

## **Determinants of Private Investment in Ethiopia (Econometric Analysis)**

**Author: Wondimu Ereda Melaku**

Department of Economics, Mekdela Amba University, Ethiopia

**Email:** [wondimuereda@yahoo.com](mailto:wondimuereda@yahoo.com) / [wondimuereda@gmail.com](mailto:wondimuereda@gmail.com)

+251914650896

## Abstract

Though some improvements have been registered as a result of economic and political reforms, the performance of private sector has remained very low thus far. This study was conducted with the main objective of analyzing factors that determine private investment in Ethiopia. A 38-years secondary data (from 1980 to 2017) was collected from various national sources and for qualitative factors that cannot be captured in secondary data information is gathered from seventy manufacturing firms. Then, multiple regressions using OLS model was applied after the data sets were transformed to log form. And, to account for inherent problems of time series data, different tests such autocorrelation, stationary, heteroskedasticity, normality, functional misspecification, co-integration tests, and Error Correction Model/ECM/ were applied. The result shows that credit to private sector, foreign aid and broad money supply have significant positive long run effect, while public investment, external debt and real exchange rate have significant negative long run effect on private investment. In the short run, real GDP, foreign aid, and credit to private sector have significant positive, while exchange rate has significant short run negative effect on private investment. It recommends that Ethiopia should focus on the development of basic infrastructure by considering its effect on private investment like resource competition and access to finance. And also the country should have better financial access to finance investment with in determined place and time, and exchange rate stabilization policy.

**Key Words:** Private Investment, Long run, Short run, Error Correction Model, Ethiopia

## 1. INTRODUCTION

### 1.1. Background of the Study

Economic literatures prove that investment is, both empirically and theoretically, the key determinant to economic growth. It 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. 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, 2005).

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 (Mustefa, 2014). As a result due attention has been given to development of private sector in developing countries to help improve economic growth (Ouattara, 2004).

### 1.2. Statement of the Problem

The expansion of the infrastructure, institutional, organizational and regulatory frameworks aimed at improving investment climate of Ethiopia can be taken as a great opportunity for private sector development. Ethiopian economic growth seems to be public sector-led in reality; it is hard to deny the significant contribution of the private sector to the economic growth of the country. Private sector is not yet close to contributing the expected level of share to the economy of Ethiopia.

Some studies show that the expansion of private sector in Ethiopia faces many challenges associated with the issue such as business environment, judicial system and property rights, finance and financial sector and global and macro environment.

The trend of domestic private investment as a percentage of gross domestic products (GDP) is a good evidence of how low the sector's contribution to the economy is. For instance, from 1992-2000 and 2001-2010 domestic private investment as a percentage of GDP were 2.6 and 1.2 respectively. Particularly, in the last ten years domestic investment has been reduced though the country's economy was growing continuously. For instance, from 2006-2010 the average domestic investment as percentage of GDP was only 0.5% while average economic growth for the same period was about 11%. Similarly while the country's domestic private investment to GDP is low, the resource gap between savings and domestic investment is very high. For instance, the resource gap between savings and investment in 2009/10 was 19.4 % which is very high in comparison to the international standard (FDRE, 2014). Ambachew (2010) and Kurabachew (2015) suggested that in the long run crowding out effect persists and there is evidence of a negative relationship between public and private investment both in the long run and in the short run. This suggests that there is a sort of competition for resources between the public and the private sectors, both in the long run and in the short run. The implication is that there might be a high level of public investment in non-infrastructure which competes resource for wide spread involvement of the private sector in various business activities at greater extent in the country. However, this might not be the case rather public investment will have crowding in effect for private investment in Ethiopia since the country invests more in infrastructure development. Therefore, this one factor motivated to identify the determinants that may help policy makers.

Secondly past studies like Hailu (2013), Hailu *et.al.*, (2015) and Ambachew (2010) were based on solely secondary data. However, this study used primary data in order to support the result obtained from secondary data that is to complement the time series analysis. There are certain variables (especially qualitative ones—political instability, policy uncertainty,

perceptions about the economy, etc.) that may affect private investment but cannot be captured in the time series analysis. Additionally, it is important to examine whether the conclusions of the time series analysis are consistent with firms' perceptions of the importance of those variables in affecting their investment. In estimating the investment function, the study employed the techniques of co-integration and error correction modeling, which provided mechanisms to deal with the problems of unit root faced and causality tests in time series data.

### **1.3. Objectives of the Study**

The general objective of this study is to analyze the determinants of private investment in Ethiopia.

The specific objectives of the study are:

- To identify the long run and short run determinants of private investment in Ethiopia;
- To examine whether public investment have crowds in/out effect on private investment in Ethiopia.

## **2. RESEARCH METHODOLOGY**

This chapter expounds on the research design, data sources and types and model specification.

### **2.1. Research Design**

The study employed explanatory research based on both qualitative and quantitative data to have a clear picture about the problem. Time series data's often not incorporate qualitative information to include qualitative information with the quantitative one primary data was collected from manufacturing firms. Variables not included in this study may affect private investment but the study focused its analysis based on the variables that has full access of data for the period of consideration.

## 2.2. Data Source and Methods of Collection

Both qualitative and quantitative types of data were used for the analysis. The quantitative type was time series data of variables expected to affect private investment. These include money supply, public investment, foreign aid, external debt, exchange rate, private investment, domestic saving, foreign direct investment, inflation rate and credit to private sector. They obtained from National Bank of Ethiopia (NBE), Ministry of Finance and Economic Development (MoFED) and Ethiopian Customs Authority. Broad money supply, exchange rate, and foreign aid were obtained from NBE. Data's public investment, real GDP, domestic saving and external debt were from MoFED. Export and import data is obtained from ECA.

The qualitative type was based on cross-sectional analysis using a questionnaire survey of seventy manufacturing firms from two towns namely, Addis Ababa and Kombolcha. The purpose of the survey is to complement it with the time series analysis. This is because of certain variables (especially qualitative ones—political instability, policy uncertainty, perceptions about the economy, etc.) that may affect private investment but cannot be captured in the time series analysis. Additionally, it is important to examine whether the conclusions of the time series analysis are consistent with firms' perceptions of the importance of those variables in affecting their investment.

## 2.3. Methods of Data Analysis

The data used for the study was analyzed through econometrics model and tables and percentages. The study employed the techniques of co-integration and error correction modeling, which provided mechanisms to deal with the problems of unit root faced and causality tests in time series data. Error Correction Model (ECM) also applied together with other appropriate econometric techniques to explain factors that determine private investment in the country.

### 2.3.1. Model Specification

The time series data was analyzed using the neoclassical model that incorporates the effects of public investment that can be specified in a function form as:

$$PRI = f(GDP, AID, PUI, CREDIT, INFL, EXDEBT, EX, OPENNESS, MS, FDI, DS) \dots\dots\dots(7)$$

Where, *PRI* = Private investment; *AID* = Foreign Aid; *EX* = Exchange rate; *GDP*= Real GDP growth; *CREDIT*= private sector credit; *EXDEBT* = External debt burden; *INFRA*= Infrastructure; *OPENNESS*= Trade openness; *PUI*=Public investment; *FDI* = foreign direct investment, *DS* = domestic saving, *MS*=money supply. Econometrically, to include the random error term, the explicit econometric model is formulated as:

$$\begin{aligned} \ln PRI_{i,t} = & C + B_1 \ln GDP_{i,t} + B_2 \ln PUI_{i,t} + B_3 \ln CREDIT_{i,t} + B_4 \ln INFL_{i,t} \\ & + B_5 \ln EXDEBT_{i,t} + B_6 \ln EX_{i,t} + B_7 \ln AID_{i,t} + B_8 \ln OPENNESS_{i,t} \\ & + B_9 \ln FDI_{i,t} + B_{10} \ln DS_{i,t} + B_{11} \ln MS_{i,t} + \varepsilon_{i,t} \dots\dots\dots(8) \end{aligned}$$

Where, **ln** natural logarithm, t time, i=1...n,  $\varepsilon_{i,t}$ = Error term

While the primary data was analyzed in tables and percentages

### 2.3.2. Stationarity and Non-Stationarity Series

If it is found that almost all macroeconomic variables are non-stationary, a regression carried out with such non-stationary series will give spurious results and referred “spurious” or “non-sense” regression (Alemayehu et al, 2012). To avoid the pitfall of wrong inferences from the non-stationary regressions, the time series data should be stationary. Hence, prior to estimation of the long run model the time series properties of the variables, unit root test, will be conducted.

### 2.3.2.1. The Unit Root Test

Before conducting the simultaneous tests, the variables must be found to be individually stationary. Several tests are usually employed to test whether time series variables are stationary or non-stationary. Testing the stationarity of variables is relevant for the reason that it incorporates important behavior for these variables and making analysis with non-stationary variables may result in spurious correlation. A stationary time series is superior or more important than a non-stationary in economic analysis as it makes easier the study of the behavior of variables in the long run (Gujarati, 2004). Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) will do stationary test on all-time series properties of data by employing the unit root test.

The general form of the DF equation is as follows:

$$\begin{aligned} Y_t &= \rho Y_{t-1} + U_t \\ Y_t - Y_{t-1} &= \rho Y_{t-1} + U_t - Y_{t-1} \\ \Delta Y_t &= Y_{t-1}(\rho - 1) + U_t \\ \Delta Y_t &= \partial Y_{t-1} + U_t, \text{ where, } \partial = \rho - 1 \end{aligned}$$

The null hypothesis of ADF is  $\partial = 0$  against alternative hypothesis that  $\partial < 0$ . A rejection of this hypothesis means that the time series is stationary or it does not contain a unit root while not rejecting means that the time series is non-stationary (Walter, 2004).

The general form of the ADF equation where an intercept and trend is included is as follows:

$$\Delta Y_t = \partial Y_{t-1} + U_t, \text{ Dickey-Fuller Test}$$

$$\begin{aligned} \Delta Y_t &= \delta + \beta t + \partial Y_{t-1} + \gamma_i \sum_{i=2}^m \Delta Y_{t-i} + U_t, \\ \text{where, } \gamma_i \sum_{i=2}^m \Delta Y_{t-i} &= \text{augmentation} \\ \delta &= \text{drift term, } \beta = \text{trend term, } U_t = \text{error term} \end{aligned}$$

### 2.3.2.2. Co-integration Test

In order to obtain both the short run and long run relationship one can appeal to what is known as co integration. Co integration among the variables reflects the presence of long run relationship in the system. In general, we need to test for co integration because differencing the variables to attain stationarity generates a model that does not show the long run behavior of the variables. One way of testing the existence of Co integration between variables of interest and estimating the co-integrating vector is by Johansen (1988) approach.

Testing for co-integration is more difficult when the (potential) co integration parameter  $\beta$  is unknown. If  $Y_t$  and  $X_t$  are co integrated, it turns out that the OLS estimator  $\beta$  from the regression  $Y_t = \alpha + \beta X_t + U_t$  is consistent for  $\beta$ . The problem is that the null hypothesis states that the two series are *not* co integrated, which means that, under  $H_0$ , we are running a spurious regression. Engle-Granger test for co-integration is as follows:

Step 1. Regress:  $Y_t = \beta_0 + \beta_1 X_t + U_t$  and – predict –  $Uhat$

Step 2. Regress:  $\Delta Uhat_t = \alpha Uhat_{t-1} + \varepsilon_t$

The null hypothesis of  $\alpha = 0$  (No co integration) against alternative hypothesis that  $\alpha < 0$  (co integration). A rejection of this hypothesis means that the time series are co integrated while not rejecting means that the time series are not co integrated.

### 2.3.2.3. Vector Error-Correction Model (VECM)

For economic variables after the unit root test, there must be co-integrations test before we precede to the VECM models. If two variables are not co integrated or proved to have no long run relationship, the testing procedure will stop there and one will not go for the construction of an error correction model. However, if they are co integrated or proved to have a long run relationship one needs to go for an error correction mechanism.

The error correction model (ECM) is a mechanism used to correct any short run deviation of the variables from their long run equilibrium. For the long run model:  $Y_t = \beta_0 + \beta_1 X_t + U_t$ , the error correction model is given as:

$\Delta Y_t = \alpha_0 + \alpha_1 \Delta X_t + \alpha_2 U_{t-1} + \varepsilon_t$  Where,  $\alpha_2$  is the error correction (adjustment) coefficient and  $\alpha_1$  is the short run coefficient.

### 3. RESULT AND DISCUSSIONS

This section presents descriptive analysis of survey result, econometrics results of unit root and co-integration test, OLS, Error Correction Model and diagnostics tests.

#### 3.1. Descriptive Analysis of Qualitative Data

This section describes firm's response on characteristics, obstacles, constraints and uncertainties in doing business.

Table 3.1: Size of the Firm

Size	Number	%
Small	20	28.87%
Medium	39	55.71%
Large	11	15.42%
Total	70	100%

Table 3.2: Types of products produced

Sector	Number	%
Furniture and wood works	31	44.28%
Metal/aluminum works	18	25.71%
Food products	11	17.71%

Fabrics/textile	8	12.3%
Total	70	100%

Table 3.3: Export status of the firm

Export status	Number	%
Exporter	21	30%
Non-exporter	49	70%
Total	70	100%

Table 3.4: Obstacles in doing investment (**rank them**)

Obstacles to investment	Number	%
Problems of getting credit	The first for 20	28.57%
Uncertainty about the economy	The first for 16	22.86%
Lack of demand	The first for 18	25.71%
Infrastructure	The first for 12	17.14%
Political uncertainty	The first for 3	4.3%
Others	1	1.42%
Total	70	100%

Table 3.5: Uncertainty as obstacles of investment

Obstacle	Major	Minor	Not at all	Total
Exchange rate uncertainty	37	33		70
Demand uncertainty	58	12		70
Interest rate uncertainty	10	56	4	70
Political uncertainty	36	34		70

Table 3.6: Government policy regarding to private investment

	Number	%
Discourage private investment	5	7.143%
Encourage private investment	62	88.57%
Unpredictable	1	1.43%
Others	2	2.857%
Total	70	100%

Table 3.7: What should be policies to encourage private investment?

Policies	Major	Minor	Total
Stable exchange rate	64	6	70
Political stability	70	-	70
Protect local industry	68	2	70
Easier access to credit	62	8	70
Lower interest rate	13	57	70

Table 3.8: What is the problem with major infrastructures?

	Number	%
Frequent interruption	32	45.71%
Lack of access	22	31.43%
Too expensive	11	15.717%
Others	5	7.143%
Total	70	100%

### 3.1.1. Summary of the Descriptive Analysis

The survey shows that more than half (55.7%) of the sample (manufacturing firms) are grouped under medium size while large and small size manufacturing firm covers 15.42% and 28.87% of the respondent respectively. In addition, 44% of the samples are furniture and wood product producers, and fabrics/textile, food products and metal and aluminum works cover the remaining. Only 30% of the manufacturing firms are exporters to abroad, 70% of the sample are non-exporters. 18.36% of non-exporter plans to export in the future even though meeting the local demand and international demand of their product may constrain them.

Regarding to obstacles to investment access of credit, lack of demand, uncertainty about the economy and infrastructural problems are the most obstacles faced most of the manufacturing firms. Exchange rate uncertainty also is the problem for most of the exporter and importers. Firms suggest that to encourage private investment policies like stable exchange rate, stable political system, protecting local industry and easier access to credit should be maintained.

To make local products competitive in international market government should give focus on how they can be competitive and should control the effect of foreign direct investment and also it is responsible to for the frequent interruption of basic infrastructures. The effect of foreign direct investment on domestic private investment might vary depending on the domestic investment environment in the country. For half of the samples (51.43%) foreign investor's activity has positive effect on domestic private investment while for 40% it has adverse effect. Foreign direct investment could crowd-in domestic private investment by generating spillovers through the diffusion of new technologies and forward and backward production linkages. On the other hand it could crowd-out domestic private investors those who cannot compete with more efficient and technologically more superior manufacturing and had operated under a heavily restricted way.

### 3.2. Stationary Test (Unit Root Test)

Unit Roots tests were conducted by utilizing the Augmented Dickey- Fuller (ADF) tests. The time series variables are in log form except exchange rate and inflation rate; LRGDP (log of real gross domestic product), LPVT (log of private investment), LPUI (log of public investment), LM2 (log of broad money supply), LCR (log of credit), LDEBT (log of debt), LFDI (log of foreign direct investment), LAID (log of aid) and LTO (log of trade openness). They were tested whether they are integrated of order one.

Table 3.9: Augmented Dickey Fuller (ADF) Unit Root Test

ADF test with trend and intercept, critical values, 5% = -3.536601, 1% = -4.226815 for level 5% = -3.540328, 1% = -4.234972 for difference

Series	Level	Difference	Decision
LPVT	-1.706	-6.107*	Reject H <sub>0</sub>
LPUI	-2.144	-4.388*	Reject H <sub>0</sub>
LM2	0.409	-4.615*	Reject H <sub>0</sub>
LCR	-3.280	-4.917*	Reject H <sub>0</sub>
LRGDP	0.448	-9.595*	Reject H <sub>0</sub>
LDEBT	-2.986	-3.557**	Reject H <sub>0</sub>
INF	-5.795	-8.292*	Reject H <sub>0</sub>
LAID	-2.403	-6.733*	Reject H <sub>0</sub>
LFDI	-3.499	-9.235*	Reject H <sub>0</sub>
ER	-1.646	-3.632**	Reject H <sub>0</sub>
LTO	-2.502	-5.459*	Reject H <sub>0</sub>

Source: Computed from secondary data (2018) using Eviews

Note: \* Significant at 1 %; \*\* Significant at 5 %.

### 3.3. Co-integration Test

#### 3.3.1. Engle-Granger test for co-integration

Step 1. Regress:  $Y_t = \beta_0 + \beta_1 X_t + U_t$  and  $\rightarrow$  predict  $-Uhat$

Step 2. Regress:  $\Delta Uhat_t = \alpha Uhat_{t-1} + \varepsilon_t$

Table 3.10: Engle-Granger test for co-integration test

Variable	$\alpha$	Std. Error	t-Statistic	Prob.
U(-1)	-1.02387*	0.166492	-6.149684	0.0000

The Engle- Granger test for co-integration shows that the series are co-integrated since the value of  $\alpha$  is less than zero and is significant.

### 3.4. Long Run Determinants of Private Investment

The results of estimating the regression of the long-term relationship is to estimate the factors which influence the private investments in Ethiopia in the year of 1980 to the year 2017. All variables are in logarithm form except exchange rate and inflation rate to dispel the problem of heteroskedasticity by compacting their scale. Since trade openness is highly correlated with almost all variables (correlation coefficient above 0.8) it is rejected from the model. But in doing so attention was made for omitted variable bias.

Table 3.11: Long Run Determinants of Private Investment

Variables	Coefficient	Std. Error[prob.]
LPUI	-0.855	0.338[0.018]**
LM2	1.516	0.450[0.002]*
LFDI	-0.128	0.132[0.338]

LDS	0.508	0.301[0.102]
LDEBT	-0.885	0.327[0.011]**
LCR	0.629	0.178[0.001]*
LAID	1.587	0.334[0.000]*
INF	-0.006	0.007[0.396]
ER	-0.254	0.086[0.006]*
LRGDP	0.223	0.486[0.650]
C	-6.988	4.556[0.136]
$R^2=91.5$	F-stat=41.095	Pro.(f)=0.00
		Dw=2.04

Source: Computed from secondary data (2018) using Eviews

Note: \* Significant at 1 %; \*\* Significant at 5 %.

The aggregate model is significant with F-statistic of 41.095 and probability 0.000 i.e. the probability is less than 1 percent hence the model is significant. The model explains 93.8 percent of the fluctuations of private investment brought about by changes in the explanatory variables with an adjusted- $R^2$  of 91.5 percent. The Durbin Watson statistic is 2.04; suggests that no spurious regression result since it is greater than R-squared. And also the Durbin Watson statistic indicates that no problem of autocorrelation between variables.

### 3.4.1. Diagnostics Tests for Long Run Model

Table 3.12: Diagnostics test for the long run model

Tests	F-Sta[p-value]
Breusch-Godfrey Serial Correlation LM Test	F=0.678[0.5166]
Breusch-Pagan-Godfrey Heteroskedasticity Test	F=2.066[0.165]
Normality test	Jarque- Bera=0.6649[0.717]
Functional Misspecification Test: RESET	F=0.195657[0.6619]

Source: Computed from secondary data (2018) using Eviews

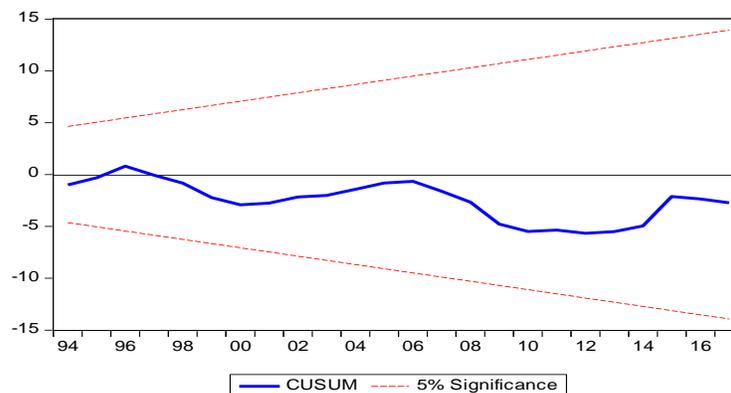
Note that numbers in the bracket are p-values

Diagnostic tests such as tests of serial correlation, normality, RESET (to check functional misspecification) and heteroskedasticity have been conducted. The estimated residuals did not provide any significant evidence of serial-correlation, non-normality and heteroskedasticity effect in the error term. Moreover, the Ramsey RESET test doesn't support the functional misspecification.

### 3.4.2. Model stability (CUSUM) Test

Before going to the interpretation of significant co-efficient it is better to test model stability test that is whether private investment has stability or not.

Figure 3-1: Model Stability Test



Note that since the bold line is between the two thin lines the model is stable (private investment has stability).

### 3.4.3. Granger Causality Result

Because the table is too large when insignificant causal relationships are included, thus the table presents only significant causal relationships whether it is bidirectional or unidirectional relationship.

The *F*-statistics from the Granger-causality test suggest bidirectional causality between real exchange rate and real GDP. However, a unidirectional causality running from external debt to real GDP, public investment, broad money supply and credit to private sector, and causality running from public investment to real GDP and broad money supply. Also the result shows that a unidirectional causality between private investment and credit to private sector and causality running from foreign aid to real GDP, public investment and credit to private sector, and causality running from broad money supply to real GDP, credit and exchange rate.

Furthermore, the result show no causality relationship between LPVT and ER, LAID and ER, LDEBT and LAID, LAID and LM2, and LCR and ER and vice versa.

Table 3.13: Results from Granger Causality Test

Causality Direction	Lag	F-Stat	Prob.	Remarks	Conclusion
LPVT does not Cause LCR	2	2.76553	0.0785*	Reject Null	LPVT cause LCR
LPUI does not Cause LRGDP	2	10.1132	0.0004*	Reject Null	LPUI cause LRGDP
LM2 does not Cause LRGDP	2	9.94226	0.0005*	Reject Null	LM2 Cause LRGDP
LDEBT does not Cause LRGDP	2	12.0981	0.0001*	Reject Null	LDEBT Cause LRGDP
LCR does not Cause LRGDP	2	3.82486	0.0328*	Reject Null	LCR cause LRGDP
LAID does no Cause LRGDP	2	3.84676	0.0322*	Reject Null	LAID cause LRGDP
ER does not Cause LRGDP	2	2.95950	0.0666*	Reject Null	ER cause LRGDP
LRGDP does not Cause ER	2	6.32340	0.0050*	Reject Null	LRGDP cause ER
LPUI does not Cause LM2	2	4.01781	0.0281*	Reject Null	LPUI cause LM2
LDEBT does not Cause LPUI	2	4.69609	0.0165*	Reject Null	LDEBT cause LPUI
LCR does not Cause LPUI	2	3.80959	0.0332*	Reject Null	LCR cause LPUI
LAID does not Cause LPUI	2	5.23228	0.0110*	Reject Null	LAID cause LPUI
LDEBT does not Cause LM2	2	6.08421	0.0059*	Reject Null	LDEBT cause LM2

LM2 does not Cause LCR	2	5.16141	0.0116*	Reject Null	LM2 cause LCR
LM2 does not Cause ER	2	4.06304	0.0271*	Reject Null	LM2 cause ER
LDEBT does not Cause LCR	2	2.93899	0.0678*	Reject Null	LDEBT cause LCR
ER does not Cause LDEBT	2	2.49617	0.0988*	Reject Null	ER cause LDEBT
LDEBT does not Cause ER	2	3.27973	0.0510*	Reject Null	LDEBT cause ER
LAID does not Cause LCR	2	2.83367	0.0741*	Reject Null	LAID cause LCR

\* Represents significance.

### 3.5. Error Correction Model

Once the long-term relationship is obtained, it is interesting to estimate a partial adjustment model (or a short-term relationship) between private investment and its main determinants.

For the long run model:  $Y_t = \beta_0 + \beta_1 X_t + U_t$ , the error correction model is given as:

$\Delta Y_t = \alpha_0 + \alpha_1 \Delta X_t + \alpha_2 U_{t-1} + \varepsilon_t$  Where,  $\alpha_2$  is the error correction (adjustment) coefficient and  $\alpha_1$  is the short run coefficient.

The parameter  $\alpha_2$  is the error-correcting speed of adjustment term. If  $\alpha_2 = 0$ , then there would be no evidence for the long-run relationship. This parameter is expected to be significantly negative under the prior assumption that the variables show a return to a long-run equilibrium.

$$\Delta lpvt = -0.366\Delta lpui + 1.145\Delta lcr + 0.246\Delta lm2 + 0.634\Delta laid + 0.698\Delta lrgdp - 0.244\Delta ler - 0.901ECM(-1)$$

Table 3.14: Short Run Dynamics (Error Correction Model)

Variables	Coefficient	Std. Error[prob.]
D(LPUI)	-0.366	0.247[0.150]
D(LCR)	1.145	0.226[0.000]***
D(LM2)	0.246	0.623[0.694]
D(LAID)	0.634	0.207[0.004]***
D(LDEBT)	0.001	0.475[0.998]

D(LRGDP)	0.698	0.247[0.008]***
D(ER)	-0.244	0.103[0.025]**
ECM(-1)	-0.901	0.159[0.000]***

Source: Computed from secondary data (2018) using Eviews

Note: \* Significant at 1 %; \*\* Significant at 5 %.

### 3.5.1. Diagnostic Tests for the Short Run Model (Error Correction Model)

Table 3.15: Diagnostics tests for the short run model

Tests	F-value [p-value]
Breusch-Godfrey Serial Correlation LM Test	F=0.007[0.992]
Heteroskedasticity Test: Breusch-Pagan-Godfrey	F=1.538[0.188]
Normality Test	Jarque- Bera=0.247[0.884]

Source: Computed from secondary data (2018) using Eviews.

Note that numbers in the bracket are p-values.

Consistent with the long run tests, the diagnostic test carried out for the short run model does not provide any evidence against the absence of serial correlation and heteroskedasticity.

### 3.6. Interpretation of Result

**Public investment** (LPUI) has a significant and negative effect on private investment in Ethiopia at 5 percent level of significance. The coefficient of the LPUI is -0.855, which means that the one percent increases in public investment decreases private investment by 0.855 percent, and this indicates that the increase in public investment results in a decrease in the private investment (Pvt) or the crowding – out effect between public investments with private investment in the long run.

That is the method of financing public sector investment imposes constraints on the private sector's access to domestic financial resources (i.e. if the government is heavily borrowing from domestic financial institutions, this constrained private investment with regard to accessing loans from these institutions), it limits the ability of private sector investors to raise funds to finance investment activities.

Even though it is statistically insignificant public investment has a negative effect on private investment in the short run. That is increase in government investment on infrastructure and other public activities are not supporting the development of private investment in the short run. It is also means that there is a resource competition (finance and market) in the short run between public and private investment.

The survey result shows that even though there is expansion of basic infrastructure frequent interruption and lack of access is still a problem. The study contradicts with the finding of Adugna (2013), Hailu and Debele (2015), 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 private investment. And the study supports with the findings of Ambachew (2010), Kurabachew (2015) that public investment competes with private investment than complement with it.

**Credit to private sector and broad money supply:** such variables are considered to capture the relationship between private investments and financial sectors. Private sector credit has significant short run and long run effect on private investment. The amount of fund provided for private sectors by government or financial sector is positively related to private investments. This shows private sectors also used the fund to finance new investments not only for other purposes. The coefficient shows that one percent increase in credit to private sector increases investment by 0.629 percent and 1.145 percent in the long run and short run respectively.

The result supports the finding of Hailu and Debele (2015) while contradicts with Ernest (2014). And 28.57 percent of the survey report shows that even though problems of getting credit with in the needed time and place is the serious problem faced it has an important role in their business.

The study also proves that broad money supply has positive and significant effect on private investment in Ethiopia in the long run. From the result the coefficient of broad money supply (M2) 1.516 indicating that if the country increases M2 by 1 percent private investment will increase by 1.516 percent. Since private manufacturers are subject to liquidity constraint they are dependent on bank loans and short term debts. And it supports Hailu and Debele's (2015) and Ernest's (2014) finding that when money supply increases, with extra money circulating within the economy, the purchasing power of all sectors that is households, business and government is enhanced. Thus, consumption expenditures, investment expenditures, government purchases all increases, resulting in an increase in aggregate demand and hence investment. Since in sub Saharan African countries money and capital market are at nascent stages of development hence broad money supply is powerful and become an important conduit monetary policy shocks.

**Public debt** has a significant negative influence on private investment in the long run. A 1 percent increase in debt results in 0.885 percent decrease in private investments. In one hand when there is huge public debt the governments attention will be on servicing it rather than supporting investment that is returns from new investments are used to service the existing debt and on the other hand huge public debt triggers inflation through increased government borrowing and hence decreased demand. Because of this increased borrowing, crowding out effect occurs.

**Exchange rate** has negative and significant effect on private investment both in the long run and short run. The result shows that a 1 percent increase, depreciation of birr results in 0.253 percent decrease in private investment in the long run and 0.103 percent in the short run respectively.

About 66.67 percent of both exporter and importer of the survey show that exchange rate uncertainty is their most serious problem. 70 percent of the importing firm said that exchange rate devaluation adversely affects our business because we are importing a lot of raw materials from abroad. They also suggested that the government should give attention in time of exchange rate change. That is the number of firms that are importer and exporter should be identified before devaluation or revaluation.

As most firms said devaluation results in many problems like shortage of foreign exchange, imports became expensive and inflation is among the other. And hence devaluation of exchange rate will decrease private investment. It is known that government of Ethiopia devaluation of birr is related with promoting export. However this policy may in turn depends on demand in the international market. That is without analyzing the demand in the international market devaluation or revaluation may not give expected result. As Hailu and Debele (2015) presupposes that the tradable sectors and import substitution industries detriment from the depreciation of the domestic currency over the period under consideration as they used imported capital goods which become expensive after policy changes. Devaluation of the exchange rate might cause the cost of imported capital to increase, thus reducing private investment.

**Foreign aid:** The other variable that has significance and positive influence on private investment both in the long run and short run is foreign aid (LAID). A 1 percent increase in foreign aid results in 1.587 percent increase in private investment in the long run and 0.207 percent in the short run. World financial institutions like World Bank and International Monetary Fund provide aid in most cases for the purpose of promoting investment, and hence private investment is expanding.

**Real GDP:** In the short-term, real GDP or economic growth has a significant and positive effect on private investment in Ethiopia with a regression coefficient of 0.698. One percent increase in real GDP increases private investment by 0.698 percent in the short run. The result indicates that increase in GDP results in increase in private investment.

When real GDP increases the demand for goods and services also increases and hence production will increase and private investors will be motivated.

The ECM estimated coefficient is -0.901 and it is statistically significant at 1 % significance level, and it has the correct sign and therefore suggests that any shock which diverge the economy from the steady state can converge to the long-run equilibrium path. That is to have long run equilibrium it needs to make 90.1 percent “adjustment” in the short run. The coefficient of ECM shows that short run deviations of private investment is corrected/adjusted to long run equilibrium very fast at a rate of 90.1% each year. The negative sign shows that the short run private investment dynamics is below the long run equilibrium level.

#### **4. SUMMARY, CONCLUSION AND RECOMMENDATION**

##### **4.1. Summary and Conclusion**

Private investment is one of the key factors that differentiate developed countries from developing countries. Higher investment leads to higher rates of growth and job creation, and higher opportunities for the poor to improve their livelihoods. The result shows that credit to private sector, exchange rate and foreign aid are significant determinants of private investment in Ethiopia both in the short run and long run. However real GDP is significant in the short run, in the short run increase in real GDP increases demand for goods and services and it in turn increases production by manufacturing firms.

The other variables including public investment, money supply and external debt have only long run effects on private investment. Public investment and money supply have a significant positive effect while external debt has significant negative effect on private investment in the long run. The probable justification is that when there is infrastructural development in the country like road, electricity, and others it attracts to invest. That is it will have a crowd in effect for private investment.

And when money circulating in the economy increases it will increase the purchasing power of households, government, firms and other actors in the economy and manufacturing firms will be motivated to produce more and more. But increase in external debt will decrease private investment because the government gives more emphasis on servicing its debt than promoting private investment. Exchange rate fluctuation also has adverse effect on private investment thus exchange rate stabilization policy is needed. Generally the study advises other researchers to do on this area and contribute a lot.

## **5.2. Recommendation**

Ethiopia now is growing fast and promoting private investment is one strategy for her development. Thus, the study recommends:

In time of infrastructural development Ethiopia should also focus on its short run and long run effect on the side of private investment.

The country should have better financial access to finance investment with in determined place and time. Money supply should be given attention as major monetary policy instrument by National Bank of Ethiopia. The country should control and minimize the risk (negative) externality of external debt.

Government of Ethiopia should analyze the effects of exchange rate change before devaluation or revaluation. Change in exchange rate has adverse effect on private investment both in the short run and long run. Therefore exchange rate stabilization policy should be implemented to address the adverse effect of exchange rate fluctuation on private investment. The means of getting foreign aid should be encouraged and be used for more productive investment areas.

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