

## A Time Series Analysis of Determinants of Private Investment in Ghana (1960-2010)

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### Abstract

In recent time, Ghana has embarked on policies that aim to rebalance the role of public and private sector in the economy and thus emphasize private sector development. This paradigm shift is to encourage private investment and ultimately make private sector the engine of growth. The study is a time series analysis of private investment in Ghana covering annual data set from 1960-2010. The study employed the techniques of co-integration and error correction modeling, which provided mechanisms to deal with the problems of unit root faced in time series data. In all, the study provides evidence that inflation, exchange rate, public investment, GDP, trade openness, aid, credit and external debt both in a short run and long run significantly affect the level of private investment. Also applying the general to specific approach to error correction model, statistical results suggested the existence of stable long run co-integrating relationships between macroeconomic and other variables and private investment.

**Key words:** Ghana, Inflation, Private Investment, Exchange Rate, Aid, Credit, External Debt

### 1. Introduction

The idea of developing the private sector as an alternative development strategy in order to enhance economic activities in developing countries to help boost economic growth and reduce poverty began to gain credibility and substance as far back as the 1980s (Ouattara 2004). In recent times, there is broad base consensus that private sector led growth has a stronger positive impact on economic growth than public investment due to the fact that private investment is relatively more efficient than public sector investment (Frimpong & Marbuah 2010).

The OECD (2006) states that private sector has a leading and significant role to play in the war on poverty as far as Sub-Saharan countries are concern. In effect private investment is identified as imperative for promoting broad-based and sustained growth that will help drive poverty reduction. A study by Khan & Reinhart (1990) observes the rate of economic growth is largely a function of the level of investment. As a consequence countries in which investment remains sluggish over a prolonged period of time face endangered growth prospect due to the lack of capital accumulation (Chirinko 1993). The flows of private investment into developing economies have been impressive over the last two decades. The IMF attributes the surge in inflow to two factors which it sees as driving force for private investment toward emerging markets investors' desire for portfolio diversification and higher profits, and macroeconomic and structural reforms in developing countries. Investors have become increasingly discriminating and show a marked preference for countries with sound policies.

In spite of Ghana impressive economic growth in the last decade, the rate of saving and investment in Ghana remains significantly lower. To achieve sustained growth path, it is necessary, among other policies, to stimulate the investment process. But investment and savings in Ghana continues to be below levels necessary and sufficient to achieve sustained economic growth. This situation presents a real and credible threat to generating economic growth necessary to raise living standards through sufficient productive employment and consequently reduce poverty Asante (2000). Asante further argued that in most part of Ghana's post independent history; the climate for private savings can best be described as hostile. Various sectors of the economy were characterized by low market competition, monopolistic tendencies and a high level of state owned enterprises in all essential sectors.

A growing number of studies have been conducted on private investment but their domain has largely been in developed countries. Clearly it is equally important for policymakers in developing countries to be able to assess how private investment respond to changes in government policy-not only in designing long-term development strategies, but also in implementing short-term stabilization programs (Blejer & Khan 1984). Even if there is consensus that an increase in private investment has an unambiguous positive effect on economic output, it is still necessary to establish how private investment in developing countries is determined in particular,

what variables systematically affect it before one can evaluate the influence that government can exercise over private investment decisions that change the current and future growth rate of the economy (Khan & Knight 1981). Ghana continues to be confronted with a number of constraints, including levels of savings and investment that are too low to fuel the growth needed to raise living standards and generate sufficient productive employment. This is worrisome because even mildly robust growth rates can be sustained over long periods only when an economy is able to maintain investment as a sizeable proportion of GDP. An understanding of investment patterns, and the factors that influence investment, is thus one of the key elements of a policy that fosters private investment.

### *2.1 Theories of Private Investment*

The theories of investment date back to Keynes (1936), who first called attention to the existence of an independent investment function in the economy. A central feature of the Keynesian analysis is the observation that although savings and investment must be identical ex-post, savings and investment decisions are, in general, taken by different decision makers and there is no reason why ex-ante savings should equal ex-ante investment. The next phase in the evolution of investment theory gave rise to the accelerator theory, which makes investment a linear proportion of changes in output. In the accelerator model, expectations, profitability and capital costs play no role. Keynesian theory has traditionally favoured the accelerator theory of investment while disregarding the role of factor costs. A more general form of the accelerator model is the flexible accelerator model. The basic notion behind this model is that the larger the gap between the existing capital stock and the desired capital stock, the greater a firm's rate of investment. The hypothesis is that, firms plan to close a fraction of the gap between the desired capital stock,  $K^*$ , and the actual capital stock,  $K$ , in each period. This gives rise to a net investment equation of the form of:

$$I = \delta (K^* - K-1) \dots \dots \dots (1)$$

Where  $I$  = net investment,  $K^*$  = desired capital stock,  $K-1$  = last period's capital stock, and  $\delta$  = partial adjustment coefficient. Within the framework of the flexible accelerator model, output, internal funds, cost of external financing and other variables may be included as determinants of  $K^*$ . The flexible accelerator mechanism may be transformed into a theory of investment behaviour by adding a specification of  $K^*$  and a theory of replacement investment. Alternative econometric models of investment behaviour differ in the determinants of  $K^*$ , the characterization of the time structure of the investment process and the treatment of replacement investment. In the flexible accelerator model,  $K^*$  is proportional to output, but in alternative models,  $K^*$  depends on capacity utilization, internal funds, the cost of external finance and other variables.

Jorgenson (1971) and others have formulated the neoclassical approach, which is a version of the flexible accelerator model. In this approach, the desired or optimal capital stock is proportional to output and the user cost of capital (which in turn depends on the price of capital goods, the real rate of interest, the rate of depreciation and the tax structure). In the "Q" theory of investment (which is also in the neoclassical framework) associated with Tobin (1969), the ratio of the market value of the existing capital stock to its replacement cost (the "Q" ratio) is the main force driving investment. Tobin argues that delivery lags and increasing marginal cost of investment are the reasons why Q would differ from unity. Another approach known as "neoliberal" emphasizes the importance of financial deepening and high interest rates in stimulating growth. The proponents of this approach are McKinnon (1973). The core of his argument rests on the claim that developing countries suffer from financial repression (which is generally equated with controls on interest rates in a downward direction) and that if these countries were liberated from their repressive conditions, this would induce savings, investment and growth. Not only will liberalization increase savings and loanable funds, it will result in a more efficient allocation of these funds, both contributing to a higher economic growth. In the neoliberal view, investment is positively related to the real rate of interest in contrast with the neoclassical theory. The reason for this is that a rise in interest rates increases the volume of financial savings through financial intermediaries and thereby raises investible funds, a phenomenon that McKinnon (1973) calls the "conduit effect". Thus, while it may be true that demand for investment declines with the rise in the real rate of interest, realized investment actually increases because of the greater availability of funds. This conclusion applies only when the capital market is in disequilibrium with the demand for funds exceeding supply.

It is clear from the discussion in this section that private investment depends on three broad categories of variables: Keynesian, neoclassical, and uncertainty variables. Variables that may be included in the Keynesian tradition include growth rate of GDP, internal funds and capacity utilization. The neoclassical determinants of private investment include Tobin's Q, real interest rate, user cost of capital and public investment ratio. There are three uncertainty variables. The first is variability (variance, moving standard deviation or moving coefficient of variation) of the user cost of capital, real exchange rate, inflation rate, distortions in the foreign exchange

market (proxied by the black market premium) and real GDP. The second uncertainty variable is the debt/GDP ratio and the third is debt service as a ratio of exports of goods and services.

## 2.2 Determinants of Private investment

There is a finite limit for domestic savings, public investment would in some cases pose a severe constraint for private investment and would crowd out private investment. Balassa (1988) in his study of 30 countries showed the presence of a negative relationship between private investment and public investment. Duncan *et al.* (1999) is of the opinion that such a negative relationship might not exist in the case of Pacific islands, which have no difficulties accessing foreign savings. The literature is fairly settled on the factors that constrained or otherwise determine private investment. Authors like Greene & Villanueva (1991); Duncan *et al.* (1999) have carried out empirical and stochastic investigations on the determinants of private investment. Most of them discovered that Private investment behaviour is primarily influenced by the profit motive in addition to other factors such as wage rate, real exchange rate policies, and raw material costs, rate of inflation and appropriate pricing of capital, labour and land.

Aside from the factors listed above, private investment would flourish in a supportive environment of cost reductions in power, transport and communications, which are often provided through public investment. For instance, Greene & Villanueva (1991) carried out an Empirical studies on 23 countries and found that public investment in physical infrastructure is complementary to private investment. However, as there is a finite limit for domestic savings, public investment would, in some cases, poses a severe constraint for private investment and would crowd out private investment. Balassa (1988) in his study of 30 countries concluded that the presence of a negative relationship between private investment and public investment. In collaborating of these findings, Duncan *et al.* (1999) pointed out that such a negative relationship might not exist in the case of Pacific Islands, which have no difficulties accessing foreign savings.

According to Duncan *et al.* (1999), user cost of capital is an important factor in any investment decision by the private sector. When the user cost of capital is increased by raising the cost of bank credit or by increasing the cost of retained earnings, which is the main source of financing investment, there is a decline in investment. Whereas there is a consensus in the literature on the factors discussed so far, findings of various empirical studies are not, however, consistent on the relationship between interest rates and investment. While certain studies such as Green & Villanueva (1991), have confirmed the negative relationship between interest rates and investment, study by others have shown that in repressed financial markets, credit policy affects investment in a distorted manner.

Thomas, (1997) in his study of 86 developing countries examined data on terms of trade, real exchange rates, property rights and civil liberties and concluded that while factors including credit, availability and the quality of physical and human infrastructure are important influences, uncertainty in the investment environment was negatively related to private investment in sub-Saharan countries. Employing the variability in real exchange rates as an explanatory variable in regression analysis, in his cross-country study on the macroeconomic environment and private investment in six Pacific Island countries observed a statistically significant negative relationship between the variability in the real exchange rate and private investment.

Duncan *et al.* (1999) argued that although variability in the real exchange rate is a reasonable proxy for instability in major economic variables as fluctuations in inflation and productivity. Generally, fiscal and monetary management are reflected in the real exchange rate, which is not a good measure of the uncertainty attached to policy or the insecurity of property rights and enforcement of contracts or the level of corruption. It has been observed that these non-economic factors appear to have significant influence on investment in the Pacific Island countries. However, Duncan *et al.* (1999) admitted that no quantitative or qualitative evidence is available of their size or their impact. In the absence of such evidence, any study on private investment is to be necessarily restricted to the conventional variables.

It has been observed by many researchers that monetary, fiscal and exchange rate policies for correcting unsustainable macroeconomic imbalances are bound to affect private investment. There are two ways by which restrictive monetary and credit policies included in stabilization packages affect investment. These are the rise in the real cost of bank credit and the opportunity cost of retained earnings from higher interest rates. The user cost of capital is increased by both mechanisms, leading to a reduction in investment. Van Wijnbergen (1982) however noted that credit policy affects investment directly, because credit is allocated to firms with access to preferential interest rates rather than through the indirect interest rate channel. Thus the effect of monetary and credit policy on investment and the means of transmission depend on the institutional structure of financial markets.

A formal framework for studying private investment in developing countries was developed by Blejer & Khan (1984). Tun Wai & Wong (1982) incorporated features of the neoclassical model into investment models for developing countries. Their approaches take into account the relevant data problems and structural features

that caused a gap between the modern theory of investment and the models that were specified for developing countries. Blejer & Khan (1984) focused on the role of government policy and derived an explicit functional relationship between the principal policy instruments and private capital formation. Using the model they were able to assess the extent of any “crowding out”. The second extension that Blejer & Khan (1984) did was to make a distinction between government investment that is related to the development of infrastructure and government investment of other kinds. Blejer & Khan (1984) found a positive relationship between the share of private investment in total investment and the ratio of total investment to income. They also found that the larger the share of private investment, the higher the average growth rate of the economy. These patterns indicate the relevance of private investment behaviour in developing countries and call for the testing of formal models of private capital formation in individual countries.

Two principal conclusions emerged from Blejer & Khan’s (1984) tests of formal model for 24 developing countries. The first was the possibility of identifying well behaved empirical function for private investment in developing countries. This challenged the traditional view that standard investment theory is not relevant for developing countries. The second conclusion was the establishment of a direct empirical link between government policy variables and private capital formation. Asante (2000) estimated a private investment equation that tried to assess the determinants of private investment in Ghana. Among the independent variables were the incremental capital output ratio, the lending rate, the exchange rate, credit to the private sector and public investment. His preliminary results showed among other things a “crowding out” effect of public investment.

### 3. Methodology

#### 3.1 Model specification

An investment model for Ghana can be specified in a function form as:

$$\text{PRIVINV} = f(\text{GDP}, \text{PUBINV}, \text{CREDIT}, \text{INFL}, \text{EXDEBT}, \text{INST}, \text{REX}, \text{AID}, \text{OPENNESS}, \text{INFRA}) \dots\dots\dots (2)$$

Where,

**PRIVINV** = Private investment; **AID** = Foreign Aid; **REX** = Real Effective Exchange Index; **GDP**= Real GDP growth; **CREDIT**= Real private sector credit; **INST**= political instability (1=Constitutional Rule and 0= Unconstitutional Rule); **EXDEBT** = External debt burden; **INFRA**= Infrastructure; **OPENNESS**= Trade openness; **PUBINV**=Public investment

Econometrically, to include the random error term, the explicit econometric model is formulated as:

$$\ln \text{PRIVINV}_{i,t} = \alpha + \beta_1 \ln \text{GDP}_{i,t} + \beta_2 \ln \text{PUBINV}_{i,t} + \beta_3 \ln \text{CREDIT}_{i,t} + \beta_4 \ln \text{INFL}_{i,t} + \beta_5 \ln \text{EXDEBT}_{i,t} + \beta_6 \ln \text{INST}_{i,t} + \beta_7 \ln \text{REX}_{i,t} + \beta_8 \ln \text{AID}_{i,t} + \beta_9 \ln \text{OPENNESS}_{i,t} + \beta_{10} \ln \text{INFRA}_{i,t} + \epsilon_i \dots\dots\dots (3)$$

Where, **ln**= natural logarithm, **t**=time, **i**=1...n, **ε<sub>i</sub>**= Error term

#### 3.2 A Priori Assumptions/ Expectations

**H1:** GDP is expected to exert a positive effect on private investment. As a result, the study expects the coefficient of GDP to be positive (**β<sub>1</sub>>0**).

**H2:**Public investment may one hand crowd-out private investment via increased deficits and a high interest rate and the competition for certain scarce resources. However, public investment may act as crowding-in catalyst through the provision of key infrastructure. The effect of public investment is ambiguous: **β<sub>2</sub><0** implies crowding-out whereas **β<sub>2</sub>>0** suggest crowding-in.

**H3:** 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 (**β<sub>3</sub>>0**).

**H4:** Macroeconomic instability may increase uncertainty and adversely affect private investment. A high inflation rate is expected to negatively affect private investment. Therefore, the study expects the coefficient to be negative (**β<sub>4</sub><0**).

**H5:** Excessive debt overhang may inhibit investment in many indebted countries because the possibility that confiscatory future taxation could be used to finance future debt service. Thus, a large external debt-to-GDP ratio is likely to have a negative impact on private investment. The coefficient of external debt is expected to be negative (**β<sub>5</sub><0**) in the case of Ghana.

**H6:** (Dummy), a regime of constitutional rule ensures well functioning democratic institutions, which is a precondition for a favourable investment climate. Non-constitutional transfers of executive power (i.e. coups) are particularly likely to increase uncertainty. 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 coefficient of political instability (dummy) variable in the model is expected to be positive ( $\beta_6 > 0$ ).

**H7:** 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.  $\beta_7$ ) is also ambiguous.

**H8:** Foreign aid flows can increase private sector investment through the conditionality attached to them. One condition attached to these flows since that the recipient country has to privatise some publicly owned enterprises. The study expects the coefficient to be positive ( $\beta_8 > 0$ ).

**H9:** The degree of trade openness is expected to have a positive influence on private investment. This is because among other things it signals to investors the readiness of an economy to investment ( $\beta_9 > 0$ ).

**H10:** Infrastructure complements private investment by lowering the cost of production and increase access to domestic markets. Following from this, it is expected that infrastructure development will induce investment by private enterprise ( $\beta_{10} > 0$ ).

### 3.3 Source of Data

Data on private investment are issued from the Global Development Network Database of the World Bank. Data on all other aggregate variables are from World Development Indicators of the World Bank. These include aggregate indicators such as infrastructure, external debt, foreign aid etc. It must be emphasize that all data series are annual and span through the period, 1960 – 2010.

### 3.4 Data Analytical Tool

The selection of the analytical tool is contingent on a thorough review of available analytical and statistical tools. In deciding which test is appropriate to use, it is important to consider the type of variables that you have (i.e., whether your variables are categorical, ordinal or interval and whether they are normally distributed). Consequently, parametric statistical method specifically ordinary least square was use to estimate the coefficient of the variables. OLS was used to analyze relationship between dependent variable and independent variables. The robustness of the coefficient was used to determine the nature of the relationship and also whether it is statistically significant. The software adopted for this study was the E-Views econometric software.

## 4. Discussion of results

The rationale for the inclusion of GDP growth is due to accelerator effects, it hypothesis that high economic growth would lead to higher investment rates (Mlambo & Oshikoya, 2001). The estimated coefficient of GDP is positive as expected but insignificant in the short run. However in the long run, the associated coefficient of GDP is both positive and statistically significant. Specifically, 1% increase in GDP causes 40.56% increase private investment. This implies that output recovery will in the long induce private investment. This indicates that real GDP growth is a determinant of private investment, confirming similar results by Mlambo & Oshikoya (2001) and Frimpong & Marbuah (2010). Apkalu (2002); Frimpong & Marbuah (2010) argue that firms in Ghana in the short-run usually operate below full capacity as a consequence, increasing aggregate demand does not cause an immediate increase in capital stock. These authors further suggest that given the adjustment mechanism in investment behaviour, existing and potential investors will take a little longer time to adjust to growth in real output, hence its short term positive impact may not be experienced.

A weak currency may affect investment through its effect on aggregate demand. If the net effect is contradictory, then the slump in economic activity is likely to lead to a reduction in investment. However, if the net effect is expansionary, devaluation may raise real incomes and stimulate investment. Also, if devaluation is considered inevitable, then when it happens, confidence in the future may be raised. Devaluation may affect the real price of imported inputs that are used in conjunction with capital goods to produce output, and may also affect interest rates, which in turn will affect private investment. As shown in Table 3, real effective exchange rate is positively related to private investment in the short run. But the coefficient associated with real effective exchange rate is insignificant. Contrary to short run, the estimated coefficient for long run is negative and statistically significant. In the long run, 1% changes in depreciation of the Cedis relative to major currencies cause a decrease of about 0.113956 % in private investments in Ghana. This result is consistent with Bakare (2011) findings which show a negative relationship between devaluation and private investment in Nigeria. It may be argued that devaluation hampers the acquisition of foreign exchange for the importation of needed inputs for investment. Depreciation of exchange rate may increase the cost of importing inputs and raw materials for domestic investment.

Bank loans remain the overwhelming source of financing for most firms and businesses in Ghana. In the light of this fact, it implies the availability of credit plays a significant role in boosting private investment. As

highlighted in Table 3, credit to private investment is both positive and significant in the short run. This implies that availability of credit to private investment significantly affect the levels of private investment in Ghana. The estimated coefficient associated credit to private investment is (0.091728). The significance of this result is that monetary policy that directs credit to the private sector in Ghana is expected to encourage private investment in Ghana.

The fiscal conditions pertaining in Ghana as the result in Table 3 indicates that it significantly affect private investment. High levels of external debt as suggested by the results in the long-run negatively affect private investment. The estimated coefficient for external debt is (-0.43655). This implies that successive governments in Ghana should pursue policy of fiscal consolidation since a reduction of the public deficit during macroeconomic adjustments allows private investment to expand. Serven & Salimano (1992) argue that how public deficit is corrected may affect private investment differently. If the reduction of public deficit involves cutting back on public investment in components of infrastructure such as roads, ports and communication networks, which may be complementary with private investment, then there will be a decline in private investment.

The result is contrary to findings of Frimpong & Marbuah (2010) on the impact of external debt on private investment. The authors found that external debt encourages private sector investment in Ghana rather than discourage it. In their view, high external debt levels signal a good credit standing though it must be mentioned that their estimated coefficient was not significant. A high rate of inflation will tend to discourage private savings and investment. This calls for prudent fiscal policies, as well as disciplined monetary policies including self-denial. Investment is depressed by overall macroeconomic instability. However, the results show that inflation rate has a positive impact on private investment level in Ghana, both in the short and long run, as the inflation variable is positive and significant in both cases. The results thus suggest that 1% increase in inflation causes a 6.74% and 3.0897 % for short and long run respectively. Thus the short-run and long-run results indicate that inflation has been a stimulant for private investment rather than discourage it.

There is evidence that supports the theory of 'crowding out' as public investment affects negatively and significantly private investment in the context of Ghana. The associated coefficient of public investment is negative and significant (-23.42) in the short run. This shows that there is competition for resources between the public and the private sector (Acosta & Loza 2005). This result confirms Frimpong and Marbuah (2010) and Shafik (1992) in the context of Ghana and Egypt respectively. The influence of political stability on private investments measured in the form of a dummy variable. This dummy variable recorded a positive sign in the short run and the long run periods and is significant. This implies that constitutional overthrows or military takeovers will affect private investment negatively by creating an adverse climate to private investment. This signifies that multi-party democracy can serve as inducement to private investment. Thus, present democracy which appears considerably stable must have contributed positively to private investments in Ghana. This is consistent with findings from Bakare (2011); Frimpong & Marbuah (2010).

The effect of trade openness on private investment is found to be positive and statistically significant only in the long-run. For short run, though positive it was found to be statistically insignificant. This signifies that trade liberalization in the long term boost private investment. To this end, government should sustain policies that promote free trade. In the case of foreign aid the estimated coefficient is found to be unstable. The associated coefficient in the long short run is (-0.15902) however, in the short run the coefficient is positive (0.75354), a situation which makes it impossible to establish the nature of the relationship between foreign aid and private investment. Finally, the variable  $\alpha$  corrects for the long run equilibrium, and is significant for this study the negative sign show how equilibrium is restored. The magnitude of the coefficient of this term (-0.4045) implies that after a shock is given to the system, it takes approximately four periods, which corresponds to four years in our study, for private investment to restore its equilibrium level. The significance of the coefficient associated with the error correction term further supports the acceptance of the co-integration hypothesis.

## 5. Findings

This study examined the determinants of private investment in Ghana. The study shows various major variables either hamper or encourage investment in Ghana. They are GDP, inflation, political stability, external debt, exchange rate, public investment, aid, trade openness and credit provided to private sector.

The study shows that GDP growth has and statistically significant impacts on the levels of private investment in the long run as opposed to short run. Specifically, 1% increase in GDP causes 40.56% increase private investment signifying that output recovery will in the long induce private investment. The effect of debt overhang on private investment is found to be adverse. High levels of external debt as in the long-run negatively affect private investment. The estimated coefficient for external debt is (-0.43655). This implies that successive

governments in Ghana should pursue policy of fiscal consolidation since a reduction of the public deficit during macroeconomic adjustments allows private investment to expand.

The research found no evidence that rate of inflation tend to discourage private investment. The results show that inflation rate has a positive impact on private investment level in Ghana, both in the short and long run, as the inflation variable is positive and significant in both cases. The results thus suggest that 1 % increase in inflation causes a 6.74% and 3.0897 % for short and long run respectively. Thus the short-run and long-run results indicate that inflation has been a stimulant for private investment rather than discourage it. The study also shows that private investment and public investment are not complementary. Rather, public investment crowded out private investment in Ghana. The associated coefficient of public investment is negative and significant (-23.42) in a short run. This shows that there is competition for resources between the public and the private sector.

Real effective exchange rate is found to be positively related to private investment in the short run. But the coefficient associated with real effective exchange rate is insignificant. Contrary to short run, the estimated coefficient for long run is negative and statistically significant. In the long run, 1% changes in depreciation of the Cedis relative to major currencies cause a decrease of about 0.113956 % in private investments in Ghana. The effect of trade openness on private investment is found to be positive and statistically significant only in the long-run. For short run, though positive it was found to be statistically insignificant. This signifies that trade liberalization in the long term boost private investment. To this end, government should sustain policies that promote free trade. Another vital finding of this research was how political stability affects private investment in Ghana. The associated coefficient was positive in the short run and the long run periods. Implying multi-party democracy with it attendant political certainty induces private investment. Conversely constitutional overthrows and military takeovers affect private investment negatively by creating an adverse climate to it.

## 6. Conclusion

The main aim of this paper was to investigate the factors that influence the levels of private investment within the context of Ghana over the period 1960-2010. The specific objective was to identify the determinants and their respective nature of relationship with private investment both in the short run and long run perspectives. The study employed the techniques of co-integration and error correction modeling, which provided mechanisms to deal with the problems of unit root faced in time series data. In all, the study provides evidence that inflation, exchange rate, public investment, GDP, trade openness, aid and external debt both in a short run and long run significantly affect the level of private investment. Applying the general to specific approach to error correction model, statistical results suggested the existence of stable long run co-integrating relationships between macroeconomic and other variables and private investment. Overall, variables that affect private investment are consistent with most of the hypothesised signs and are also found to be statistically significant.

## 7. Recommendations

1. If the private sector is to remain the engine of growth in the economy as envisioned by many Ghanaian policy makers, then the amount of credit to private sector should be encouraged by providing incentives to financial institutions. Appropriate policies should be pursued to ensure considerable and sustainable credit to entrepreneurs to lend more to private businesses.
2. It is evident that public investment impedes private investment. This deleterious effect of public investment on private investment can be rectified by moderating the degree of public investment while increasing the role of private investment in the provision of social goods. Furthermore, public investments should be made on areas that complement private investment rather than hamper private investment.
3. A weak currency contributes to macroeconomic instability, a factor identified as a major hindrance to private investments. This fact demands that monetary authorities in Ghana should endeavor to ensure the stability of the cedis against major currencies. Such policy direction will engender positive response from the private sector.
4. There is overwhelming evidence that constitutional overthrows depressed significantly the levels of private investment in Ghana due to its associated political uncertainty. This suggests that Ghana stands to gain enormously by deepening multiparty democracy through strengthening of political institutions that safeguard constitutional rule.

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**Notes**

**Table 1: The results of the intercept form of ADF test where a unit root null hypothesis is tested against a stationary alternative.**

**Results of Augmented Dickey Fuller test**

Variable	ADF in Levels	ADF in difference	Order of Integration	Number of Lags
<b>LnPRIVINV</b>	(1.256384) 3.615588 2.941145	(6.863474) 3.621023* 2.943427**	I (1)	3
<b>LnOPENESS</b>	(1.811285) 3.632900 2.922449	(5.089592) 3.574446* 2.923780**	I(1)	3
<b>LnREX</b>	(2.418110) 3.679322 2.967767	(3.54488) 3.679322* 2.971853**	I(1)	3
<b>LnAID</b>	(4.339753) 3.57444* 2.923730**	(8.115411) 3.574446* 2.923780**	I(0)/I(1)	3
<b>LnGDP</b>	(2.29350) 3.57446 2.923730	(6.29350) 3.57446* 2.923730**	I(1)	3
<b>INFL</b>	(4.905337) 3.571310* 2.922449**	(8.766819) 3.577723* 2.925169**	I(0)/I(1)	3
<b>LnEXTDEBT</b>	(1.506992) 3.610453 2.938987	(5.594988) 3.615588* 2.941145**	I(1)	3
<b>LnINFRA</b>	(2.376322) 3.621484 2.942317	(7.368735) 3.615588* 2.941145**	I(2)	3
<b>LnPUBINV</b>	(2.3598) 3.57224 2.92366	(6.243178) 3.623247* 2.926434**	I(1)	3
<b>LnCREDIT</b>	(0.795710) 3.568308 2.921175	(7.913551) 3.571310* 2.922449**	I(1)	3

\* (\*\*) denotes significance at 1 %( 5%) levels respectively

**I (d) = Order of integration**

**Table 2.Trend assumption: Linear deterministic trend**  
**Series: *INST, InAID, InEXDEBT, INFL, InGDP, InOPENESS, InPRIVINV, InREX, InPUBINV, InCREDIT.***  
**Lags interval (in first differences): 1 to 1**

**Unrestricted Cointegration Rank Test (Trace)**

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None*	0.999997	834.0692	197.3709	0.0001
At most 1*	0.997922	479.2985	159.5297	0.0000
At most 2*	0.962740	306.3582	125.6154	0.0000
At most 3*	0.936587	214.2429	95.75366	0.0000
At most 4*	0.908172	137.0165	69.81889	0.0000
At most 5*	0.720701	70.15694	47.85613	0.0001
At most 6*	0.509441	34.44376	29.79707	0.0136
At most 7	0.368812	14.50188	15.49471	0.0702
At most 8	0.056136	1.617650	3.841466	0.2034

**Trace Test indicates 8 co integration eqn(s) at the 0.05 Level**

**\*denotes rejection of the hypothesizes at the 0.05 Level**

**\*\*MacKinnon-Haug-Michelis (1999) p-values**

**Unrestricted Cointegration Rank Test (Maximum Eigen Value)**

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None*	0.999997	354.7706	58.43354	0.0000
At most 1*	0.997922	172.9403	52.36261	0.0000
At most 2*	0.962740	92.11529	42.23140	0.0000
At most 3*	0.936587	77.22636	40.07757	0.0000
At most 4*	0.908172	66.85959	33.87687	0.0000
At most 5*	0.720701	35.71318	27.58434	0.0036
At most 6*	0.509441	19.94187	21.13162	0.0727
At most 7	0.368812	12.88423	14.26460	0.0816
At most 8	0.056136	1.617650	3.841466	0.2034

**Trace Test indicates 8 co integration eqn(s) at the 0.05 Level**

**\*denotes rejection of the hypothesizes at the 0.05 Level**

**\*\*MacKinnon-Haug-Michelis (1999) p-values**

**Table 3. Results of Error correction model (ECM) within the environment of vector error correction model (VECM)**

**Dependent Variable: Private investment**

Variable	Coefficient	Standard error	T-statistics
$\Delta \ln AID_t$	0.753540	0.196970	3.825600**
$\Delta \ln OPENNES_t$	0.762720	0.412560	1.847800
$\Delta \ln EXDEBT_t$	3.166740	0.242402	1.192660
$\Delta \ln PUBINV_t$	-23.421300	11.126200	-2.105000**
$\Delta \ln INFL_t$	6.743540	3.306780	2.039340**
$\Delta \ln GDP_t$	26.414300	19.287420	1.144020
$\Delta \ln CREDIT_t$	0.091728	0.034950	2.624150**
$\Delta \ln REX_t$	0.242402	0.767624	0.315740
$\ln OPENNES_{t-1}$	1.293924	0.287760	4.496530**
$\ln EXDEBT_{t-1}$	-0.436550	0.124081	-3.518346**
$\ln INFL_{t-1}$	3.06789	1.385670	2.214080**
$\ln GDP_{t-1}$	40.57890	20.156450	2.013360**
$\ln CRIDIT_{t-1}$	0.002634	0.001505	1.750282
$\ln REX_{t-1}$	-0.313956	0.119994	-2.616519**
$\ln AID_{t-1}$	-0.159020	0.066741	-2.382648**
$\ln PUBINV_{t-1}$	60.234500	39.246790	1.534800
$\ln INST_{t-1}$	0.222992	0.074645	2.987440**
$\alpha_{t-1}$	-0.404500	0.193400	-2.091500**
$R^2$	0.753400		
Observations (n)	51		