

Impact of Government Capital Expenditure on Growth of Private Sector Investment: The Case of Ethiopia

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Abstract

The paper is entitling with impact of government expenditure on growth of private sector investment the case of Ethiopia. Ethiopia's public sector led development strategy has delivered strong growth and rising living standards. To sustain growth and employment creation, there is a need to carefully consider the balance between public and private sectors in the economy. The main object of this study is focused on the impact of government capital expenditure on growth of private sectors investment. Currently Ethiopian economy is goes sustainable growth with the program of millennium development goals, as result improving private investment also one of this program and the researcher wants to see the gap between the government capital expenditure and private sector investment means weather crowd in or crowd out. The study used secondary time series data Annual from 1981 to 2014 and the multiple regression analysis and co-integration methods are used in estimating the parameters of the model. The result from the analysis indicates capital expenditure in the long run model output is significant and positive effect on the private investment and the positive value shows capital expenditure is crowd in private investment. This result also concludes different scholars. Accordingly, Serven (1998), He argued that an increase in public infrastructure raises the long run private capital stock by reducing the cost of capital to the private sector.

Keywords: government expenditure, private sector investment

1. Introduction

1.1. Background of the study

The Ethiopia government is an investment friendly country with a stable macro-economic environment. Its monetary policy have played a significant role in creating an enabling climate to addressing the need of the public, assisting the economics activity and attractive investors. Ethiopia has been taking suitable measures to improving the investment policy of the country with aim to promoting sustainable economic development. Ethiopia is a country with huge investment opportunity and it is a reliable business partner. The government of Ethiopia has been taking different measuring to create a more conductivity investment land cape with the aim to stimulating and encourage the private sector to explore these investment potentials. Ethiopia's feasible economic environment, the investment code with its incentive prize both at federal and regional levels, the available natural resources and availability of relatively cheap labor force are said to be the major investment attracting factors.

The interest of economists in the relationship between government expenditure and private investment is motivated mainly by the controversy over the crowding out or crowding in effect of government expenditure on private investment. With the renewed interest in the role of the private sector as an engine of economic growth, the examination of this relationship is given further movement.

As a result of the poor performance of the economy over the period in which government played the leading role in the economy, there was a change in the expected role of the government. To this end, market oriented structural reform programmes such as privatization, deregulation and liberalization were adopted to ensure a reduction in the role of government in the economy. The guiding principle in this redefined role of government was that government should concentrate its resources in areas that compliments rather than crowd-out private sector investment, thereby creating an enabling environment for the private sector investment.

Building and operating infrastructure facilities as well as the delivery of basic services have predominantly been the responsibility of the public sector as they involve huge investment costs and take long time for the returns on investment to be realized. However, it has proved very difficult for many governments to meet the growing demand for infrastructure facilities and basic services by themselves. The inability of the public sector (government) to provide infrastructure and deliver services affects the promotion and expansion of businesses in communities. As a result, governments in several countries have been increasingly engaging the private sector in the provision of infrastructure facilities, investments in operation and maintenance of facilities as well as the delivery of basic services through public private partnership arrangements.

Private investment enhances the development of country through reduction of poverty, increasing the accumulation of fixed capital, creation of employment opportunity, increasing the revenue of government. And the researcher wants to study the impact of government capital expenditure on the growth private sector investment and to see trend between the government expenditure for the investment and the private investment.

Throughout the 19th Century, most governments followed laissez faire economic policies & their

functions were only restricted to defending aggression & maintaining law & order. The size of public expenditure was very small. But now the expenditure of governments all over has significantly increased. In the early 20th Century, John Maynard Keynes advocated the role of public expenditure in determination of level of income and its distribution.

In developing countries, public expenditure policy not only accelerates economic growth & promotes employment opportunities but also plays a useful role in reducing poverty and inequalities in income distribution.

Ethiopia's public sector led development strategy has delivered strong growth and rising living standards. To sustain growth and employment creation, there is a need to carefully consider the balance between public and private sectors in the economy. A vibrant private sector is essential to attain middle income status. Therefore, it would be important to further competition in areas where public enterprises enjoy monopolies, and gradually withdrawing from sectors where they crowd out the private sector.

Private sector operators argued that the factors which militate against their contributions to the economy include high cost of doing business, unstable macroeconomic policies, infrastructural restricted access, faltering consumer spending, lack of capital investment and roasting effect of multiplicity of taxes. The very low productivity or competitiveness of the private sector is as a result of the aggressive business environment.

Currently Ethiopian economy is goes sustainable growth with the program of millennium development goals, as result private investment also one of this program and the researcher wants to see the gap between the government expenditure and the growth of private sector investment means weather crowd in or crowd out.

2. LITERATURE REVIEW

2.1. Theoretical Literature Review

The private sector encompasses all for-profit businesses that are not owned or operated by the government. Companies and corporations that are government run are part of what is known as the public sector, while charities and other nonprofit organizations are part of the voluntary sector.

Private investors wealthy individuals looking for a profitable return in a viable business venture, also known as business angels or angel investors will also offer networking opportunities and business connections or sometimes take on a management role in their invested company. While other sources of business funding exist, like bank loans and government grants, private investors are willing to take risks on developing companies that many financial institutions are not (even more so in recent market conditions). Private investment funds are also often received quicker than funding from venture capitalists an individual, firm or pool of individuals who invest large sums of money in already-established businesses, because less due diligence (investigations or audits of a potential investment) is involved. In turn, private investors are usually more patient about receiving a return on their investment than venture capitalists or large firms.

Keynesian Theory of Investment

The evolution of investment theory has its origin from Keynes' (1936) path breaking work. Keynes argued that investment depends to a large extent on the prospective Marginal Efficiency of Capital, relative to interest rate which is the opportunity cost of capital. He stresses the volatility of private investment given that investors cannot predict for a certainty the returns on investment. This collaborates with the views of both Keynesian and neoclassical model of investment.

Subsequent theories of investment after Keynes were basically growth models. This growth models gained currency in the 1960s. One of the most important is the Accelerator Theory which argues that investment is a linear proportion of changes in output. Jorgenson (1967), (1971) and Hall (1977) as mention in Mamatzakis (1994) reviewed the restrictive assumptions of the accelerator theory and formulated the neoclassical approach. In this approach, optimal capital stock is a function of the level of output and user cost of capital. These works serve as the bases for the theories to be reviewed in this work.

Fiscal policies that increase the deficit will result in future taxes being higher than they otherwise would have been, but, depending on the policies 'effects on incentives for investing in human or physical capital, they might also raise future living standards. Policies that absorb slack resources or foster investment might reduce government saving, as reflected in the greater budget deficit, while they increase total saving, as reflected in the greater rate of capital formation. This additional saving might be supplied by the increase in national income, or it might come from foreign sources. Policies that fail to raise income and investment not only reduce government saving, but also reduce total saving. Closely related to investment is foreign aid. In theory, foreign aid could relax any or all of the constraints on investment (Bacha, 1990).

Public private partnership

Public private partnership arrangements in Ethiopia can certainly establish the appropriate balance between the crowding in and crowding out business syndrome currently prevailing in the market-based approach to strengthen private sector development and ultimately bridge the demand and supply gap in infrastructure and

service delivery. This is achievable in the short to medium term, depending on the type of projects prioritized and the way and manner projects are formulated and implemented to achieve win-win results for the public and private sectors as well as the citizens who are the ultimate beneficiaries.

For private sector service providers in Ethiopia, the public private partnership investment modality offers an opportunity to have access to public powers and competencies as well as significant influence on government decision-making with regard to urban development, infrastructure, service delivery, and other development activities. This is because in public private partnerships an all-inclusive planning and decision making process is entrenched, clearly understood risks identified and shared, and functional capacities developed to maximize efficiency gains. Irrespective of the activity, area and/or project, international experience has shown that one crucial factor for public private partnership investment is whether the private partner can earn a profit from a satisfactory return on his investment or because there are sufficient public subsidies to make up for shortfalls in return on investments.

Privatization

Privatization infers that a government sells a public asset/ physical structure to a private or nongovernmental buyer and consciously disengages itself from responsibilities and accountability for the provision of a service. In the context of Ethiopia, privatization can also involve co-ownership and joint ventures between government and private partners or a set of processes leading to divestiture and outright sale of state assets by government to private parties. In the case of the first scenario (co-ownership and joint ventures), responsibilities and accountability are exercised jointly by the government and private partners, whereas in the latter case responsibility and ownership are ceded to private parties by the government.

2.2. Review of Empirical Literature

There have only been a few empirical studies on how the presence of government owned corporations affects investment by other firms. For Malaysia, Razak et al. (2011) set out to examine a related issue by looking at the relative performance of 210 listed firms between 1995 and 2005 to see if ownership matters. They report mixed results, with the relative performance of GLC (Government-Linked Corporations) and non-GLCs as a group critically dependent on the inclusion of a few, large GLCs. The small sample size and sensitivity of the results to inclusion of a handful of firms prevent any robust conclusions to be drawn, unfortunately. Dewenter and Malatesta (2001), on the other hand, examine the differences in efficiency between the characteristics of a sample of very large global private and state-owned firms. They find that government firms are much less profitable than private firms. In addition, government-owned firms also tend to have greater leverage and a higher level of labor intensity.

Ramirez and Tan (2004) set out to examine the behavior of GLCs in Singapore, focusing on the differences in the characteristics between GLCs and non-GLCs. They find that GLCs in Singapore do not enjoy preferential access to finance. This is not that surprising given the financial market in Singapore is well developed and their sample consists of listed firms only.

Empirical studies on capital expenditure issue report contrasting results for both developing and developed countries. Apergis (2000) evaluated the effect of public spending (consumption and investment) on Greece for the period (1948–96) He found that for early years both variables are positively co integrated. However, for a more recent sub-period, 1981–96, the co integration relationship between those variables is negative. Ramirez (2000) finds a positive relationship between public and private investment in eight Latin American countries (Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Uruguay) for the period 1980–95. Cardoso (1993) found a similar result with data for six Latin American countries (Argentina, Brazil, Colombia, Chile, Mexico, and Venezuela) using a panel comprising information for three sub-periods between 1970 and 1985.

Other studies in Africa have focused on the effect of investment through the availability of credit where government-owned firms are seen to have preferential and easy access to credit. Harrison and McMillan (2001) examine the response of private and state-owned firms to greater foreign direct investment in Ivory Coast. There are concerns that borrowing by foreign firms could crowd out domestic firms' access to the limited bank funding available. They find that state-owned firms are less credit constrained than domestic firms and that only private firms are crowded out by higher borrowings by foreign firms.

In the case of Africa, Badawi (2004) investigated the impact of macroeconomic policies on private investment in Sudan employing annual data over the period 1969-1998. The focus was on public investment, credit, devaluation, and interest rate policies while blending co integration, vector autoregressive (VAR) and error correction techniques to estimate the long and short run coefficients. The results suggested significant crowding-out effect of public investment on private investment in Sudan. Devaluation policies also contributed to discouraging private sector capital expansion. Monetary policy in the form of restricting domestic credit appeared to have had a significant impact on private investment. This was indicated

by the positive impact of banking sector credit on private investment. Increasing real interest rates has been impacting negatively on private investment in Sudan.

Ronge and Kimuyu (1997) examined the determinants of private sector investment for Kenya using data over the period 1964-1996. A double-logarithmic form of the investment equation was estimated using OLS. The results indicated that both the availability of credit and foreign exchange exerts significantly positive effects on private investment confirming the results in most empirical studies.

The study also establishes a negative of exchange rate depreciation on investment while public investment crowded in private investment, contrasting the results of Were (2001) for Kenya where crowding-out was found. Interest rate was also found to be less important in determining the level of private investment in Kenya.

In a related study, Asante (2000) employed the Ordinary Least Squares approach to model private investment behaviour in Ghana using time series data over the period 1970 to 1992. Asante finds a positive public-private investment relationship which was significant at the 1% level suggesting a “crowding-in” effect of public investment on private investment thus confirming the theoretical hypothesis between the two variables. The growth rate of real credit to the private sector also has a significant positive sign in all the trials. Further, the measure of macroeconomic instability has a negative in the trials and significant at the 1% level particularly inflation rate.

Separating public investment into infrastructure and non-infrastructure investment, some empirical studies have found evidence of a positive relationship between public investment in infrastructure and private investment. By contrast, the effect of government spending on non infrastructure has a negative effect on private investment (see, for instance, Blejer and Mohsin (1984)). Pereira (2000) reports that five types of total public investment have a positive effect on private investment and output in the US for the period 1956–97 using a four variable VAR. Due to the type of spending considered, the result is consistent with the view that public investment in infrastructure tends to encourage private activity by means of a rise in private sector productivity.

3. METHODOLOGY

3.1. Data Sources and coverage

The study used secondary time series data Annual data from 1981 to 2014 of variables like private investment, GDP, Bank Credit to private sector, Capital Expenditure, CPI, and NER. And its main source is from the National Bank of Ethiopia National Bank of Ethiopia and Minster of Financial and Economic Development. The researcher used EVIEWS software to carrying out the estimation.

3.2. Model Specification

In determining the effect of government capital expenditure on growth private sector investment in Ethiopia, the multiple regression analysis and co-integration methods are used in estimating the parameters of the model. Thus, the estimated coefficients served to indicate the extent of crowding in and crowding out between government capital expenditure and private investment. The Regression Coefficient is estimated using Ordinal Least Squares. The private investment function has been specified using the following Econometrics Model.

$$PI_t = f(CE_t, GDP_t, BC_t, CPI, NER_t, DD_t) \dots \dots \dots 1$$

Where

t=1, 2, 3...33 (time period ranging from 1981 to 2014)

PI= private investment in time t. CE= government capital expenditure.

BC = Bank credit availability CPI = Consumer price index.

RIR =Real interest rate (real interest rate =nominal interest rate – inflation rate.)

GDP = gross Domestic Product. NER=Nominal Exchange Rate

D=Dummy variable

Equation (1) can be rewritten for estimation purpose as follows:-

$$IPI_t = \partial_0 + \partial_1 IBC_t + \partial_2 ICE_t + \partial_3 NER_t + \partial_4 IGDP_t + \partial_5 ICPI_t + \partial_6 DD_t + \varepsilon_t \dots \dots \dots 2$$

Where ∂_0 is the intercept and $\partial_1, \partial_2, \partial_3, \partial_4, \partial_5, \partial_6$ are the coefficients of BC, CE, NER, GDP, CPI and DD respectively. ε_t is error term.

All variables are in natural logarithm form and the dummy variable DD. Log transformation can reduce the problem of heteroskedasticity because it compresses the scale in which the variables are measured, thereby reducing a tenfold difference between two values to a twofold difference (Gujarati,1995). It is important to note that the model is a multiplicative one where all parameter coefficients represent constant elasticities.

3.3. variables selection and Theoretical assumption

Private investment: - for this study the researcher used as the dependent variable. In many cases, this refers to a

private business that has a limited number of share holders the utilization in national territory of capital, technologies and know-how, capital equipment and other assets, in specific economic projects, or the utilization of funds assign for the setting up of new companies, association or other forms of corporate representation of private domestic or foreign companies, as well as the acquisition of the whole or part of existing companies incorporated under the country law, with a view to the implementation or continuity of a specific economic activity in accordance with their corporate purposes. Because of data unavailability of private investment the researcher used the proxy for private investment as the following formula.

$$TI = CE + PI \text{ And } GCF = CE + PI \text{ then } PI = GCF - CE$$

Where TI =total investment, and GCF= gross capital formation

Bank credit to private sectors: - An increase in real interest rates encourages deposits and, hence, increases the availability of funds to the private sector to finance investment projects while discourage low-yield projects. In contrast, the theory emphasizing the role of asymmetric information in financial markets predicts that an increase in interest rates causes credit rationing because the lenders expected profitability is not monotonically increasing in interest rates. At higher rates, lenders may experience a decrease in profits due to adverse selection, moral hazard, and monitoring costs. Therefore, lenders are not willing to lend at a rate higher than that which maximizes their expected profits, even though there are agents willing to borrow at that higher rate. Increasing credit by the banking sector to the private sector is likely to boost private sector investment. Thus the effect of credit to the private sector is expected to be positive ($\partial 1 > 0$).

Government Capital Expenditure:-can be defined as, the expenditure incurred by public authorities like central, state and local governments to satisfy the collective social wants of the people is known as public expenditure.

Government Capital Expenditure is also associated to investment or development spending, where expenditures have benefits extending years into the future. According to theory, the effect of public investment on private investment is indeterminate. The sign of the effect depends on the area in which the government executes the investment projects. Public (government) investment has an ambiguous a priori effect on private investment. On one hand, public investment may crowd-out private investment via increased deficits and a high interest rate (i.e. the Ricardian Equivalence Theorem) and the competition for certain scarce resources (e.g. skilled labour, raw materials, etc). However, public investment may act as crowding-in catalyst through the provision of key infrastructure (e.g. transport, communication, irrigation projects, etc). Thus at the theoretical level, the effect of public investment is ambiguous: $\partial 2 < 0$ implies crowding-out whereas $\partial 2 > 0$ suggest crowding-in.

Exchange Rate:- can influence the level of private-sector investment, as it is one of the components that determine the real cost of imports. A currency devaluation increases the real cost of purchasing imported capital goods, thereby reducing the profitability of the private sector and possibly causing investment to decline. Furthermore, a real devaluation can mean a fall in the real income of the economy as a whole, thus reducing productive capacity and activity to levels that businesses find uncomfortably low. Conversely, real currency devaluation can have a positive impact on investment in sectors producing internationally traded goods, as it increases competitiveness and export volumes. Similarly, real exchange rate depreciation increases profitability in export oriented sectors and therefore promotes investment in these sectors. On the other hand, depreciation of the exchange rate increases the cost of imported capital goods, and thus decreases investment in import dependent production sectors. Thus the effect of real exchange rate on private investment (i.e. $\partial 3$) is also ambiguous.

Gross Domestic Price:- Real GDP is used to capture the aggregate demand conditions in the economy and it is expected to exert a positive effect on private investment. In addition to the determinants mentioned above, private investment spending depends on output, economic reform policy, and on its own lagged values. Since the early study of Clark (1917), the change in output is considered as a determinant of investment spending. This effect is the well known "accelerator effect". Output also plays an important role in the neoclassical approach of investment introduced by Jorgenson (1963), although the central feature of this theory is to evaluate the effects of relative prices on the demand for capital. Output affects investment decisions due to its effect on firms' profitability and also by means of the output-saving-aggregate investment channel. Consequently, the study expects the coefficient of real GDP to be positive ($\partial 4 > 0$).

Inflation rate:- Macroeconomic instability may increase uncertainty and adversely affect private investment. If government does interference, say by increasing spending, and this is expected, then people will expect an inflationary effect, and private sectors become less. As a result a high inflation rate is expected to negatively affect private investment, i.e. $\partial 5 < 0$.

Dummy variable:- A regime of constitutional rule ensures well functioning democratic institutions, which is a precondition for a favourable investment climate. This is constructed such that it takes the value of zero for the period of durge regime (before 1992) and the value one in the transition government of Ethiopia (1992-1994) and in the period of EPRDF(1994-2013).

Thus, a socio-politically stable environment where property rights and contracts are enforced through a properly functioning judicial system will have a positive impact on private investment. Thus, the dummy variable in the model is expected to be positive ($\delta > 0$).

3.4. Unit Root Test

Augmented Dickey-Fuller test proposed by Dickey and Fuller (1979, 1981) is widely used in economic literature to investigate the stationarity of a time series data. Dickey and Fuller (1979, 1981) on the basis of Monte-Carlo simulation and under the null-hypothesis of the existence of unit root in time series have tabulated critical values for to which are called 'τ (tau) statistics'. Philips (1986) points out that if we treat the non stationary series with Ordinary Least Squares (OLS), the results will be misleading for economic analysis. The model can lead to the problem of spurious regressions with very high R-squared (approximating unity) and significant t and F-statistics (Granger and Newbold, 1974).

3.5. Testing for Co-Integration

In the case of co integration recognizing the fact that most macroeconomic data are non stationary. Co-integration is a popular econometric technique which is used to find long run relationship between variables. A regression based on unit roots is meaning if the variables are co-integrated, i.e. have long run relationship. According to time series econometrics, if the residuals from a regression of unit roots are stationary then the variables are said to be co-integrated. This is because even if the variables are individually non stationary their linear combination is stationary which is despite by the stationarity of the residuals. The analysis is preceding using Johansen co-integration test

3.6. Long Run Model Specification

Long Run OLS estimation result shows in model private investment determined by how many percent of R-squared by the independent variables as well as by what percentage of Adjusted R-Squared (coefficient of determination) measures the proportion or percentage of the total variation in dependent variable explained by the regression model.

3.7. Short Run Model Specification

ECM has been used to find out the short run dynamics. It is important to recognize that the ECM is perfectly appropriate for stationary time series. The term 'error correction models' applies to any model that directly estimates the rate at which changes in dependent variable return to equilibrium after a change in independent variable. The ECM model has a nice behavioral justification in that it implies that the behavior of dependent variable is tied to independent variable in the long run and that short run changes in dependent variable respond to deviations from that long run equilibrium.

3.8. Model Fitness and Diagnostic Checking

R-Squared (correlation coefficient) the measure of correlation between dependent and independent variable well explained the model. If the dependent and the independent are highly correlated this shows the strength of the model. Adjusted R-Squared (coefficient of determination) measures the proportion or percentage of the total variation in dependent variable explained by the regression model. Which is the most commonly used measure of the goodness of fit of a regression.

The value of Durbin Watson Statistics is the most celebrated test for detecting the existence of serial correlation. To use the DW test, we have to assume these assumption (i) the regression model contains an intercept, (ii) the error process is AR1 (the test says nothing about higher order autocorrelation), (iii) the error term is normally distributed, (iv) there is no lagged dependent variable, and (v) there are no missing observations in the data.

The second test for serial correlation is the Breusch-Godfrey (BG) or Lagrange Multiplier (LM) Test. The BG test is useful in that it allows for (i) lagged dependent variables, (ii) higher order autoregressive processes as well as single or higher order moving average processes. The basic idea is to regress the residuals from the OLS regression on all of the independent variables and on the lagged values of the residuals.

The researcher applied the necessary diagnostic tests on our model to check the problems of normality, serial correlation, multicollinearity, heteroskedasticity and model specification. And the residuals obtained from our long run model are normally distributed using normality test (Jarque-Bara test of normality) stats that we test the hypothesis. And the model well specified using Ramsey's RESET test. The ARCH test also negates or

cancels out the presence of autoregressive conditional heteroskedasticity.

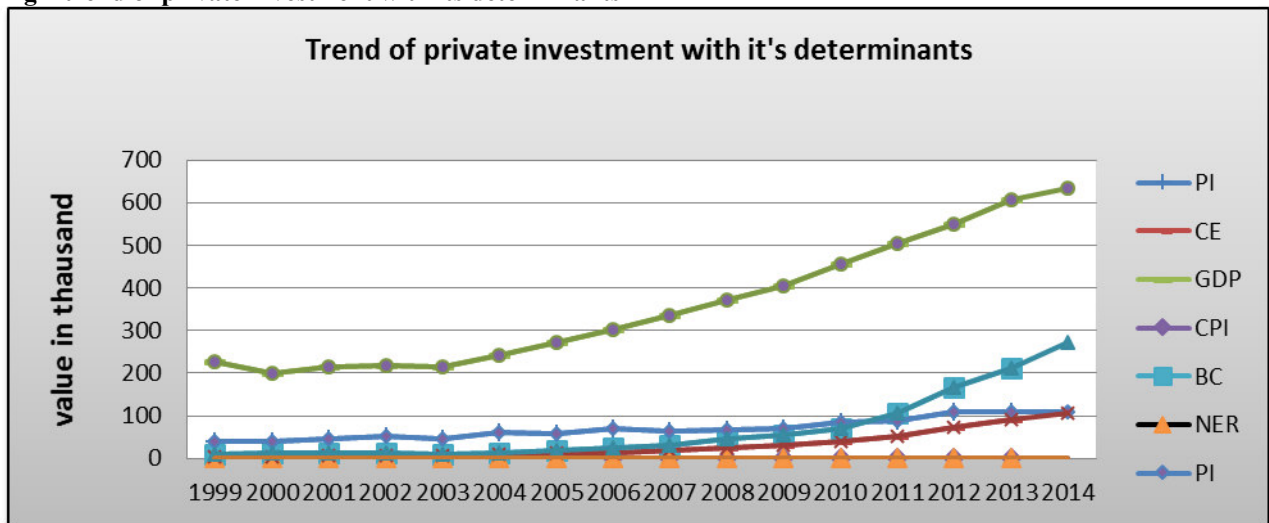
Multicollinearity is a condition where independent variables are strongly correlated with each other. When multicollinearity exists in your model, you may see very high standard error and low t statistics, unexpected changes in coefficient magnitudes or signs, or non-significant coefficients despite a high R-square. Formally, variance inflation factors (VIF) measure how much the variance of the estimated coefficients is increased over the case of no correlation among the X variables. If no two X variables are correlated, then all the VIFs will be 1. If VIF for one of the variables is around or greater than 5, there is collinearity associated with that variable.

4. Result and Discussion

4.1. Descriptive Analysis

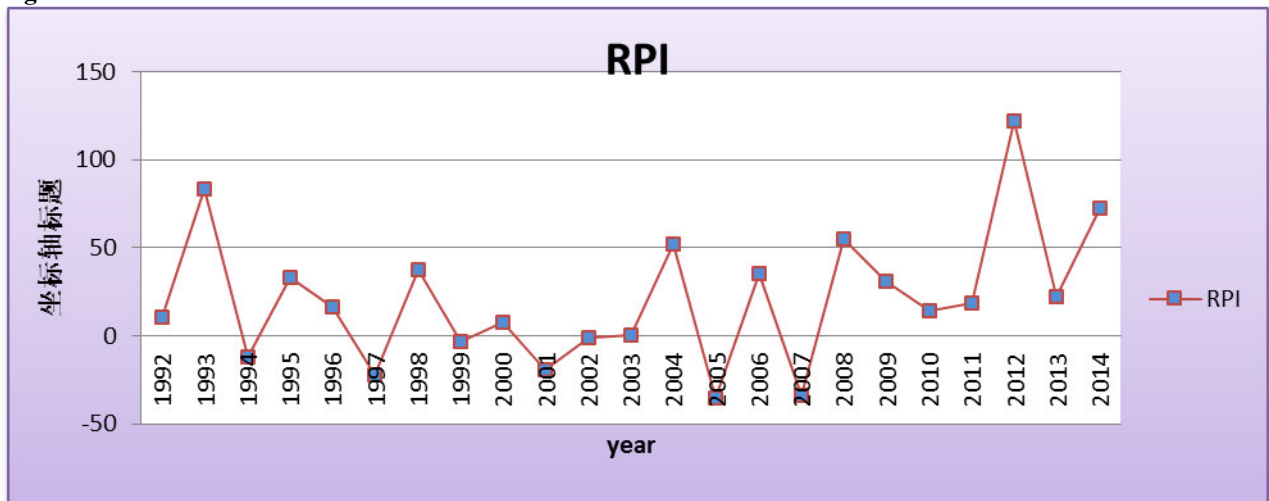
Fig 1 shows the trend of the dependent variable and the independent variable. As we show in the below graph the trend of RGDP is indicating highly increment from all variables. The trend of NER is stable or no change in the graph and the rest variable are almost the same trend of increment.

Fig 1 trend of private investment with its determinants



Source NBE data completion

Fig 2 Growth of Private Investment



Source NBE and MoFED

In May 1992, the government issued a detailed proclamation on investment and established and Investment Authority accountable to the Board of Investment. This proclamation was further revised in June 1996. Ethiopia's investment code provides incentives for development-related investments, reduces capital entry requirements for joint ventures, permits the duty free entry of capital goods (except computers and vehicles), opens the real estate sector to expatriate investors, extends the losses carried forward provision, cuts the capital gains tax from 40 to 10 percent, and gives priority to investors in obtaining land for rent (Ethiopian government portal). In the above fig.2 indicates the growth rate of private investment from the period 1992 to 2013.

The growth of private investment in 1993 indicated almost 80% this is because the transition period of low productivity or the new proclamation of investment. In the period of 2005 also the growth rate of private investment is decline this is due to Ethiopian draught (1977E.C).the other point is in 2007/08 also unstable growth this also might due to the world financial instability. After 2009 the growth of private investment is showed increment and in 2012 the growth of private investment highly increment this is due the government concentrates on development of infrastructure.

4.2. Empirical Analysis

4.3. Result of unit root test

Table-1: Augmented Dickey-Fuller (ADF) Test for Unit Root

Variable	ADF Test at level		ADF Test at 1st difference	
	Constant	Constant +Trend	Constant	Constant +Trend
	Actual value (t-cal)	Actual value (t-cal)	Actual value (t-cal)	Actual value (t-cal)
LPI	0.06	-3.19	-3.73*	-3.96*
LCE	0.78	-1.01	-2.12	-4.36*
LBC	2.28	-1.16	-3.35**	-4.23**
LCPI	1.19	-0.83	-5.03*	5.33*
LGDP	3.27**	-0.28	-4.11*	-7.07*
NER	-0.67	-3.08	-4.20*	-4.17*

Note

- ✓ **t critical without trend at 1%=-3.66 and 5%=-2.96 with trend and intercept at 1%=-4.28 and at 5%=-3.56**
- ✓ *** represents significant level at 1%. And ** represent significant level at 5%.**

The above table indicates the unit root test result of the variable using Augmented Dickey-Fuller (ADF) type. For this test Akaike info criterion test was used to select the maximum lag length. All variable are stationary at first difference with constant and trend and constant at 1% ,5% level of significance.

4.4. Testing for Co-Integration

In order to check for the existence of long run relationship, co integration, in the model a Johansen co integration test was used to check whether have a long run relation among the variable's or not. There may be more than one co-integrating relationship among co-integrated variables. Johansen test provides estimates of all such co integrating equations and provides a test statistic for the number of co integrating equations.

Table -2 LR Test of Co-Integration

Null Hypothesis: Residual has a unit root		
Exogenous: Constant		
Lag Length: 2 (Automatic based on SIC, MAXLAG=7)		
		t-Statistic
		Prob.*
Augmented Dickey-Fuller test statistic		-5.026446
Test critical values:	1% level	-3.679322
	5% level	-2.967767
	10% level	-2.622989
*MacKinnon (1996) one-sided p-values.		

As the above table 2 indicate the Augmented Dickey-Fuller test statistic (5.02) is greater than the test critical values ,which indicates fail to reject the null hypothesis the presence of unit root test (non stationarity), there for we conclude that the residuals are stationary at a level. This hypothesis is indicates the meaning full relationship among the variables in the long run.

4.5. Long Run Model

Equation 2 also can be written as in the long run form and logarithm form for the normalization purpose to see the correct figure of variables:-

$$IPI_t = \partial_0 + \partial_1 LBC_t + \partial_2 LCE_t + \partial_3 LNER_t + \partial_4 LGDP_t + \partial_5 LCPI_t + \partial_6 DD_t + \varepsilon_t \dots \dots \dots 3$$

Table -3 LR OLS Estimation Result

Dependent Variable: LPI				
Method: Least Squares				
Date: 01/18/16 Time: 13:24				
Sample (adjusted): 1982 2014				
Included observations: 33 after adjustments				
Convergence achieved after 7 iterations				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGDP	0.666873	0.330779	2.016069	0.0551
LCPI	-0.658615	0.091522	-7.196257	0.0000
LCE	0.266018	0.095831	2.775917	0.0105
LNER	-0.383780	0.158219	-2.425630	0.0232
LBC	0.034830	0.100929	0.345097	0.7330
DD	-0.046329	0.145998	-0.317325	0.7537
C	3.972070	3.188718	1.245664	0.2249
@TREND	-0.004508	0.008305	-0.542790	0.5923
AR(1)	-0.438683	0.188799	-2.323547	0.0289
R-squared	0.969484	Mean dependent var		10.61664
Adjusted R-squared	0.959312	S.D. dependent var		0.566393
S.E. of regression	0.114249	Akaike info criterion		-1.273872
Sum squared resid	0.313268	Schwarz criterion		-0.865733
Log likelihood	30.01889	F-statistic		95.30839
Durbin-Watson stat	2.053775	Prob(F-statistic)		0.000000
Inverted AR Roots	-0.44			

Table 3 LR OLS estimation result of R-squared shows in long run model private investment was determined by 96% of the independent variables. In the long run model the independent variables are very high determine of private investment. The 95% Adjusted R- Squared (coefficient of determination) measures the proportion or percentage of the total variation in dependent variable explained by the regression model. The value of Durban-Watson 2.05 stats there is no serial correlation between the variables in the long run. As shown in the above table all variables except BC are significance at 1% and 5% level.

4.6. Short Run Dynamics

ECM has been used to find out the short run dynamics. The results of short run dynamics of the variables are reported in table-4. According to these results all variables except CE are significant at 1% and 5% level of significance. ECM also significant at 1% level of significant.

Short Run model is given as:-

$$DIPI_t = \partial_0 + \partial_1 DIBC_t + \partial_2 DICE_t + \partial_3 DNER_t + \partial_4 IDGDP_t + \partial_5 IDCPI_t + \partial_6 DD_t + \gamma ECM(-1) \dots \dots \dots 4$$

Table -4 short run model out put

Dependent Variable: DLPI				
Method: Least Squares				
Date: 01/18/16 Time: 13:47				
Sample (adjusted): 1984 2013				
Included observations: 30 after adjustments				
Convergence achieved after 81 iterations				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLGDP	2.079517	0.430168	4.834193	0.0001
DLCPI(1)	-0.495111	0.197653	-2.504955	0.0201
DLCE	0.135836	0.122974	1.104594	0.2813
DLNER(1)	-0.714036	0.198987	-3.588363	0.0016
ECM(-1)	-0.971303	0.259062	-3.749310	0.0011
DLPI(1)	-0.679354	0.114341	-5.941493	0.0000
C	-0.056793	0.040203	-1.412670	0.1717
AR(1)	0.304679	0.247210	1.232471	0.2308
R-squared	0.812535	Mean dependent var		0.055863
Adjusted R-squared	0.752887	S.D. dependent var		0.231616
S.E. of regression	0.115138	Akaike info criterion		-1.262200
Sum squared resid	0.291647	Schwarz criterion		-0.888547
Log likelihood	26.93300	F-statistic		13.62215
Durbin-Watson stat	2.040347	Prob(F-statistic)		0.000001
Inverted AR Roots	.30			

The above EViews result of output can be rewrite as follow:-

$$DLPI = 2.07 * DLGDP - 0.49 * DLCPI(1) + 0.13 * DLCE - 0.71 * D(LNER(1)) - 0.97 * ECM(-1) - 0.67 * DLPI(1) - 0.05 + [AR(1) = 0.30]$$

The Error Correction Model of our short run model is also statistically significant with a negative sign. It is another proof that short relationship exists among the variables. The negative value of coefficient of ECMt-1, which is (-0.91), indicates the very high speed of convergence towards equilibrium.

4.7. OLS Regression result

The above long run EViews result of output can be rewrite as follow:-

$$LPI = 0.66 * LGDP - 0.65 * LCPI + 0.26 * LCE - 0.38 * LNER + 0.039 * LBC - 0.04 * DD + 3.97 - 0.004 * @TREND + [AR(1) = -0.43]$$

The above OLS regression result indicates the coefficient of parameters variables are describes as follow. As expected in the above GDP in the long run and in the short run is positive significant relation with the main variable. As stated in the above theoretical expectation as GDP increases private investment also increase by 66% in the long run. This is interpreting as GDP increase by one unit private investment also increase by 66%.

The coefficient of CPI is negative and significant value as expected in the theoretical assumption in both models. The coefficient in the long run -0.6585 measures change in the private investment when other things remain constant, and the negative value interprets as CPI change by one unit price private investment decrease by 65%.

CE also take as independent variable measure for the private investment and in the long run model output is significant and positive with the value of 0.2660 coefficient measures the private investment, and the positive value shows capital expenditure is crowded in private investment, This result also concludes different

scholars. Accordingly, Serven (1998), He argued that an increase in public infrastructure on the road, telecommunication and electric city raises the long run private capital stock by reducing the cost of capital to the private sector.

The other variable that describes the main variable is BC. In the long run model output as expected there is positive relation with private investment but not a significant value. they interpret as bank credit increase by one unite private investment also increase by 3% (0.0348),so bank credit is crowd in private investment .

NER also takes as independent variable which is measure to the main variable in both long run and short run output. In the both model output NER is negative significant effect up on private investment with the coefficient value -0.38 means as NER increases by one unit private investment decrease by 38%. they indicates currency devaluation increases the real cost of purchasing imported capital goods, thereby reducing the profitability of the private sector and possibly causing investment to decline.

4.8. Model Fitness

R-Squared (correlation coefficient) the measure of correlation between dependent and independent variable with 0.96 values well explained the model. Therefore the regressor and the regressond are highly correlated which shows the strength of the model. Adjusted R- Squared (coefficient of determination) measures the proportion or percentage of the total variation in dependent variable explained by the regression model. Which is the most commonly used measure of the goodness of fit of a regression. The value 0.95 depicts that 95 percent measures the proportion or percentage of the total variation of the independent variable explained by the regression model, which is nice explanation.

The value of Durbin Watson Statistics is 2.05which the most celebrated test for detecting the existence of serial correlation. In both long run and short run the study shows there is no a problem of serial correlation.

The second test for serial correlation is the Breusch-Godfrey (BG) or Lagrange Multiplier (LM) Test. The basic idea is to regress the residuals from the OLS regression on all of the independent variables and on the lagged values of the residuals. As shown below in annex 1 the BG test shows there is no problem of serial correlation using the null hypothesis :-

H_0 = There is no problem of serial correlation and the alternative hypothesis

H_1 = At least one has a problem of serial correlation.

4.9. Diagnostic Checking

The researcher applied the necessary diagnostic tests on the model to check the problems of normality, heteroskedasticity and model specification and multi-collinarity problems. The results of these tests are reported in Annex1. If this number of F-statistic is larger than the critical Chi-square value from the table you have a problem with Heteroskedasticity. But, the results in this table indicate that there is no problem of heteroskedasticity means critical Chi-square is greater than F-statistic. And the residuals obtained from our long run model are normally distributed using normality test (Jarque-Bara test of normality) stats that we test the hypothesis. Our model is well specified according to Ramsey's RESET test. The test statistics and probabilities from Breush-Godfrey Serial Correlation LM Test and White Heteroskedasticity test indicate respectively that there is no problem of serial correlation and heteroskedasticity. The ARCH test also negates or cancels out the presence of autoregressive conditional heteroskedasticity.

5. CONCLUSION AND RECOMMENDATION

5.1. Conclusions

The main object of this study is focused on the impact of government capital expenditure on growth private sectors investment. In the study time series data from 1981 to 2014 of relevant variables was used for empirical analysis. The study used co-integration test and multiple regression analysis to determine the influence of some identified explanatory variables on private investment in Ethiopia. The study concluded that the result of the analysis confirmed the basic findings of some earlier studies that the actual impact of government expenditure on private sector investment varies depending on the type of government expenditure under consideration.

Stationarity of variables of time series was checked by using Augmented Dickey-Fuller (ADF) unit root test. All variables are integrated in the same order of I (1) at their first differences at 5% level of significance. The results from the model will show the long run relationship among the variables. In order to check for the existence of long run relationship co integration in the model Johansson co integration test was applied.

Error Correction Model (ECM) had been used for the analysis of short run dynamics. The negative value of coefficient of ECTt-1 which is (-0.97), indicated the very high speed of convergence towards equilibrium.

Finding of this study shows that private investment is determine by the independent variable's in both long run and short run models.

The impact of the government capital expenditure on private investment was analyzed, and as shown in the above in long run there is positive significant effect up on private investment or crowded in government expenditure. This result also concludes different scholars. Accordingly, Serven (1998), He argued that an increase in public infrastructure raises the long run private capital stock by reducing the cost of capital to the private sector. In the short run there is not significant effect. The other crowded in effect in the long run up on private investment is GDP, as increasing domestic production with on a country private investment also highly increases.

The other important variable is bank credit In long run shows positive relation with private investment. Which means as bank credit to the private sectors increase the private investment also increase or crowded in private investment.

NER also takes as independent variable which is measure to the main variable in both long run and short run output. In the both model output NER is negative significant effect up on private investment. they indicates currency devaluation increases the real cost of purchasing imported capital goods, thereby reducing the profitability of the private sector and possibly causing investment to decline .

The last conclude variable is CPI, In the long run it shows negative significant value or crowd out private investment in both long run and short run means as inflation rate increase private investment goes decline.

5.2. Recommendation

The researcher recommend to the government or policy analysis Empirical results of this study prove that capital expenditure ,bank credit and GDP are positive effect on the main variables or does not crowd out private investment and CPI and NER are negative relation to the private investment ,as a result the researcher recommended as follow .

In this situation the researcher suggested that government should encourage the expansion in private sector investment especially towards the government capital investment Increase in public expenditures on the provision of infrastructure for rural areas will also be helpful for optimal private investment, And easy available of bank credit towards the private investment parallel to lending interest rate. And the other concern thing is inflation rate, we must control our inflation rate which indirect relation with private investment.

Annex

Annex : Diagnostic Tests (Long run Model)

Normality Test (Jarque-Bera Statistics)	Jarque-Bera Statistics = 5.05		Probability =0.09
Serial Correlation (Breush-Godfrey Serial Correlation LM Test)	F-Statistics=0.17	Critical chi-square =0.24	Probability = 0.61
ARCH Test (Autoregressive Heteroskedasticity Test)	F-Statistics=0.11	Critical chi-square=0.24	Probability = 0.88
Heteroskedasticity Test (White Heteroskedasticity Test)	F-Statistics=0.66	Critical chi-square=10.27	Probability = 0.67
Model Specification Test (Ramsey RESET Test)	F-Statistics=0.45	Log likelihood ratio=1.33	Probability = 0.51

Note:- for the test of Normality the researcher used the jarque-Bera statistics and must be less than 5.99 to be normal. And for the other test Critical chi-square must be greater than f-statistics to fill full the assumption.

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