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Effect of Foreign Direct Investment on Private Domestic Investment in Ethiopia

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Abstract: This study examines the effect of foreign direct investment (FDI) on private domestic investment in Ethiopia. This study employed annual time-series data from 1990 to 2019 for gross fixed capital formation, real gross domestic product, exchange rate, inflation, and foreign direct investment (FDI). This study adopted an autoregressive distributed lag (ARDL) approach and other econometric tools of analysis to answer the objectives set out in this study. The Augmented Dickey–Fuller test, Phillips–Perron unit root test, and bounds test method of cointegration employed indicate that the series used in the model are all stationary, with a unique long-run relationship established among the variables. The study also establishes an inverse relationship between FDI and private domestic investment within the period under reference. Using econometric procedures, the ADF unit root test revealed that some variables were integrated into the first difference. The ARDL test indicated the existence of long-run relationships among the variables. When testing for causality using the Granger causality test, the results obtained indicate that there is a unidirectional relationship between FDI and private domestic investment in Ethiopia, meaning that FDI causes private domestic investment in Ethiopia, while private domestic investment does not cause foreign direct investment. Based on the findings, the following recommendations were made: First, the concerned body should put in place policy with respect to domestic investment, and there must be safety measures to protect domestic investors from falling out of business and domestic investment promotion measures that will stimulate domestic firms' investment. Second, in an attempt to control the birr exchange rate since it does have bearing on inflation, the government should put in place an enduring framework to strike the risk of domestic producers for them to take innovative domestic investors that will have a competitive advantage with foreign investors.

Keywords: ARDL, Foreign Direct Investment, Gross Fixed Capital Formation, Real Exchange Rate, Real GDP

1. Introduction

1.1. Background of the Study

In light of this, the presence of an organized and well-structured economy is critical to the growth of domestic investment in any country. Various policies have been implemented in Ethiopia to aid economic growth and development by regulating the amount of domestic investment or indirectly via policies designed to reduce capital flight in the economy. Domestic investment is a tool for unimpeded effective economic systems and serves as an important factor that influences the economic growth of most economies worldwide. Essentially, domestic investment is the size of physical investment used in calculating the gross domestic product (GDP) of a country's economic undertakings [1]. This is a pertinent element of GDP because it is an indicator of the future productive capacity of the economy. Many policy makers in developing countries or the fourth world have found domestic investment to be a major constraint in policy making and implementation. Earlier studies [2] indicate that domestic investment has important implications for the economy by increasing the potential growth and development of a country.

Key encounters in Ethiopia support positive economic growth and accelerate poverty reduction, both of which necessitate significant advancements in job creation and improved governance. The government is dedicated to a high share of its budget

for pro-poverty programmes and investments. Large-scale donor provision will continue to provide a vital contribution in the near term to finance the cost of pro-poor programmes. The key challenges are related to limited competitiveness, which constrains the development of manufacturing, the creation of jobs, and an increase in exports. The underdeveloped private sector limits a country's trade competitiveness and resilience to shocks. The government aimed to increase the role of the private sector through foreign investment and industrial parks to increase Ethiopia's growth momentum. Political disruption associated with social unrest could negatively impact growth through lower foreign direct investment, tourism, and exports.

1.2. Statement of the Problem

Some scholars, such as [49],[17], and [6], find that foreign direct investment crowds private domestic investment. Conversely, crowding-out effects have been found by [56], and [44) found that increases in FDI crowd out domestic investment. Numerous researchers find mixed evidence when using several lags for FDI or when splitting the country sample according to [43], [46], [2], [8] or even find no effect of FDI on domestic investment [42] or [48]. FDI may crowd out domestic investment if, instead of augmenting capital accumulation in the recipient country, it displaces domestic investors through channels such as competition in the product market or financial market or via superior technology that has thus far discredited various FDI theories, suggesting that the inflow of FDI to the developing world is necessarily associated with a rise in gross capital formation. FDI has a neutral effect on domestic investment if it brings a one-for-one increase in total investment in the host economy. The study by [8] confirm a bidirectional relationship between FDI and investment, and FDI has been found to crowd investment in Africa and Asia. [19] investigate the macroeconomic determinants of investment in Nigeria. The results show that inflation, the exchange rate, the debt burden, coup d'état, and political crises negatively influence investment. [7] used a multivariate cointegration technique to assess the long-run relationships between private domestic investment, public investment, and FDI in Malaysia from 1960 to 2003. The results reveal the existence of a long-run relationship between the variables and that public investment and FDI appeal have complementary effects on private investment. As [50] study indicates that the benefits of FDI tend to be maximized when foreign investors operate in an even and competitive environment. Free entry also encourages the establishment of effective linkages between foreign investors and domestic buyers or suppliers so that best practices can be diffused in the economy. Investment is one of the most important measures used to explain economic growth and cycles; however, it is one of the most difficult variables to model satisfactorily. [5] shows that FDI crowds out domestic private investments. [4) found bidirectional causality between gross fixed capital formation and foreign direct investment. This also indicates the displacement effect of FDI on domestic investments. In view of this, the need to study the effect of foreign direct investment on domestic investment in Ethiopia is vital for guiding the government, as well as indigenous financiers, in creating additional domestic investments to stimulate economic growth. This served as the motivation for the current study. Introducing different variables and effects into investment theory and equations in empirical studies is one of the most promising areas of research. Few studies have examined the association between FDI and domestic investment. However, the results of these studies were contradictory and led to controversies over the effects of FDI and the exchange rate on domestic investment. Thus, an inconclusive relationship between these two variables is a research gap.

1.3. Research Question

The research attempts to answer the following basic questions:

1. What do the trends of foreign direct investment and domestic investment look like in Ethiopia?
2. What impacts has foreign direct investment had on domestic investment in Ethiopia?
3. What is the causal relationship between FDI and domestic investment in Ethiopia?

1.4. Objectives of the Study

The general objective of this study is to examine the short- and long-term effects of FDI on domestic investment. Specifically, the study aimed to achieve the following objectives:

i. To assess the foreign direct investment and domestic investment trends.
ii. To analyse the effect of FDI on domestic investment in Ethiopia.
iii. To examine the direction of causality between FDI and domestic investment in Ethiopia.

1.5. Significance of the Study

This work provides an in-strength awareness of the workings of FDI and its wrinkle effect on domestic firms in these countries. In summary, this approach will assist the government in designing or having a second appearance in the FDI policy structure to ensure that any negative effect of foreign investment on the domestic economy is reduced before it is too late. Additionally, domestic investors and other stakeholders will benefit from the information revealed in this work to adapt to the necessary measures and techniques to ensure longevity in the market if FDI is causing a substitutability effect or complementarities effect. A proper understanding of the impact of FDI on the domestic market will better equip both local and foreign investors with initiatives to improve all of them. Equally, this study could set off the mark for further research into the effect of FDI on other

macroeconomic variables or on this same variable to bring on the table other potential factors that may be in play. This study is also highly important for macroeconomists, financial analysts, academicians, policy makers, and central bankers in understanding the impact of FDI on domestic investment and thus for developing relevant policies to maintain a reasonable rate of foreign direct investment that stimulates production.

1.6. Study Scope

This study was conducted based on the availability of data. This study covered the period from 1990-2019 G. C. The overall scope of the study was only for the last 29 years. This study focuses on analysing the impact of FDI on domestic investment in Ethiopia at the national level over the period 1990–2019. Therefore, time series data were used in this study.

1.7. Organization of the Study

The study is organized into five parts. The first chapter introduces the study. In this section, the background of the study, statement of the problem, objectives of the study that the paper needs to achieve, hypotheses regarding the topics, and scope of the study are presented. The second chapter contains different studies on this topic. The definitions of the different terms used in the study, the opinions of different schools of economics about FDI and private domestic investment, and different empirical evidence from both the rest of the world and Ethiopia are revised. The third part explains the model's specifications and methodology. In this section, the different theoretical empirical methodologies used in the analysis and their justifications are presented. The fourth part analyses and discusses the results. The final section presents the conclusions and implications of the study.

2. Research Methodology

2.1. Research Design

This study used annual time-series data for the period from 1990 to 2019. The study sourced data on growth fixed capital formation (proxy for domestic investment), foreign direct investment as a percentage of GDP, the exchange rate as a percentage of the real exchange rate, and trade openness as the sum of exports and imports as a percentage of GDP from World Development Indicators. The other control variables used in the study were external debt and interest rates, all sourced from the World Bank. Eviews-9 software was used to analyse the data because it is more suited for analysing timeseries data compared to STATA and SPSS. The data analysis was presented in graphs, charts, and Tables.

2.2. Model Specification

This study adopted the [10] model and modified it to incorporate the exchange rate, FDI, interest rate, and trade openness as the independent variables. We assume that there are linear relationships between foreign direct investment and the exchange rate and between foreign direct investment and domestic investment.

The model is specified as follows:

$$GFCF = (FDI, RGDP\ RER, TOP, INTR \quad (1)$$

Therefore,

$$GFCF = \beta 1\ FDI + \beta 2\ RER + \beta 3TOp + \beta 4INTR + \beta 5RGDP + \beta 6INFL + \mu \quad (2)$$

where GCF is the growth fixed capital formation

$$GFCF = f\ (RER, FDI, INTR\ TOP, RGDP, INFL) \quad (3.1)$$

where GFCF=gross fixed capital formation (%gdp)
RER, =real exchange rate
FDI=foreign direct investment (%gdp)
INTR =Interest rate
TOP=Trade openness
RGDP=real gross domestic product
INFL=Inflation

To examine the relationships between FDI and exchange rate and between FDI and domestic investment, we used multiple regressions, where the dependent variable (GFC) was regressed against the independent variables (FD, RER, INTR, and TOP). This model is specified as follows: The model is transformed into a log-linear form, which is expressed as

$$LNGCF = a + \beta 1\ FDI + \beta 2RER + \beta 3\ INTR + \beta 4TOP + \beta 5RGDP + \beta 6\ INFL + \varepsilon t \quad (3.2)$$

β represents the parameters of the independent variables, *a* constant and *εt* the error term.

2.3. Estimation Procedure

The methodological approach of the study included the following steps:

First, we test the stationarity of the individual series in the regression model or otherwise to determine the order of integration of the variables. Second, we test for the existence of a stable long-run equilibrium relationship between the variables. Third, we estimate the parameters of the model. To estimate the equation, the stability properties of the variables employed were first investigated. Two-unit root tests, that is, the augmented Dickey–Fuller (ADF) test and Phillips–Perron (PP) test, will be used in the study. The choice of the two unit roots is informed by imperatives of comparison and consistency. According to Hamilton (1994), the PP unit root test is generally considered to have greater reliability than the ADF because it is robust in the midst of serial correlation and heteroscedasticity, although it has its own shortcomings.

2.4. Unit Root Testing (Stationary Test)

Time-series data were tested for stationarity. To perform unit root tests for the variables real exchange rate, foreign direct investment, interest rate, trade openness, and domestic investment, this study used the augmented Dickey–Fuller (ADF) technique and the Philipherron test. These tests were concurrently employed to obtain robust results.

2.5 Estimation Techniques and Modelling Approach

After the unit root tests, the next step is to use the ARDL approach developed by Pesaran et al. [36] to investigate the long-term relationships between the variables. Variables in the time series examination are categorized as cointegrated if they exhibit a long-run equilibrium relationship and share common trends. Considering the nature of the study, it is relevant to employ autoregressive distributed lag (ARDL) bounds testing following [36] and [36]. This method is based on the assessment of an unrestricted error correction model (UECM), which has several advantages over conventional cointegration techniques. First, it can be applied to studies with small sample sizes. Second, it estimates both the short- and long-run components of the model simultaneously, removing problems associated with autocorrelation and omitted variables. Third, the standard Wald of F-statistics used in the bounds test has a nonstandard distribution under the null hypothesis of no cointegration relationship between the examined variables, irrespective of whether the underlying variables are I(1), I(0), or fractionally integrated [36]. Fourth, this technique generally provides unbiased estimates of the long-run model and valid t-statistics, even when some regressions are endogenous.

The ARDL models that will be used in this study are indicated equation below

$$\Delta LNGCF_t = B_{o+}\sum_{i=1}^{p} ai\,\Delta lnGCF_{t-1}+\sum_{i=1}^{q}\emptyset\, i\,\Delta lnFD_{t-1}+\sum_{i=1}^{r}\partial i\Delta RER_{t-1}+\sum_{i=1}^{n}\forall i\Delta iINTR_{t-1}$$
$$+\sum_{i=1\propto_i}^{m}\Delta lnTO_{t-1}+B_1 lnGCF_{t-1}+B_2 lnFD_{t-1}+B_3 RER+B_4 lnTO_{t-1}+B_5 INTR_{t-1}+e_t \quad (3.3)$$

where $B_o, ai, \partial i, \forall i, \propto_i, \emptyset_{i,} B_{1,} B_2, B_3, B_4, B_5$ are parameters to be estimated and e_t is assumed to be a white noise error. The test for cointegration using the bound test approach is based on the Wald test.

The F-statistic of the Wald test was compared with two sets of critical value bounds developed by Perasan et al. (2001). H0 is rejected when the F value is greater than the upper bound, and the conclusion is that a long-run relationship exists between the variables. If the F value is less than the lower bound, H0 is accepted, with the conclusion that there is no long-run relationship between the variables. The F test statistic was used to check for the existence of long-term equilibrium among the variables under study. The null hypothesis for no cointegration among the variables is represented as H0: $\beta 0 = ai = \partial i = \forall i = \propto_i = \emptyset_{i=} 0$, while the alternative hypothesis is represented by H1: $\beta 0 \neq ai \neq \partial i \neq \forall i \neq \propto_i \neq \emptyset_{i,} \neq 0$. The F-statistic is a nonstandard test that relies on whether the variables included in the model are integrated of order zero I(0) or integrated of order one I(1), the number of regressors, and whether the model contains a trend and/or an intercept. The test encompasses the use of critical value bounds, which depend on the order of integration of variables. Thus, I (0), I (1), or a mixture of both. Two sets of critical values (i.e., I (0) and I (1) series) were generated. The lower-bound critical values are the terms used to classify the critical values generated for the I(0) series, while the critical values for the I(1) series are referred to as the upper-bound critical values. The rule is that if the computed F-statistic falls below the lower bound value I(0), the null hypothesis (no cointegration) will not be rejected. Otherwise, if the computed F-statistic exceeds the upper bound value I(1), the null hypothesis is rejected, which indicates that there is cointegration. If the computed result falls between the lower and upper bounds, the test is inconclusive. This is in line with [36] who suggested that, in the case of inconclusive reports, investigations may be based on short-term analysis.

2.5.1. Error Correction Model

After the cointegration test, the long-run relationship among the variables is established using the ARDL test for cointegration. The error-correction models (ECMs) within the ARDL framework were estimated to obtain the short- and long-term relationships among the economic variables under study.

A generalized form of the ECM within the ARDL framework is represented below, which also allows for the introduction of optimal lags for both the dependent and explanatory variables. Thus, various variables are allowed to have their optimal speed of adjustment to the equilibrium. The error correction version of the ARDL model pertaining to the variables in equation (2) is as follows, where∪ is the speed of adjustment parameter and EC is the residual obtained from the estimated cointegration model of the equation.

$$\Delta LNGCF_t = B_{o+} \sum ai\, \Delta lnGCF_{t-1} + \sum \emptyset\, i\, \Delta lnFD_{t-1} + \sum \partial i \Delta RER_{t-1} + \sum_{i=1}^{n} \forall i \Delta intr_{t-1} + \sum_{i=1\propto_i}^{m} \Delta lnTO_{t-1} + \cup EC_{t-1} + e_i \qquad (3.4)$$

where $LNGCF$ is the dependent variable, the others are vectors of explanatory variables, t represents the time trend, and e represents the error term. Here, $B_o, B_1, B_2, B_3, B_4, B_5$ and ∂i represent the long-run coefficient estimators, a $ai, \partial i, \forall i, \propto_i, a$ and $\emptyset_i$, represent the short-run dynamic coefficients, ∪ represents the speed of the adjustment parameter, and the error correction term represents the error correction term.

2.5.2. Lag Selection Criteria

To carry out ARDL estimation, the choice of lag length is vital. There are various lag length criteria, including the Akaike information criterion (AIC), the sequential modified LR test statistic with each test at 5%, the final prediction error (FPE), the Schwarz information criterion (SC), and the Hannan–Quinn information criterion (HQ). However, each of these methods has different penalty factors. Therefore, for the purpose of this study, we limited the selection to the Akaike information criterion (AIC) and the Schwarz information criterion (SC).

2.5.3. Stability test

According to Pesaran and Shin (1998), the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) were employed to perform parameter stability tests. The stability of the model and the coefficients should be tested using CUSUM and CUSUM-Q, although the graphical representation of the recursive coefficients is used to judge the stability of the coefficients.

2.5.4. Diagnostic tests

The model that was used for testing the long-term relationships and coefficients was further tested with diagnostic tests of normality, serial autocorrelation, heteroscedasticity, and any model misspecifications. A test was performed to test the robustness of the results from the ARDL model.

2.6. Granger Causality Model

This study adopted the multivariate vector autoregressive (VAR) model to determine the causal relationship between FDI and real GDP and between FDI and private domestic investment.

$$GCF_t = a_{0+\sum_{i=1}^{q} a_i} GCF_{t-i} + \sum_{j=1}^{q} c_j FD_{t-j} + e_{1t} \qquad (3.5)$$

$$FD_t = B_0 + \sum_{i=1}^{q} B_i\, FD_{t-i} + \sum_{j=1}^{q} a_i\, GCF_{t-i} + e_{2t} \qquad (3.6)$$

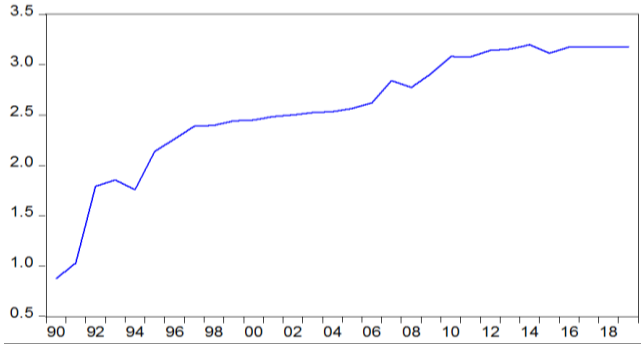
$$RER_{t=} a_0 + \sum_{i=1a_i}^{q} RER_{t-i} + \sum_{j=1C_j}^{q} GCF_{t-j} + e_{1t} \qquad (3.7)$$

$$GCF_t = B_0 + \sum_{i=1B_i}^{q} FD_{t-i} + \sum_{j=1a_j}^{q} RER_{t-j} + e_{2t} \qquad (3.8)$$

3. Analysis of Data and Discussion of Empirical Results

3.1. Domestic Investment Trend in Ethiopia"

LNGFCF



Source: Author's computation

Figure 1. *Private domestic investment trend graph.*

3.2. Foreign Direct Investment Trend in Ethiopia"

Figure 2 shows the percentages (%) in Ethiopia from 1990–2019. In the years 1992-1997, the FDI rate increased by 3.36% but decreased by 1.6% in 1998-2000. From the data below, we can conclude that foreign direct investment in Ethiopia sometimes increases or decreases; that is, it fluctuates nonlinearly.

FDI

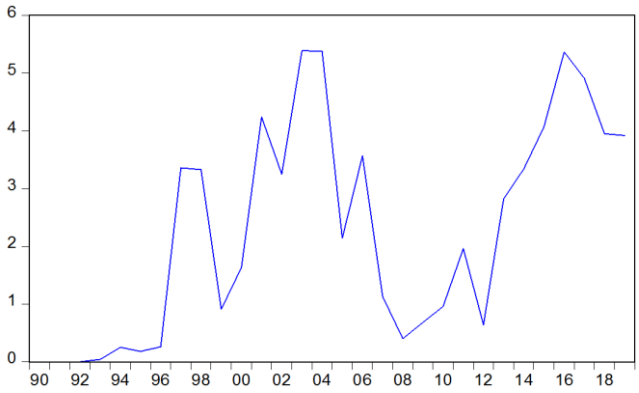


Figure 2. *Foreign Direct Investment Trend Graph.*

3.3. Econometric analysis

3.3.1. ADF and PP Unit Root Tests

Earlier execution of the ARDL bounds test and the stationarity properties of all variables in the model are determined to determine the order of integration for each variable. This is a compulsory step to confirm that the variables are not second-order stationary (i.e., I(2)). Pesaran et al. (2001) argue that these findings are not valid in the presence of I(2) variables because the bounds tests are based on the assumption that the variables are either I(0) or I(1). Accordingly, the use of unit root tests in the ARDL method may still be required to ensure that none of the variables are integrated of order two or more. The results of the ADF unit root tests were tabulated.

Table 1. *Augmented Dickey Fuller test results.*

Variable	At Level			At First Difference		
	Intercept	intercept and trend	none	intercept	intercept and trend	None
LNGFCF	−5.223948 *	-5.703810	-1.282809	-5.547781	-5.397205	-5.696591
FDI	3.078193	-0.622489	3.82405	−4.704595 *	-5.559325	0.581662
INFL	-1.593241	-2.167731	-0.378351	−3.967378*	-3.965843	-4.050990
LNRGDP	−3.543047*	-3.475240	0.197224	-5.584969	-5.612381	-5.579231
LNTOP	−4.223948 *	-5.700080	-4.001328	-13.59244	-12.93452	13.94794
LNRER	-1.593241	-2.167731	-0.378351	−3.967378*	-3.965843	-4.050990
LNINTR	2.085534	- 1.791866	0.276206	-2.103412	-2.308724	−2.081487*

* indicates significance at the 5% level

Source: Author's computation from E-views 10

Table 2. *Phillips-Perron (PP) Unit Root Tests at Level and at First Difference.*

Variable	At Level			At First Difference		
	Intercept	intercept and trend	none	intercept	intercept and trend	None
LNGCF	6.119077	-0.172321	3.824058	-4.704595 *	-6.095208-	3.248055
FDI	2.085534	- 1.791866	-7.967378*	-6.175456	-2.308724	-2.081487*
LNRER	2.085534	- 1.791866	0.276206	-2.103412	-2.308724	-2.081487*
INFL	-5.223948 *	-5.700080	-4.001328	-4.967378*	-12.93452-	13.94794
LNRGDP	6.119077	-0.172321	3.824058	-4.704595 *	-6.095208-	3.248055
LNTOT	-1.593241	-2.167731	-0.378351	-3.967378*	-3.965843	-4.050990
LNINTR	-3.532719*	-3.460233	0.260202	-5.584969	-5.596944	-5.579231

*indicates significance at the 5% level

The results from the augmented Dickey Fuller and Phillips-Perron tests indicate that gross fixed capital formation, real gross domestic product, trade openness, and the real exchange rate are integrated into order one I(1), while the foreign direct investment rate and interest rate are integrated into order zero I(0). Having determined that the order of integration of the variables retained in the model is either 0 or 1, the ARDL bounds test can be simply applied to determine the cointegration relationships among the variables in the model.

Table 3. *VAR order lag selection criteria*

Lag	LogL	LR	FPE	AIC	SC	HQ
1	6.346708	NA	1.11e-07	3.708982	6.128078	4.317378
2	101.3566	74.35560*	6.96e-09*	-0.291882*	4.546310*	0.924910*

AIC: Akaike information criterion
SC: Schwarz information criterion

According to [36] as, yearly data are suggested for choosing a maximum of two lag lengths. Thus, the lag length that minimizes the AIC is 2. Hereafter, the AIC is used to determine the optimal lag because it is a better choice for smaller sample sizes. Furthermore, the AIC was found to produce the lowest probability of underestimation among all available criteria [40]. The model that minimized the AIC was chosen automatically by Eview 10, as shown in table 3 above.

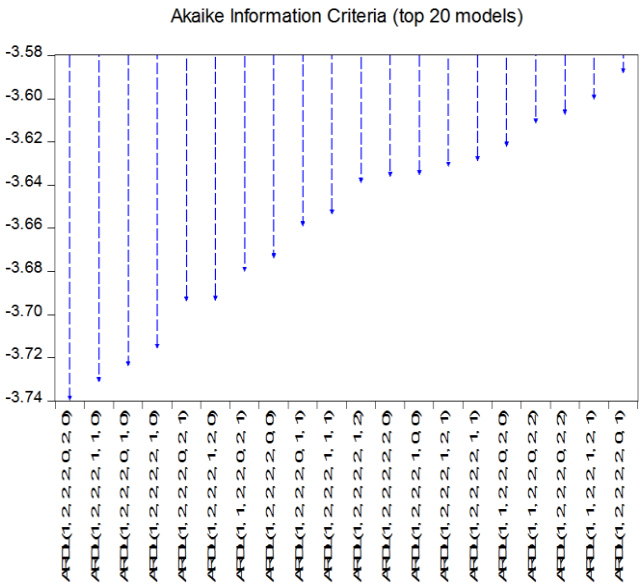


Figure 3. *Akaike Information Criteria Model Selection.*

3.3.2. ARDL Cointegration Results

To test whether a long-term relationship exists between private domestic investment and foreign direct investment, this study used autoregressive distributed lag (ARDL). The results of the bound test for cointegration in Table 4a indicate that the null hypothesis is rejected because the F-statistic (14.56266) is greater than the upper bound value (3.28) at a 5 percent critical value. This indicates the existence of a long-term relationship between private domestic investment and foreign direct investment in Ethiopia. A similar study conducted by [44] showed that a long-run equilibrium relationship between private domestic investment and foreign direct investment exists. The coefficients of the variables were statistically significant, as shown in Table 5. The

results demonstrate that there is a long-run relationship among the variables and that inflation, external debt, and economic growth have negative impacts on unemployment, while the interest rate has a positive impact on unemployment.

As seen clearly in the bound test results in Table 4, the calculated F statistic (11.56) is greater than the Pesaran lower bound at the I0 (10%, 2.5%, and 5%) significance level and less than all I1 significance levels and the 10% significance level of I0. This finding implies that the null hypothesis of no long-term relationship is rejected; therefore, there is evidence of a long-term relationship among the variables in equation (5).

Table 4 *F bound test - null hypothesis: no long-term relationship.*

Test Statistics	Value	Signif.	I(0)	I(1)
F	11.56266	10%	1.99	2.94
		5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99
K	6	10%	1.99	2.94

Table 5. *Long-Run Coefficient of ARDL When Private Domestic Investment Dependent Variable (2, 0, 0, 2, 2) Model.*

Variable	Coeff.	Std. error	T statistic	Prob
LNRGDP	0.719607	0.047015	15.305885	0.0000***
LNINR	-1.090925	0.230215	-4.738726	0.0021**
LNRER	-0.761565	0.217115	-3.507659	0.0099**
FDI	-0.140436	0.017670	-7.947611	0.0001***
INFL	-0.007545	0.002645	-2.852503	0.0246*
LNTOT	0.113573	0.204875	0.554351	0.5966

EC=LNGFCF - (0.719607*LNRGDP -0.761565*LNRER -0.140436*FD -0.007545
*INFL + 0.113573LNTOP -1.090925*LNINR -3.0120)

There are statistically negative relationships between foreign direct investment and private domestic investment and between foreign direct investment and the real exchange rate, confirming [31]. The results show that an increase in FD by 1 percent leads to a 0.19 percent decrease in private domestic investment, which is insignificant. The inflation rate has a negative effect on private domestic investment. The results show that a 1 percent increase in the inflation rate leads to a 0.005356 percent decrease in the private domestic investment rate. The real exchange rate also has a negative effect on domestic private investment. Real growth in domestic products, trade openness, and interest rates have positive effects on private domestic investment.

Table 6. *Error Correction Representation of the ARDL When Private domestic investment Depentvariable (2, 0, 0, 2, 2) Model.*

Dependent variable: LNUNMPL				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(LNRGDP)	0.282412	0.068572	4.118483	0.0045**
D(LNRGDP(-1))	-0.063706	0.079982	-0.796501	0.4519
D(LNINR)	-0.209258	0.184676	-1.133106	0.2945
D(LNINR(-1))	-0.462635	0.077772	-5.948580	0.0006***
D(LNRER)	-0.088403	0.154668	-0.571565	0.5855
D(FDI)	-0.032171	0.008067	-3.988198	0.0053**
D(FDI(-1))	0.036194	0.008928	4.054001	0.0048**
D(INFL)	-0.006324	0.001606	-3.938553	0.0056**
D(LNTOT)	0.521803	0.114986	4.537974	0.0027**
ECT(-1)	-0.656642	0.109522	-5.995535	0.0005***

Cointeq=LNGFCF - (0.7196*LNRGDP -1.0909*LNINR -0.7616*LNRER
-0.1404*FDI -0.0075*INFL + 0.1136*LNTOT -0.1229)

Table 6 shows the short-term coefficient results. In the short run, foreign direct investment has a positive impact on the private domestic investment rate, which is in line with Kamaly (2014), who found a positive short-run relationship between foreign direct investment and private domestic investment. Similarly, the interest rate, real exchange rate, economic growth rate, and inflation rate have negative effects in the short run. The results show that an increase in foreign direct investment and an exchange rate of 1 percent lead to a 0.05 percent increase and 1.23 percent decrease in the private domestic investment rate, respectively. The R2 is 0.94, meaning that a 94% change in private domestic investment is explained by FDI, the interest rate, the exchange

rate, the interest rate, and economic growth.

The Error Correction Term (ECT) measures the speed of adjustment toward equilibrium after the initial deviations are corrected. The ECT coefficient is -0.646935 and is significant at the 5% level. This indicates that 64.6% of the disequilibrium due to the shock in the previous years is adjusted back to the long-run equilibrium in the current year.

3.4. Granger Causality Test Analysis

In many studies examining causality, Granger causality tests have been the most commonly used method. Based on the results presented in Table 7, hypothesis (a) (was rejected at the 5% level of significance because the p values were less than 0.05. However, the second null hypothesis was not rejected at the 5% level of significance because the p value was greater than 0.05. This means that during the study period, there was unidirectional causality between FDI and private domestic investment because the null hypothesis that FDI Granger causes private domestic investment was not rejected. This finding indicates that causality between foreign direct investments Granger causes private domestic investment at the 5% level of significance, meaning that foreign direct investments Granger cause private domestic investment. These results show that, within the study sample, unidirectional causality runs from FDI to private domestic investment.

Table 7. *Pairwise Granger Causality Tests.*

Null Hypothesis:	Obs.	F-Statistic	Prob.
FDI does not Granger Cause LNFGCF	23	4.35942	0.0200
LNFGCF does not Granger Cause FDI		0.22310	0.8789

3.5. Diagnostic Checking Results

As a result of several problems related to long-term estimation, a number of post diagnosis tests, such as normality, heteroscedasticity, and stability tests, were conducted. To test whether the model has no problem and whether the OLS assumptions have been violated, diagnostic tests, including the normality test, serial correlation test, heteroscedasticity test, and correct specification test, were performed.

Multicollinearity test: The pairwise correlation matrix and variance inflation factor were employed to test whether multicollinearity existed among the explanatory variables. The results are presented in Appendix 1. The results indicate that none of the variables were strongly correlated. Jarque–Bera test: The normality of the data can be checked through the Jarque–Bera test. Jarque-Bera statistics follow a chi-squared distribution. The results were as follows: Prob Chi =0.6593> α=5% or 0.05. Therefore, the null hypothesis cannot be rejected; instead, it is accepted. Therefore, it was concluded that the error term of the model was normally distributed. Ramsey RESET tests: The regression specification error test suggested by Ramsey is used to check for important variables that are not included in the model. This means that it was used to check whether the model was correctly specified.Breusch–Godfrey test: The results were as follows: Prob> F=0.7779, which was >α=5% or 0.05. Therefore, the null hypothesis of the model is correctly specified and cannot be rejected; instead, it is accepted. Therefore, the conclusion of the test is that the model is free from misspecifications.

Table 8. *Diagnostic test results*

TEST	NULL Hypothesis	TEST Statistic value	probability value
Ramsey Reset	No omitted variables	0.091738	0.9299
Breusch pagan test	No Heteroscedasticity	0.458721	0.9028
Jargue- Bera Test	Normally Distributed	0.832872	0.6593
Breusch- Godfrey test	No serial correlation	0.26419	0.7779

Therefore, the null hypothesis of no correlation y cannot be rejected; rather, it is accepted. Therefore, the conclusions of the test indicate that the model is free of serial correlations. Breusch–Pagan test: Heteroscedasticity in a multiple linear regression model can be checked using the Breusch–Pagan test. The hypothesis for this test was as follows: Prob> chi2=0.9028, which is >α= 5% or 0.05. Therefore, the null hypothesis is not rejected. This conclusion is free of heteroscedasticity. The results of the diagnostic tests are presented in Table 8. According to the results, the null hypothesis that there is no serial correlation was not rejected at the 5% level of significance since the p value (0.8526) is greater than 0.05.

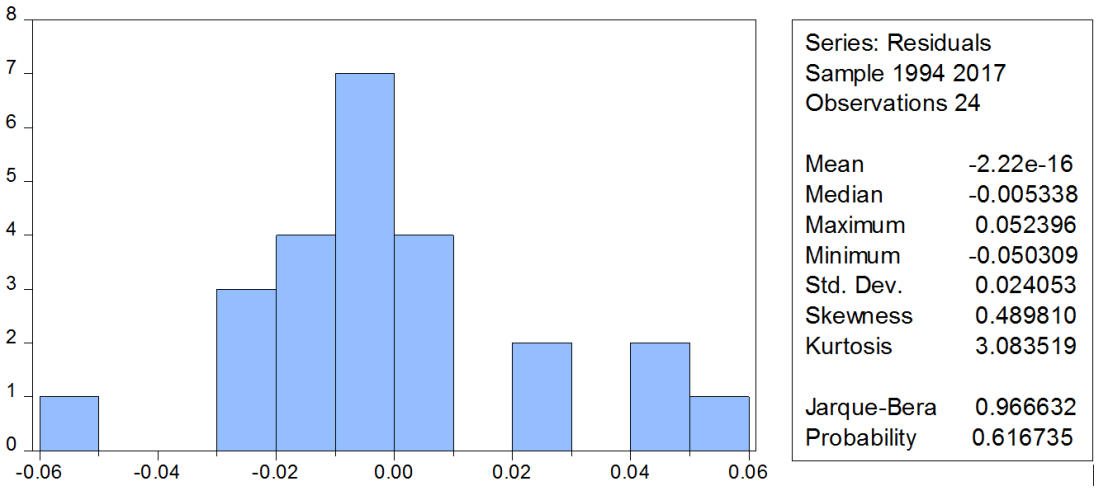


Figure 3

Similarly, the null hypothesis that there was no heteroscedasticity was not rejected at the 5% level of significance since the p value (0.3621) was greater than 0.05. Additionally, the Jarque–Bera test showed that the residuals were normally distributed since the null hypothesis was not rejected at the 5% level of significance, and the p value of the Jarque–Bera statistic (0.6593) was greater than 0.05. In addition, Ramsey's RESET shows that the model is correctly specified since the p value (0.2284) of the F-statistic is greater than 0.05.

3.6. Diagnostic test model for the ARDL model

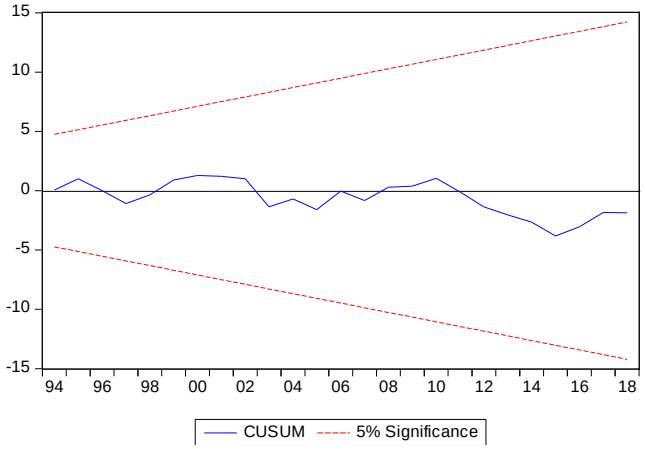


Figure 4. *CUSUM Curve.*

The stability of the model for long- and short-run relationships is distinguished by using the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) tests. Pesaran and Shin (1997) suggested that the structural stability of long-term and short-term relationships for the fourth full period be better tested by the cumulative sum (CUMSUM) and the cumulative sum of squares (CUMSUMSQ) of the recursive residual test, as proposed by Brownetal (1975), to assess the consistency of a given parameter. The null hypothesis of these tests is that the regression equation is specified correctly. The cumulative sum goes outside the area (never returns) between the two critical lines. Graphical representations of CUSUM and CUSUM squares are shown in Fig. 4 and 5 null hypotheses (i.e., that the regression equation is correctly specified) cannot be rejected if the plot of these statistics remains within the critical bounds of the 5% significance level. This graph shows the long-term stability of the model because the test statistics are within the bounds of the model at the 5% significance level. Figure 4 and 5 show the plots of both CUSUM and the CUSUM squared. These statistics confirm the long-term stability of the TSVR. Coefficients of regressors.

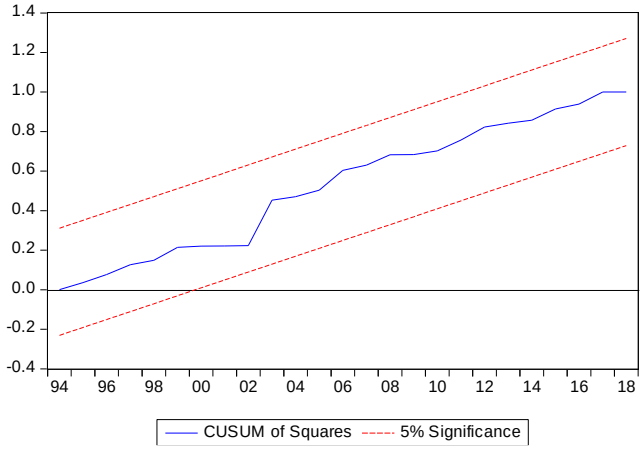


Figure 5. *CUSUM of the Square Curve.*

The CUSUM and CUSUMQ data are within the critical values at the 5% significance level, which means that all the coefficients in the ECM are stable. The straight lines represent the critical bounds at the 5% significance level. In conclusion, the model stability test using cumulative sum (CUMSUM) and (CUMSUMSQ) control plots also confirmed that the null hypothesis of parameter stability cannot be rejected at the 5% critical bound. Thus, the parameters of the estimated savings model did not suffer from structural instability during the study period.

4. Conclusions and Policy Recommendations

4.1. Conclusions

Establishing a relationship between foreign direct investment and private domestic investment has therefore been fundamental to policymakers in different countries. However, there is no agreement on whether FDI is beneficial or detrimental to private domestic investment in developing countries. Given this scenario, there is a need to establish a relationship between FDI and private domestic investment in Ethiopia. This study investigates whether foreign direct investment affects private domestic investment in Ethiopia. Therefore, this study primarily attempts to investigate the empirical relationship between FDI and private domestic investment in Ethiopia by applying the ARDL bounds test model to examine both the long- and short-term effects on the variables of interest. The study used the Philip-Peron (PP) and augmented Dickey–Fuller (ADF) unit root tests to confirm that all the variables were integrated of order I [0] or [1]. To ensure that long- and short-run dynamics exist in the variable of interest, we ratify using the variable addition test in which the F-statistics exceed the calculated value of Pesaran et al. (2001). This finding indicates the presence of both long- and short-term dynamics. All the models passed the diagnostic test by confirming that the model passed all the problems associated with the ARDL model in the time series, such as serial correlation, functional form, normality, and heteroscedasticity. Similarly, the model permits a stability test by confirming that the cumulative sum of recursive residuals (CUSUM) is significant at the 5% level. The Durbin–Watson test for serial correlation, the Breusch–Pagan test for heteroscedasticity, and the Jarque–Bera test for normality were employed to test the reliability of the goodness of fit of the model. It also determines the extent to which foreign direct investment, the real exchange rate, the interest rate, inflation, and the economic growth rate affect private domestic investment. The bounds test confirms the existence of long-run relationships between FDI, the exchange rate, and private domestic investment in Ethiopia. The long-run estimates of the ARDL test indicate a negative and significant relationship between FDI, inflation, the exchange rate, and private domestic investment. Inflation, FDI, and economic growth have negative and statistically significant impacts on private domestic investment in the long run. The interest rate has a positive and significant impact on private domestic investment in the long run. The negative impact of foreign direct investment on private domestic investment is consistent with [48] and [44].

Furthermore, a pairwise Granger causality test is applied to determine the directional causation between private domestic investment and foreign direct investment. The results from the augmented Dickey Fuller and Phillips-Perron tests indicate that gross fixed capital formation, real gross domestic product, trade openness, and the real exchange rate are integrated into order one I (1), while the foreign direct investment rate and interest rate are integrated into order zero I (0). The bounds test confirms the existence of long-run relationships between FDI, the exchange rate, and private domestic investment in Ethiopia. The long-run estimates of the ARDL test indicate a negative and significant relationship between FDI, inflation, the exchange rate, and private domestic investment. Inflation, FDI, and economic growth have negative and statistically significant impacts on private domestic investment in the long run. The interest rate has a positive and significant impact on private domestic investment in the long run. The negative impact of foreign direct investment on private domestic investment is consistent with [48] and [44]. In addition, model stability tests were performed, and the results revealed no evidence of serial correlation, no functional form

problem (the model was correctly specified), a normally distributed residual, and no evidence of heteroscedasticity. To determine the direction of causality, Granger causality was used in the study. The results show that short- and long-run unidirectional causality exists running from FDI to private domestic investment in Ethiopia. The results of the causality test suggest that foreign direct investment does not cause private domestic investment but that private domestic investment Granger causes foreign direct investment.

4.2. Policy Implications

1. The findings reveal that foreign direct investment has a negative impact on private domestic investment in a country, which shows that when the foreign direct investment inflow to the country increases, private domestic investment decreases. Consequently, efforts to attract foreign investment must not dominate those aimed at boosting domestic investment through higher domestic savings. There is sufficient evidence to show that, in the long term, this process by itself is the best strategy for attracting FDI, as foreign investment tends to be strongly attracted to countries that have achieved sustained rates of economic growth and where domestic investment is large enough to generate dynamic and technologically advanced enterprises. It is recommended that the concerned body put in place a policy with respect to domestic investment, and there must be safety measures to protect domestic investors from falling out of business and domestic investment promotion measures that stimulate domestic firms' investment.
2. This study indicates that exchange rates have a negative influence on private domestic investment. Thus, the Ethiopian government should emphasize the exchange rate to increase the private domestic investment rate. Since the real exchange rate is indicated as an indicator of the competitiveness of domestic goods relative to foreign goods, fluctuations in the exchange rate decrease the desire of domestic producers to invest. The government should try to stabilize the real exchange rate to motivate investments in the private sector. Any change in the price index causes instability in the real exchange rate; therefore, the government should implement appropriate policies to reduce the volatility of commodity prices.
3. Since the study revealed a negative relationship between private domestic investment and the inflation rate, the National Bank of Ethiopia should formulate and implement monetary policies that encourage private domestic investments. Regarding the inflation rate, which adversely affects private domestic investment in the country, the government should focus on improving the macroeconomic policy environment that strengthens the economy and builds confidence in the potential of private domestic investors. Thus, necessary steps should be taken to improve inflationary conditions through the adoption of sound fiscal and monetary policies, such as controlling the money supply.
4. This study reveals a negative relationship between interest rates and private domestic investment. Based on these findings, it is recommended that the concerned body stabilize interest rates and that relatively stable interest rates result in increased access to credit for investment.

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