Macroeconomic, Political, And Institutional Determinants of Private Investment In Ethiopia: A Dynamic Analysis

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Abstract

This article investigates the macroeconomic, political, and institutional determinants of private investment in Ethiopia based on a time series data from 1985 to 2018. We apply ARDL approach to Co-integration to investigate the long-run and short run outcomes. The result reveals that real GDP has positive significant effect on private investment growth in both long run and short run while public investment has a crowding-out effect in short run but crowding-in effect in the long run. Real interest rate has a significant negative effect on private investment growth in long run unlike its short run effect. Hence, we recommend more effort has to be exerted to increase the market-size and real income of the people to promote private investment. Secondly, public investment in infrastructures is crucial to attract private investors though public investment in sectors that compete directly with the private sector retard private investment growth. Thirdly, given the negative significant effect of real effective exchange rate on private investment, devaluation is not a long-lasting solution to promote private investment unless the marshal-learner condition is satisfied. Fourthly, the government has to ensure consistent management strategies to minimize corruption, violent uprisings, and bureaucratic inefficiencies to build up confidence of private investors.

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1. Introduction

Different economic literature proves that investment as a key determinant of economic growth from both theoretical and empirical dimensions. For instance, investment plays an important role in promoting long term economic growth and expanding the productive capacity of the country (Jongwanich and Kohpaiboon, 2008). Especially, a private investment made by the private sectors has remained very great importance to the developing countries' development program (Batu, 2016). The history of economic development also clearly contends the fact that the importance of private investment in generating long-run economic growth in an economy cannot be undermined (Nyoni and Bonga, 2017). In various economies, across the globe, the private sector had been known to contribute more meaningfully to economic growth than public investment (Ayani, 2014). Further, in developing countries, public investment is not enough to address sustainable economic growth challenges but a private investment. This can be explained in the direction that private sectors has more capacity to make wise investment decisions, to

mobilize resources more efficiently, and lesser corruption while public investment is usually made for political purposes which lack economic validation (Serven, 1997; Khan and A. R. Kemal, 1996). Moreover, private investment contributes more meaningfully in poverty alleviation, job creation opportunities, economic development, and in improving society's welfare (Attefah and Enning, 2016). However, knowing these facts, in sub-Saharan Africa the performance of private investment is relatively weak (Admasu 2016; Nyoni and Bonga, 2017).

Ethiopia is one of the sub-Saharan Africa countries whose economy falls under the group of the least developed countries (LCD's) as classified by the United Nations. Its economy has undergone series of reforms, from a liberalized economy (imperial regime till 1974) to command type (Derg regime from 1974-1989/90), and again liberalized after 1991. Since the beginning of 1990s, Ethiopia has successfully launched economic reform and has been experiencing significant economic reforms, political and social changes. In 1992, after the fall of the social regime, the Transitional Government has come out with a new economic policy (Tada, 2001). Mainly the economic reform measures undertaken were concerned with the removal of restrictions on private sector including no ceiling and registration. Licensing procedures were also simplified; legal restrictions were almost removed; trade liberalization and privatization took off; tariff lowered and correction of price distortion and macro and micro measures were undertaken; exchange rate devalued; and interest rate rose (Tada, 2001). Apparently various measures including formulating various development policies and plans were taken; the investment code was revised many times; a more liberal and less bureaucratic policy was introduced (Solomon, 2001).

Moreover, the Government of Ethiopia promised to promote the private sector in many ways. To make private investment more attractive a package of investment incentives was granted by Ethiopian investment code to both domestic and foreign private investors. For instance, lower minimum investment capital requirement, full exemption from customs duty paid upon import of capital goods for investment; various export incentive schemes; reduction of income tax and exemption from the payment of income tax; carry forward of losses; provision of a plot of land for investment with very low renting and leasing cost; and provision of investment loan facilities were provided for private sectors (Investment Proclamation No.769/2012, Council of Ministers' Regulation No. 270/2012). After the introduction of the reform program, growth of GDP has registered increasing rate. There is also an improvement in saving and investment since 1992. The performance and growth level of private investment has been improved (Tada, 2001). The economy began to get better following this series of economic and political reforms (Adugna, 2013). Since 2004 -2011 the recovery gave way to an outstanding growth performance with about 10.6 percent annual average GDP growth rate. This rate is by far greater than the growth rate of the region (Africa) which was 4.9% (Admasu, 2016).

Despite all these applauded efforts, the growth rate and performance of private investment did not show an impressive growth as it was expected. It has remained low and shy to make significant strides (World Bank, 2004; Adugna, 2013). The share of private sectors investment in

GDP has never been more than 6 percent until 2003 (Ambachew, 2010). With the same trend the contribution of private investment to the economic growth of Ethiopia remained very low (World Bank, 2013). The Ethiopian investment commission also reports that private investment is relatively low in achievement and weak in implementation (EIC, 2019). This suggests that the performance and determinants of private investment has to be studied. Hence, promoting private sectors investment should be approached with locally fit and globally approachable investment strategies and policies based on contemporary and contextualized empirical researches. This basically requires investigation of the macroeconomic, political and institutional determinants of private investment.

In addition, there are also two main motivations for this research to be conducted. First, Ethiopia has pursued a public investment-led economic development model since the 1990s and the government makes a huge public investment. However, the development of a strong and vibrant private sector is needed to sustain high and sustainable growth (World Bank, 2013). A key question here is whether the public investment has a crowding-in effect or crowding-out effect on private investment. With this regard, the previous studies came up with contradicting conclusions. For instance, Habtu (2000), Zelalem (2002), Member (2015), and Kidane (2020) claimed that public investment has a crowding-out effect on private investment whereas Mamo (2015), and Adugna (2013) concluded that public investment has a crowding-in effect on private investment. This issue of crowding- in/out effects of public investment requires a clear investigation using appropriate methodology. Second, the effect of macroeconomic factor (for instance, real effective exchange rate and inflation) across studies varies depending on the time period covered and methodology followed. Hence, the existence of mixed/or inconsistent results, non-uniform empirical shreds of evidence, contradicting conclusions, adding or omission of irrelevant or relevant variables in the previous studies necessitate another round of investigation. Thus, in this paper, we investigate macroeconomic, political, and institutional factors that determine private investment in Ethiopia from the period 1985 to 2018. Specifically, we also see whether the public investment has crowding-out/in effect and identify strategies to create a better private investment climate.

The remainder of the paper is organized as follows. Section 2 discusses literature review. In chapter 3, description of data and methodology is presented. Chapter 4 discusses results and chapter 5 concludes.

2. Literature Review

There are several studies that have attempted to investigate macroeconomic and political determinants in different part of the world regions. Among others, Feng (2001) investigated the effect of political institutions on private investment in developing countries using cross-country panel data for the period 1988-1998. The result indicates that political freedom, political instability, and policy uncertainty affect the individual's decision to invest in the asset market and confirms that political freedom promotes private investment whereas political instability and policy uncertainty negatively affect private investment. Stasavage (2002) also analyzed 74

developing countries using panel data on the issue titled private investment and political institutions. In the study, he investigated the extent to which checks and balances in government might facilitate credible commitment and argued that checks and balances lead to enhancement of the level of private investment. Quan (2004) also showed that socio-political instability mainly characterized by non-violent protests can promote private investment.

Xiaoming Xu and Yanyang Yan (2014) examined whether government investment “crowds out” or “crowds in” private investment in the case of China using a structured vector autoregressive approach. The econometric result founds that government investment in public goods in China “crowds-in” private investment significantly, while government investment in private goods, commerce, and industry, mainly via state owned enterprises, “crowds-out” private sectors investment significantly. Finally, the researcher suggested the government to increase public investment and reduce investment in sectors that compete directly with the private sector for future growth. In the case of Ghana, Frimpong and Marbuah (2010) also found that private investment is determined by public investment, real interest rate, inflation, trade openness, real exchange rate, and a regime of constitutional rule in the short-run, while in the long-run private investment is significantly affected by real output, external debt, inflation, real interest rate, trade openness, and real exchange rate. Moreover, Escaleras (2014) identified that macroeconomic uncertainty, macroeconomic instability, and socio-political instability jointly have an adverse effect on private investment in 37 developing countries between 1970 and 2000.

Aysan et al. (2007) also studied governance institutions and private investment in North Africa region for a panel of 31 developing countries during the 1980s and the 1990s. They argued that governance plays a significant role in private investment decisions, particularly in cases of administrative quality composed of control of corruption, law and order, bureaucratic quality as well political stability. Garikai et al. (2019) examined the macroeconomic determinants of private investment in Sub Saharan Africa by using panel data for 35 Sub Saharan African (SSA) countries. The study covers the period from 2000 to 2017. In order to examine the macroeconomic determinants of private investment the study applied the pooled regression, random effect and fixed effect models as well as the Panel Corrected Standard Error (PCSE) technique. In this study, critical diagnostic tests were carried out and the unit root tests indicated that the employed data was stationary. The main study findings indicated that, in the SSA region, private investment was determined by GDP, real interest rates, public investment and inflation.

In Ethiopia, growing number of researchers have been conducted on investment. However, on the determinants of private investment robust empirical evidence is limited. For instance, among those private investment studies Abdishu (2000) examined the macroeconomic determinants of private investment in Ethiopia from the period 1975- 1998. The empirical evidence shows that the real per capita GDP growth rates, credit availability to the private sector have a positive and significant impact on private investment while real exchange rate and inflation have a negative effect on private investment. Zelalem (2002) also investigated that private investment is negatively affected by the debt stock, the public expenditures, real exchange rate, and inflation

over the period from 1975 to 2000 by applying modified version of flexible accelerator model. Adugna (2013) and Yechale (2015) examined the determinants of private investment in Ethiopia by applying multiple regressions using the OLS model from the period 1981-2010 and 1980-2014, respectively. The estimation results show that private investment, in the long run, is positively and significantly affected by public investment, real GDP per-capita, and external debt while inflation has a significant negative effect on a private investment in short run.

Another study held by Ambachew (2010) examined the determinants of private investment in Ethiopia using annual time-series data sets for 1950-2003 by employing a multivariate single equation error correction model. The results shows that private investment in Ethiopia is positively influenced by domestic market, trade openness, return to capital, liberalization measures, foreign direct investment, and infrastructural facilities but negatively affected by government activities, political instability, and macroeconomic uncertainty. Admasu (2015) also found that firms with rare access to credit respond vigorously to investment opportunities than constrained ones; access to credit shortens average durations of investment and it increases with firm size; and small firms with bank ties are at least as responsive to investment opportunities as large firms are. Brhane (2017) studied the financial determinants of private investment using time series data from 1975 to 2015. In the study, OLS regression analysis was undertaken to estimate long run model and ECM has been also used to find out the short run dynamics. The results shows that variables like bank credit, broad money supply, and availability of foreign exchange have a significant positive effect on private investment both in short run and long run. The other macro variable capital expenditure has positive association with private investment. In sum, the study provides evidence that private investment in Ethiopia affected by important financial and macroeconomic variables.

Other studies conducted by Member (2015), Mamo (2017), Habtu (2018), and most recently Kidane (2020) also investigated the determinants of private investment in Ethiopia in a different time period with different methodology. In aggregate, these few and scant studies found out that real gross domestic product, public investment, inflation rate, real exchange rate, credit availability to the private sector, external debt, and interest rate explained the performance of the private investment. However, the effect of such factors varies depending on the time period covered and the methodology they followed.

As we have seen from the above in Ethiopia, all of these studies tried to investigate the determinants of private investment without giving room for governance and political instability or paying little/no attention to political and institutional factors. But governance plays some fundamental role and can determine the performance of an investment. Moreover, Private investment operates in a political and institutional environment (Feng, 2001). In support of this, there is empirical evidence that show the effect of governance/ or political and institutional factors on private investment. For instance, Alesina and Perotti (1996), Roubini and Swagel (1996), Barro (1997), and Quan (2004) investigated the effect of governance on private investment and showed that private investment is negatively affected by political instability and

positively by public accountability. However, in Ethiopia, discussion on political and institutional determinants of private investment besides macroeconomic determinants is on its infant stage. Hence, it is with this background that this research starts to further explore the macroeconomic, political, and institutional determinants of private investment in Ethiopia.

3. Data and Methods

3.1. Data

This study is conducted basically using annual time series data from secondary sources. An attempt has been made to gather 34 years data on important macroeconomic, political, and institutional variables that are expected to determine private investment. The data covers the period between 1985 and 2018. Non-availability of data, especially on political and institutional variables, before the starting year 1985 has restricted the length of the time series. The quality of data and measurement errors are taken care of taking the data from appropriate/legitimate organizations. Accordingly, data for macroeconomic variables including public investment are taken from legitimate sources such as IMF, National Bank of Ethiopia (NBE), Ministry of Finance (MoF), Ethiopian Investment Commission (EIC), Central Statistical agency (CSA) of Ethiopia. The data on political and institutional variables indexes (Worldwide Governance Indicators (WGI) and political risk indexes) are drawn from World Bank and ICRG research dataset of the Political Risk Services. The data are used to capture the effect of political stability and quality of institutions in attracting investment. Basically, the dataset summarizes the views on the quality of governance provided by a large number of enterprises, citizens, and expert survey respondents in industrial and developing countries. This data was gathered from a number of survey institutes, non-governmental organizations, international organizations, and private sector firms.

3.2. Empirical Strategy

The study applies both descriptive and econometrics method of analyses. The study adopts variant of the flexible accelerator model was used to evaluate the determinants of private investment and ARDL model to investigate short run and long run outcomes. flexible accelerator model is built on the assumption that if there is a larger gap between the existing capital stock and the desired level of capital stock, there will be greater rate of firm's investment. Private sectors will plan to close the gap between the desired capital stock, K^* , and the actual capital stock, K in each period (Mbaye, 2014).

The flexible accelerator model has been the most popular in the context of developing countries due to the data limitations and structural constraints. A variant of the flexible accelerator model has often been used in empirical research (Ouattara, 2004; Seruvatu and Jayaraman, 2001). One of such model is the neoclassical flexible accelerator model. 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 (Mamo, 2017). In this study, to capture the macroeconomic, political, and institutional determinants of private investment

taking the neoclassical flexible accelerator model as the basis, an eclectic version of the flexible accelerator model is designed as follows. According to the accelerator investment theory, investment is a function of economic growth. On the basis of investment theory, in the long-run, the desired capital stock (K) is assumed to be directly related to levels of income (Y).

$$\begin{aligned} & \circ K_t \sim Y_t \\ & \circ K_t = \beta Y_t \dots \dots \dots (4.1) \end{aligned}$$

Where β is a constant and t is time-operator. Then, differencing the equation with respect to time t gives;

$$\circ \Delta K_t = \beta \Delta Y_t \dots \dots \dots (4.2)$$

Where, Δ is the difference operator. Then, in order to obtain an equation for the relationship between investment and desired capital stock, the conventional capital accumulation identity will be used to identify investment (I); thus;

$$\circ K_t = (1 - \delta) k_{t-1} + I_t \dots \dots \dots (4.3)$$

Where, δ refers to the depreciation of capital. Then from equation (3) one can obtain the following equation;

$$\circ K_t - k_{t-1} = I_t - \delta k_{t-1} \dots \dots \dots (4.4)$$

By assuming $\delta = 0$ and by rearranging the expression (4), one can solve for I_t to yield the following equation;

$$\circ \Delta k_t = I_t \dots \dots \dots (4.5)$$

When equation (5) is substituted in equation (2) then;

$$\circ I_t = \beta \Delta y_t \dots \dots \dots (4.6)$$

Hence, equation (6) represents the basic investment function. But here, 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;

$$\circ I_t = \rho I_{t-1} + \gamma_1 \Delta y_t + \gamma_2 \Delta y_{t-1} + \varepsilon_t \dots \dots \dots (4.7)$$

Where, γ represents coefficients, Δy_{t-1} represents lagged differences of output, and ε is the residual or disturbance (error) term. In addition, the first two terms on the right-hand side are lagged investment and income growth (increment) respectively which capture the effects of omitted variables, (Mbaye, 2014). Thus, the final equation can be estimated;

$$\circ I_t = \rho I_{t-1} + \gamma_1 \Delta y_t + \gamma_2 \Delta y_{t-1} + X_t + \varepsilon_t \dots \dots \dots (4.8)$$

Where, X_t represents some of the variables that are applicable in the developing countries such as financial factors, policy-related factors, neoclassical factors, open economy factors and general macroeconomic related variables, and political and institutional factors that are exogenous variables. The variables are chosen based on the availability of data and the existence of wide literature that support the variable.

Hence, to operate the above theoretical model, which is basic eclectic flexible accelerator functional model, the following empirical function incorporating macroeconomic, political, and institutional variable is formulated. That is $PRI = F(RGDP, PUI, RIR, REER, OPEN, POIST)$, where PRI = Private investment which is measured by growth of private fixed capital formation; $RGDP$ = Real Gross Domestic Product; PUI = Public Investment; RIR = Real Interest Rate; $REER$ = Real Effective Exchange Rate; $OPEN$ = Trade Openness/ Economic Openness ((Export + Import)/GDP); and $POIST$ = Political (proxied by Conflict index) and Institutional Variables (corruption index)¹. Consequently, the econometric model to be estimated is specified as follows;

$$PRI_t = \alpha_0 + \alpha_1 RGDP_t + \alpha_2 PUI_t + \alpha_3 RIR_t + \alpha_4 REER_t + \alpha_5 OPEN_t + \alpha_6 POIST_t + \varepsilon_t, \dots \dots \dots (4.9)$$

Having this, we run ARDL regression model to estimate the long run and short run relationship between dependent and explanatory variables. The ARDL approach has recently been credited for its advantages over the traditional co- integration techniques such as full maximum likelihood based approach by Johanson (1988), Johansen and Juselius (1990), and the residual based approach by Engle & Granger (1987). Firstly, ARDL co integration technique does not require pretests for unit roots unlike other techniques. Secondly, this technique is comparatively more robust in small or finite samples consisting of 30–80 observations. Thirdly, ARDL co integration technique is preferable when variables are integrated of different order, $I(0)$, $I(1)$ or combination of both. In such situation, the application of ARDL approach to co-integration will give realistic and efficient estimates. Fourthly, the ARDL method can distinguish between dependent and explanatory variables and remove the problems that may arise due to the presence of auto-correlation and endogeneity. Fifthly, Autoregressive Distributed Lag (ARDL) approach to co-integration helps in identifying the co-integrating vector(s) and if one co-integrating vector is identified, the ARDL model of the co-integrating vector is re-parameterized into ECM. The re-parameterized result gives short-run dynamics and long run relationship of the variables of a single model.

¹ In this study, the definition of those governance indicators taken as political and institutional variables is based on International Country Risk Guide (ICRG) of Political Risk Services (2015). The lower the index value the higher risk and the higher the index value to the lower risk and provides a means for assessing the political and institutional framework of countries. The highest rating is given to those countries where there is no armed or civil opposition to the government and the government does not indulge in arbitrary violence, direct or indirect, against its own people. The lowest rating is given to a rustic embroiled in an ongoing war. The risk rating assigned with a maximum score of four points and a minimum score of 0 points.

Thus, in order to examine the long-run relationship and dynamic interaction between private investment growth and its determinants our study employs an ARDL modeling approach. According to Pesaran et al. (2001) the ARDL approach requires three steps: The first step is estimating the long-run relationship among the variables. This is done by testing the significance of the lagged levels of the variables in the error correction form of the underlying ARDL model. Thus, following Pesaran et al. (2001), our ARDL model can be written as:

$$\Delta \text{GRPRI}_t = \alpha_0 + \alpha_1 \text{GRPRI}_{t-1} + \alpha_2 \text{GRRGDP}_{t-1} + \alpha_3 \text{GRPUI}_{t-1} + \alpha_4 \text{RIR}_{t-1} + \alpha_5 \ln \text{REER}_{t-1} + \alpha_6 \text{OPEN}_{t-1} + \alpha_7 \text{POIST}_{t-1} + \sum_{i=1}^p \beta_1 \Delta \text{GRPRI}_{t-i} + \sum_{i=0}^p \beta_2 \Delta \text{GRRGDP}_{t-i} + \sum_{i=0}^p \beta_3 \Delta \text{GRPUI}_{t-i} + \sum_{i=0}^p \beta_4 \Delta \text{RIR}_{t-i} + \sum_{i=0}^p \beta_5 \Delta \text{REER}_{t-i} + \sum_{i=0}^p \beta_6 \Delta \text{OPEN}_{t-i} + \sum_{i=0}^p \beta_7 \Delta \text{REER}_{t-i} + \sum_{i=0}^p \beta_8 \text{POIST}_{t-1} + \epsilon_t \dots \dots \dots (b)$$

Where the variables are as defined before is the first difference operator; β_0 is the intercept (drift); α_1 - α_{10} denote the long-run coefficients; β_1 - β_{10} are the short-run parameters of the private investment model to be estimated through the error correction model framework in the ARDL model; of private investment with respect to the above-identified variables; ϵ_t is the white noise residuals; Δ is the difference operator; and p is the optimum lag-length selected through Akaike Information Criteria (AIC).

Then, the F-test (Wald test) is used to test the existence of a long-run relationship among the variables using OLS to estimate the above equation. Wald F-statistics for testing the joint hypotheses will be compared with the critical values to test co-integration among the variables. Consequently, the joint hypotheses that will be tested are as follows:

$H_0: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \dots \dots \dots, = \alpha_{10} = 0$ (the null hypothesis of no long run relationship)

$H_1: \alpha_i \neq 0, i = 1, 2, 3, \dots, 10$ (the alternative hypothesis for the presence of long-run relationship)

The null hypothesis H_0 will be rejected if the F-statistic is higher than the upper bound critical value, indicating the existence of the long-run relationship between the lagged level variables in the model. In contrast, H_0 will not be rejected if the F-statistic falls below the lower bound, indicating the existence of the long-run relationship. However, if the F-statistic falls in between the lower bound and upper bound critical values, the inference is inconclusive. At this condition, the order of integration of each variable will be determined before any inference can be made.

Then, the conditional ARDL long-run model of the determinants of GRPI_t can be estimated following co-integration is established (or this model is extracted from (a) to obtain the long-run coefficients, the following model is extracted from (a)).

$$\text{GRPRI}_t = \alpha_0 + \sum_{i=1}^p \alpha_1 \text{GRPRI}_{t-i} + \sum_{i=0}^p \alpha_2 \text{GRRGDP}_{t-i} + \sum_{i=0}^p \alpha_3 \text{GRPUI}_{t-i} + \sum_{i=0}^p \alpha_4 \text{RIR}_{t-i} + \alpha_5 \text{REER}_{t-1} + \sum_{i=0}^p \alpha_6 \text{OPEN}_{t-i} + \sum_{i=0}^p \alpha_7 \text{POIST}_{t-1} + \epsilon_t \dots \dots \dots (b)$$

Lastly, by estimating an error correction model (ECM) associated with the long-run estimates, the short-run dynamic parameters are obtained and specified as follows:

$$\Delta \text{GRPRI}_t = \alpha_0 + \sum_{i=1}^p \beta_1 \Delta \text{GRPRI}_{t-1} + \sum_{i=0}^p \beta_2 \Delta \text{GRRGDP}_{t-1} + \sum_{i=0}^p \beta_3 \Delta \text{GPUI}_{t-1} + \sum_{i=0}^p \beta_4 \text{RIR}_{t-1} + \sum_{i=0}^p \beta_5 \Delta \text{REER}_{t-1} + \sum_{i=0}^p \beta_6 \text{OPEN}_{t-1} + \sum_{i=0}^p \beta_8 \Delta \text{POIST}_{t-1} + \theta \text{ECM}_{t-1} + \varepsilon_t \dots \dots \dots (c)$$

Where α_0 is the intercept; $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9$, and β_{10} are the short-run dynamic coefficients of the model's convergence to equilibrium; ε_t is the white noise residuals; Δ is the difference operator; ECM_{t-1} is the error correction term lagged by one period (captures the long-run relationships in the model); θ is the speed of adjustment (the long run parameter that captures the long run causality effect), and p is the lag length.

The null hypothesis to be tested here is $H_0: \theta = 0$, which indicates the non-convergence to its long-run dynamics against the alternative hypothesis of $H_1: \theta \neq 0$, the existence of a long-run relationship between the dependent variable and exogenous variables. The coefficient of error correction model (θ) is also expected to have a negative sign, which indicates the convergence to its long run dynamic equilibrium.

4. Results and Discussions

4.1. Descriptive Statistics

In this section we discussed the descriptive statistics of variables included in this study.

Table 1: Summary statistics

Variable	Observations (year)	Mean	Median	Std. Dev.	Minimum	Maximum
GRPRI	34	8.753785	11.20000	17.60256	-35.01900	44.99000
GRRGDP	34	6.036168	8.470000	32.11755	-12.68100	22.96030
GRPUI	34	14.06570	21.02000	32.11755	-45.87000	68.40000
RIR	34	-4.39412	-3.10000	14.77213	-51.20000	19.00000
REER	34	148.6441	140.4500	47.95021	71.90000	261.5000
OPEN	34	34.57793	35.12910	11.36042	14.85000	55.03782
CONF	34	6.638237	6.854167	2.095390	2.250000	10.94840
CORR	34	2.178922	2.000000	0.419502	1.666667	3.000000

Source: Own Computation based on NBE, WB, and IMF data.

From table 5.1, the growth of private investment in Ethiopia for the period under study had a mean of 8.753785 and a standard deviation of 17.20 with a minimum and maximum of -35.019 and 44.99 respectively. Real GDP growth had a mean of 6.036168 and a standard deviation of

32.11755 with a minimum value of -12.68100 and a maximum value of 22.96030 for the period under study. The growth of public investment had a mean of 14.06570 and a standard deviation of 32.11755 with a minimum of -45.87000 and a maximum of 68.40000. Based on this, the growth rate of public investment is higher than the growth rate of private investment. Under the study period the economy has annually grown by 6 percent on average whereas private investment and public investment has annually grown by 8.7 and 14 percent on average, respectively. The real interest rate has a mean of -4.39412 and a standard deviation of 14.777213. This means, on average, the nominal interest rate is lower than the inflation rate saving is not more important. The description shows that private investment growth, public investment growth, and real economic growth, real interest rate, and real effective exchange rate variables are abnormal, while the other variable trade openness, conflict, and corruption have normality showing a greater standard deviation than the mean value. This means trade openness, conflict, and corruption more clear, on average, the growth rate of public investment is two times higher than the growth display the lowest dispersion whereas private investment growth, growth of real GDP, real interest rate, and real effective exchange rate displays the highest dispersion as shown by the standard deviation. This shows stability in the long-run relationship between Private investment and its determinant factors.

4.2 Empirical Analysis

4.2.1 ADF Unit Root Testing Result

A unit root test is a common practice and a first step that are to be undertaken in macro-level data analysis to address the non-stationarity problem of variables. Hence, before the estimation of the econometric model, unit root test for stationary of each time series variable is necessary to show mean, variance, and covariance of the process is time-invariant. Most often macroeconomic variables are non-stationary; hence, before doing any econometric analysis testing stationarity of variables is common and mandatory. Otherwise, estimating non-stationary dependent variable upon a non-stationary independent variable lead to the spurious regression in which the estimators and test statistics are misleading.

Table 2: Unit root test result

Result for Unit root tests									
Variable	ADF Test				PP Test				Order of integration (conclusion)
	Level		1st difference		Level		1st difference		
	Intercept	Intercept & trend	Intercept	Intercept & trend	Intercept	Intercept & trend	Intercept	Intercept & trend	
GRPRI	-0.26	-5.99*	-5.28*	-5.19*	-6.88*	-22.87*	-37.39*	-37.06*	I(0)
GRRGDP	-5.39*	-6.93*	-6.87*	-6.84*	-5.45*	-7.27*	-38.54*	-40.29*	I(0)
GRPUI	-3.48	-3.09**	-2.09**	-2.05	-6.59*	-12.90*	-35.14*	-34.99*	I(0)
RIR	-4.91*	-3.68**	-7.71*	-7.60*	-4.97*	-5.26*	-14.14*	-13.73*	I(0)
REER	-2.44	-1.21	-5.23*	-5.36*	-2.46	-1.87	-5.26*	-5.96*	I(1)
OPEN	-1.65	-0.69	-4.83*	-2.21*	-1.62	1.19	-5.03*	-5.40*	I(1)
CONF	-3.44	-3.44***	-3.37***	-3.82***	-2.13	-2.12	-2.44**	-2.35**	I(0)
CORR	2.17	2.16	-4.38*	-4.65	-2.12	-1.96	-6.15*	-7.39*	I(1)
Note: *, **, and *** indicates the significance level of variables at 1%, 5%, and 10 % respectively The null hypothesis is that the series is non-stationary or the series has a unit root against alternative hypothesis that the series are stationary									

Source: own Computation

As shown in the table 2, in both augmented Dickey-Fuller and Phillip and Perron tests the growth of the variables of private investment (GRPRI), the growth of real domestic product (GRRGDP), the growth of government/public investment (GRPUI), real interest rate (RIR), and conflict index (CONF) are stationary at level, integrated of order zero (I(0)), whereas real effective exchange rate (REER), trade openness (OPEN), and corruption index (CORR) are not stationary at level but stationary at the first difference, integrated of order one (I(1)). This implies the series are of mixed order of I(1) and I(0) and therefore, for the given time series, the ARDL methodology is quite appropriate to be adopted. This gives the stepping stone for the next co-integration analysis and error correction estimation that may proceed to the existence of co-integration.

4.2.2 Result of Bound Test for Co-Integration

Co-integration is the formal statistical justification of the existence of this relationship among the variables for the long-run equilibrium. Hence, after determining the stationary nature of the variables, the next task in the bounds test approach of co-integration is estimating the specified ARDL model using the appropriate lag-length selection criterion. Pesaran and Shine (1999) recommended choosing 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. Accordingly, under the study period, co-integration (a long run relationship) is witnessed between private investment and the given set of determinants considered and shown as follows:

Table 3: Bound testing for co-integration

Table: Bounds Co-integration Testing Result		
Null Hypothesis: No long run relationship exist (No level relationship)		
Test Statistic	Value	K
F-statistic	10.84744	7
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.03	3.13
5%	2.32	3.5
2.5%	2.6	3.84
1%	2.96	4.26

Source: own computation

From the above table 5.3, the F-statistics (10.84744) is higher than both the Pesaran et al. (2001) and Narayan (2004) upper bound critical values at a 1% level of significance. This implies that the null hypothesis of no long-run relationship is rejected; rather accept the alternative hypothesis (there is a long-run relationship) based on critical values at a 1% level of significance. Therefore, there is co-integration or long-run relationship among the variables. Thus, the bound test shows there is co-integration among the variables. In other words, there is a systematic relationship that functionalizes the variables to form a linear stationary process that adjusts to the long-run after any shocks or deviation of the short-run.

4.2.3 Diagnostics Testing Result

Prior to doing any statistical regression analysis of the model, different diagnostic tests should be undertaken to check the fulfillment of different assumptions. In other words, a diagnostic test is required to check the standard property of the model. In this study, the researcher is carried out a number of diagnostic check, which includes a Serial correlation test (Brush & Godfray LM test), Functional form (Ramsey's RESET) test, Normality (Jaque-Bera test), and Heteroscedasticity test. In order to reject or accept the null hypothesis, a decision is made by looking at the p-values associated with the test statistics. That is the null hypothesis is rejected when the p-value is smaller than the standard significance level (i.e. 5%).

Table 4: Diagnostic test result

Diagnostic Testing Results for selected ARDL (1, 1, 1, 1, 0, 1, 1, 1)model				
H0: hypothesis	H1:hypothesis	Test type	F-statistics (F-version) ($P \geq 0.05$)	Decision
No serial correlation	Serial correlation	Breusch-Godfrey Serial Correlation LM Test	1.099558(0.3569)	Accept the null hypothesis
Homoskedastic	Heteroskedastic	Breusch Pagan	0.601236(0.8308)	Accept the null hypothesis
No omitted variable	Omitted variable	Ramsey RESET test	1.129374(0.3028)	Accept the null hypothesis
Normally distributed	Not the null	Jarque Berra test for the distribution of the disturbance	0.201749(0.904047)	Accept the null hypothesis

Source: own Computation

The above table shows that the ARDL model estimated in this study generally passes all the diagnostic tests. Serial correlation test; the post estimation test of serial correlation in the null hypothesis of there is no serial correlation over the alternative hypothesis of there is serial correlation has the expected result. As shown in the first row of the table above, a p-value is 0.35. This is much higher than 0.05 or even the weak significance level of 0.1. Therefore, we cannot reject the null hypothesis of there is no serial correlation. Thus, there is no evidence of serial correlation in the model as the Brush Godfray LM test failed to reject the null hypothesis.

Heteroscedasticity: heteroscedasticity test shows that the error term/ or residual have a constant variance or not. By assumption, the variance of the errors is constant, σ^2 is known as the homoscedasticity. The study uses Breusch-Pagan-Godfrey test for Heteroscedasticity. Thus, in the table above, the Breusch-Pagan heteroscedasticity test statistics show the absence of heteroscedasticity as p-value of the test statistics is 0.8308 which is greater than 5 percent. Hence, the model exhibits constant variance as hetrokedatisticity test failed rejects the null hypothesis. Functional form: the model specification test for omitted variables problem of the analysis shows whether the model suffers from omitted variable bias or not. In this study, the researcher uses Ramsey's Reset test of H0: no omitted variable in the model specification against H1. Taking the p-value 0.3028 greater than 5%, we can't reject the null hypothesis of there is no omitted variable in the model. Hence, the model is correctly specified. Normality: the normality Jarque-Berra test of the disturbance term found good results. In the same fashion, p-value (0.904047) is greater than 5 percent and we can't reject the null hypothesis in favor of the normality of the disturbance term. Hence, the residual is normally distributed since Jaque-Berra normality test is larger than the standard significance level.

4.2.4 Model Stability Testing Result

After the entire short-run and long-run estimation, model/ parameters stability is tested. Commonly, the stability of the model for long run and short run relationship is detected by using the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ). Cumulative sum of recursive residuals (CUSUM) helps as to show if coefficients of the parameters are changing systematically and the cumulative sum of squares of recursive residuals (CUSUMSQ) tests is useful to indicate if the coefficient of regression are changing suddenly. Accordingly, we accept the null hypothesis of the parameter instability if the blue line cross redline which is critical line and never returns back between two critical line and we reject the null and accept the alternative there is parameter stability in the short run and long run if the cumulative sum goes inside the area (can returns back) between the two critical lines.

Figure 1: *plot of cumulative sum of recursive residuals*

Source: Owns Computation

Figure 2: Plot of cumulative sum of recursive residuals

Source: Owns Computation

In the above two graph obtained using STATA14, the test of the stability of the parameters by cumulative sum of recursive residuals shows the model is stable. The plot of CUSUM test did not cross the critical limits and the CUSUMSQ test also shows that the graphs do not cross the lower and upper critical limits. So, we can conclude that long-run estimates are stable and there is no any structural break. In addition to the confirming model stability, we can look at goodness of fit statistics of the model containing the explanatory variables that actually explain variations in the dependent variable because it is important to have some measure of how well the regression model actually fits the data. According to the result, R^2 is 0.843367 and adjusted R^2 is 0.721541. Thus, 84.33 percent of the variation in the dependent variable is explained by the explanatory variables. Hence, the results of the estimated model are consistent and efficient.

4.2.5 Error Correction Estimation Result

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 and short-run coefficients. Hence, error correction model estimation for both the short-run and long-run coefficients simultaneously presented in table below. Besides, the model passes all the post estimation diagnostics tests including the normality, heteroscedasticity, serial correlation, model specification, and model stability. In addition, the estimation results show that the estimated model has good fit and the coefficient estimate for the error correction term is the lagged dependent variable. The short-run dynamics are captured by the first differenced variables while the long run is captured by level variables in the error correction model.

Table 5: Error correction estimation result

VARIABLES	(1) ADJ	(2) LR	(3) SR
GRRGDP		1.251*	
		(0.611)	
GRPUI		0.446***	
		(0.133)	
RIR		-0.537*	
		(0.299)	
REER		0.205**	
		(0.0965)	
OPEN		0.219	
		(0.357)	
CONF		0.661	
		(1.641)	
CORR		-11.84	
		(9.566)	
L.GRPRI	-0.964***		
	(0.127)		
D.GRRGDP			1.407***
			(0.330)
D.GRPUI			-0.147**
			(0.0666)
D.RIR			0.633***
			(0.183)
D.OPEN			0.499
			(0.421)
D.CONF			-5.074**
			(1.818)
D.CORR			52.51***
			(12.95)
Constant			-5.938
			(38.11)
Observations	33	33	33
R-squared	0.938	0.938	0.938
Standard errors in parentheses *** p < 0.01, ** p < 0.05, * p < 0.1			

Source: own computation

The above table 5.5 table presented error correction model results. the estimation result shows that the error correction terms (ECT) coefficient of the given equation is statistically significant and have negative signs, as expected. The error correction term lagged by one period ECT (-1) confirms the co-integration relationship among variables at 1% level of significance and the coefficient of the ECT (-1) = -0.964 indicates a rate of adjustment to the equilibrium at 96.4 percent per annum in the next period in case of a shock to private investment in the current

period. The negative sign of the coefficient of the error correction model indicates that short run shock was above the long run equilibrium value and therefore the adjustment towards the long run equilibrium will be taken place by decreasing (declining). Thus, the short run equilibrium value will adjust by 96.4% within a year. Moreover; the value of the R-Squared implies that about 93.8% of variations in private investment are explained by the variations in the independent variables considered. Therefore, the goodness of fit of the short run model is proved to be strong.

4.2.5.1 Long-Run Result

In line with previous empirical studies in Africa, on macroeconomic side, most of the explanatory variables have their expected signs in the long run. The growth of real GDP, Public investment growth and real effective exchange rate are found to have a positive and significant impact on private investment growth in the long run; whereas real interest rate is found to have a negative and significant impact on private investment growth. Economic variable trade openness and selected political and institutional variables proxy by conflict and corruption is found to be insignificant in the long run. This means an increase in growth of real GDP results in an increase in private investment growth due to the fact that an increase in real GDP stimulate domestic investors to invest more by increasing aggregate and effective demand as disposal income increases. This investigation is also supported by Adugna (2013).

In the long run, public or government investment growth has a crowding-in effect on private investment growth. An increase in the growth of public investment induces the growth of private investment in the long run. This is due to the fact that public investment in the country is primarily concentrated on the development of basic economic infrastructures (such as road, telephone, power, irrigation canals, etc) and social overhead capitals (like schools, universities, health centers etc.) could lead to favorable effect on private investment growth. A similar significant effect of public investment on private investment has been reported in prior studies for different countries (see Frimpong and Marbuah, 2010). In Ethiopia, this positive effect of public investment on private investment is also supported by and Mamo (2017).

The significant negative coefficient of the real interest rate variable suggests that private investment growth and real interest rate are inversely related in the long run. Hence, the response of private sector for an increase in interest rate is negative. This is due to the fact that for an adjusted inflation at a higher interest rate, the opportunity cost of investment is very high and firms prefer not to invest. In line with this, a one percent increases in real interest rate causes a statistically significant 0.537 percent decline in private investment growth in the long run in Ethiopia. Hence, for a rise in real interest rate private agents prefer saving to investing more in the long run. Previously, a study conducted by Frimpong and Marbuah (2010) also supports this investigation.

Another macroeconomic variable real effective exchange rate which represents a nation's nominal effective exchange rate adjusted for inflation in the home country is positively associated with private investment growth in the long run. This positive and significant long run relationship between real effective exchange rate and private investment growth may indicate effectiveness of the respective policies. This means that a strengthening of the home currency with respect to other currencies creates an opportunity for private investors via determining the real cost of import. Moreover, our country Ethiopia is mainly importing capital goods and intermediate goods, hence, an increase in real effective exchange rate causes imported capital goods more cheaper which intern helps them to produce more products. Hence, weakening of home currency or devaluation is not long lasting a solution to encourage private sectors. In addition, devaluation makes imported raw materials more expensive and reduces the demand for domestic products in the domestic market. An increase in real effective exchange rate decreases the cost of imported capital goods, and thus increases private investment in import-dependent production sectors as supported by Ayeni (2009).

4.2.2.2 Short-Run Result

The short run estimate of the ARDL model shows the negative and significant relationship between public investment and private investment unlike to long-run case. This shows that, in the short run, public investment has a crowding-out effect on private investment as public due to the fact that private sectors and public sector compete for the same resources in the economy and thereby reducing private sectors potential to produce more output. In addition, public investment may crowd out private investment via increased deficits and a high lending interest rate; in turn, it reduces the amount of money available for credits to private sectors. Crowding out effects are highly pronounced where public investment majorly financed from increased taxes, which reduces level of savings, and by increasing borrowing from domestic markets, which pushed up domestic lending rates, and also leads to credit rationing in the private sector. In addition, it also crowds-out private sectors via the competition for certain scarce resources (skilled labour, key raw materials, etc). A similar significant crowding-out effect of public investment on private investment has been also reported in prior studies (see Habtu, 2018).

The relationship between real interest rate on private investment growth in the short run is positive in contrast to the long run relationship and it is highly significant. This is due to the fact that, in short run, an increase in real interest rate encourages households to save more in banks and this in turn gives the opportunity for private investors to have good credit access channeled through financial institutions which mobilizes savings and advance credit borrowers. In line with this, one percent increase in real interest rate is associated with 0.633 rises in private investment growth in the short run. A similar significant positive effect of real interest rate on private investment growth has been reported in prior studies (see Habtu, 2018).

When we came to political and institutional variables, the negative sign of political instability proxy by conflict indicates that political instability and private investment growth are positively

associated. An increase in index of conflict reflects better political stability and conversely a decrease in index size of conflict reflects high political instability. Hence, the negative sign of the parameter of conflict has shown that political instability may have a positive effect on private investment growth. This means that political instability may promotes private investment growth due to the fact that socio-political instability characterized by riots, antigovernment demonstrations, which represents collective protests has positive effect on private investment growth and countries experiencing collective protests typically under take political and economic reforms. In addition, political instability in the form of post-election violence may also lead to an adoption of market reform policies. As stated by Feng (2015), in a situation of collective protests, major government change, countries experience to undertake reforms, including transition to democracy, which leads to stability that provides signal of policy readjustments towards market oriented reforms, hence, inducing more private investment. Therefore, political instability may have a positive impact on private investment growth. A similar significant effect of political instability on investment growth has been also reported in prior studies for different countries. For instance, Quan (2004) concluded that countries experiencing collective protests typically undertake political and economic reforms which intern promotes private investment. Fedderke and Klitgaard (1998) also argue that political instability may have a positive impact on economic growth. For example, the Asian financial crisis in 1997 led to widespread collective protests in Thailand and South Korea followed by a series of radical political and economic reforms. However, the violent uprisings experience in Indonesia during the Asian financial crisis made the adoption of economic reforms more difficult. Thus, the possible reason for the short run statistically significant and positive impact of political stability may relate to the fact that riots, antigovernment demonstrations or collective protests may led to different economic and political reform, hence, promoting private investment.

The short run estimates of the ARDL model shows that the relationship between corruption and private investment growth is negative and statistically significant. An increase in index of corruption reflects low political risk or lower corruption and conversely a decrease in index size of corruption reflects high political risk. Hence, the positive sign of the coefficient shows a negative association between private investment growth and corruption. This negative association between private investment growth and corruption can be explained due the fact that corruption causes inefficiently allocated resources, results unethical business practices and shadow economy. In addition, corruption raises operational cost, reduces the quality of investment potentials, discourages foreign investment, and prevents the natural laws of the economy from functioning freely. In a corrupt economy companies would not be qualified to win government contracts and awarded projects as a result of bribery or kickbacks and is a disincentive for foreign investment. Investors who seek a fair, competitive business environment avoids investing in countries where there is a high level of corruption. Thus, corruption has a negative and significant impact on private investment growth. A similar significant negative effect of corruption on private investment growth has been also reported in prior studies (see Fiestas and Sinha, 2011; Shleifer and Vishny, 1993; Wei, 1997 and Campo et al., 1999).

5. Conclusions and Implications

The primary objectives of this study was to investigate the macroeconomic, political, and institutional determinants of private investment in Ethiopia using a time series data from 1985-2018. To fulfill the objective, the researcher has reviewed theoretical explanations and empirical literature regarding to the determinants of private investment in the context of developing countries. The study used secondary data sourced from NBE, EIC, ICRG, IMF, and World Bank data basis in examining the trending behavior of real GDP, public investment, real interest rate, real effective exchange rate, trade openness, political instability, and corruption in Ethiopia. In this study, an Autoregressive Distributed Lag (ARDL) bounds test approach to co-integration was employed in data analysis to help in addressing the objectives along with ADF unit-root tests and convectional tests for reliability of the models. The ADF test conducted on the series showed that private investment growth, public investment growth, growth real GDP, real interest rate, and conflict are stationary at level or integrated of order zero $I(0)$ while real effective exchange rate, trade openness, and corruption are integrated of order one $I(1)$.

After the stationary test, the bound test for co-integration was conducted and the empirical analysis showed that private investment growth and its determinants considered (i.e. public investment growth, real gross domestic product, real interest rate, real effective exchange rate, trade openness, political instability, and corruption) are co-integrated. Hence, an error correction model (ECM) developed by Coutinho and Gallo (1996) was then estimated. The model passed all the required diagnostic tests including model stability. Besides, the error correction coefficient estimated -0.964 is highly significant which further confirmed the existence of a stable long-run relationship among the data series. According to the estimation, the major findings of the empirical models revealed that public investment growth has a crowding-out effect on private investment growth in short run but crowding-in effect in long run whereas growth of real gross domestic product has a positive and significant effect on private investment growth both in the short-run and long run.

Another macroeconomic variable real interest rate is found to have significant and positive impact on private investment of Ethiopia in the short run but it has a negative and significant impact on private investment growth in long-run. In addition, real effective exchange rate has a negative and significant impact on private investment growth while trade openness is totally insignificant in both short run and long run. Further, in this study, the researcher ascertained that private investment growth is not only determined by macroeconomic factors but also by political and institutional factors. The estimation result revealed that political instability has a positive and significant impact on private investment growth in short run while corruption has a negative and significant impact. However, in the long run, political instability and corruption are both insignificant.

After all, under the study period, the implication of the study was that private investment performance in Ethiopia is not only determined by macroeconomic factors but also by governance or political and institutional factors such as political instability and corruption. The descriptive analysis also shows as private investment is determined by geographical location.

We recommend the following from our result. Firstly, it is essential to take measures that can improve real income of people which in turn induces market demand. Secondly, government should make public investment in basic infrastructures (like road, electricity, water, education, health) and institutions that are crucial to attract private investment by taking into account its crowding-out effect. Thirdly, devaluation is not a long lasting solution to encourage private sectors to invest more; rather it may have negative impact by increasing the cost of imported capital and intermediate goods used in production and by reducing the domestic demand for domestic products. Hence, the researcher suggests the exchange rate policy that will be favorable to reduce the cost of imported capital goods and the government should look inward for the supplying of raw materials which locally promotes investment in the area where the required raw materials are available locally.

Fourthly, political instability characterized by collective and non-violent protests, riots, government demonstrations, constitutional government change, and regime type instability may stimulates and promotes the flow of private investments since they signal the need for economic, political, and market oriented reforms and leads to a gradual policy readjustments. However, violent uprisings, wars, ethnic tensions which are outside of government control can hinder private investment growth. Hence, the government should create stable investment environment for private sectors. Lastly, as indicated in the descriptive part, investment growth remained low in performance because of governance problems including corruption which is a disincentive for investors. The estimation result also revealed that corruption has a negative impact on private investment performance. Hence, the government should address institutional inefficiencies and poor governance problems (including corruption) that are necessary to build up long- lasting confidence of private sectors.

Consent for publications

The authors confirm that the content of the manuscript has not been published, or submitted for publication elsewhere.

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