to GDP. This is because most of the time series macro-economic variables are expressed as a proportion or ratio of GDPs contribution measured by GDP share. It expresses the reality and sometimes helps to avoid the problem of non-stationary. Private sector’s gross domestic investment is defined as all additions to the stocks of assets or purchases and own-account gross capital formation, less any sales of second- hand and scrapped assets(Asante,2000). The independent economic variables that are hypothesized to affect private domestic investment in Ethiopia are described below.

Real Gross Domestic product: is an inflation-adjusted measure that reflects the value of all goods and services produced by an economy in a given year, expressed in base-year prices, and is often referred to as “constant-price, GDP” is one of the most influential variables affecting private investment(Were,2001). GDP/real GDP/Economic growth/Real Income are positively

contributes for private investment development.

Public Investment: is the money that a government spends on public services, such as education, infrastructure and health (Abdush, 2000). Public Investment expenditure is also another influential variable that determines private investment. The role of public investment is seen from two aspects. On one hand public investment, in the form basic infrastructures, is a complement to private investment and hence promote private sector expansion and development. On the other hand, public expenditure is a competitor of private sector and hence, reduces the amount of money available for them.

As of Adugna (2013), Jalloh (2012), Ouattara (2014), and Molapo and Damane (2015), Public investment expenditure directly contributes for private investment. According to them public extensive investments on basic infrastructures-such as roads, energy and telecommunication - creates conducive environment for investment. However, Naa-Idaret, al (2012) and Kaputo (2011), in Ghana and Zambia respectively, found the results that support the theory of –crowding out effect. According to them public investment is inversely related with private investment.

Inflation: is the rising price of goods and services over time and general increase in prices and fall in the purchasing value of money (Asante, 2000). According to Jalloh (2002), inflation reduces private investment, and causes low levels of private investment since domestic investors foresee a low return on capital. Inflation as measured by the consumer price index (CPI) reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.

Interest rate (Lending): According to economists interest is the cost of investment (Jalloh, 2012). The results from the studies show that interest rate inversely related to private sector performance in Sierra Leone and Zambia. According to Jalloh (2012), an increase in the real rate of interest will raise the user cost of capital, thereby making investment less profitable. As of Kaputo (2011) real lending interest rate has a significant negative effect in the long-run. This is so because the high cost of investment capital discourages investment by local firms.

Access to Credit: refers to the loans, treasury bills and other monetary instruments granted by financial institution to the private sector. It is expected to have positive relation with private investment. This is because as the availability of finance increases, people can have the finances

required and invest which increases the volume of private investment. Kaputo (2011) suggested that credit plays a significant role in improving private investment.

Taxation: tax is a compulsory financial charge or some other type of levy imposed upon a taxpayer (an individual or legal entity) by a governmental organization in order to fund various public expenditures. A failure to pay, along with evasion of or resistance to taxation, is punishable by law. In economic terms, taxation transfers wealth from households or businesses to the government. A higher corporate tax is a disincentive to privates' investment, since they erode whatever profits made by the firms and hence scare away the private investors.

Foreign Direct Investment: The World Bank World Development Indicators (2014) defined FDI as the net amount invested or reinvested by non-residents to acquire a lasting interest (10 percent or more of voting stock) in enterprises in which they exercise significant managerial control.

Exchange Rate: Exchange Rate refers to the price paid in one currency to acquire the one unit of foreign currency or the foreign currency received to sell one unit of home currency. It is frequently used by governments to correct external imbalance. The objectives of exchanges rates devaluation are to reduce expenditure on imports and increase exports. This expenditure switching policy may have conflicting effects on private investments. For example, devaluation reduces the relative price of non-tradable which results in the reallocation of resource towards tradable. According to serven and solimon (1992), devaluation tends to dampen investments by rising the price of capital goods imported and intermediary's inputs, which acts like an adverse supply shock on the production of investments goods.

Human capital: Human capital investment on health and education, including institutional and on-the job training, as well as adult literacy programmers, could overcome obstacles to productivity and higher earnings by the labor force and ill health, lack of illiteracy, lack of skills and adaptation to technology, poor incentives and immobility could be reduced. These decrease the costs of doing business and increase the rate of return on investment; thus human capital has positive impact on private investment.

Political stability: As Barro (1991) pointed out that the presence of political stability and the manner of rent-seeking activity in an economy have substantial impacts on private investment. Similarly, Olson (1996) stated that the complex system of political and social institutions are still

not given due attention in an empirical investigation and theoretical growth models. This variable has positive effect on private investment.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1. Research Design.

The study has been adopted quantitative research Approach and in addition uses secondary data which is readily available for convenience, in terms of time available. A descriptive design has been assumed for analyzing the determinants of private investment in Ethiopia. Descriptive design allows for the explanation of how private investment relates with its determinants, through the use of quantitative methods (Rippy; 2004). Descriptive design gives room for the manipulation of independent variables to determine their effect on a dependent variable (Box and Draper; 1987).

The main data source of the study has been secondary data collected from various governmental and non-governmental institutions through flash and website. The collected data have been analyzed by using econometrics model called Autoregressive Distributed Lag (ARDL) Model using EVIEW 9.0 econometric software.

3.2. Study Area

Ethiopia's location gives it strategic dominance as a jumping off point in the Horn of Africa, close to the Middle East and its markets. Bordering Eritrea, Somalia, Kenya, South Sudan, and Sudan, Ethiopia is landlocked, and has been using neighboring Djibouti's main port for the last two decades. However, with the recent peace with Eritrea, Ethiopia is set to resume accessing the Eritrean ports of Assab and Massawa for its international trade.

With about 109 million people (2018), Ethiopia is the second most populous nation in Africa after Nigeria, and the fastest growing economy in the region. However, it is also one of the

poorest, with a per capita income of \$790. Ethiopia aims to reach lower-middle-income status by 2025.

Ethiopia's economy experienced strong, broad-based growth averaging 9.9% a year from 2007/08 to 2017/18, compared to a regional average of 5.4%. Ethiopia's real gross domestic product (GDP) growth decelerated to 7.7% in 2017/18. Industry, mainly construction, and services accounted for most of the growth. Agriculture and manufacturing made lower contribution to growth in 2017/18 compared to the previous year. Private consumption and public investment explain demand-side growth, the latter assuming an increasingly important role.

Higher economic growth brought with it positive trends in poverty reduction in both urban and rural areas. The share of the population living below the national poverty line decreased from 30% in 2011 to 24% in 2016. The government is implementing the second phase of its Growth and Transformation Plan (GTP II) which will run to 2019/20. GTP II aims to continue expanding physical infrastructure through public investments and to transform the country into a manufacturing hub. GTP II targets an average of 11% GDP growth annually, and in line with the manufacturing strategy, the industrial sector is set to expand by 20% on average, creating more jobs. Figure 1. Geographical location of Ethiopia



3.3. Data Sources and Type of Data

To conduct this paper the researcher have used annul time series data for the period ranging from 1986-2018 that is 32 years data have been employed. This study has been limited to macroeconomic variables, monetary, fiscal and institutional variables determining private

investment in Ethiopia. These variables are interest rate, gross domestic product (GDP), inflation, access to bank credit, public investment as a ratio of GDP, human capital, institution, investment incentive and foreign direct investment as a ratio of GDP.

To achieve the basic objective of the study secondary data have been employed and the necessary data required to those determinants are obtained from different secondary data sources such as publications, annual bulletins and reports by concerned institutions like Ministry of finance and Economic Development (MOFED, 2019), Ethiopian Economic Association (EEA, 2019), National Bank of Ethiopia (NBE, 2019), Central statistical Authority (CSA, 2019), Ethiopian investment commission and others. In addition to these, Secondary data from World Bank (WB), Africa development Bank (ADB) and IMF report of various years have been included in the study.

3.4. Method of Data Analysis

The methodology for analyzing the data included both descriptive statistics and economic regression analysis and descriptive tools like simple statistical tools, tables and percentage with appropriate econometric analysis like unit root test and Autoregressive distributed lag Model (ARDL) to estimate the determinants of private investment.

3.5. Econometric Model Specification

The model adopted for this study has been developed from the neoclassical flexible accelerator model formulated by Jorgensen (1967). The reason for the adoption of this model is that it ranks the most popular amongst all investment theories and the assumption of the theory is relevant in the context of developing countries in general. The benchmark model to be tested here is the modification of flexible accelerator model of investment for a developing economy and focuses on the hypothesized determinants of private investment in Ethiopia.

There is no general consensus on the determinants of private investment; therefore, to formulate the investment equation, we have to first estimate the standard accelerator investment model and thereafter incorporate other variables until a more robust model is formulated. According to the

accelerator theory, investment is a function of economic growth. In the long-run, the desired capital stock (K) is assumed to be directly related to levels of income (Y).

$$K_t \sim Y_t$$

$$K_t = \alpha Y_t \dots \dots \dots (1)$$

Where α is a constant, and t is time-operator. Differentiating the equation with respect to time t ;

$$\Delta K_t = \alpha \Delta Y_t \dots \dots \dots (2)$$

Where the Δ is the difference operator. To obtain an equation for the relationship between investment and desired capital stock, the conventional capital accumulation identity is used to identify investment, I;

$$K_t = (1 - \delta)K_{t-1} + I_t \dots \dots \dots (3)$$

Where (δ) refers to the depreciation of capital. From equation (3) we can obtain the following equation;

$$K_t - K_{t-1} = I_t - \delta K_{t-1} \dots \dots \dots (4)$$

Rearranging the expression and assuming $\delta = 0$, we can solve for I_t to yield the following equation;

$$\Delta K_t = I_t \dots \dots \dots (5)$$

Equation (5) can be substituted in equation (2) to obtain;

$$I_t = \alpha \Delta Y_t \dots \dots \dots (6)$$

This equation represents the basic investment function. But we need to account for the slow adjustment of the actual capital stock to the desired capital stock, lagged values of the dependent variable can be introduced into the expression to yield the following investment equation denoted by ;

$$I_t = \rho I_{t-1} + \beta_1 \Delta Y_t + \beta_2 \Delta Y_{t-1} + \varepsilon_t \dots \dots \dots (7)$$

Where the first two terms on the right-hand side are lagged investment and income growth rates respectively. β represents coefficients while ΔY_{t-1} represents lagged growth rate of output. ε is the disturbance (error) term which captures the effects of unobserved variables. The final equation can thus be estimated;

$$I_t = \rho I_{t-1} + \beta_1 \Delta Y_t + \beta_2 \Delta Y_{t-1} + X_t + \varepsilon_t \dots \dots \dots (8)$$

Where, X_t represents some of the variables that are applicable in the developing countries such as financial factors, policy-related factors, institutional and structural factors, open economy factors and general macroeconomic related variables. The variables are chosen based on the availability of data and existence of wide literature that support the variable. Our model for private investments can now take the following form;

$$PDI = f(RGDP, PI, HC, EXC, INT, PS, AC, CPI, FDI, TAX) \dots \dots \dots (9)$$

To estimate the parameters β , the equation can take logarithmic form. The application of logarithm will help us to reduce the problem of multicollinearity to some extent and it also help us when we interpret the coefficients that is our interpretations becomes in terms of elasticity (1% change in the explanatory variable has X% change in the dependent variable).

$$PDI = \beta_0 + \beta_1 \ln GDP + \beta_2 \ln f + \beta_3 \ln INT + \beta_4 \ln PI/GDP + \beta_5 \ln HC + \beta_6 \ln EXC + \beta_7 \ln FDI/GDP + \beta_8 \ln TAX + \beta_9 \ln AC + \beta_{10} PS + \varepsilon_t \dots \dots \dots (10)$$

Where PDI is the dependent (endogenous) variable being private domestic Investments whereas the independent variables are RGDP, CPI, INT, PI, HC, EXC, FDI, TAX, AC and PS are real gross domestic product, consumer price index, real interest rate, public investment, human capital, exchange rate, foreign direct investment, taxation, access to credit and political stability respectively. ε is white noise error term.

3.6. Research Variables and Hypothesis

3.6.1. Dependent Variables

Private Investment (PI): is the dependent variable, which refers to the flow of spending that adds to outlays, buildings and construction by domestic private investors. It is measured as a ratio of the amount of private investment to GDP. This is because most of the time series macro-economic variables are expressed as a proportion or ratio of GDP's contribution measured by GDP share. It expresses the reality and sometimes helps to avoid the problem of non-stationary. Private sector's gross domestic investment is defined as all additions to the stocks of assets or purchases and own-account gross capital formation, less any sales of second-hand and scrapped assets (Asante, 2000). The data is in constant price birr and then transformed into natural logarithm. .

Hint H_0 for null hypotheses for the variable that have positive significant effect on private domestic investment.

H_1 , for alternative hypotheses for the variable that have negative significant effect on private domestic investment.

3.6.2. Independent Variables

Real Gross domestic product: is often considered the best measure of how well the economy is performing. The goal of GDP is to summarize in a single number the dollar value of economic activity in a given period of time. There are two ways to view this statistic. One way to view GDP is as *the total income of everyone in the economy*. Another way to view GDP is as *the total expenditure on the economy's output of goods and services*. From either viewpoint, it is clear why GDP is a gauge of economic performance. GDP measures something people care about their incomes.

According to Basha and Debela (2015), private investment is positively and significantly affected by real GDP/income. Adugna (2013) also identified that real GDP per capita positively affects private investment higher real GDP per Capital is assumed increase effective demands for goods and services and thereby inspire private investors.

H₀. There is significant positive impact of GDP on private domestic investment.

Public Investment: is the money that a government spends on public services, such as education, infrastructure and health (Abdush, 2000). Public Investment expenditure is also another influential variable that determines private investment. The role of public investment is seen from two aspects. On one hand public investment, in the form basic infrastructures, is a complement to private investment and hence promote private sector expansion and development. On the other hand, public expenditure is a competitor of private sector and hence, reduces the amount of money available for them.

As of Adugna (2013), Jalloh (2002), Ouattara (2004), and Molapo and Damane (2015), Public investment expenditure directly contributes for private investment. According to them public extensive investments on basic infrastructures-such as roads, energy and telecommunication - creates conducive environment for investment. However, Naa-Idaret, al (2012) and Kaputo (2011), in Ghana and Zambia respectively, found the results that support the theory of -crowding out effect. According to them public investment is inversely related with private investment. This shows that there is competition for resources between the public and the private sector.

H₀. There is positive and significant impact of public investment and private domestic investment.

Inflation: is the rising price of goods and services over time and general increase in prices and fall in the purchasing value of money (Asante, 2000). According to Jalloh (2002), inflation reduces private investment, and causes low levels of private investment since domestic investors foresee a low return on capital. Inflation as measured by the consumer price index (CPI) reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.

H₁. There is negative significant impact of inflation and private domestic investment.

Interest rate (Lending): According to economists interest is the cost of investment (Jalloh, 2002). The results from the studies show that interest rate is inversely related to private sector performance in Sierra Leone and Zambia. According to Jalloh (2002), an increase in the real rate of interest will raise the user cost of capital, thereby making investment less profitable. As of Kaputo (2011) real lending interest rate has a significant negative effect in the long-run. This is

so because the high cost of investment capital discourages investment by local firms. Real interest rate is the lending interest rate adjusted and transforming it into natural logarithm.

H₁. There is negative significant impact of interest rate on private domestic investment.

Access to Credit: *Credit to the private sector (CR):* refers to the loans, treasury bills and other monetary instruments granted by financial institution to the private sector. It is expected to have positive relation with private investment. This is because as the availability of finance increases, people can have the finances required and invest which increases the volume of private investment. As of Ouattara (2004), credit to the private sector is negatively related to private investment. This implies that increases in credit to the private sector will not enhance private investment. Weak institutional environment and lack of experienced personnel and expertise were few reasons. Kaputo (2011), however, suggested that credit plays a significant role in improving private investment.

H₀. There is positive significant impact of access to credit on private domestic investment.

Taxation: tax is a compulsory financial charge or some other type of levy imposed upon a taxpayer (an individual or legal entity) by a governmental organization in order to fund various public expenditures. Given that all other factors remain constant and following Norgah (1998), corporate taxes is expected to be negatively related to private investment.

H₁. There is negative and significant impact of taxation on private domestic investment.

Foreign Direct Investment: The World Bank World Development Indicators (2014) defined FDI as the net amount invested or reinvested by non-residents to acquire a lasting interest (10 percent or more of voting stock) in enterprises in which they exercise significant managerial control. In line with the approach used in the FDI literature, in this study used the net foreign direct investment inflows as a percentage of RGDP as proxy of this variable.

H₁. There is negative and significant impact of FDI on private domestic investment.

Human capital: Human capital investment on health and education, including institutional and on-the job training, as well as adult literacy programmers, could overcome obstacles to productivity and higher earnings by the labor force and ill health, lack of illiteracy, lack of skills

and adaptation to technology, poor incentives and immobility could be reduced. These decrease the costs of doing business and increase the rate of return on investment; thus human capital has positive impact on private investment. *H₈. There is appositive and significant impact of human capital on private domestic investment*

Political stability: AsBarro (1991) pointed out that the presence of political stability and the manner of rent-seeking activity in an economy have substantial impacts on private investment. Similarly, Olson (1996) stated that the complex system of political and social institutions are still not given due attention in an empirical investigation and theoretical growth models. This variable has positive effect on private investment.

H₀. There is positive and significant impact of Political stability on private domestic investment.

Exchange rates: Exchange Rate refers to the price paid in one currency to acquire the one unit of foreign currency or the foreign currency received to sell one unit of home currency. According to serven and solimon (1992), devaluation trends to dampen investments early on by raising the price of capital goods imported and intermediary's inputs, which acts like an adverse supply shock on the production of investments goods. However, as the economy responds to its competitiveness with higher exports, the longer run effects on private investments can be favorable.

H₁. There is a negative and significant impact of exchange rate on private domestic investment.

Table 3.1:- variables measurement and expected sign

S/NO	Factors	Proxy of variables	Expected sign
1.	Private domestic investment	Private domestic gross fixed capital formation at Constant prices.	
2.	Economic growth	Real GDP growth	+
3.	Interest rate	Lending Real interest rate (%)	-
4.	Human capital	Gross enrollment rate	+
5.	Political stability	Dummy(1 for stable period and 0 for war and turbulent period)	+

6.	Exchange rate	Real Exchange rate	-
7.	Taxation	Annual average tax on domestic investors	-
8.	Foreign direct investment/GDP	Net foreign direct investment inflows as a percentage of RGDP	-
9.	Public investment/GDP	Sum of public fixed capital formation and General government fixed capital formation	+/-
10	Access to credit	Credit to the domestic private sector [% of GDP]	+
11.	Inflation	CPI	-

3.7. Model Estimation Procedure

3.7.1. Unit Root Test

It is fundamental to test for the statistical properties of variables when dealing with time series data. Time series data are rarely stationary in level forms. Regression involving non-stationary (I.e., variables that have no clear tendency to return to a constant value or linear trend) time series often lead to the problem of spurious regression. This occurs when the regression results reveal a high and significant relationship among variables when in fact, no relationship exist. Moreover, Stock and Watson (1988) have also shown that the usual test statistics (t, F, DW, and R^2) will not possess standard distributions if some of the variables in the model have unit roots. The other necessary condition for testing unit root test when we applying ARDL model is to check whether the variables enter in the regression are not order two (I.e. I(2)), which is Precondition in ARDL model. Therefore, it is necessary to test for time series variables before running any sort of regression analysis. Non-stationary can be tested using Augmented Dickey-Fuller (ADF) test so to ensure reliable result of test for stationary, the study employs Augmented Dickey-Fuller (ADF) test. This test is conducted by augmenting the different equations by adding the lagged value of the dependent variable say ΔY_t . Now consider Y_t is a random walk with drift around a stochastic trend:

$$\Delta y_t = \beta_1 + \beta_2 t + \delta y_{t-1} + \mu_t \dots \dots \dots (1)$$

To be specific, suppose we use the above equation. The ADF test here consists of estimating the following regression.

$$\Delta y_t = \beta_1 + \beta_2 t + \delta y_{t-1} + \sum_{i=1}^m \alpha \Delta y_{t-i} + \varepsilon_t \dots \dots \dots (2)$$

where ε_t is a pure white noise error term and where $\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2})$, $\Delta Y_{t-2} = (Y_{t-2} - Y_{t-3})$ etc. the number of lagged difference terms to include is often determined empirically, the idea being to include enough terms so that the error term in equation (2) is serially uncorrelated. In ADF we still test whether $\delta=0$ and the ADF test follows the same asymptotic distribution as the DF statistics, so the same critical value can be used.

That is H0, $\delta=1$, H1, $\delta<1$

If the t value or t-statistic in absolute value greater than the critical values, the first hypothesis (I.e. H0) is rejected and the conclusion is that the series is stationary. Conversely, if the t-statistic in absolute value less than the critical values, the second hypothesis (H1) is rejected

3.7.2. Long Run Model Estimation Procedure

To test the long run relationship between dependent variable (private investment) and independent variable (interest rate, GDP, public investment as ratio of GDP, inflation, etc.), the study applies Autoregressive Distributed Lag (ARDL) Model. The study was first investigate the time series properties of the data by using Augmented Dickey-Fuller (ADF) tests. The unit root tests will be used to check the stationary of the variables and to check the variables are not order two (I.e. I (2)), which is precondition to apply ARDL model (Pesaran et al., 2001).

The Autoregressive distributed lag Model (ARDL)

A large number of past studies have used the Johansen co-integration and Engle-Granger causality technique to determine the long-term relationships between variables of interest. In fact, this remains the technique of choice for many researchers who argue that this is the most accurate method to apply for I (1) variables. Recently, however, a series of studies by Pesaran et

al. (1999, 2001); Narayan (2004); have introduced an alternative co-integration technique known as the ‘Autoregressive Distributed Lag (ARDL)’ bound test. There are numbers of advantages of using ARDL model also called ‘Bound Testing Approach’ instead of the conventional Engle-Granger two-step procedure (1987), Maximum likelihood methods of co-integration (Johansen, 1988) and Johansen and Juselius (1990). First, the ARDL model is the more statistically significant approach to determine the co-integration relation in small samples as the case in this study (Pesaran et al.,2001; Narayan,2004), while the Johansen co-integration techniques require large data samples for validity.

A second advantage of the ARDL approach is that while other cointegration 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 co integration, which requires that the variables be already classified into I(1) or I(0) or mixture of both (Pesaran et al., 2001). *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 questions are determined simultaneously (Nasiru, 2012 as cited in Tsadkin, 2013). Finally, Applying the ARDL technique we can obtain unbiased and efficient estimators of the model (Narayan, 2004), (Harris and Sollis, 2003; Pesaran, 1995) as cited in Tsadkin 2013.

$$\ln PDI = \beta_0 + \beta_1 \ln PUI + \beta_2 \ln GDP + \beta_3 \ln CPI + \beta_4 \ln EXC + \beta_5 \ln HC + \beta_6 \ln TAX + \beta_7 PS + \beta_8 \ln FDI + \beta_9 \ln AC + \beta_{10} \ln INT + \varepsilon_t \dots \dots \dots (3)$$

The bounds test is mainly based on the joint Wald test or F- test which its asymptotic distribution is non-standard under the null hypothesis of no co-integration. The null hypothesis for no co-integration in the long-run among the variables in equation [3] is $H_0=0$ (Meaning no long run relationship among the variables) against the alternative one $H_1 \neq 0$. The F-test has no standard distribution which depends on (i) whether the variables include in the model are I(0), or I(1), (ii) the numbers of regressors, and (iii) whether the model contains an intercept and/or a trend (Narayan, 2004). In order to test the existence of long-term relationship among the variables,

equation [3] had been estimated applying bound test. To test the significance of lagged level of the variables under consideration, the appropriate statistic is F or Wald test as Pesaran et al. (2001) proposed for bound test approach will be applied. According to Pesaran et al. (2001), there are two sets of critical value bounds for all classifications of regressors' namely upper critical bound value and lower critical bound value. The critical values for I (1) series are referred to as upper bound critical values; while the critical values for I (0) series are referred to as lower bound critical values.

If the calculated F statistic is greater than the upper bound critical values, we reject the null hypothesis of no long run relationship among the variables. If the calculated F statistic is less than the lower bound critical values, we can't reject the null hypothesis rather accept the null hypothesis of no co-integration among the variables. However, if the calculated F statistic is between the upper and lower bound critical values, inference is inconclusive and we need to have knowledge on the order of integration of underlying variables before we made conclusive inference (Pesaran et al., 2001).

However, in this study we are not going to follow the bound critical value developed by pesaran et al. (2001) because of the computed critical values are based on large sample size (500 and more). Rather, a relatively small sample size in this study of 32 years observations, we will use the critical values developed by Narayan (2004) which was developed based on small sample size between 30 and 80 observations. If there is an evidence of long-run relationship (co-integration) of the variables, the following long-run ARDL model will be estimated

$$coint = PDI - (\beta_0 + \beta_1 \ln PI + \beta_2 \ln GDP + \beta_3 \ln CPI + \beta_4 \ln EXC + \beta_5 \ln HC + \beta_6 \ln TAX + \beta_7 \ln PS + \beta_8 \ln FDI + \beta_9 \ln AC + \beta_{10} \ln INT + \varepsilon_t) \dots \dots \dots (4)$$

Here all variables are as previously defined. The orders of the lags in the ARDL Model are selected by either the Akaike Information criterion (AIC) or the Schwarz Bayesian criterion (SBC), before the selected model is estimated. We use the Akaike Information criterion (AIC) in lag selection because of its advantages for small sample size (Tsadkan, 2013) as it is the case in this study. Determination of the optimal lag length is so crucial in ARDL model, because of it helps us to address the issue of over parameterizations and to save the degree of freedom (Taban,

2010) as cited in Tsadkan (2013). For annual data, Pesaran and Shin (1999) recommend choosing a maximum of 2 lags. From this, the lag length that minimizes Akaike Information criterion (AIC) is selected.

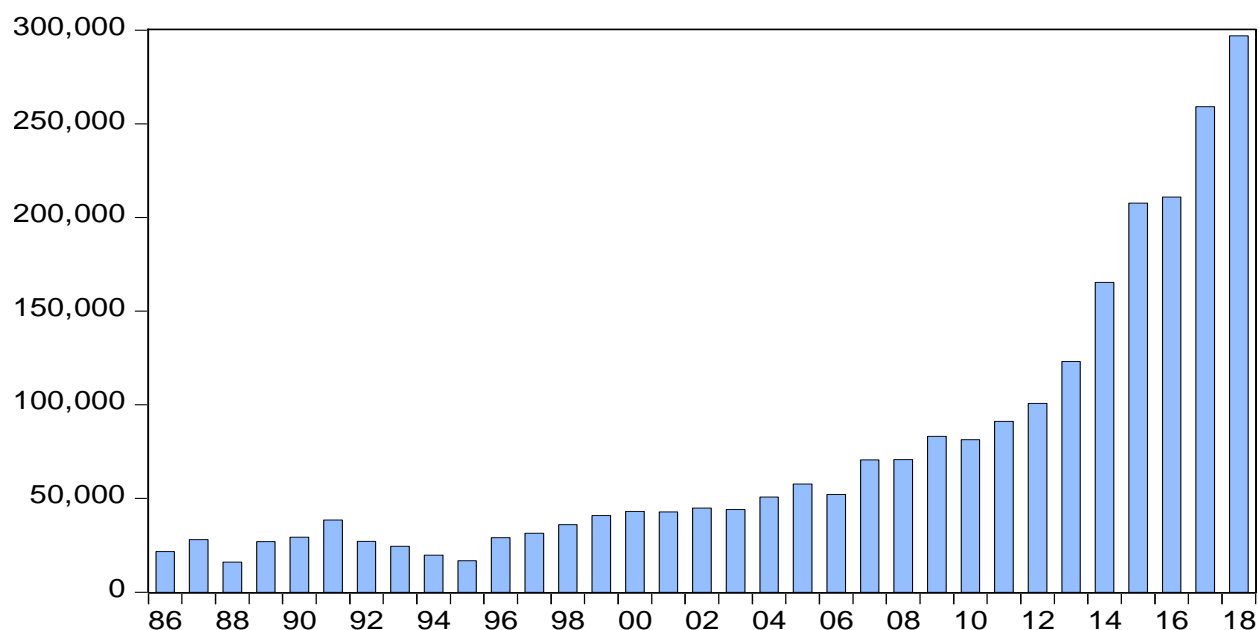
CHATER FOUR

RESULTS & DISCUSSIONS

4.1. Descriptive Analysis

4.1.1. Trends of Private Domestic Investment in Ethiopia

Private investment as a percentage share of GDP exhibit different trends in Ethiopia from 10.40% of GDP in 1986GC to the end of period specified in this study 28.67 % of GDP in 2018 GC. In the period the maximum amount 37.99% registered in 2008, while the minimum 6.50% in 1997GC. In the study period on average the percentage share of private investment to GDP is 17.34%, the Ethio-Eritrean war period (1998-1999) registered a smallest while the Ethiopian millennium year (2008) largest share of private investment exhibited. The higher inflation rate after 2008 deteriorates the rate of private investment.



Graph 4.1:-trends of private domestic investment in Ethiopia from 1986-2018

Source:-own computation based on EIC data

Graph 4.1 shows us trends of private investment in Ethiopia from 1986-2018 and as we observe from the graph during the Derg regime (1974-1991), which was centered on socialist economic system, gave dominant role to public sector than private sectors. Thus, the private sector was deliberately eliminated from any type of investment activities. Moreover, the policy of the military government had started to be implemented by nationalizing different private property thus as observed from the graph the private investment was very low. In 1991/92 the present government of Ethiopia declared a new market oriented policy and relaxed some of the policies so that a greater participation of private sectors and minimum role of government to take place. Many changes have been introduced such as trade liberalization, devaluation, investment proclamation, and privatization.

4.1.2. Regional distribution of private domestic investment in Ethiopia

The distribution of private domestic investment in Ethiopia also shows difference in terms of regional distribution this can emanate from difference in terms of infrastructural facilities that are the main determinants of private domestic investment. Among the regions and city administration of the Country Addis Ababa City administration has highest number of projects of private investment also in terms of capital invested in the projects. Next to the capital city Tigray regional state has the highest number of projects and the third in terms of capital invested to the projects.

Amhara regional state is the third region with highest number of projects of private domestic investment and the fifth in terms of capital allocated to the projects. Oromia regional state is the fourth region with the number of projects of private investment also the fourth region in terms of capital allocated to the projects. SNNPs are the fifth regional states with regard to number of projects and the second in terms of capital invested to those projects. Benishangul Gumuz, Afar, Somali, Harari, Dire Dawa, and Gambella regional states are the other regional states with less private investment number of projects in accordance to their consecutive names.

Region of Investment	Projects on Operation			
	No of Projs	Capital in '000' Birr	Perm Empl.	Temp Empl.
Addis Ababa	5,162	52,349,029	322,374	51,470
Afar	102	924,873	2,048	8,458
Amhara	1,384	7,919,052	38,029	125,508
B.Gumze	171	1,041,847	7,252	25,877
Dire Dawa	57	234,637	1,162	507
Gambella	12	60,845	2,483	4,510
Harari	67	266,577	2,076	301
Oromia	1,283	8,004,884	29,821	26,634
SNNPR	1,197	26,664,309	34,424	67,796
Somali	75	528,373	2,757	3,194

Tigray	1,668	10,445,902	45,373	328,086
Grand Total	11,203	108,700,104	488,746	642,711

Table 4.1:- regional distribution of private domestic investment

Source: Ethiopian investment commission

4.1.3. Sectoral Distribution of Private Domestic Investment

Just as the regional distributions of private domestic investment are different there is sectoral difference in the distribution of private domestic investment. The first most selected sector is real state, machinery and equipment rental and consultancy service with 3227 investors have invested their capital in this sector. The second most preferable sector by private investors were manufacturing sector with 3125 investors have invested their capital in this sector. The third sector with highest number of investors is the agriculture; hunting and forestry sector with 1974 investors have invested their capital in this sector. The fourth sector with investment attractiveness is the construction contracting including water well drilling sector with 1190 investors have invested their capital in this sector.

The hotel and restaurant sector is the fifth preferable sector for private investors with 472 investors have invested their capital in the sector. The sixth sector with highest number of investment projects is the education sectors with 427 investors have invested their capital. Tour operation, transport and communication services are the seventh preferable sector with 365 investors have invested their capital in this sector. Health and social work is the eighth sectors with 145 private domestic investors have invested their capital in this sector. Wholesale and retail trade is the ninth sector with 112 investors who have invested their capital in the sector. Other community and social services, mining and quarrying, fishing and finally electricity are the other sector that 95, 67, 3, 1 private domestic investors invested their capital in those sectors respectively.

Sector	Operation			
	No of Projs	Capital in '000' Birr	Perm Empl.	Temp Empl.
Agriculture, hunting and forestry	1,974	29,244,198	54,170	472,514
Fishing	3	5,558	515	10
Mining and quarrying	67	472,998	1,529	1,896
Manufacturing	3,125	35,857,663	200,132	81,391
Electricity (Generation, Transmission and Distribution)	1	100,000	0	250
Education	427	3,225,581	19,510	6,469
Health and social work	145	1,850,766	4,861	2,260
Hotels (Including Resort Hotels, Motels and Lodges) and Restaurants	472	4,497,187	14,345	9,537
Tour Operation, Transport and Communication	365	2,139,503	8,878	2,320
Real estate, Machinery and Equipment Rental and Consultancy Service	3,227	20,324,108	29,872	22,553
Construction Contracting Including Water Well Drilling	1,190	9,601,900	26,507	38,247
Other community, social and personal service activities	95	479,503	126,007	709
Wholesale, retail trade & repair service	112	901,140	2,420	4,555
Grand Total	11,203	108,700,104	488,746	642,711

Table 4.2:- sectoral distribution of private domestic investment

Source:-Ethiopian investment commission.

4.1.4 Descriptive Statistics of variables

	LDI	INF	LGDP	LEX	LFDI	LGE	LI	LLO	LPI	LTAX
Mean	10.88	9.332	23.40	1.984	14.05	13.27	2.403	21.05	17.32	12.19
Median	10.69	7.390	23.07	2.145	14.11	13.02	2.474	20.82	17.32	12.03
Maximum	12.60	55.24	25.01	3.196	16.57	14.50	2.740	22.12	17.85	13.34
Minimum	9.684	-11.82	22.65	0.727	10.95	12.28	1.916	19.69	16.81	11.53
Std. Dev.	0.798	14.28	0.716	0.807	1.829	0.692	0.237	0.715	0.308	0.533
Skewness	0.595	1.490	0.966	-0.375	-0.169	0.498	-0.934	0.159	0.025	0.773
Kurtosis	2.467	5.678	2.499	2.054	1.538	1.904	3.019	1.736	1.863	2.385
Jarque-Bera	2.342	22.08	5.478	2.006	3.096	3.015	4.807	2.335	1.779	3.809
Probability	0.309	0.001	0.064	0.366	0.212	0.221	0.090	0.311	0.410	0.148
Sum	359.2	307.9	772.3	65.48	463.6	438.0	79.30	694.8	571.7	402.3
Sum Sq. Dev.	20.41	6528.	16.42	20.85	107.0	15.33	1.800	16.36	3.050	9.103
Observations	33	33	33	33	33	33	33	33	33	33

Table 4.3:- descriptive statistics of private investment and its determinants

Source: Own computation using Eviews 9.

Where LNDI is log of private domestic investment, INF is rate of inflation, LGDP is log of real gross domestic product, LEX is log of real exchange rate, LFDI is log of foreign domestic product, LGE is log of gross enrollment, LI is log of lending interest rate, LLO is log of access to credit, LPI is log of public investment and finally LTAX is log of tax levied on private sectors.

From Table 4.3, log of private investment in Ethiopia for the period understudy had a mean of 10.88 and a standard deviation of 0.798 with a minimum and maximum of 9.684 and 12.64 respectively. Log of Real GDP had a mean of 23.4 and a standard deviation of 0.716 with a minimum value of 22.65 and a maximum value of 25.01 for the period under study. The log of real exchange rate had a mean of 1.984 and a standard deviation of 0.807 with a minimum of 0.729 and a maximum of 3196. Log of foreign direct investment had a mean of 14.05 as well as

standard deviation of 1.829. Log of gross enrollment that is the proxy for human capital had a mean of 13.27 and standard deviation of 0.692 with a minimum and maximum of 12.28 and 14.50 respectively. Log of Real lending interest rate had a mean of 2.403 and a standard deviation of 0.237 with a minimum and maximum value of 1.916 and 2.740 respectively while rate of inflation had a mean of 9.33 and a standard deviation of 14.28 with a minimum and maximum value of (-11.82) and 55.24 respectively.

The log of access to loan had a mean of 21.05 and a standard deviation of 0.715 with a minimum value of 19.69 and maximum value of 22.12. Log of tax levied on private investors had a mean of 12.19 and standard deviation 0.533 with minimum and maximum of 11.53 and 13.34 respectively. Finally, the mean of public investment was 17.32 and a standard deviation of 0.308 with a minimum and maximum value of 16.81 and 17.85 respectively for the period under study. The standard deviation shows how much dispersion exists from the average value. Except inflation a low standard deviation indicates that the data point tend to be very close to the mean, whereas inflation has high standard deviation indicates that the data point are spread out over a large range of values. As shown in the summary statistics, all have low standard deviation (except inflation). This shows stability in the long run relationship between Private investment and its determinant factors.

4.2. *Econometric Analysis*

4.2.1. Pre-Estimation Test

Unit Root Test

The first important step in the estimation of every time series model is to test the stationarity of variables. Non-Stationarity of time series data has often been regarded as a problem in empirical analysis. Therefore working with non-stationary variables lead to spurious regression results, from which further inference is meaningless (misleading regression). A unit root test is a common practice and a first step that are to be undertaken in data analysis to address the non-stationarity problem of variables. The test examines whether the data series is stationary or not. In order to obtain a consistent and reliable result, we must transform the non-stationary data into stationary data by differencing if the test happens to reveal the non-stationarity of variables. The

tests of stationarity based on augmented ducky fuller test has been conducted and presented as below.

Variables	ADF t-statistics at level		ADF t-statistics at 1 st difference		Order of integration
	With intercept	With trend and intercept	With intercept	With trend and intercept	
LPDI	0.374881	-2.052497	-7.214443***	-7.798890***	I(1)
INF	-5.168660***	-5.298351***	-7.572255***	-7.446958***	I(0)
LGDP	0.673388	-0.116586	-3.068911**	-3.763460**	I(1)
LEX	-0.959588	-2.778672	-3.959611***	-3.910040**	I(1)
LFDI	-1.628342	-0.774385	-5.913594***	-6.232986***	I(1)
LGE	0.069179	-2.008904	-3.363165**	-3.397297*	I(1)
LI	-5.347234***	-5.262550***	-3.048821**	-3.124546	I(0)
LLO	-1.290577	-1.866028	-7.190149***	-7.031794***	I(1)
LPI	0.683221	-3.466354*	-6.783922***	-6.764795***	I(1)
LTAX	2.988919**	-0.439583	-3.963588***	-5.725430***	I(1)
PS	-3.863204***	-3.996710**	-7.294947***	-7.154391***	I(0)
MacKinnon (1996) Critical Values					
The critical values	With intercept		With intercept & trend		
1%	-3.653730		-4.273277		
5%	-2.957110		-3.557759		
10%	-2.617434		-3.212361		

Table 4.4:- unit root tests

Source: own computation from Eviews result

(***) stands for Stationary at 1%, (**) stand for stationary at 5% and (*) represent stationary at 10 % significant level.

The null and alternative hypotheses for the unit root test are:

H_0 :- The variable to be tested has unit root

H_1 :- The variable to be tested has no unit root

From table 4.4 we can see that all variables that are under consideration are stationary at level and stationary at order one I (1). Among the variables determining private domestic investment inflation rate, log of lending interest rate and political stability and absence of conflict are integrated at level/stationary at level. Other variables such as log private domestic investment, log of gross domestic product, log of real exchange rate, log foreign direct investment, log of gross enrollment, log of access to loan, log of public investment and log of taxation are stationary at first difference.

Our test of stationary can help us to choose the best model to be employed in fitting a model for determinants of private domestic investment. When data is stationary at level, Simple Regression is applicable and ARDL can be used when data is stationary at level or at first difference or mix. VAR model is important when at least one variable in the regression is stationary at second difference, I (2) and more. The results in Table 4.4 show that all variables are stationary after the first difference is taken except inflation rate, log of lending interest rate and political stability and absence of which are stationary at level, I (0). Therefore, reject the null hypothesis and accept the alternative for each case. Thus, variables are stationary at level, I (0) and at first difference, I(1) and hence, Autoregressive Distributive Lag (ARDL) model is applicable for the estimation of the determinants of private domestic investment in Ethiopia.

4.2.2. Post-Estimation Diagnostic Test

To accept this model as a good one, it has to meet the required criteria of the post estimation test such as normality, serial correlation, heteroscedasticity and stability tests. And their respective null and alternative hypotheses are as follow:-

Normality

H_0 :- the residuals are normally distributed.

H_1 :- The residuals are not normally distributed.

Serial-Correlation

H₀:- no serial correlations

H₁:- there exists serial correlations.

Heteroscedasticity

H₀:- Homoscedastic variance

H₁:- Heteroscedastic variance.

Type of test	Type of test applied	Prob.	Significance	Reject/accept null hypothesis
Normality	Jarque-Bera	0.131002	insignificant	Accept
Serial correlation	Lagrange multiplier Test	0.2406	insignificant	Accept
Heteroscedasticity	Breusch-Pagan Godfrey	0.9779	insignificant	Accept

Table 4.5:- model diagnostic test

Source; own computation from Eview 9.5

The above table indicates that the long run ARDL model estimated in this study passes all the diagnostic tests. This is because the p-value associated with F version of the statistic was unable to reject the null hypothesis specified for each test. Therefore based on the result of the test:

- A) The null hypothesis of the residuals are normally distributed (Jarque-Bera test) is failed to reject because the p-value associated with F-statistics is greater than the standard significant level i.e. $0.1310 > 0.05$. So the residuals of this study are normally distributed.

- B) The null hypothesis of no serial correlation (Brush God fray LM test) is failed to reject for the reason that the p-values associated with test statistic is greater than the standard significant level (i.e. $0.2406 > 0.05$). Here LM test for testing serial correlation is applied because unlike the traditional Durbin Watson test statistic which is totally inapplicable when the lagged dependent variable appear as a regressors, LM test avoid such limitation of DW test.
- C) The last diagnostic test is hetroscedasticity test. As we have seen from the above table, we can reject at 5% significant level due to its p-value associated with the test statistics are greater than the standard significance level(I.e. $0.9779 > 0.05$).

4, 2, 3, Long Run Co-integration Test

Since we determined the stationary nature of the variables, the next task in the bounds test approach of co-integration is estimating the ARDL model using the appropriate lag-length selection criterion. According to Pesaran and Shine (1999), as cited in Narayan (2004) for the annual data are recommended to choose a maximum of two lag lengths but for small data it is advisable to use 1 lag because when the lag length increases the observation fail to show the appropriate long run relationship among variables because to show the long run relationship the number observation must be greater than 30. So in this study 1 lag length have been selected for both dependent and independent variables. The reason for selection of fixed optimal lag is in order to save degrees of freedom since in this study we do have only 33 years observation.

Bound test is performed to check the joint significance of the coefficients. The Bound test is conducted by imposing restrictions on the estimated long-run coefficients of log of Real Gross Domestic product (LGDP), log of foreign direct investment (LFDI), log of real exchange rate (LEX), log of gross enrollment (LGE), inflation rate (INF), log of lending interest rate(LI), log of access to bank credit (LLO), log of tax(LTAX), log public investment (LPI), and political stability and absence of conflict(PS).

To test for the presence of co-integration for long run form, bound test is conducted. The Fstatistics value is used to check for the existence of long-run co integration of the model. The value of F-statistics is either less than lower bound (I0) or between lower and upper bound or greater than upper bound (I1). When the value of F-statistic is below lower bound (I0), we fail to

reject the null hypothesis and inconclusive when it is between the lower and upper bounds. However, we reject the null hypothesis when it is above the upper bound (I1). The null hypothesis and alternative hypothesis are:

H_0 :-No long run relationship

H_1 :- There exists long run relationship

Test Statistic	Value	K
F-statistic	12.95562	10
Critical Value Bounds		
Significance	I ₀ Bound	I ₁ Bound
10%	1.83	2.94
5%	2.06	3.24
2.5%	2.28	3.5
1%	2.54	3.86

Table 4.6: Bound Test Result for Co-integration

Source; own computation from Eview 9.5

From the above table calculated F statistics (12.95562) is higher than upper bound critical values at 1% level of significance. This implies that the null hypothesis of no long -run relationship is rejected; rather accept the alternative hypothesis (there is long-run relationship) based on critical values at 1% level of significance. Therefore, there is co-integration relationship among the variables in long run.

4.2.3. Long Run ARDL Model Estimation

After confirming the existence of long-run co-integration relationship among the variables, the next step is running the appropriate ARDL model to find out the long run coefficients, which is reported in table below.

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF	-0.002681	0.001747	-1.534674	0.1559
LGDP	0.579447	0.137919	4.201356	0.0018***
LEX	-0.852312	0.156202	-5.456485	0.0003***
LFDI	0.012477	0.020962	0.595228	0.5649
LGE	0.452400	0.198375	2.280524	0.0657**
LI	-0.450602	0.191813	-2.349175	0.0407**
LLO	-0.299959	0.089133	-3.365279	0.0072***
LPI	4.480356	0.635066	7.054947	0.0000***
LTAX	0.237357	0.304744	0.778872	0.4541
PS	0.146984	0.041016	3.583579	0.0050***
C	-70.505038	9.611524	-7.335469	0.0000***

(***) stands for Stationary at 1%, (**) stand for stationary at 5% and (*) represent stationary at 10 % significant level.

Table 4.7: Long-Run Dynamics

Source; own computation from Eview 9

From table 4.7 we observe that all the variables are in line with the expected sign of the researcher except log of gross enrollment and log of lending interest rate. From the variables taken in to consideration while analyzing the determinants of private domestic investment log of real gross domestic product, log of real exchange rate, , log of lending interest rate, log of access to credit, log of public investment and political stability & absence of conflict are the significant variables on average at 5% level of significance.

➤ **Impacts of real gross domestic product on private domestic investment**

From long run regression result we can observe that log of gross domestic product has positive and significant impact on log of private domestic investment even at 1% level of significance. Holding all other factors constant, one percent increases in real gross domestic product leads to 0.58 percentage increment in private domestic investment. This result is due to the fact that higher real GDP per Capital is assumed increase effective demands for goods and services and thereby inspire private investors.

The result is in line with accelerator model which assumes that investment as a linear proportion of changes in output. This result also supported by the finding of woldemarian (2018), Osmod (2014), Asiedu and freeman (2009), Esubalew (2014), and ,Kaseem et.al (2012), Adugna (2013) about the positive and significant impact of real gross domestic product in the growth of private investment. Whereas these studies contradict the finding of Seruvatu (2001), according to his finding private investment is negatively affected by real GDP growth.

➤ **Impacts of public investment on private domestic investment**

Investment by public/government sector affects private domestic investment positively and significantly. Coefficient of public investment is 4.48. This shows that one percent increase in public investment will increase the growth of private investment by 4.48%. This finding confirms the hypothesized argument about the positive effect of public physical and social infrastructure investment on the private investment. This finding is in line with the findings of some scholars such as Asante (2000), Adugna (2013), Sakr (2016), Fimpong (2010), Kazeem (2012), Siraj (2014) and woldemariam (2018) among others, who have conducted research in a similar topic in various developing countries. In Ethiopia, public investment is primarily concentrated on the development of basic economic infrastructures (such as road, telephone, power, irrigation canals, etc), and social infrastructures (like schools, universities, health centers etc.) Such investments obviously create favorable effect on private investment. Whereas the results contradict the findings of Seruvatu et.al (2010), Osmod (2014) and Esubalew (2014), they stated that private investment is negatively affected by public investment.

➤ **Impacts of access to credit on private domestic investment**

Access to domestic bank credit is one of the explanatory variables which the researcher comes up with negative influence in the growth of private investment. The coefficient of access to bank credit is -0.299 which mean that one percent increase in access to bank credit lowers private domestic investment by 0.299 percent. This implies that increases in credit to the private sector will not enhance private investment. Weak institutional environment and lack of experienced personnel and expertise were few reasons for this negative impact of access to bank credit on private domestic investment. This finding is supported by the study of Quattara (2004) and

Ambachew (2010) and Contradict with the findings of Asante (2000),Dawit(2010), Esubalew(2014), .

➤ **Impacts of real exchange rate on private domestic investment**

The long run result also shows that there exists a negative and significant impact of real exchange rate on private domestic investment. Holding other factors negligible one percentage increase in real exchange rate causes 0.85 percentage decrease in private domestic investment. This result is due to the fact that real devaluation of exchange rate affects domestic private investment negatively through raising the real cost of imported capital goods for investment purpose. This result is consistent with the findings of (Oshikoya1994; Jalloh 2002; Harupara1998), Esubalew (2014). But this result contradicts with the findings of Abate (2016), Brhane (2016) and Ambachew (2010).

➤ **Impacts of political stability& absence of conflict on private domestic investment**

The relationship between political stability& absence of conflict and private domestic investment found to be positive and significant at 1% level of significance. This dummy variable has the coefficient of 0.1469 which mean that when there is political stability and absence of conflict private domestic investment increases by 0.1469 percent. This due to the fact that when there is political stability and absence of conflict the investors are looking forward to business prospects. Quality of the bureaucracy is closely associated with the institutional strength of a particular country. Ensuring law and order and reducing corruption levels are important determinants of private domestic investment. This result is supported by Esubalew (2014), Matthias and Carsten (2005), Busari & Lloyd (2007).

➤ **Impacts of lending interest rate on private domestic investment.**

The impact of lending interest rate on private domestic investment is found to be negatively and significantly affecting private domestic investment in Ethiopia. Holding other factors constant, when lending interest rate increase by one percent private domestic investment decreases by 0.45 percent. This result is in line with the finding of economist Jalloh .According to Jalloh (2002), an increase in the real rate of interest will raise the user cost of capital, thereby making investment less profitable. This is so because the high cost of investment capital discourages investment by

localfirms. These are the few reasons why lending interest rate has a negative effect on private investment.

4.2.5, ARDL Short-run (Error Correction Model/ECM) Dynamics

Short-run relationships between the private domestic investment and its determinant variables are examined with the Error Correction Model (ECM) based on the ARDL approach. It indicates the speed of adjustment to restore equilibrium in the dynamic model and the coefficient of the ECM which has to be negative and statistically significant shows how quickly the dependent variables converge to the long run equilibrium. Results of the error correction model based on the ARDL model are presented in Table 4.8.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF)	-0.000993	0.001787	-0.555658	0.5907
D(LGDP)	0.099113	0.186826	0.530510	0.6073
D(LEX)	-2.025521	0.358912	-5.643501	0.0002***
D(LFDI)	-0.029359	0.021316	-1.377312	0.1985
D(LGE)	-0.297823	0.332077	-0.896849	0.3909
D(LI)	-0.436288	0.187560	-2.326120	0.0423**
D(LLO)	-0.295834	0.119439	-2.476869	0.0327**
D(LPI)	5.792705	1.448918	3.997953	0.0025***
D(LTAX)	1.976069	0.486940	4.058133	0.0023***
D(PS)	0.126155	0.045115	2.796280	0.0189**
CointEq(-1)	-1.582753	0.170289	-9.294482	0.0000***
R-squared	0.897142	Mean dependent var		10.91441
Adjusted R-squared	0.871141	S.D. dependent var		0.794620
F-statistic	166.1589	Durbin-Watson stat		2.394142
Prob(F-statistic)	0.000000			

Table 4.8: Short Run Dynamics (ECM Estimation: ARDL)

Source; own computation from Eview 9

$$\text{Cointeq} = \text{LDI} - (-0.0027*\text{INF} + 0.5794*\text{LGDP} - 0.8523*\text{LEX} + 0.0125*\text{LFDI} - 0.4524*\text{LGE} + 0.4506*\text{LI} - 0.3000*\text{LLO} + 4.4804*\text{LPI} + 0.2374*\text{LTAX} + 0.1470*\text{PS} - 70.5050)$$

The short-run ARDL estimate above indicates that, like that of the long-run analysis, here the coefficient of lending interest rate is negative and significant at 5%. In the short run taking other factors constant one percent increase in interest rate leads to 0.43 percent decrease in private domestic investment. This is due to the fact that an increase in the real rate of interest will raise the user cost of capital, thereby making investment less profitable. Unlike the long analysis taxation is significant variable affecting positively private domestic investment at 1% level of significance.

The coefficient of log of real exchange rate is also negative as of the long run estimation result and significant at 1% level of significance. Here taking other factors constant one percent increase in real exchange rate leads to 2.025 percent decrease in private domestic investment. This negative impact of exchange rate is attributed due to the fact that our country's exchange rate policy that is devaluation of domestic currency would make those imported capital goods expensive and also devaluation makes those exported goods of private investor's very cheap. Ethiopia imports a large amount of good for investment; depreciation of the nation's currency leads to raise the cost of these imported goods and consequently lowers the private investment activity in the nation.

The coefficient of public investment is positive also higher than the long run's coefficient and it is significant at 1% level of significance. Taking other factors constant one percent increase in public investment would bring 5.79 percent increment in private domestic investment. This is due to the fact that in Ethiopia, public investment is primarily concentrated on the development of basic economic infrastructures (such as road, telephone, power, irrigation canals, etc), and social infrastructures (like schools, universities, health centers etc.) Such investments obviously create favorable effect on private investment.

Political stability and absence of conflict found to be positively and significantly affecting private domestic investment in Ethiopia even at 1% level of significance. Taking all other factors

fixed if there is political stability and absence of conflict then private domestic investment increases by 0.126 percent. This is due to the fact that if there is political stability there won't be tension of being under risk of theft and robbery so this reduces uncertainty to do investment activity.

The last variable that is significantly and negatively affecting private domestic investment is access to working capital/credit. This variable negatively affects private domestic investment both in the short run and in the long run. In the short run taking all other factors constant one percent increase in access to working capital reduces private domestic investment by 0.295 percent. This is due to the existence of weak institutional environment and lack of experienced personnel and expertise. The other reason is that financial markets are not well developed and credit given to the private sector with the preferential interest rate affects the private investment rates negatively. The coefficient of determination (R-squared) is high explaining that about 89.7 % of variation in the private domestic investment is attributed to variations in the explanatory variables in the model. In addition, the DW statistic does not suggest autocorrelation and the F-statistic is quite robust suggesting the model was in overall correctly specified the study is free from multicollinearity problem. The error correction coefficient, estimated at -1.58 is highly significant, has the correct negative sign, and implies a very high speed of adjustment to equilibrium. According to Narayan and Smyth (2006) the highly significant error correction term further confirms the existence of a stable long-run relationship even though most economists recommend that $ECM < -1$. Moreover, the coefficient of the error term (ECM-1) implies that the deviation from long run equilibrium level of private domestic investment in the current period is corrected by 158 % in the next period to bring back equilibrium when there is a shock to a steady state relationship but higher than 100% ECM means that it has oscillating type of convergence to long run equilibrium and it takes less than one year to return to its long run equilibrium.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Conclusion and Summary of Findings

In the growth literature, investment has been regarded as one of the primary engines of growth. Growth theories emphasize the importance of investment in determining the level of income (neoclassical) and the pace of economic growth (endogenous growth model). However, the Ethiopian, private investment performance has been weak for long time. It had been stagnantly low until the end of the socialist regime. In spite of little improvement in the post-socialist era, the share of private investment in GDP has never been above 15 percent even until 2003. Yet, the reasons behind the weak performance have not been well studied. So this study has been undertaken with the objective of assessing the determinants of private domestic investment in Ethiopia. In order to meet this objective of the study time series secondary data have been collected from different sources including central statistics agency (CSA), Ethiopian investment commission (EIC), Ethiopian economic association (EEA) and national bank of Ethiopia(NBE). After the data have been collected pre-estimation test of augmented dicky fuller test have been undertaken and checked that all the variables are not integrated at order two since this is the major criteria of using ARDL model. After pre-estimation test have been undertaken post estimation diagnostic test have been done then bound test of long run co-integration have been made. Finally from both short run and long run estimation result the study come up with the following summary of findings:-

- ♣ Real gross domestic product is positively and significantly affecting private domestic investment in the long run. This result also supported by the finding of Abdushu (2010), Osmod (2014), Asiedu and freeman (2009),Esubalew(2014) ,Kaseem et.al (2012)Adugna (2013),Wasihun(2018) and Woldemariam (2018).As per the researcher conclusion the implication behind this positive result is in line with the accelerator effect. The central feature of this theory assumes that investment as a linear proportion of changes in output so the economic growth boosts the purchasing power and the annual income of the citizen

these create conducive environment for the investor. The rationale behind the positive and significant role of economic growth to the growth of private investment is because of the fact that economic growth boosts the demand for produced goods and services of private investment activities and with the increase in the purchasing power of the societies that resulted from the grown income and increase in the effective demand.

- ♣ Both in the short run and in the long run real exchange rate negatively and significantly affecting private domestic investment. This result is consistent with the findings of Jalloh (2012), Esubalew (2014). These implies that the depreciation of the domestic currency does not stimulate private investment. As per the result of the studies the implication is if there is volatility in exchange rate and depreciation of the home currency leads to increased cost of production and lead *to cost push inflation* and reduce private investment.
- ♣ Both in the short run and in the long run the dummy variable i.e. political stability and absence of conflict are positively and significantly affecting private domestic investment. This result is supported by the studies of Esubalew (2014), Matthias and Carsten (2005), Busari & Lloyd (2007). These implies that good investment climate make investors looking forward to business prospects. These variables are also good for investor because it reduce the uncertainty of climate. On the other hand for the home countries because if there is stability the country receive more foreign currency by inspiring FDI.
- ♣ Lending interest rate negatively affects private domestic investment in the short run and in the long run. These finding is supported by several scholar such as fimpong et al ((2010), kazeem et al (2012), gatachew (2012), seruvatu et al (2010), osmod (2014) and weldemariam (2018). As per the researcher the implication of the result is the higher the real interest rate the higher the opportunity cost of capital and lower the desired capital stock and investment spending. These also supported by jorgenson(1963)
- ♣ Both in the short run and in the long run public investment have significant positive effect on private domestic investment. The result is consistent with the findings of some scholars such as Adugna (2013), Sakr (2016), Fimpong et.al (2010), Kazeem et.al (2012), Siraj (2014) and Woldemariam (2018). As per the researcher knowledge the implication

of this result is the public sector has crowding in effect for private investment if the government perform complementary role.

- ♣ Accesses to bank credit both in the short run and long run have negative significant impact on private domestic investment. This finding is supported by the study of Qattara (2004) and Ambachew (2010). In support of the above evidence and as per the researcher, the implication of this result is the private sector does not go to finance new investments because of poverty most people would borrow to finance other matters like basic necessities as result private sector credit is negatively related to private investment. *The other reason is that financial markets* are not well developed and credit given to the private sector with the preferential interest rate affects the private investment rates negatively.

5.2. Recommendation

From the analysis of the determinants of private investment in Ethiopia, the study delivers the following recommendations;

- ♠ One of the determinants of private domestic investment in the long run was real gross domestic product. So enhancing the real per-capital income of people by creating various employment opportunities and income generating means, since gross domestic product is an important variable that determine private investment in the Ethiopia economy, it is necessary for policy makers to first seek to understand these factors that the study have found are important in the country. The impacts of economic growth in the private investment are found to be positive and significant in the study period which implies that economic growth is crucial to the growth of private investment which addresses the need to enhance further the growth of the economy. The result confirm the validity of the accelerator principle that suggest the quantity of domestic output should be expanded as it will increase the profitability of firms , especially those that produce tradable goods.
- ♠ Both in the short run and in the long run the effect of real public investment on the growth of private domestic investment found to be positive and significant. The

responsible authority, first to identify which sectors of public investment are crowding in and which sectors are crowding out private investment, before expansion of state participation. The guiding principle for public investment should be complimentary rather than compete with private investment. So promoting government investment infrastructure, in transport, energy, water and ICT services are essential for the growth of private investment.

- ♣ Other variable positively and significantly affecting private domestic investment both in the short run and in the long run is political stability and absence of conflict. Hence the government should also avoid internal unset such as corruption, civil war, inefficient and rigorous bureaucratic administration to attract both domestic and foreign investors .It should establish rule and regulation for protection of private property right good governance in the country.Thise variable show the healthiness of investment climate so, if there is un stability the riskiness of investment increase so the concerned body should be accountable.
- ♣ Real exchange rate negatively and significantly affecting private domestic investment both in the short run and in the long run so it is better if the government try to ensure stability in foreign exchange rate, by promoting exports or increasing import substitution mechanism. And also the monetary authorities should adapt appropriate policy in appreciating the value of the home currencies and reduce the uncertainty of exchange rate by controlling volatility in commodity indices. The concerned body give a great attention for the major concept like inflation, interest rate, balance of payment (current account) term of trade, recession and political stability because these variable have great impact on real exchange rate.

Finally the government encourages the country's foreign currency earning, by encouraging of Ethiopian diaspora to contribute dollar for their nation, by giving the chance for back of illegal hoarded currency in to legal form of transaction.

- ♣ Accesses to bank credit both in the short run and long run have negative significant impact on private domestic investment. Ensuring financial development for private sector or increasing access to finance for private investors is important to increase private domestic investment in the country. The national bank of Ethiopia reduces the barrier for accessing the financial service by reducing the high charge and minimum

balance requirement. The government makes strong effort in developing the weak financial sector and strengthens the primary market by establishing secondary market.

- ♣ Lending interest rate negatively affects private domestic investment in the short run and in the long run. So it is recommended that the NBE to follow economic fundamentals of money demand and supply in order to set equilibrium interest rate.

Generally, there should be appropriate policy tools and implementation to reduce the vulnerability of domestic industry from the external treats and extending efforts to augment the growth of the national output through investment in infrastructure, good governance and collaborated endeavor to develop human capital if there is need to realize the contribution of private investment to the economy. The government should create fertile macroeconomic environment having the stable price and exchange rate situation to enable the private investor to have the motive to invest and reduce uncertainty in the investment decision. The working capital requirements and the supplementary fund required by the private investors will have to be met efficiently and on sound conditions by financial institutions. For private investment to grow there is a need to extend the operation of financial institutions such as commercial banks even in remote areas the government should strive to expand and distribute financial institutions such as banks and micro finance institution towards rural and remote areas to promote saving mobilization and credit availability for the growth of private investor.

5.3 ,Directions for further research

This paper examined the determinants of private investment in Ethiopia. To achieve this study the researcher used only secondary sources of data, (quantitative, approach) this is not sufficient to assess factors which determine these variables. As per the researcher knowledge there is qualitative variable that are greatly determine private investment. Hence, future studies should address to identify the determinant variable of private investment in Ethiopian by supporting with qualitative approaches and good research methodology if there is. Good investment climate are incentive for private investment. However, in the developing countries, business frequently operate investment climate that Undermine their incentive to invest and grow. From structural and institutional variable the researcher addresses few variables so the coming researcher should incorporate the remaining structural and institutional variable like, corruption, Business Regulation and Licensing. ,

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Appendices

Appendix A: Pre Estimation Results:-Unit Root Test for Stationarity

Log of private domestic investment with intercept at I (1)/first difference

Null Hypothesis: D(LDI) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.214443	0.0000
Test critical values:		
1% level	-3.661661	
5% level	-2.960411	
10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LDI,2)

Method: Least Squares

Date: 03/13/20 Time: 16:45

Sample (adjusted): 1988 2018

Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LDI(-1))	-1.274556	0.176667	-7.214443	0.0000
C	0.098158	0.041248	2.379670	0.0241
R-squared	0.642188	Mean dependent var		-0.003942
Adjusted R-squared	0.629850	S.D. dependent var		0.354572
S.E. of regression	0.215721	Akaike info criterion		-0.167317
Sum squared resid	1.349536	Schwarz criterion		-0.074802
Log likelihood	4.593412	Hannan-Quinn criter.		-0.137159
F-statistic	52.04819	Durbin-Watson stat		1.530489
Prob(F-statistic)	0.000000			

Log of private domestic investment with trend and intercept at I (1)/ at first difference

Null Hypothesis: D(LDI) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.798890	0.0000
Test critical values:		
1% level	-4.284580	
5% level	-3.562882	
10% level	-3.215267	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LDI,2)
 Method: Least Squares
 Date: 03/13/20 Time: 16:48
 Sample (adjusted): 1988 2018
 Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LDI(-1))	-1.343933	0.172324	-7.798890	0.0000
C	-0.036823	0.079434	-0.463562	0.6465
@TREND("1986")	0.008267	0.004225	1.956538	0.0604
R-squared	0.685223	Mean dependent var		-0.003942
Adjusted R-squared	0.662739	S.D. dependent var		0.354572
S.E. of regression	0.205915	Akaike info criterion		-0.230944
Sum squared resid	1.187224	Schwarz criterion		-0.092171
Log likelihood	6.579631	Hannan-Quinn criter.		-0.185707
F-statistic	30.47595	Durbin-Watson stat		1.585462
Prob(F-statistic)	0.000000			

Rate of inflation with intercept at I (0) /at level

Null Hypothesis: INF has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.168660	0.0002
Test critical values:		
1% level	-3.653730	
5% level	-2.957110	
10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(INF)
 Method: Least Squares
 Date: 03/13/20 Time: 16:51
 Sample (adjusted): 1987 2018
 Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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INF(-1)	-0.909717	0.176006	-5.168660	0.0000
C	9.172056	2.971472	3.086704	0.0043
R-squared	0.471040	Mean dependent var		0.893663
Adjusted R-squared	0.453408	S.D. dependent var		19.15057
S.E. of regression	14.15837	Akaike info criterion		8.198951
Sum squared resid	6013.784	Schwarz criterion		8.290559
Log likelihood	-129.1832	Hannan-Quinn criter.		8.229316
F-statistic	26.71505	Durbin-Watson stat		2.050135
Prob(F-statistic)	0.000014			

Rate of inflation with trend and intercept at I (0) /at level

Null Hypothesis: INF has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.298351	0.0008
Test critical values:		
1% level	-4.273277	
5% level	-3.557759	
10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(INF)
 Method: Least Squares
 Date: 03/13/20 Time: 16:59
 Sample (adjusted): 1987 2018
 Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF(-1)	-0.963560	0.181860	-5.298351	0.0000
C	4.517761	5.122837	0.881887	0.3851
@TREND("1986")	0.311773	0.280092	1.113111	0.2748
R-squared	0.492714	Mean dependent var		0.893663
Adjusted R-squared	0.457728	S.D. dependent var		19.15057
S.E. of regression	14.10230	Akaike info criterion		8.219613
Sum squared resid	5767.375	Schwarz criterion		8.357026
Log likelihood	-128.5138	Hannan-Quinn criter.		8.265162
F-statistic	14.08346	Durbin-Watson stat		2.030232
Prob(F-statistic)	0.000053			

Log of real GDP with intercept at first difference

Null Hypothesis: D(LGDP) has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.068911	0.0396
Test critical values:		
1% level	-3.661661	
5% level	-2.960411	
10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LGDP,2)
 Method: Least Squares
 Date: 03/13/20 Time: 17:02
 Sample (adjusted): 1988 2018
 Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGDP(-1))	-0.492534	0.160491	-3.068911	0.0046
C	0.032643	0.024134	1.352549	0.1867
R-squared	0.245150	Mean dependent var		0.000417
Adjusted R-squared	0.219120	S.D. dependent var		0.136914
S.E. of regression	0.120987	Akaike info criterion		-1.323921
Sum squared resid	0.424500	Schwarz criterion		-1.231406
Log likelihood	22.52078	Hannan-Quinn criter.		-1.293763
F-statistic	9.418214	Durbin-Watson stat		1.875079
Prob(F-statistic)	0.004627			

Log of real GDP with trend and intercept at first difference

Null Hypothesis: D(LGDP) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.763460	0.0326
Test critical values:		
1% level	-4.284580	
5% level	-3.562882	
10% level	-3.215267	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LGDP,2)
 Method: Least Squares
 Date: 03/13/20 Time: 17:03
 Sample (adjusted): 1988 2018
 Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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D(LGDP(-1))	-0.628318	0.166952	-3.763460	0.0008
C	-0.044854	0.044865	-0.999751	0.3260
@TREND("1986")	0.005081	0.002527	2.010541	0.0541
R-squared	0.340377	Mean dependent var		0.000417
Adjusted R-squared	0.293262	S.D. dependent var		0.136914
S.E. of regression	0.115100	Akaike info criterion		-1.394257
Sum squared resid	0.370947	Schwarz criterion		-1.255484
Log likelihood	24.61098	Hannan-Quinn criter.		-1.349020
F-statistic	7.224258	Durbin-Watson stat		1.888942
Prob(F-statistic)	0.002952			

Log of real exchange rate with intercept at first difference/I (1)

Null Hypothesis: D(LEX) has a unit root
 Exogenous: Constant
 Lag Length: 1 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.959611	0.0049
Test critical values:		
1% level	-3.670170	
5% level	-2.963972	
10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LEX,2)
 Method: Least Squares
 Date: 03/13/20 Time: 17:06
 Sample (adjusted): 1989 2018
 Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LEX(-1))	-0.812552	0.205210	-3.959611	0.0005
D(LEX(-1),2)	0.284709	0.182990	1.555874	0.1314
C	0.066858	0.028673	2.331699	0.0274
R-squared	0.376216	Mean dependent var		0.002919
Adjusted R-squared	0.330010	S.D. dependent var		0.158807
S.E. of regression	0.129988	Akaike info criterion		-1.148104
Sum squared resid	0.456218	Schwarz criterion		-1.007984
Log likelihood	20.22156	Hannan-Quinn criter.		-1.103278
F-statistic	8.142118	Durbin-Watson stat		2.012627
Prob(F-statistic)	0.001710			

Log of real exchange rate with trend and intercept at first difference/I (1)

Null Hypothesis: D(LEX) has a unit root

Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.910040	0.0241
Test critical values:		
1% level	-4.296729	
5% level	-3.568379	
10% level	-3.218382	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LEX,2)
Method: Least Squares
Date: 03/13/20 Time: 17:07
Sample (adjusted): 1989 2018
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LEX(-1))	-0.816211	0.208748	-3.910040	0.0006
D(LEX(-1),2)	0.284386	0.185952	1.529353	0.1383
C	0.085889	0.057526	1.493040	0.1475
@TREND("1986")	-0.001071	0.002791	-0.383685	0.7043
R-squared	0.379728	Mean dependent var		0.002919
Adjusted R-squared	0.308159	S.D. dependent var		0.158807
S.E. of regression	0.132091	Akaike info criterion		-1.087083
Sum squared resid	0.453650	Schwarz criterion		-0.900257
Log likelihood	20.30625	Hannan-Quinn criter.		-1.027316
F-statistic	5.305706	Durbin-Watson stat		2.016459
Prob(F-statistic)	0.005476			

Log of foreign direct investment with intercept at first difference/I (1)

Null Hypothesis: D(LFDI) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.913594	0.0000
Test critical values:		
1% level	-3.661661	
5% level	-2.960411	
10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LFDI,2)
Method: Least Squares
Date: 03/13/20 Time: 17:10
Sample (adjusted): 1988 2018

Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LFDI(-1))	-1.235586	0.208940	-5.913594	0.0000
C	0.026756	0.184590	0.144950	0.8858
R-squared	0.546667	Mean dependent var		-0.088868
Adjusted R-squared	0.531034	S.D. dependent var		1.492342
S.E. of regression	1.021971	Akaike info criterion		2.943685
Sum squared resid	30.28834	Schwarz criterion		3.036200
Log likelihood	-43.62712	Hannan-Quinn criter.		2.973843
F-statistic	34.97059	Durbin-Watson stat		1.707844
Prob(F-statistic)	0.000002			

Log of foreign direct investment with trend and intercept at first difference/I (1)

Null Hypothesis: D(LFDI) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.232986	0.0001
Test critical values:		
1% level	-4.284580	
5% level	-3.562882	
10% level	-3.215267	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LFDI,2)

Method: Least Squares

Date: 03/13/20 Time: 17:12

Sample (adjusted): 1988 2018

Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LFDI(-1))	-1.276284	0.204763	-6.232986	0.0000
C	0.587324	0.388244	1.512772	0.1415
@TREND("1986")	-0.032751	0.020111	-1.628457	0.1146
R-squared	0.585887	Mean dependent var		-0.088868
Adjusted R-squared	0.556308	S.D. dependent var		1.492342
S.E. of regression	0.994052	Akaike info criterion		2.917712
Sum squared resid	27.66792	Schwarz criterion		3.056485
Log likelihood	-42.22453	Hannan-Quinn criter.		2.962948
F-statistic	19.80721	Durbin-Watson stat		1.794540
Prob(F-statistic)	0.000004			

Log of gross enrollment with intercept at first difference/I (1)

Null Hypothesis: D(LGE) has a unit root

Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.363165	0.0204
Test critical values:		
1% level	-3.661661	
5% level	-2.960411	
10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LGE,2)
 Method: Least Squares
 Date: 03/13/20 Time: 17:13
 Sample (adjusted): 1988 2018
 Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGE(-1))	-0.560491	0.166656	-3.363165	0.0022
C	0.037812	0.018045	2.095359	0.0450
R-squared	0.280591	Mean dependent var		-0.001428
Adjusted R-squared	0.255784	S.D. dependent var		0.088847
S.E. of regression	0.076647	Akaike info criterion		-2.236883
Sum squared resid	0.170366	Schwarz criterion		-2.144367
Log likelihood	36.67168	Hannan-Quinn criter.		-2.206725
F-statistic	11.31088	Durbin-Watson stat		1.734868
Prob(F-statistic)	0.002180			

Log of gross enrollment with trend and intercept at first difference/I (1)

Null Hypothesis: D(LGE) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.397297	0.0701
Test critical values:		
1% level	-4.284580	
5% level	-3.562882	
10% level	-3.215267	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LGE,2)
 Method: Least Squares
 Date: 03/13/20 Time: 17:15
 Sample (adjusted): 1988 2018
 Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGE(-1))	-0.582165	0.171361	-3.397297	0.0021
C	0.021340	0.030640	0.696470	0.4919
@TREND("1986")	0.001058	0.001583	0.668657	0.5092
R-squared	0.291898	Mean dependent var		-0.001428
Adjusted R-squared	0.241319	S.D. dependent var		0.088847
S.E. of regression	0.077388	Akaike info criterion		-2.188208
Sum squared resid	0.167689	Schwarz criterion		-2.049435
Log likelihood	36.91723	Hannan-Quinn criter.		-2.142972
F-statistic	5.771167	Durbin-Watson stat		1.732839
Prob(F-statistic)	0.007968			

Log of lending interest rate with intercept at level/I (0)

Null Hypothesis: LI has a unit root

Exogenous: Constant

Lag Length: 4 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.347234	0.0002
Test critical values:		
1% level	-3.689194	
5% level	-2.971853	
10% level	-2.625121	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LI)

Method: Least Squares

Date: 03/13/20 Time: 17:17

Sample (adjusted): 1991 2018

Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LI(-1)	-0.586599	0.109701	-5.347234	0.0000
D(LI(-1))	0.247223	0.140237	1.762893	0.0918
D(LI(-2))	0.152354	0.145121	1.049843	0.3052
D(LI(-3))	0.098431	0.143639	0.685267	0.5003
D(LI(-4))	0.465130	0.142567	3.262537	0.0036
C	1.448744	0.267697	5.411888	0.0000
R-squared	0.585198	Mean dependent var		0.023970
Adjusted R-squared	0.490925	S.D. dependent var		0.124574
S.E. of regression	0.088883	Akaike info criterion		-1.815590
Sum squared resid	0.173803	Schwarz criterion		-1.530118
Log likelihood	31.41826	Hannan-Quinn criter.		-1.728318
F-statistic	6.207475	Durbin-Watson stat		2.125174
Prob(F-statistic)	0.000985			

Log of lending interest rate with trend and intercept at level/I (0)

Null Hypothesis: LI has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 4 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.262550	0.0011
Test critical values:		
1% level	-4.323979	
5% level	-3.580623	
10% level	-3.225334	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LI)

Method: Least Squares

Date: 03/13/20 Time: 17:18

Sample (adjusted): 1991 2018

Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LI(-1)	-0.635275	0.120716	-5.262550	0.0000
D(LI(-1))	0.284759	0.145627	1.955401	0.0640
D(LI(-2))	0.188252	0.149923	1.255657	0.2230
D(LI(-3))	0.135950	0.148909	0.912973	0.3716
D(LI(-4))	0.497254	0.146522	3.393715	0.0027
C	1.522080	0.278449	5.466271	0.0000
@TREND("1986")	0.002348	0.002416	0.972010	0.3421
R-squared	0.603057	Mean dependent var		0.023970
Adjusted R-squared	0.489645	S.D. dependent var		0.124574
S.E. of regression	0.088994	Akaike info criterion		-1.788169
Sum squared resid	0.166320	Schwarz criterion		-1.455118
Log likelihood	32.03437	Hannan-Quinn criter.		-1.686352
F-statistic	5.317385	Durbin-Watson stat		2.178922
Prob(F-statistic)	0.001792			

Log of access to credit with intercept at 1st difference /I (1)

Null Hypothesis: D(LLO) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.190149	0.0000
Test critical values:		
1% level	-3.661661	
5% level	-2.960411	
10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LLO,2)
 Method: Least Squares
 Date: 03/13/20 Time: 17:21
 Sample (adjusted): 1988 2018
 Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LLO(-1))	-1.124206	0.156354	-7.190149	0.0000
C	0.065355	0.035529	1.839461	0.0761
R-squared	0.640637	Mean dependent var		-0.019542
Adjusted R-squared	0.628245	S.D. dependent var		0.306004
S.E. of regression	0.186576	Akaike info criterion		-0.457618
Sum squared resid	1.009505	Schwarz criterion		-0.365102
Log likelihood	9.093074	Hannan-Quinn criter.		-0.427460
F-statistic	51.69824	Durbin-Watson stat		1.804203
Prob(F-statistic)	0.000000			

Log of access to credit with intercept and trend at 1st difference /I (1)

Null Hypothesis: D(LLO) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.031794	0.0000
Test critical values:		
1% level	-4.284580	
5% level	-3.562882	
10% level	-3.215267	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LLO,2)
 Method: Least Squares
 Date: 03/13/20 Time: 17:23
 Sample (adjusted): 1988 2018
 Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LLO(-1))	-1.117859	0.158972	-7.031794	0.0000
C	0.033147	0.074950	0.442252	0.6617
@TREND("1986")	0.001866	0.003809	0.489960	0.6280
R-squared	0.643691	Mean dependent var		-0.019542
Adjusted R-squared	0.618241	S.D. dependent var		0.306004
S.E. of regression	0.189069	Akaike info criterion		-0.401639

Sum squared resid	1.000924	Schwarz criterion	-0.262866
Log likelihood	9.225398	Hannan-Quinn criter.	-0.356402
F-statistic	25.29178	Durbin-Watson stat	1.833676
Prob(F-statistic)	0.000001		

Log of public investment with intercept at 1st difference /I (1)

Null Hypothesis: D(LPI) has a unit root
 Exogenous: Constant
 Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.783922	0.0000
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LPI,2)
 Method: Least Squares
 Date: 03/13/20 Time: 17:24
 Sample (adjusted): 1989 2018
 Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LPI(-1))	-1.833037	0.270203	-6.783922	0.0000
D(LPI(-1),2)	0.462699	0.170719	2.710292	0.0115
C	0.059423	0.009045	6.569602	0.0000

R-squared	0.706622	Mean dependent var	0.000143
Adjusted R-squared	0.684890	S.D. dependent var	0.023143
S.E. of regression	0.012991	Akaike info criterion	-5.754421
Sum squared resid	0.004557	Schwarz criterion	-5.614301
Log likelihood	89.31631	Hannan-Quinn criter.	-5.709595
F-statistic	32.51570	Durbin-Watson stat	2.066278
Prob(F-statistic)	0.000000		

Log of public investment with intercept and trend at 1st difference /I (1)

Null Hypothesis: D(LPI) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.764795	0.0000
Test critical values:	1% level	-4.296729	
	5% level	-3.568379	
	10% level	-3.218382	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LPI,2)
 Method: Least Squares
 Date: 03/13/20 Time: 17:25
 Sample (adjusted): 1989 2018
 Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LPI(-1))	-1.854957	0.274207	-6.764795	0.0000
D(LPI(-1),2)	0.473154	0.172803	2.738107	0.0110
C	0.056573	0.009922	5.701820	0.0000
@TREND("1986")	0.000203	0.000278	0.731062	0.4713
R-squared	0.712531	Mean dependent var		0.000143
Adjusted R-squared	0.679362	S.D. dependent var		0.023143
S.E. of regression	0.013105	Akaike info criterion		-5.708102
Sum squared resid	0.004465	Schwarz criterion		-5.521275
Log likelihood	89.62153	Hannan-Quinn criter.		-5.648334
F-statistic	21.48151	Durbin-Watson stat		2.086713
Prob(F-statistic)	0.000000			

Log of tax with intercept at 1st difference /I (1)

Null Hypothesis: D(LTAX) has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.963588	0.0047
Test critical values:		
1% level	-3.661661	
5% level	-2.960411	
10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LTAX,2)
 Method: Least Squares
 Date: 03/13/20 Time: 17:27
 Sample (adjusted): 1988 2018
 Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTAX(-1))	-0.703440	0.177475	-3.963588	0.0004
C	0.037497	0.014258	2.629952	0.0135
R-squared	0.351376	Mean dependent var		5.68E-05

Adjusted R-squared	0.329010	S.D. dependent var	0.072591
S.E. of regression	0.059462	Akaike info criterion	-2.744617
Sum squared resid	0.102536	Schwarz criterion	-2.652102
Log likelihood	44.54157	Hannan-Quinn criter.	-2.714460
F-statistic	15.71003	Durbin-Watson stat	1.568705
Prob(F-statistic)	0.000442		

Log of tax with intercept and trend at 1st difference /I (1)

Null Hypothesis: D(LTAX) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.725430	0.0003
Test critical values:		
1% level	-4.284580	
5% level	-3.562882	
10% level	-3.215267	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(LTAX,2)
 Method: Least Squares
 Date: 03/13/20 Time: 17:28
 Sample (adjusted): 1988 2018
 Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTAX(-1))	-1.014093	0.177121	-5.725430	0.0000
C	-0.014996	0.019651	-0.763124	0.4518
@TREND("1986")	0.004060	0.001192	3.407463	0.0020

R-squared	0.541502	Mean dependent var	5.68E-05
Adjusted R-squared	0.508752	S.D. dependent var	0.072591
S.E. of regression	0.050878	Akaike info criterion	-3.026999
Sum squared resid	0.072481	Schwarz criterion	-2.888226
Log likelihood	49.91848	Hannan-Quinn criter.	-2.981762
F-statistic	16.53448	Durbin-Watson stat	1.756782
Prob(F-statistic)	0.000018		

Log of political stability and absence of conflict with intercept at level /I (0)

Null Hypothesis: PS has a unit root
 Exogenous: Constant
 Lag Length: 2 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.863204	0.0062

Test critical values:	1% level	-3.670170
	5% level	-2.963972
	10% level	-2.621007

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(PS)

Method: Least Squares

Date: 03/13/20 Time: 17:30

Sample (adjusted): 1989 2018

Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PS(-1)	-1.120961	0.290164	-3.863204	0.0007
D(PS(-1))	0.368030	0.235269	1.564292	0.1298
D(PS(-2))	0.288914	0.187636	1.539763	0.1357
C	0.576780	0.184001	3.134651	0.0042

R-squared	0.430637	Mean dependent var	-0.033333
Adjusted R-squared	0.364941	S.D. dependent var	0.614948
S.E. of regression	0.490056	Akaike info criterion	1.534970
Sum squared resid	6.244019	Schwarz criterion	1.721797
Log likelihood	-19.02456	Hannan-Quinn criter.	1.594738
F-statistic	6.555012	Durbin-Watson stat	2.073975
Prob(F-statistic)	0.001897		

Log of political stability and absence of conflict with intercept and trend at level / I (0)

Null Hypothesis: PS has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 2 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.996710	0.0199
Test critical values:		
	1% level	-4.296729
	5% level	-3.568379
	10% level	-3.218382

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(PS)

Method: Least Squares

Date: 03/13/20 Time: 17:31

Sample (adjusted): 1989 2018

Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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PS(-1)	-1.186721	0.296924	-3.996710	0.0005
D(PS(-1))	0.402340	0.237428	1.694577	0.1026
D(PS(-2))	0.298495	0.187695	1.590319	0.1243
C	0.803686	0.287940	2.791161	0.0099
@TREND("1986")	-0.010897	0.010643	-1.023850	0.3157
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R-squared	0.453550	Mean dependent var	-0.033333	
Adjusted R-squared	0.366118	S.D. dependent var	0.614948	
S.E. of regression	0.489601	Akaike info criterion	1.560562	
Sum squared resid	5.992739	Schwarz criterion	1.794094	
Log likelihood	-18.40842	Hannan-Quinn criter.	1.635271	
F-statistic	5.187453	Durbin-Watson stat	2.097513	
Prob(F-statistic)	0.003495			

Appendix B: Autoregressive Distributive lag (ARDL) Estimation

Dependent Variable: LDI

Method: ARDL

Date: 03/13/20 Time: 17:32

Sample (adjusted): 1987 2018

Included observations: 32 after adjustments

Dependent lags: 1 (Fixed)

Dynamic regressors (1 lag, fixed): INF LGDP LEX LFDI LGE LI LLO LPI

LTAX PS

Fixed regressors: C

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LDI(-1)	-0.582753	0.170289	-3.422129	0.0065
INF	-0.000993	0.001787	-0.555658	0.5907
INF(-1)	-0.003250	0.001530	-2.124676	0.0596
LGDP	0.099113	0.186826	0.530510	0.6073
LGDP(-1)	0.818009	0.291929	2.802077	0.0187
LEX	-2.025521	0.358912	-5.643501	0.0002
LEX(-1)	0.676522	0.245569	2.754913	0.0203
LFDI	-0.029359	0.021316	-1.377312	0.1985
LFDI(-1)	0.049107	0.029968	1.638642	0.1323
LGE	-0.297823	0.332077	-0.896849	0.3909
LGE(-1)	-0.418214	0.320918	-1.303180	0.2217
LI	-0.436288	0.187560	-2.326120	0.0423
LI(-1)	1.149478	0.319535	3.597349	0.0049
LLO	-0.295834	0.119439	-2.476869	0.0327
LLO(-1)	-0.178927	0.114819	-1.558333	0.1502
LPI	5.792705	1.448918	3.997953	0.0025
LPI(-1)	1.298591	1.300514	0.998521	0.3416
LTAX	1.976069	0.486940	4.058133	0.0023
LTAX(-1)	-1.600392	0.439754	-3.639288	0.0045
PS	0.126155	0.045115	2.796280	0.0189
PS(-1)	0.106483	0.043487	2.448646	0.0343
C	-111.5920	14.45485	-7.720039	0.0000
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R-squared	0.897142	Mean dependent var	10.91441	
Adjusted R-squared	0.871141	S.D. dependent var	0.794620	
S.E. of regression	0.074791	Akaike info criterion	-2.136398	
Sum squared resid	0.055936	Schwarz criterion	-1.128705	

Log likelihood	56.18237	Hannan-Quinn criter.	-1.802376
F-statistic	166.1589	Durbin-Watson stat	2.394142
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Appendix C: Post Estimation Test

C1. Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.578376	Prob. F(1,9)	0.2406
Obs*R-squared	4.774648	Prob. Chi-Square(1)	0.0289

Test Equation:

Dependent Variable: RESID

Method: ARDL

Date: 03/13/20 Time: 17:37

Sample: 1987 2018

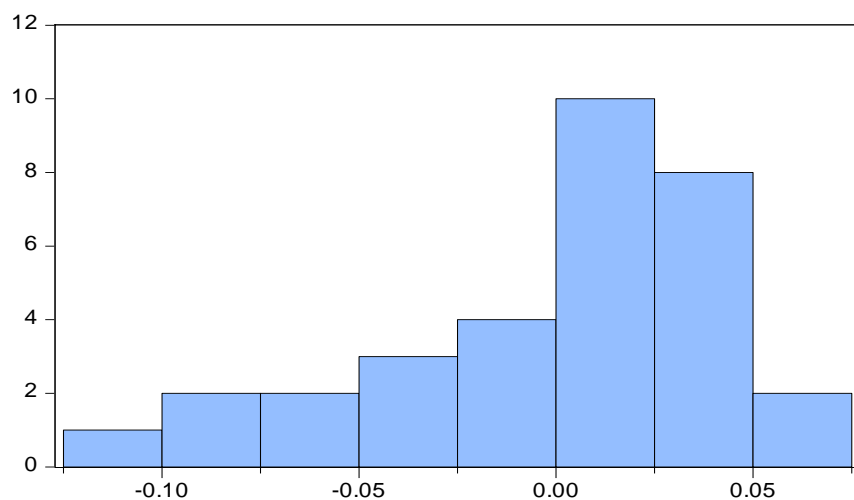
Included observations: 32

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LDI(-1)	0.169479	0.213567	0.793563	0.4479
INF	0.000241	0.001748	0.137672	0.8935
INF(-1)	6.80E-05	0.001488	0.045686	0.9646
LGDP	-0.073608	0.190862	-0.385663	0.7087
LGDP(-1)	0.062785	0.288202	0.217850	0.8324
LEX	0.015438	0.349179	0.044213	0.9657
LEX(-1)	0.019146	0.239248	0.080025	0.9380
LFDI	0.013637	0.023396	0.582899	0.5743
LFDI(-1)	0.009571	0.030117	0.317804	0.7579
LGE	0.247685	0.378304	0.654726	0.5290
LGE(-1)	0.049513	0.314501	0.157434	0.8784
LI	0.046523	0.186083	0.250014	0.8082
LI(-1)	0.002168	0.310682	0.006978	0.9946
LLO	-0.089551	0.136259	-0.657216	0.5275
LLO(-1)	-0.014551	0.112236	-0.129648	0.8997
LPI	-0.346841	1.435547	-0.241609	0.8145
LPI(-1)	-0.266022	1.282068	-0.207495	0.8402
LTAX	-0.084457	0.478190	-0.176618	0.8637
LTAX(-1)	-0.170218	0.448517	-0.379514	0.7131
PS	0.022522	0.047386	0.475275	0.6459
PS(-1)	-0.030484	0.048749	-0.625332	0.5473

C	9.873376	16.10220	0.613169	0.5549
RESID(-1)	-0.697863	0.555476	-1.256334	0.2406
R-squared	0.149208	Mean dependent var	-4.00E-15	
Adjusted R-squared	-1.930507	S.D. dependent var	0.042478	
S.E. of regression	0.072717	Akaike info criterion	-2.235486	
Sum squared resid	0.047590	Schwarz criterion	-1.181988	
Log likelihood	58.76777	Hannan-Quinn criter.	-1.886281	
F-statistic	0.071744	Durbin-Watson stat	2.209404	
Prob(F-statistic)	1.000000			

C2. Normality Test



Series: Residuals	
Sample 1987 2018	
Observations 32	
Mean	-4.00e-15
Median	0.005362
Maximum	0.059002
Minimum	-0.103478
Std. Dev.	0.042478
Skewness	-0.870867
Kurtosis	3.123188
Jarque-Bera	4.065083
Probability	0.131002

C3. Heteroscedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.355780	Prob. F(21,10)	0.9779
Obs*R-squared	13.68434	Prob. Chi-Square(21)	0.8828
Scaled explained SS	1.418673	Prob. Chi-Square(21)	1.0000

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 03/13/20 Time: 17:40

Sample: 1986 2018

Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.337591	0.666218	-0.506727	0.6233
LDI(-1)	0.000920	0.007849	0.117232	0.9090
INF	3.09E-05	8.24E-05	0.375384	0.7152

INF(-1)	8.75E-05	7.05E-05	1.241138	0.2429
LGDP	-0.000879	0.008611	-0.102051	0.9207
LGDP(-1)	0.005411	0.013455	0.402170	0.6960
LEX	-0.013689	0.016542	-0.827504	0.4273
LEX(-1)	0.004526	0.011318	0.399868	0.6977
LFDI	0.000815	0.000982	0.829853	0.4260
LFDI(-1)	-0.000281	0.001381	-0.203570	0.8428
LGE	0.004481	0.015305	0.292761	0.7757
LGE(-1)	-0.010543	0.014791	-0.712771	0.4923
LI	-0.005543	0.008645	-0.641199	0.5358
LI(-1)	0.020476	0.014727	1.390335	0.1946
LLO	-0.002236	0.005505	-0.406154	0.6932
LLO(-1)	0.000656	0.005292	0.123904	0.9038
LPI	0.010815	0.066780	0.161949	0.8746
LPI(-1)	0.003450	0.059940	0.057551	0.9552
LTAX	-0.013533	0.022443	-0.602987	0.5599
LTAX(-1)	0.018877	0.020268	0.931345	0.3736
PS	-0.000239	0.002079	-0.114952	0.9108
PS(-1)	0.000102	0.002004	0.050854	0.9604
<hr/>				
R-squared	0.427636	Mean dependent var	0.001748	
Adjusted R-squared	-0.774330	S.D. dependent var	0.002588	
S.E. of regression	0.003447	Akaike info criterion	-8.290735	
Sum squared resid	0.000119	Schwarz criterion	-7.283041	
Log likelihood	154.6518	Hannan-Quinn criter.	-7.956713	
F-statistic	0.355780	Durbin-Watson stat	2.544414	
Prob(F-statistic)	0.977922			

Appendix D: ARDL Bound Test

ARDL Bounds Test

Date: 03/13/20 Time: 17:41

Sample: 1987 2018

Included observations: 32

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	K
F-statistic	12.95562	10

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	1.83	2.94
5%	2.06	3.24
2.5%	2.28	3.5
1%	2.54	3.86

Test Equation:

Dependent Variable: D(LDI)
 Method: Least Squares
 Date: 03/13/20 Time: 17:41
 Sample: 1987 2018
 Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF)	0.003250	0.001530	2.124676	0.0596
D(LGDP)	0.099113	0.186826	0.530510	0.6073
D(LEX)	-2.025521	0.358912	-5.643501	0.0002
D(LFDI)	-0.029359	0.021316	-1.377312	0.1985
D(LGE)	-0.297823	0.332077	-0.896849	0.3909
D(LI)	-0.436288	0.187560	-2.326120	0.0423
D(LLO)	-0.295834	0.119439	-2.476869	0.0327
D(LPI)	5.792705	1.448918	3.997953	0.0025
D(LTAX)	1.976069	0.486940	4.058133	0.0023
D(PS)	0.126155	0.045115	2.796280	0.0189
C	-111.5920	14.45485	-7.720039	0.0000
INF	-0.004243	0.002662	-1.593631	0.1421
LGDP(-1)	0.917122	0.194750	4.709225	0.0008
LEX(-1)	-1.348998	0.237219	-5.686727	0.0002
LFDI(-1)	0.019748	0.033050	0.597519	0.5634
LGE(-1)	-0.716037	0.334095	-2.143217	0.0577
LI(-1)	0.713191	0.294284	2.423477	0.0358
LLO(-1)	-0.474760	0.134579	-3.527746	0.0055
LPI(-1)	7.091296	0.931808	7.610251	0.0000
LTAX(-1)	0.375677	0.506349	0.741933	0.4752
PS(-1)	0.232639	0.066811	3.482036	0.0059
LDI(-1)	-1.582753	0.170289	-9.294482	0.0000

R-squared	0.962559	Mean dependent var	0.081851
Adjusted R-squared	0.883934	S.D. dependent var	0.219531
S.E. of regression	0.074791	Akaike info criterion	-2.136398
Sum squared resid	0.055936	Schwarz criterion	-1.128705
Log likelihood	56.18237	Hannan-Quinn criter.	-1.802376
F-statistic	12.24240	Durbin-Watson stat	2.394142
Prob(F-statistic)	0.000134		

Appendix E: Short Run (ECM) and Long Run Dynamics

ARDL Cointegrating And Long Run Form
 Dependent Variable: LDI
 Selected Model: ARDL(1, 1, 1, 1, 1, 1, 1, 1, 1, 1)
 Date: 03/13/20 Time: 17:43
 Sample: 1987 2018
 Included observations: 32

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF)	-0.000993	0.001787	-0.555658	0.5907
D(LGDP)	0.099113	0.186826	0.530510	0.6073

D(LEX)	-2.025521	0.358912	-5.643501	0.0002
D(LFDI)	-0.029359	0.021316	-1.377312	0.1985
D(LGE)	-0.297823	0.332077	-0.896849	0.3909
D(LI)	-0.436288	0.187560	-2.326120	0.0423
D(LLO)	-0.295834	0.119439	-2.476869	0.0327
D(LPI)	5.792705	1.448918	3.997953	0.0025
D(LTAX)	1.976069	0.486940	4.058133	0.0023
D(PS)	0.126155	0.045115	2.796280	0.0189
CointEq(-1)	-1.582753	0.170289	-9.294482	0.0000

$$\text{Cointeq} = \text{LDI} - (-0.0027*\text{INF} + 0.5794*\text{LGDP} - 0.8523*\text{LEX} + 0.0125*\text{LFDI} - 0.4524*\text{LGE} + 0.4506*\text{LI} - 0.3000*\text{LLO} + 4.4804*\text{LPI} + 0.2374*\text{LTAX} + 0.1470*\text{PS} - 70.5050)$$

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF	-0.002681	0.001747	-1.534674	0.1559
LGDP	0.579447	0.137919	4.201356	0.0018
LEX	-0.852312	0.156202	-5.456485	0.0003
LFDI	0.012477	0.020962	0.595228	0.5649
LGE	0.452400	0.198375	-2.280524	0.0657
LI	-0.450602	0.191813	2.349175	0.0407
LLO	-0.299959	0.089133	-3.365279	0.0072
LPI	4.480356	0.635066	7.054947	0.0000
LTAX	0.237357	0.304744	0.778872	0.4541
PS	0.146984	0.041016	3.583579	0.0050
C	-70.505038	9.611524	-7.335469	0.0000

Variance Inflation Factors

Date: 0/30/20 Time: 13:44

Sample: 1986 2018

Included observations: 32

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LDI(-1)	0.028999	19556.78	90.12194
LEX	0.128820	3460.844	442.7134
LEX(-1)	0.060305	1515.677	208.4760
LFDI	0.000454	526.7410	8.251171
LFDI(-1)	0.000898	1040.455	16.43884
LGDP	0.034904	109651.2	100.2574
LGDP(-1)	0.085224	266127.2	209.5723
LGE	0.110275	111979.8	282.4227
LGE(-1)	0.102989	103485.2	253.4651
LI	0.035179	1180.059	10.98821
LI(-1)	0.102101	3387.652	32.12314
LLOAN	0.014266	36362.48	36.89698

LLOAN(-1)	0.013183	33364.86	35.76753
LPI	2.099289	3612887.	1044.755
LPI(-1)	1.691263	2899807.	835.7042
LTAX	0.237113	202660.7	370.5213
LTAX(-1)	0.193385	163778.7	267.1298
PS	0.002035	6.185894	2.899638
PS(-1)	0.001891	5.747352	2.694071
INF	0.0031	5.288129	3.463510
INF(-1)	2.3442	3.815012	2.706632
C	208.9469	1195333.	NA
