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Nexus Between Foreign Direct Investment and Domestic Investment in Ethiopia: Crowding-in/out Effects

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Abstract
Ethiopia has devoted itself to entice foreign direct investment across time. The experiences of many countries have shown that FDI has either supplementary or substitution effects. This paper is geared based on the FDI contribution and intends to reveal the path of influence on domestic investment. To reach at a conclusion, the research used a time series data between 1975-2014 periods and Vector Error Correction Model (VECM) approach. Accordingly, the result shows that FDI crowds out private domestic investment despite it is being crowd out by domestic investment through private domestic investment. FDI has no effect on domestic investment in the long run and short run dynamics. The result also found public investment has a crowding in effect for both private domestic investments and FDI in both short run and long run dynamics. This shows that FDI might not be increased in the expense of private domestic investment. By the same token, private domestic investment has a supplementary effect on public investment which is supported by a theory where a booming of investment nurtured the income of the government in the form of tax and other revenues. Therefore, to increase foreign investor participation, government should pursue privatization and liberalization policies in the remaining sectors along with building up in a house investment by creating a forward and backward linkage investment policy in domestic-foreign investment. Moreover, the inefficient private investment should have to merge to increase their potential to compete foreign counterparts together with empowering themselves with technology.
Keywords: Multinational Corporations, VECM, FDI, GDP, Crowding-in/out, bi-directional

1. Introduction

Different countries are aspiring to have fast and sustainable economic growth in this epoch. One of the strategies to achieve this is having strong domestic investment as well as enabling the domestic environment conducive for FDI. Economic growth could not be achieved without a stringent policy prescription which incorporates incentives and forward and backward linkage investment policy. In this regard, recent decades, Ethiopia takes initiatives in order to accelerate domestic investment and FDI; this scheme augments domestic investment per GDP share changes from 14.53 to 40.27 percent from the year 1991-2014 G.C. In the same way, foreign direct investment has been improved by its amount from $6 million to $1.2 billion from 1991 to 2014 time period (UNCTAD, 2014). This is a consequence to the country's initiation to lure FDI.

After the downfall of the Derge regime Ethiopia relatively relaxed very restrictive policies such that the flow of FDI has increased over time. This could be corroborated by World Bank (2014) which has witnessed that Ethiopia was the third largest host of foreign direct investment in Africa in 2013 with a 240 percent increase from the amount in 2012. FDI in Ethiopia is soared following the liberalization of private sector and accompanied by the shifting policy of the military to EPRDF regime.

FDI contributes at large on domestic investments in the host economies if it engages in the production of goods and service which are not produced by the domestic firm. Contrary to this, foreign company which produces commodities which have been already produced by domestic firms would smash up domestic firm's activities and creates crowding out effects through substituting locally produced goods. FDI also come up with a high technology and ample management practice which are spillover to the local investors, nevertheless, enclose a spillover effects to the host country domestic firms, subsequently enabled them efficient in productivity of goods and services. These spillovers drive domestic firms to invest more and to adopt more efficient production systems which are known as crowding in effects (Mileva, 2008).

1.1 Statement of the problem

Different theories have shown that FDI causes either crowding out or crowding in effect (MacDougall, 1958; Hymer, 1960). In this regard, crowding out/in effects of investments has been recorded in various literatures. Driffield and Hughes (2003) observed that the impact of FDI on DI for the period 1984-1997 classified based on regions, industry and time for the whole United Kingdom. The paper locates that inflow of FDI into the United Kingdom had the effect of enhancing manufacturing investment in the domestic sector. The result also point out there are industries where FDI inflow had negative effect on DI. The inflow of FDI crowds-in DI in the South-East of England except crowds-out DI in regions like Scotland, Wales and the North of England (Eregha, 2011).

Jude (2014) argued that FDI led capital accumulation in Central and Eastern European countries over the period of 1990-2010. The study finds that FDI primarily crowds out domestic investment, while the effect

decreases with time. The result also indicates that Greenfield FDI may develop long run complementary with domestic investment, while mergers and acquisitions do not prove and significant effect on domestic investment. Similarly, Agosin and Ricardo Mayer (2000) suggest that, over a long period of time (1970–1996), crowding in effect of FDI has been strong in Asia, and crowding out has been the norm in Latin America. In Africa, FDI has been increasing over time. Adams, S. (2009) has provided using a large cross sectional dimension but shorter time series dimension has reported a net crowding out effect of FDI on DI for Sub-Saharan Africa.

The channel through which FDI affects domestic investment varies. FDI might augment domestic investment via spillover effect (technology and management skill transfer) which is bounded a forward and backward linkage between both foreign and domestic investments. FDI may switch resources into the provision of public goods to attract foreign direct investment which consequently may cause crowding out effect on domestic investment. In this effect, FDI on domestic investment are not rigorously addressed in Ethiopia. For example, Kedir (2012) studied the impacts of FDI on poverty reduction with VAR approach. The result was FDI has a negative impact on economic growth and does not reduce poverty. In fact, she put the reasons it may be due to underdevelopment of human capital, backward institutions, crowding out of domestic investment. The above paper is different in concept determining the level of FDI influence in the economy. Aregie (2014), in his paper on the relationship between FDI and privet domestic investment in VECM approach ignored public investment, that has a huge impact on economic growth and investment. Therefore, this paper envisions abridging such research gaps by examining the effect of FDI on domestic economy and sorting out the path through FDI affects domestic investment.

2. Review of Related Literature

2.1. Theory of FDI

Though many researchers have studied on FDI, there is no a universally accepted general theory in relation to it (Denisia, 2010). Broadly, the theories associated to FDI could be classified into two categories: macro and micro level (Razin, 2004). The former theory more or less focuses on market failures and on the desire of transnational corporations to enlarge their market power (Caves 1971). Hence literatures of such types have given more emphasis on firm-specific advantages, owing to product superiority or cost advantages that stemmed from economies of scale, multi plant economies and advanced technology, or superior marketing and distribution (Helpman 1984). According to this theory, international companies find it cheaper to expand directly in a foreign country, rather than through export trade or making business through correspondents in host countries, in cases where the advantages associated with cost or product are based on internal, indivisible assets based on knowledge and technology. Different explanations for FDI have centered on regulatory boundaries, including tariffs and quotas that either encourage or discourage cross-border acquisitions, depending on whether one deem horizontal or vertical integrations[2]. With this explanation, theories of FDI may be categorized mainly in the following titles.

2.1. 1. Production Cycle Theory of Vernon

Vernon has posited production cycle theory in 1966 and was used to explain certain types of foreign direct investment outflows by U.S. companies in Western Europe after the end of Second World War in the manufacturing industry. He believes that there are four stages of production cycle: innovation, growth, maturity and decline. As to him, in the first stage the U.S. multinational companies create new innovative products for local use and export the excess in order to serve the rest of the world. As per the theory of the production cycle, after the Second World War, Europe has initiated to increase manufactured products like those produced in USA. Consequently, American firms began to export, having the advantage of technology over international contenders.

If in the beginning phase of the production cycle, manufacturers have an advantage by possessing new technologies, as the product develops also the technology becomes known. Manufacturers will standardize the inventions, but there will be companies that you will copy it hereby, European firms have started imitating American products that U.S. firms were exporting to these countries sooner or later to substitute the imported products by locally produced goods. US companies were forced to perform production facilities on the local markets to maintain their market shares in those areas. This theory controlled to explain certain types of investments in Europe Western made by U.S. companies within 1950-1970.

2.1.2. The Theory of Exchange Rates on Imperfect Capital Markets

The theory of exchange rate on imperfect capital markets asserts that initially the foreign exchange risk has been analyzed from the viewpoint of international trade. Itagaki (1981) and Cushman (1985) analyzed the influence of uncertainty as a factor of FDI. Cushman (1985) shows that real exchange rate increase stimulated FDI made by USD, while a foreign currency appreciation has reduced American FDI.

2.1.3. The Internalization Theory

The theory attempts to explain the growth of multinational companies and their motivations for achieving

foreign direct investment other than parent countries. The theory was developed by Buckley and Caisson, in 1976 and then by Hennart, in 1982 and Caisson, in 1983. Initially, the theory was launched by Coase in 1937 in a national context and Hymer in 1976 in an international framework. Hymer identified two major targets of FDI. The first was the exclusion of competition. The second one was the advantages which some companies hold in a particular activity (Hymer,1976). Buckley and Caisson (1976) provided another explanation of FDI by putting emphasis on intermediate inputs and technology, which then to be exploited. Dunning (1977, 1979 and 1988) employs internationalization theory in the eclectic theory, but he argues that this explains only part of FDI flows. Hennart (1982) extends the idea of internalization by developing models between the two types of integration: vertical and horizontal. According to Hymer (1976) the Multi-National Companies (MNCs) appears due to the market imperfections that led to a deviation from perfect competition in the final product market (Henisz, 2003).

2.1.4. The Eclectic Paradigm of Dunning

The eclectic theory is developed by Dunning in (1977). The theory has verified an exceptionally productive way of idea on Transnational companies (TNCs) and has stimulated a great deal of applied work in economics and international business. The theory combines three different theories of foreign direct investment (OLI): Ownership, Location, and Internalization, three potential sources of advantage that may trigger a firm's decision to become a multinational.

Ownership Advantage "O": imply to intangible assets, which are, at least for a while exclusive possesses of the company and may be transferred within multinational companies at low costs, leading either to higher incomes or reduced costs. However, Transnational Corporations Operations performed in different countries face some extra costs. Thereby to successfully enter a foreign market, a company must have certain uniqueness that would triumph over operating costs on a foreign market (Dunning,1973, 1980, 1988).

Location Advantage "L": When the first condition is fulfilled, it must be more advantageous for the company that owns them to use them itself rather than sell them or rent them to foreign firms. Location advantages of different countries are the key factors to shaping who will become host countries for the activities of the multinational corporations.

Internalization theory "I": Assuming the first two conditions are met, it must be profitable for the company that use of these advantages, in collaboration with at least some factors outside the country of origin (Dunning, 1973, 1980, 1988). This third feature of the eclectic paradigm theory OLI suggest a framework for evaluating different ways in which the company will exploit its powers from the sale of goods and services to various accords that might be signed between the companies. At the same time as cross-border market Internalization benefits is higher the more the firm will want to engage in foreign production rather than offering this right under license, franchise (Denisia, 2010).

2.2. Empirical Literature

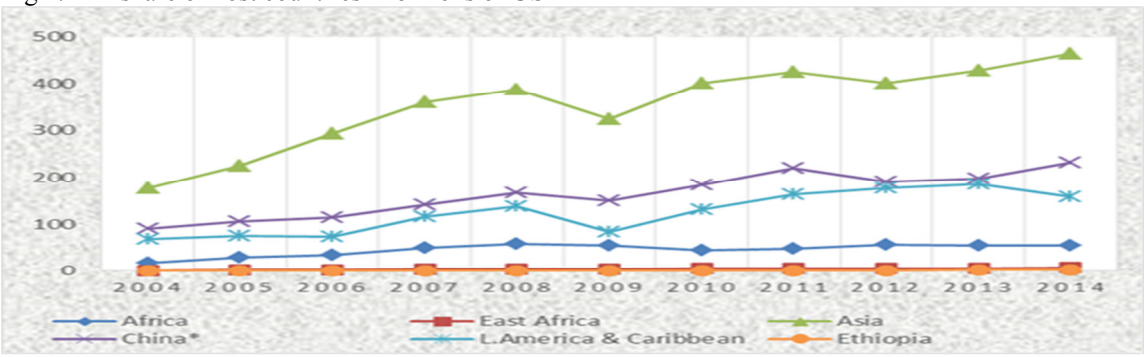
2.2.1. World FDI Trend

Though FDI has been increasing trend in the world economy, it has also shown a fluctuation and unbalanced distribution since 1990. Despite its uneven distribution in world FDI trend, the emerging countries are more benefited than other countries. MNCs are flooding to these countries due to their ample resources endowment and to expand market share.

UNCTAD, (2015) showed that most of the world foreign direct investment has been drown into industrially developed and emerging economies relative to other developing countries like East Africa, whose FDI share remain insignificant. Asia and Latin America have favored in accommodating larger foreign investors. Chain swallows one fifth of FDI flows in the continent which is approximately 34 percent of FDI deploying to developing countries, this is the approximately 19 percent of total foreign direct investment flows.

FDI in Ethiopia is soared following the liberalization of private sector and accompanied by the shifting policy of the military to EPRDF regime. The investment strategy embodies various types of incentives to foreign investors so as to participate in the glance of economic activities of the country and contributed indispensable activities in to the economic growth of the country (EIC, 2015).

Fig 1. FDI share of host countries in billions of USD



*China Include Hong Kong

3. Methodology and Model specification

This study follows widely used approaches in modeling the relationship between the economic variables. The Vector Autoregressive (VAR) model is used to avoid the complexity of misspecification that always arises in the economic variables. This model also identifies the relationship between variables without extracting variables as exogenous. It considered as the endogenous variables in the series as a function of lagged values. As Sims (1980) and other argued in series of influential early papers, the model promise of providing a coherent and creditable approach to data presentation.

Therefore, this study tried to include the variables such as GDP, Private Domestic Investment (PVDI), Public Investment (PUBI), Average Lending Interest Rate (AVIR) and Foreign Direct Investment (FDI) to comprehend the relationship between domestic investment and foreign direct investment. In addition to this, some of variables have been taken their proxies. Even though the objective of the paper is to address the linkage between FDI and domestic investment, additional variables have been taken as control variable and to avoid misspecification problem which also in turn reduces heteroscedasticty problem. Specifically, the gross domestic product (GDP) is intends to shows the market potential of country as well as the economic growth. The second variable which is domestic investment has substituted with gross capital formation (private & public) which shows the investment (capital accumulation) within the territory of countries. An increase in income stimulates saving which directly increases the level of capital stock[1]. As a result accumulated capital formation could be an indicator of strong domestic investment. Capital formation also referred the acquisition or creation of resources to be used in production. In capitalist economies much attention is focused on business investment in physical capital building, equipment and inventories (Coen and Eisher, 1992). Lastly, the study ploughs lending interest rate as a variable as it is sensitive for investment. The investment theory and traditional theory of monetary policy confirmed that investment expenditure by businesses is negatively affected by interest rate (Sharpe & Suarez, 2013). Moreover, regime dummy is employed to give light whether shocks have had between the two regimes of the country in 1974-1991 and 1992-2014.

Thus, econometrically the variables are equated in the following manner with Vector Autoregressive approach. In order to make easy for stationary of variable and to reduce growing seasonal variation as well as hetroschedasticty problem in time series data, the approach transforms the stock value into logarithms.

$$logFDI_t = \alpha_2 + \sum_{s=1}^{n} \gamma_1 logFDI_{t-s} + \sum_{s=1}^{n} \gamma_2 logDI_{t-s} + \sum_{s=1}^{n} \gamma_3 logGDP_{t-s} + RDUM + U_t \quad \text{.....1}$$

$$logFDI_t = \alpha_3 + \sum_{s=1}^{m} \delta_1 logFDI_{t-s} + \sum_{s=1}^{m} \delta_2 logPVDI_{t-s} + \sum_{s}^{m} \delta_3 PUBI_{t-s} + \delta_4 logAVIR + \delta_5 logGDP + U_t \quad \text{.....2}$$

$$logPVDI_t = \alpha_1 + \sum_{s=1}^{p} \beta_1 logPVDI_{t-s} + \sum_{s=1}^{p} \beta_2 logPUBI_{t-s} + \sum_{s=1}^{p} \beta_3 logFDI_{t-s} + \beta_4 logGDP + \beta_5 logAVIR + U_t \quad \text{.....3}$$

$$logPUBI_t = \alpha_3 + \sum_{s=1}^{m} \delta_1 logPUBI_{t-s} + \sum_{s=1}^{m} \delta_2 logPVDI_{t-s} + \sum_{s}^{m} \delta_3 logFDI_{t-s} + \delta_4 logGDP + \delta_5 logAVIR + U_t \quad \text{.....4}$$

$$logDI_t = \alpha_3 + \sum_{s=1}^{m} \delta_1 logDI_{t-s} + \sum_{s=1}^{m} \delta_2 logFDI_{t-s} + \sum_{s}^{m} \delta_3 logGDP_{t-s} + \delta_4 logAVIR + U_t \quad \text{.....5}$$

Where, $\alpha_1, \alpha_2, \alpha_3$ are constant

β_i , γ_i and δ_i , are estimated parameters

FDI = Foreign Direct Investment
GDP = Gross Domestic Product
DI = Domestic Investment
PVDI = Private Domestic Investment

[1] Harrod-Domar growth model

PUBI = Public Investment
AVIR = Average Lending Interest Rate
RDUM = Regime dummy, where before 1991, D=0, 1 is after 1991
U = Stochastic Term

4. Results and Discussion

4.1. Optimal lag length

Prior to test the co-integration or VECM, we ought to specify how many lags to be included in the model. Among the six lag selection criterion (LR, FPE, AIC, SBIC, LL, HQIC), the model have chosen both Hanan-Quinn information criteria (HQIC) and Schwarz Bayesian information criteria (SBIC) for all the models at 1% of significance level. As mentioned in the method part, the paper set to find the three criterions. In this regard two of the criterions are fulfilled to do the next step of co-integration. This is because literatures have shown that these methods of lag length selection yield results (Brooks, 2008).

4.2. Stationary Test

Co-integration analysis requires testing whether variables are stationary or not. In this research we used the two most widely used method of testing stationarity; Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests. The results have shown that all the variables are not stationary at level I (0) but stationary at first difference I (1) (Table 2).

Table 2: ADF and PP Unit root test result

Variables	ADF				PP			
	Test statistics at I(0)	p-value	Test Statistics at I(1)	p-value	Test statistics at I(0)	p-value	Test Statistics at I(1)	p-value
fdi	-2.530	0.3131	-5.949	0.0000	-0.509	0.893	-9.358	0.0000
pvdi	-1.550	0.8114	-5.879	0.0000	-1.698	0.4321	-9.115	0.0000
pubi	-0.895	0.9567	-3.920	0.0114	-0.629	0.9883	-4.281	0.0005
di	-0.746	0.9699	-3.623	0.0280	1.005	0.9943	-5.865	0.0000
gdp	-1.037	0.9389	-3.982	0.0093	0.054	0.9628	-3.447	0.0094
avir	-2.525	0.3154	-4.144	0.0054	-2.155	0.2231	-5.698	0.0000

Source: Own computation

For I (0) critical values at 5% is -3.548 and -2.961

For I (1) critical value at 5% is -3.552 and -2.964

The null hypothesis is accepted at level because there is a presence of unit root in the series (H_0 = has a unit root). However, at first difference in both tests (ADF & PP) the series is stationary. Therefore the null hypothesis is rejected at I (1), but the alternative hypothesis is accepted.

4.3. Johansson Co-integration Test

The presence and the number of co-integrating relationships are evaluated using the Trace and maximum Eigen value methods. Accordingly the variables are co-integrated at rank one; imply that the variables have a long run relationship.

Maximum rank	Parms	LL	eigen value	trace statistic	5% critical value
0	5	-51.485292		105.8775	68.52
1	14	-20.091745	0.80010	43.0904*	47.21
2	21	-9.099823	0.43089	21.1066	29.68
3	26	-2.8139113	0.27556	8.5348	15.41
4	29	-0.2202937	0.12454	3.3475	3.76
5	30	1.4534784	0.08225		

Source: Own computation

The above table shows that the trace test gives an indication that there is one co-integrating equations while the maximum Eigen value test also indicates that there is a one co-integrating equations at 0.05 significance level. The remaining models co-integration equation results depicted also there is a one co-integrated equation in the model.

4.4. Vector Error Correction Model: The Long Run Dynamics Equilibrium

- **Model one**

Model one is presented to examine the responsiveness of foreign direct investment over domestic investment (private + public investment), separately. Therefore, this model implicitly shows that which one of investment has a crowding in or out effect on the foreign direct investment in the economy.

ce1 = logfdi + 4.999logpvdi – 3.563logpubi + 0.8498loggdp – 1.865logavir – 59.3

logfdi = 59.3 – 4.999logpvdi + 3.563logpubi - 0.8499loggdp + 1.865logavir + ce1

Table 4. Vector Error Correction Model long run result of co-integration

	beta	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
_ce1							
	logfdi	1					
	logpvdi	4.999359	0.511649	9.77	0.000**	3.996545	6.002173
	logpubi	-3.56327	0.653784	-5.45	0.000**	-4.84466	-2.28187
	logavir	-1.8654	1.194101	-1.56	0.118	-4.20579	0.474998
	loggdp	0.849876	0.637447	1.33	0.182	-0.3995	2.09925
	_cons	-59.3007					

Source: Own computation **at 1% significant level

The coefficients measure the responsiveness of FDI due to the changes of the induce variables. Accordingly, a percentage increase in private domestic investment will change FDI by 4.9% negatively and significantly. However, a change in public investment will lead to a 3.56% change in FDI positively and significantly in the long run. This means that private domestic investment has a crowding out effect on FDI in the economy. The result is consistent with the study done by Aregie (2014) and Kim and Seo (2003). The reason might be because domestic private investment in the sector are efficient because they are stabilized, information asymmetry between foreign direct investors and domestic private investors that foreign investors are planning to invest creates hesitation of foreign direct investment, risk aversion, language barrier and so on. However, public investment has supplementary effects on foreign direct investment. This may be due to the current human and physical infrastructural investment aspiration of the government since infrastructure availability hastens economic growth and FDI inflows. A study conducted in Nigeria by C.Olise et al, (2013), found that a meager transportation, energy affect the Nigeria economy as well as FDI. The change in GDP and AVIR has insignificant effect to mobilize FDI.

- **Model two**

Model two has been look out the overall domestic investment (DI) influences on foreign direct investment in the economy.

. ce1 = logfdi + 1.9logdi – 2.3459loggdp – 2.05624 – 4.58rdum

logfdi = 2.056 – 1.9logdi + 2.3459loggdp + 4.58rdum + ce1

Table5. Vector Error Correction Model long run result of co-integration

	beta	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
_ce1							
	logfdi	1					
	logdi	1.902126	0.6676909	2.85	0.004**	0.5934758	3.210776
	loggdp	-2.345968	0.9740081	-2.41	0.016*	-4.254989	-0.4369475
	rdum	-4.580575	0.7521341	-6.09	0.000**	-6.054731	-3.10642
	_cons	-6.63141					

Source: Own computation **at 1% significant level; *at 5% significant level

The above long run model shows that, a percentage change in domestic investment (DI) will change the level of FDI by 1.9 percent negatively and significantly. But, a change in gross domestic product (GDP) will lead to change 2.35 percent in FDI positively and significantly.

This implied that the overall domestic investment has a crowding out effect on foreign direct investment in the long run. Similarly, Razin (2003) also found that an increase in domestic investment appears to push out the inflow of foreign direct investment. In this dynamics, the crowding out effects on FDI from the economy emanated from the private domestic investment as reviewed in model one. In addition to this, the current regime will supplement FDI in a 4.5 percent change positively and significantly in the long run.

- **Model three**

Model three is presented to examine that the public and foreign investment influences on the private domestic investment.

ce1 = logpvdi – 0.7127logpubi + 0.2logfdi + 0.1699loggdp - 0.373logavir – 11.86

logpvdi = 11.86 + 0.7127logpubi - 0.2logfdi – 0.1699loggdp + 0.373logavir + ce1

Table6. Vector Error Correction Model long run result of co-integration

	beta	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
_ce1							
	logpvdi	1					
	logpubi	-0.71274	0.088048	-8.09	0.000**	-0.88532	-0.54017
	logfdi	0.200026	0.036948	5.41	0.000**	0.12761	0.272442
	loggdp	0.169997	0.137357	1.24	0.216	-0.09922	0.439212
	logavir	-0.37313	0.247123	-1.51	0.131	-0.85748	0.111225
	_cons	-11.8617					

Source: Own computation **at 1% significant level

The result also shows that a percentage change in foreign direct investment will change the private domestic investment by 0.2 percent negatively and significantly in the long run. Nevertheless, public investment has positive (0.71%) and significant effects on private domestic investment in the long run. This means the FDI has a crowding out effect on private domestic investment. However, public investment is found to be supplementary effect on private domestic investment (crowding-in effect). James, B. Ang. (2015), found that a 1 percent increase in public investment will result in a 0.281 percent increase on privet domestic investment. This shows that public investment is a positive impact on both private domestic investment and foreign direct investment. In support of this (Erden & G.Holcombe, 2005), examined that, in developing countries indicate that a ten percent increase in public investment would augment privet investment by around 2 percent.

- **Model four**

Model four elucidates the influence of private domestic and foreign investment on public investment.

ce1 = logpubi – 1.40logpvdi – 0.28logfdi – 0.2385loggdp + 0.5235logavir + 16.64

logpubi = -16.64 + 1.40logpvdi + 0.28logfdi + 0.2385loggdp – 0.5235logavir + ce1

Table7. Vector Error Correction Model long run result of co-integration

	beta	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
_ce1							
	logpubi	1					
	logpvdi	-1.40303	0.094496	-14.85	0.000**	-1.58824	-1.21782
	logfdi	-0.28064	0.050669	-5.54	0.000**	-0.37995	-0.18133
	loggdp	-0.23851	0.179258	-1.33	0.183	-0.58985	0.112828
	logavir	0.523508	0.338133	1.55	0.122	-0.13922	1.186235
	_cons	16.64223					

Source: Own computation **at 1% significant level

The above table shows that a percentage change of private domestic investment and foreign direct investment will change public investment by 1.4 percent and 0.28 percent positively in the long run, respectively, significantly. This implies that private domestic investment and FDI has a crowding in effect on public investment. Similarly, Tadess (2012) found a result that privet domestic investment positively affects public investment. The result is a ten percent increase in private investment would increase public investment by 1.87 percent. Theoretically, while increase of private investment engenders tax revenue with which the government can commence its investment programs.

It can also be observed in the 3rd model and 4th model, both public and private domestic investment inducing (crowding in effect) each other. Public investment impacts on private domestic investment are positive and supplementary which improves the performance of private participation in the economy. Moreover, the vast participation of providing infrastructure investment (public goods) and mechanized industries lead by government will favor both private domestic investor and FDI.

- **Model five**

Model five shows us the change in domestic investment (DI) due to a percentage change in foreign investment inflows in Ethiopia.

ce1 = logdi – 0.349logfdi – 1.09loggdp – 1.326logavir + 6.95

logdi = - 6.95 + 0.349logfdi + 1.09loggdp + 1.326logavir + ce1

Table8. Vector Error Correction Model long run result of co-integration

	beta	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
_ce1							
	logdi	1					
	logfdi	-0.0349367	0.0444754	-0.79	0.432	-0.122107	0.0522335
	loggdp	-1.09313	0.1498469	-7.29	0.000*	-1.386824	-0.7994354
	logavir	-1.326079	0.2912107	-4.55	0.000*	-1.896841	-0.755316
	_cons	6.951056					

Source: Own computation **at 1% significant level

As presented in the above Table foreign direct investment has insignificant effect on domestic

investment in the long run. In the previous analysis in model 2 FDI has a substitution effect on private domestic investment, whereas it has a crowding-in effect on public investment. GDP has a positive and significant effect on DI, meaning that, a one unit change in GDP intensifies domestic investment by 1.09%. Besides, an increasing of interest rate will change domestic investment by 1.32% and positively. This result might be indicated the interest insensitivity of domestic investors.

4.5. The Short Run dynamics equilibrium

Here, the short run relationships of variables are examined. Accordingly, as presented in Table 10, the inference of the short run factor that explain the speed of adjustment towards the long run equilibrium position, meaning it has rapid adjustment towards equilibrium. The result also shows that private domestic investment has a negative and significant effect on foreign direct investment in the short run. However, public investment and GDP has a supplementary effect on FDI significantly in the short run.

Model 1	**Dependent Variable = logfdi**	
Error Correction	Coefficient	Std. Err.
ce1	-0.0001 (0.988)	0.4386
Dlogpvdi (1)	-0.0702 (0.015)*	0.2874
Dlogpubi (1)	0.0340 (0.001)**	0.0104
Dlogavir (1)	0.0597 (0.470)	0.0049
Dloggdp (1)	0.0192 (0.000)**	0.0083

Source: Own computation *at 5% significant level, **at 1% significant level

In general, the models show that private domestic investment has a crowding out effect on FDI both in the short run and long run relationship. Whereas public investment has a crowding in effect on FDI both in the long run and short run dynamics. Similar results were proponent by Aregie (2014), associated the result with the economic theory that when domestic investment are grown up obviously FDI will be reduced.

In model 2 below, the error term at lag one are negative which holds the expected sign, meaning that it is error correcting. Both domestic investment and regime dummy has a negative sign, these showing that any short-run variation and fluctuation between variables will move towards a stable long run equilibrium association within its speed of adjustment. The variables quickly adjust towards the long run equilibrium position by 18.7 percent over time. However, GDP has a supplementary effect on FDI significantly.

Model 2	**Dependent Variable = logfdi**	
Error Correction	Coefficient	Std. Err.
ce1	-0.1870344 (0.017)*	0.07834
D_logdi (1)	-0.0080066 (0.692)	0.02023
D_loggdp (1)	0.0407478 (0.000)**	0.00893
rdum	-0.0131749 (0.348)	0.01404

Source: Own computation *at 5% significant level, **at 1% significant level

In model 3, the result shows us the short run dynamics of the private domestic investment. as noted from the result, except FDI all variables has a positive sign. The error correction model (ECM) term at lag one is statistically significant. A 35 percent quick adjustment from its equilibrium value eliminated every year; hence, full adjustment would require a period of less than three years.

Model 3	**Dependent Variable = logpvdi**	
Error Correction	Coefficient	Std. Err.
ce1	-0.3507685 (0.015)*	0.14367
Dlogpubi (1)	0.1698803 (0.001)**	0.05193
Dlogfdi (1)	-0.0034264 (0.988)	0.21926
Dloggdp (1)	0.0961004 (0.000)**	0.02443
Dlogavir (1)	0.0298477 (0.470)	0.04131

Source: Own computation *at 5% significant level, **at 1% significant level

The short run result shows that public investment and GDP has an inducing effect on private domestic investment. In general, FDI has no a crowding out effect on domestic private investment.

As the table below indicated that the ECM term has the expected sign such that is it negative and statistically significant, meaning any short run variation and fluctuation between variables will move quickly in the direction of a stable long run equilibrium association as value increase over time. There is 12 percent inference of short run parameters that explain the speed of adjustment in the direction of the long run equilibrium position per annum, implying rapid adjustment of equilibrium position which may take less than 9 years. The result depict that both private domestic investment and FDI has a positive relationship with public investment. Suggesting that private domestic investment has a crowding in effect on public investment in the short run but FDI has no effect.

Model 4	Dependent Variable = logpubi	
Error Correction	Coefficient	Std. Err.
ce1	-0.1210813 (0.001)**	0.03702
Dlogpvdi (1)	0.2500083 (0.015)*	0.10239
Dlogfdi (1)	0.0024421 (0.988)	0.15628
Dloggdp (1)	-0.0684950 (0.000)**	0.01742
Dlogavir (1)	-0.0212738 (0.470)	0.02944

Source: Own computation *at 5% significant level, **at 1% significant level

As the table below shows that FDI has no effect on domestic investment in short run dynamics. GDP has a supplementary effect on domestic investment significantly in the short run. In this respect, the error correction is negative such that it holds the expected sign. However the speed of adjustment has insignificant coefficient.

Model 5	Dependent Variable = logdi	
Error Correction	Coefficient	Std. Err.
ce1	-0.129907 (0.108)	0.108
Dlogfdi (1)	-0.2542528 (0.460)	0.460
Dloggdp(1)	0.186102 (0.000)**	0.000
Dlogavir (1)	-0.0265708 (0.686)	0.686

Source: Own computation **at 1% significant level

4.6. Post Estimation Test

Having the VEC model is estimated, we carried out some diagnostic tests in order to confirm the model and to check consistencies of the model.

- **Test of Autocorrelation for all models**

Lagrange-Multiplier Test

Models	lag	chi2	Prob > chi2
Model 1	1	11.3677	0.99096
Model 2	1	6.9048	0.97505
Model 3	1	11.3677	0.99096
Model 4	1	11.3677	0.99096
Model 5	1	7.5054	0.96225

Source: Own computation

- **Jarque Bera (Residual Vector Normality) Test**

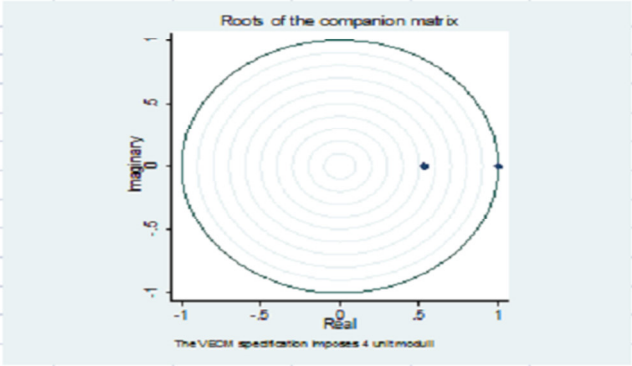
Model	Variables	chi2	df	prob > chi2
Model 1	loffdi, logpvdi, logpubi, loggdp, logavir	8.5810	10	0.57223*
Model 2	logfdi, logdi, loggdp rdum	131.279	8	0.0000
Model 3	logpvdi, logpubi, logfdi, loggdp, logavir	7.3480	10	0.69223*
Model 4	logpubi, logpvdi, logfdi, loggdp, logavir	7.4990	10	0.67760*
Model 5	logdi logfdi loggdp logavir	11.472	8	0.17635*

Source: Own computation * the error terms are normally distributed

- **Stability Test**

Eigenvalue stability condition

Eigenvalue	Modulus
1	1
1	1
1	1
1	1
.5326647	.5326647



Source: Own computation

5. Conclusion

The result shows that FDI has a crowding in effect on public investment and crowding out effect on private domestic investment in the long run however, in the short run it has no effect in both investments. Private domestic investment has also a crowding out effect on FDI both in the short run and long run dynamics. The research identifies that FDI is negatively and significantly affected by the domestic investment. In this regard, the overall domestic investment has a crowding out effect on FDI through the private domestic investment. Moreover, FDI has no effect on the overall Domestic investment in the long run. Correspondingly, public investment has a supplementary effect on private domestic investment and FDI, both in the short run and long run dynamics. Given the infrastructural development and provision of public goods or by any other intrusion, public investment is not a position in deterrence of private domestic investment for attracting FDI inflows. Similarly, private domestic investment has also a crowding in effect on public investment both in the long run and short run which is supported by a theory where a booming of investment nurtured the income of the government in the form of tax and other revenues.

References

Acar, S. et.al (2013). The Effect of Foreign Direct Investment on Domestic Investment: Evidence from MENA Countries.

Ahmeda, K. T., Ghanib, G. M., Mohamadc, N., & Derusd, A. M. (2014). Does inward FDI crowd-out Domestic Investment? Evidence from Uganda. Global Conference on Business & Social Science-2014, GCBSS-2014, 15th & 16th December,Kuala Lumpur (pp. 419 – 426). Kuala Lumpu: Procedia - Social and Behavioral Sciences.

Amighinia, A. A., McMillanb, M., & Sanfilippoc, M. (2015, April). FDI as a Catalyst for Domestic Investment in Developing Economies: New Evidence from Industry-level Data.

Association, E. E. (2014). *Report on Ethiopian Economy*. Addis Ababa: Ethiopian Economic Association.

Bank, W. (2015). worldbank.org. Retrieved December 08, 2015

Brooks, C., 2008. *Introductory Econometrics for Finance*. 2nd Edition ed. New York: Cambridge University Press.

Bukari, P. A. (2013). Foreign Direct Investment: How Beneficial Is It?

Commission, E. I. (2015). Ethiopia: *A Preferred Location for Foreign Direct Investment in Afric*. Addis Ababa: Ethiopia Investment Commission.

CROTTY, J. R. (1993). Neoclassical and Keynesian approaches to the theory of investment.

Davidson, R., & MacKinnon, J. G. (1999). *Econometric Theory and Methods*.

Denisia, V. (2010). Foreign Direct Investment Theories:An Overview of the Main FDI Theories. European Journal of Interdisciplinary Studies , 2 (2).

EIC. (2015). Ethiopian Investment Guide. Addis Ababa: EIC.

Erden, L., & G.Holcombe, R. (2005, September). the effect of public investment on private private investment in developing economies. Public Finance Review . Florida: sage publication.

Eregha, P. B. (2011, March). The Dynamic Linkages Between Foreign Direct Investment and Domestic Investment in ECOWAS Countries: A Panel Cointegration Analysis. oxford.

Farla, K., Crombrugghe, D. d., & Verspagen, B. (2013). Institutions, Foreign Direct Investment, and Domestic Investment: Crowding out or Crowding in? Maastricht: Maastricht Economic and social Research institute on Innovation and Technology (UNU - MERIT).

FDI-intelligence. (2015). Global greenfield investment trends. Global from the financial times LTD. http://lexicon.ft.com/Term?term=foreign-direct-investment. (n.d.). Retrieved December 08, 2015, from Financial Times.

IMF. (2014). The Federal Democratic Republic Of Ethiopia:Selected Issues Paper. Washington,D.C: IMF.

Intelligence, F. (2015). Global greenfield investment trends. Global insight from the financial times LTD.

Kamaly, A. (2014). Does FDI Crowd in or out Domestic Investment ? New Evidence from Emerging Economies. Scientific Research .

Khatib, H. B., Altaleb, G. S., & Alokor, S. .. Economical Determinants Of Domestic Investment. European Scientific Journal , April edition vol. 8, No.7.

Moses, Olise, Anigbogu, Theresa, Okoli, Moses, et al. (2013). Domestic Investment and Foreign Direct Investment Flows In Nigeria. IOSR Journal Of Humanities And Social Science , 13 (6).

Lean, H. H., & Tan, B. W. (2011). Linkage Between Foreign Direct Investment, Domestic investment and Economic Growth in Malaysia. Journal of Economic Cooperation and Development , 75-79.

Mustefa, S. (2014, June). Private Investment and Economic growth Evidence from Ethiopia. Mekele.

Nayak, D., & Choudhury, R. N. (2014, March). A selective review of foreign direct investment theories. Bangkok.

N.Gujarati, D., & Porter, D. C. (2009). *Basic Econometrics*. West Point: McGraw Hill.

Ndikumana, L., & Verick, S. (2007). The Linkages between FDI and Domestic Investment: Unravelling the Developmental Impact of Foreign Investment. Economics Department Working Paper Series . University of Massachusetts - Amherst.

Razin, A. (2004). The Contribution of FDI Flows to Domestic Investment in Capacity, and Vice Versa. (T. I. Rose, Ed.) Growth and Productivity in East Asia, NBER-East Asia Seminar on Economics , 3.

Sharpe, S. A., & Suarez, G. A. (2013). The insensitivity of investment to interest rates: Evidence from a survey of CFOs. Washington DC: Federal Reserve Board.

State, U. o. (2015). Investment Climate Statement-Ethiopia. Addis Ababa.

Tadesse, A. (2012, June). The Nexuses Between Public Investment, Private Investment, Trade Opennes And Economic Growth In Ethiopia: Co-Interated Var Approach. Addis Ababa.

Velde te., D. (2006, January 30). Foreign Direct Investment and Development:An historical perspective. Overseas Development Institute.

Todaro, M. P., & Smith, S. C. (2012). *Economic Development* (Eleventh ed.). (D. Battista, Ed.) New York, Washington: New York & Washington University.

Ullah, I., Shah, M., & Khan, a. F. (2014). Domestic Investment, Foreign Direct Investment,and Economic Growth Nexus: A Case of Pakistan. Economics Research International , Volume 2014.

UNCTAD. (2007). Definitions And Sources.

UNCTAD. (1999). Foreign Direct Investment and the Challenge of Development. New York and Geneva: United Nation.

UNCTAD. (2015). World Investment Report. New York: UNCTAD.

Velde, D. W. (2006, January 30). Foreign Direct Investment and Development;An historical perspective. Overseas Development Institute.

Verbeek, M. (2004). *A Guide to Modern Econometrics* (Second ed.). West Sussex: John Wiley and Sons ,Ltd.

Worku, M. (2006). Private investment, Public investment and Economic growth in Ethiopia.