Review Paper

Determinants of foreign direct investment in Ethiopia: an autoregressive distributed lag (ARDL) approach

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Abstract

Foreign Direct Investment plays enormous role in enhancing economic growth, level of employment and technology transfer. Hence, the country persuades the inflow of foreign direct investment mainly by picking up the investment climate and offering various incentive packages to foreign direct investors. However, the performance of foreign direct investment has been declined for the last two years and remained relatively low so far. Therefore, this paper aimed at analyzing the major factors that affect foreign direct investment in Ethiopia by using a 30 years' data ranging from 1989 to 2019. In order to analyze determinants of foreign direct investment, it used an Auto-Regressive Distributed lag (ARDL) model. The finding of the study revealed that real gross domestic product, domestic private investment and credit for private investment determines FDI in the long run while rate of inflation, domestic private investment and public investment determines it in the short run. Hence, besides, to have a bird eyes view on the above mentioned determinants of FDI; to bring sustainable growth, it is important to ensure stable macro-economic indicators and political environment that are the bench mark in building confidence for foreign private investors

Keywords: Foreign Direct Investment, Auto-regressive Distributed Lag Model (ARDL), Ethiopia.

Introduction

Investment is an act of current pay out in order to obtain future expected return. It is one of the major determinant of economic growth and the primary engines of growth[1]. Demand-driven investment also poses a significant role in raising the productive capacity of an economy, the level of employment and technology transfer through foreign direct investment and increasing capital accumulation[2,3]. In Ethiopia, the volume of investment has been rising over the past years due to the presence of conducive investment climate. Thus, in recent years, Ethiopia is becoming an investment friendly country with stable macro-economic from the horn of Africa[4]. Basically, investment can be either private investment or public investment. Private investment is a type of investment that has been undertaken by private investors. Similar to public investment, in Ethiopia, private investment also contributes a powerful role in entrepreneurship activities, economic growth and poverty reduction[5].

Foreign direct investment is also a type of private investment that has significant roles in enhancing growth and development in Ethiopia. For the past several years, Ethiopia remained the largest recipient of foreign direct investment in East Africa[1]. It has been ranked 159th worldwide, for the ease of doing business[6]. In terms of country, China took the greatest share in 2019 that accounts for about 60% of newly approved foreign direct investment projects, with a major investment in manufacturing and services[6]. On the other hand, even though there has been an increasing trend in foreign direct investment in Ethiopia, due to instability in some parts of the country, foreign private investment that has been inflows in to the country in terms of foreign direct investment were declined to 2,5billion USD in the year 2019, compared to 3,3 billion USD in the year 2018[1].

Foreign resources that inflows into the country in terms of loans, aid, remittances, foreign direct investment enable the country to eradicate poverty[7]. However, yet now, compared to the available investment opportunities in the country, it didn't contribute much as expected[4]. Its contribution was hindered by a number of constraints like; government interferences, shortage of infrastructures, land acquisition problems, severe foreign exchange controls, high transaction costs and institutional failure[1]. Moreover, in Ethiopia, private investment in general and foreign direct investment in particular were also hindered by a number of external and internal factors likes; public investment, real GDP per capital, domestic private investment, external debt and inflation[2,3,7,8].

A number of scholars were conducted their study on private investment with special focus on domestic private investment in Ethiopia[2,3,5,8-11]. However, recently, the study on determinants of FDI was the only study conducted so far in Ethiopia[11]. Thus, to the best of this paper, none of them were conducted their study on the determinants of FDI in Ethiopia.

Similarly, even study conducted recently on determinants of FDI was only used a time series data collected until 2014, which was six years later and didn't reflect the current situation[7]. Besides, the consequences of an important variables likes; domestic private investment, public investment and inflation on FDI are not premeditated. Thus, to fill these gaps, this paper aimed to identify the major determinants of FDI in Ethiopia by using more recent data and variables with the effort to address the following main research questions: i. What are the major determinants that affect FDI in Ethiopia?, ii. Is there a long run relationship between foreign direct investment and its determinants?, iii. If so, how long does it take to adjust itself toward the long run equilibrium?

Methodology

Sources of Data: Secondary data that was used for this study were collected from seven major sources namely; United Nations Conference on Trade & Development (UNCTAD), National Bank of Ethiopia (NBE), International Financial Statistics (IFS), Ethiopian investment agency (EIA), World Bank (WB), OECD and Ministry of finance and economic development (MOFED). Hence, a total of thirty (30) years data were collected covering the period from 1989 to 2019.

Variables and Their Descriptions: After a thorough a review of the work of different researchers on determinants of private and foreign direct investment, the following variables were hypothesized to affect foreign direct investment in Ethiopia.

Dependent variable: Foreign private Investment (LnFPI): It is the capital invested for foreign private investment in millions of birr. It is the dependent variable and considers all the flows of spending that adds to outlays, buildings and construction by foreign private investors.

Independent Variables: Rate of Inflation (LnInfln): It is proxy for macroeconomic instability. It reflects the prices of goods and services that have been used for final consumption. Thus, it would determine FDI positively.

Changes in terms of trade (LnTOT): It is proxy for economic openness. It is the ratio of export price index to the import price index. It is expected to have a positive effect on FDI. Hence, an enhancement in the terms of trade would generate a rise in FDI, provided that the improvement in terms of trade promotes imports of capital goods.

Real GDP (LnRGDP): It is proxy for market size. Hence, the real GDP growth would determines FDI positively.

Domestic private investment (LnDPI): It includes investments undertaken by domestic private investors. It is obtained by subtracting gross private investment from FDI. It may have a "crowed in" effect, when domestic private investment plays a complementary role to foreign direct investment or "crowed

out" effect, when the opposite happen. Thus, the effect of domestic private investment on foreign direct investment would be inconclusive.

Public investment (LnPUINV): It includes investments undertaken by the government and public corporation. It is obtained by subtracting gross domestic investment from private investment. It may also have a "crowed in" effect, when public investment plays a complementary role to foreign direct investment or "crowed out" effect, when the opposite happen. Thus, it would have an inconclusive effect on FDI.

Real lending interest rate (LnRLIR): It is proxy for cost of capital. It measures the opportunity cost of capital. Hence, foreign direct investment would be expected to increase with a decline in real lending interest rate.

Credit for private investment (LnCRPI): It refers to the loans, treasury bills and other monetary instruments granted by financial institutions to private investors. Thus, it would determine foreign direct investment positively.

Methods of Data Analysis: In this paper, prior to estimate bound tests for co-integration, a unit root test were conducted by using Augmented Dickey- Fuller (ADF)and Phillips perron unit tests in order to identify the level of integration. Then, to determine the determinants of FDI, an ARDL bounds testing approach were used[12].

This is mainly due to the fact that it does not need pre-testing of the series, correct for autocorrelation and endogeneity problems[13,14] due to its sample properties[15] and its appropriateness for different level of integration as opposed to same level of integration[16] and maximum likelihood based approach of co-integration techniques[17,18].

Therefore, an ARDL model can be specified as follows:

$$\Delta LnFPI = \alpha_0 + \sum_{1=1}^{q} \alpha_1 \Delta LnPBI_{t-i} + \sum_{1=1}^{q} \alpha_2 \Delta LnInfln_{t-i} + \sum_{1=1}^{q} \alpha_3 \Delta LnTOT_{t-i} + \sum_{1=1}^{q} \alpha_4 \Delta LnRGDP_{t-i} + \sum_{1=1}^{q} \alpha_5 \Delta LnDPI_{t-i} + \sum_{1=1}^{q} \alpha_6 \Delta LnPUINV_{t-i} + \sum_{1=1}^{q} \alpha_7 \Delta LnRLIR_{t-i} + \sum_{1=1}^{q} \alpha_8 \Delta LnCRPI_{t-i} + \gamma_1 LnPBI_{t-1} + \gamma_2 LnInfln_{t-1} + \gamma_3 LnTOT_{t-1} + \gamma_4 LnRGDP_{t-1} + \gamma_5 LnDPI_{t-1} + \gamma_6 LnPUINV_{t-1} + \gamma_7 LnRLIR_{t-1} + \gamma_8 LnCRPI_{t-1} + \mu_t$$

Where, Δ refers the first difference of a variable, Ln is the value of variables in terms of natural logarithm, α_0 is a constant q is maximum lag order for a dependent variables, $\alpha_1, \ldots \ldots \alpha_8$, refers the short run coefficient, $\gamma_1, \ldots \ldots \gamma_8$, refers the long-run relationship, i refers time trend, and μ_t is the error.

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The short run error correction form could be:

$$\Delta LnFPI = $$
$$\alpha_0 + $$
$$\sum_{1=1}^{q} \alpha_1 \Delta LnPBI_{t-i} + $$
$$\sum_{1=1}^{q} \alpha_2 \Delta LnInfln_{t-i} + \sum_{1=1}^{q} \alpha_3 \Delta LnTOT_{t-i} + \sum_{1=1}^{q} \alpha_4 \Delta LnRGDP_{t-i} + \sum_{1=1}^{q} \alpha_5 \Delta LnDPI_{t-i} + $$
$$\sum_{1=1}^{q} \alpha_6 \Delta LnPUINV_{t-i} + \sum_{1=1}^{q} \alpha_7 \Delta LnRLIR_{t-i} + $$
$$\sum_{1=1}^{q} \alpha_8 \Delta LnCRPI_{t-i} + \partial ECM_{t-1} + \mu_t \qquad (2)$$

Where ∂ refers to the speed of adjustment and ECM is the residuals obtained from the first equation.

Results and discussions

Tests and their Results: Unit root test and co-integration test were conducted prior to estimation of the model to be used for the final analysis. Here below are the outcomes of each test:

Unit root tests: Prior to unit root tests, Akaike Information Criterion (AIC) was used to estimate an optimum number of lags. Thus, for unit root tests and ARDL approach, a maximum lag of order one was used for the analysis. The result of each tests in Table-1 above imply that except LnTOT, all of the variables are non-stationary at level form and stationary at first difference at the conventional 1%, 5% and 10% level of significance. Thus, while Ln TOT is found to be I(0), the others variables are found to be integration of order one. Hence, as opposed to Johansen co-integration test, an ARDL bounds testing approach, were used for the analysis.

Bound Tests for Co-integration: To examine a long run equilibrium relationship among variables included in the model, Co-integration test is applied. Hence, the results of bound test is presented in the following Table-2.

The null of no co-integration is tested in opposition to the alternate hypothesis using F-test with critical values tabulated by Narayan[15]. Hence, since the calculated value of F which is 18.52 is greater than the upper bound, the null hypothesis of no co-integration is rejected at a 5% level of significance (Table-2). Hence, there are long run relationships between FDI and its determinants.

Results of Econometric model: Determinants of FDI in Long run in Ethiopia: The next step after having established co-integration long run relationships between FDI and its determinants is estimating the long-run determinants of the model. Hence, the result of ARDL model is presented in the following Table-3.

Table-1: ADF and PP unit root tests.

Variables	ADF results at their level form		ADF results at the first difference form		Phillip Perronat the first difference form		Order of integration
	Constant only	Constant & trend	Constant only	Constant & trend	Constant only	Constant & trend	
LnFPI	-0.203	-0.189	-1.320***	-1.409***	-0.181	-0.202	I(1)
LnInfln	-0.824	-0.922	-2.008***	-2.007***	-0.372**	-0.374**	I(1)
LnTOT	-0.679***	-1.083***	-1.686***	-1.689***	-0.174	-0.187	I(0)
LnRGDP	-0.027	-0.025	-0.714***	-1.187***	0.220	-0.022	I(1)
LnDPI	-0.498	-0.502	-1.188***	-1.189***	0.067	0.066	I(1)
LnPUINV	-0.555	-0.510	-2.286***	-2.387***	-0.462**	-0.492***	I(1)
LnRLIR	-0.268	-0.278	-0.701***	-0.711***	0.387	0.365*	I(1)
LnCRPI	-0.004	-0.204	-0.734***	-0.748***	0.188	0.172	I(1)

Note:*, ** and *** represents the significance level at 10%, 5% and 1% respectively.

Table-2: Bound tests for Co-integration analysis.

Test static	Value	Max Lag	Significance level (%)	Bound critical values			
				Restricted intercept & no trend		Restricted intercept & trend	
				I(0)	I(1)	I(0)	I(1)
F-static	18.52	1	1	2.654	3.716	4.343	6.723
			5	1.950	2.986	3.584	4.981
			10	1.602	2.624	3.230	3.633

Table-3: The estimated result of long run ARDL Model.

ARDL (1,0,0,0,0,0,0,0) selected based on AIC				
Variables	Coefficient	Std. Err.	t-static	P-value
LnInfln	-0.147697	0.153576	-0.96	0.348
LnTOT	0.8865009	0.6855876	1.29	0.211
LnRGDP	1.420383	0.5171446	-2.75	0.012**
LnDPI	0.4090428	0.0829445	4.93	0.00***
LnPUINV	-0.0166973	0.0216417	-0.77	0.449
LnRLIR	-0.2975365	0.706952	-0.42	0.678
LnCRPI	0.2242644	0.0620422	3.61	0.002***
Cons	26.31861	9.400584	2.8	0.011

Where: ** and *** level of significance at 5% and 1% respectively.

From Table-3 above, three variables out of seven exogenous variables are significant in determining FDI in the long run and they are also consistent with the hypothesized sign. The discussions of each significant variable are presented as follows:

Real GDP (LNRGDP): The coefficient for real GDP is significant at 5% level of significance indicates that if real GDP were increased by 1%, FDI will also increased by 1.42%. Moreover, an increased in disposable income leads to a rise in demand for goods and services in the economy, which further stimulate the FDI in the economy over the period under study. It is also in line with the finding of Akpalu *et al.;* Ouattara; Frimpong and Marbuah; Kazeem and Olukemi; Hailu and Abate [2,3,7,19-22]. However, it contradicts with that of Asante [23].

Domestic Private Investment (LNDPI): The coefficient for domestic private investment is also significant at 1% level of significance. The value of its coefficient which is 0.41 shows that a rise in domestic private investment by one percent generates an increase in foreign direct investment by 0.41%. Besides, in this paper, domestic private investment plays a complementary role to foreign direct investment. Hence, it has a crowed in effect on foreign direct investment. However, it is contradict with the finding of Haregewoyn [7].

Credit for Private Investment: A raise in credit given to private investors by 1% generates an increase in foreign direct investment by 0.22 percent. Thus, the ease availability of credit to the private sectors, the greater foreign direct investment under taken due to the availability of the investment financing. This result is in line with the finding of Asante; Frimpong and Marbuah [2,20,21,23]. However, it contradicts with that of

Oshikoya [24]. Hence, the ease accessibility of loans, treasury bills and other monetary instruments for private investors is an important determinant for success of foreign direct investment.

Determinants of FDI in Short run in Ethiopia: The short run determinants of FDI were presented in Table-4. Like in long run, three variables out of seven independent variables are also statistically significant in the short run. Among those three variables, domestic private investment is the only variable that affects FDI in the long run and short run simultaneously.

The discussions of each significant variables are presented as follows:

Inflation (ΔLnInfln):-It determines FDI positively at 5% level of significance. Hence, inflation is a driver than a drag on foreign direct investment in Ethiopia. Even though, it contradict with the finding of Hailu [3], it is consistent with the finding of Acosta and Loza and Frimpong and Marbuah [23,25].

Domestic Private Investment (ΔLnDPI): It also determine FDI positively and significantly at 10% significance level. Thus, a raise in domestic private investment by 1% leads to a raise in FDI by 0.27% in the short run. Hence, since domestic private investment serve as a bench mark for foreign investor who have a potential to invest in the country, the rise in demand for goods and services in domestic private investment raise the demand for competitor from outsiders to be benefited from the rise in demand and cheap labor force. Moreover, domestic private investment plays a complementary role to foreign direct investment. Hence, it have also a crowed in effect on FDI in short run.

Table-4: Result of short-run dynamic model.

Variables	Coefficient	Std. Err	T-Ratio	Prob
ΔLnInfln	0.3448309	0.1380574	2.5	0.012**
ΔLnTOT	-0.0255177	0.0273251	-0.93	0.35
ΔLnRGDP	-0.0038209	0.014298	-0.27	0.789
ΔLnDPI	0.2710245	0.1395005	1.94	0.052*
ΔLnPUINV	4.963108	0.6623376	7.49	0.000***
ΔLnRLIR	0.0020766	0.0102043	0.2	0.839
ΔLnCRPI	0.0726726	0.0482507	1.51	0.132
ECM(-1)	-0.0890132	0.0965114	-0.92	0.356
R-squared			0.8632	
Adjusted R- squared			0.8196	
S. E of regression			93.5793	
Sum squared resid.			14.8348	
Log likelihood			-28.5727	
Durbin –Watson static			2.2242	
Mean dependent variable			21.5884	
S.D dependent variable			1.9062	
Diagnostic tests				
Test statistics		F-Version		
A. Serial correlation LM test		25.5471(0.43207)		
B. Normality(Jarque-Bera test)		47.643 (0.113)		
C. Eigen value stability condition		0.2684904(0.2684)		
D. Heteroscedasticity		0.15(0.7000)		

Where: *,** and *** represents significance level at 1%, 5% and 10% respectively.

Public Investment (ΔLnPUINV): It affects FDI significantly at 1% significance level. Hence, if public investment were increased by 1%, the FDI will increased by 4.96%. Moreover, in Ethiopia, public investment is primarily concentrated on the development of basic economic infrastructures such as road, telephone, power, irrigation canals and social overhead capitals likes; schools, universities and health centers. Thus, such investments play a complementary role and create a favorable 'crowding-in' effect on FDI. This finding is also consistent with

that of Frimpong and Marbuah[20]. However, it contradicts with that of Kazeem and Olukemi and Sohail and Sameh[21,26].

Moreover, the coefficient of ECM is found to be negative 0.0890132. Thus, 8.9% of the divergence from long run equilibrium is adjusted every year toward long run equilibrium. Furthermore, as indicated in Table-4 above, error terms are uncorrelated with each other; its variance is constant, and structurally stable. Besides, the value of Jarque-Bera test and R^2

also indicates as errors terms are normally distributed and 86.32 percent of the variations in the model are explained by variables of interest respectively. Thus, the model passed all the diagnostic tests.

Conclusion

This paper tries to empirically indentify the major determinants of FDI in Ethiopia having a 30 years time series data that has been collected from 1989 to 2019.

In order to achieve these objectives, an ARDL bounds testing approach was employed. The result of the study pointed out that real GDP, domestic private investment and credit for private investment are the major long run determinants of FDI in Ethiopia while rate of inflation, domestic private investment and public investment are the short run determinants. Hence, domestic private investment is the major determinant that affects FDI both in the long run and short run.

The main recommendation that were emanated from the results of the study are: i. To raise foreign direct investment, the production and productivity levels of sectors likes agriculture and manufacture should be enhanced through emergency of advanced technologies. ii. The government should also make ease accessibility of credit to foreign direct investors through improvement in policies related to loans.

Finally, due to lack of data, this paper only used a 30 years' time series data. Hence future researcher should consider this limitation in order to obtain more reliable result.

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