

An OLS Approach to Modelling the Determinants of Private Investment in Ghana

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ABSTRACT

After independence, most developing countries embraced the development paradigm of import substitution. Nevertheless, in the 1980s, there was a shift in development paradigm from import substitution to the private sector-led development strategy to boost growth in developing countries. The study analyses the determinants of private investment in Ghana using a time series data from 1980 to 2010 with the aid of multiple linear regression model. It was revealed that factors that have a significant impact on private investment in Ghana were public investment, credit supply to the private sector, external debt, openness of the economy, corporate tax and democracy. Nevertheless, variables like: GDP growth, real interest rate, inflation and real exchange rate were not statistically significant. The study therefore recommends a tighter fiscal policy to reduce the crowding out effect on private investment. Foreign trade and trade liberalization must be encouraged to ameliorate private investment in Ghana.

INTRODUCTION

During the Great depression, most banks went into insolvency and so could not provide adequate funds for investment. As a result, aggregate demand and employment rate were generally low. This called the classical view that the economy is always self-correcting into question. The classical economists assumed that saving and investment are always equal. Keynes flawed this view by arguing that investment and saving are undertaken by different people with different motivations. Keynes argued that output level and employment can be improved by increasing Aggregate Demand. The Keynesian view became the dominant paradigm after the Great Depression and Roosevelt's New Deal and Marshall Plan for Europe were examples of this new thinking. Aggregate demand was increased by increasing investment and in Ghana; this was specifically accomplished by government directing banks to lend to

specific sectors of the economy. This led to sectorial allocation of investment in the 1950s and 1960s (Bawumia, 2010)

After independence, most developing countries embraced the development paradigm of import substitution. Nevertheless, in the 1980s, there was a shift in development paradigm from import substitution to the private sector-led development strategy to boost growth in developing countries. For example, the International Financial Corporation created the African Enterprise Fund; the United States via its Overseas Private Investment Corporation initiated the African Growth Fund. In the 1990s also, a strategy was introduced by African Development Bank to help boost private investment to 25% of GDP (Pfefferman and Madarassy, 1990).

It is a well-known fact that investment significantly contribute to economic growth. Recent empirical studies conducted in Africa, Asia and Latin America has proven beyond all reasonable doubt, the critical linkage between investment and rate of growth (Seruvatu and Jayaraman, 2001). As a component of overall demand, investment has an effect on the level of demand, especially, on the fluctuation of this demand. Investment is indeed the component of the aggregate demand that is most susceptible to change, since the other components namely household consumption and public expenditure are relatively stable. A slowdown in investment is translated into a slowdown in economic growth (Gnansounou, 2010). Investment is the accumulation of capital and therefore determines the productive capacity of an economy as well as the size of labour utilised in order to exhaust this productive capacity. In sum, investment has a multiplier effect on the economy and therefore necessary for economic growth.

Recent studies relate investment to financial development in general by laying emphasis on the role that financial intermediaries play in investment. With respect to the role played by financial institutions, some indicators are pronouncing. These are: credit to the private sector and total liquid liabilities of financial intermediaries (Ndikumana, 2000). After the promulgation of the Bank of Ghana (BOG) Act of 2002, the Central bank became autonomous. This enabled the BOG to embark on prudent initiatives (such as a reduction in the discount rate, elimination of the secondary reserve requirement) which made banking more attractive in Ghana. Consequently, the number of banks in Ghana increased and this led to competition, financial deepening and hence improvement in investment in the country.

Investment in Ghana is classified by many analysts into two main epochs. These are: investment under direct control (1957-1983) and investment under indirect control (1983 to date). Under the direct control, Dr Kwame Nkrumah's ambitious development plan led to significant government intervention where banks were directed to give funds to specific sectors of the economy (mainly to the manufacturing sector because the agriculture sector was regarded as a 'cash cow'). To achieve this objective, the Bank of Ghana set up the Bank Examination Department (BED) in 1964. The huge government intervention under the direct control regime, coupled with external shocks (droughts in the 1980s) led to declined output, low saving and hence reduced investment. Things were quite different under the indirect control regime. After the Bretton Woods system, there was a dominant ideology that the state is inefficient and the market is efficient. As a result, Ghana introduced the Economic Recovery Program (ERP) in 1983 which required a deregulation in the financial sector. Some of the policies initiated to reduce

the restrictions (boost investment) include the reduction of corporate tax rate from 32.5% in 2004 to 28% in 2005 and to 25% in 2006. In the 1990s, the government of the day took some steps to promote private investment. For example, the BOG mopped up excess liquidity that reduced the growth of money supply, inflation and hence maintained positive real interest rates to encourage investment. Also, through its tax policies, the government encouraged investment by reforming the capital income taxation. Corporate tax was reduced from 45% to 35% for all sectors except trading, finance and printing (World Bank Document CR 2236-GH, 1991). Recently, the Ghana Investment Promotion Centre (GIPC) in line with government policy to promote private investment toured the ten regions and some part of the world. In Ghana, they interacted with Regional, District and Metropolitan Authorities, Planning Officers and the private sector to encourage them to help identify investment opportunities, call for project proposals, and to explain to them the role and services of the GIPC. In spite of this background, investment has been growing at a slow rate and this work seeks to identify the determinants of private investment in Ghana.

Problem of Statement

Over the years, measures have been put in place to improve the investment climate in Ghana. These measures provided basically include: tax holidays, accelerated depreciation allowances, exemption from import duties on machinery and equipment, investment allowances and arrangements for profit repatriation.

The Ghana Investment Promotion Centre (GIPC) was set up with the main objective of promoting investment. Measures that have been taken in recent years to improve the investment climate include gradual removal of administrative and other bottlenecks, review of the tax structure as it relates to private investment and liberalization of the financial system. Corporate tax for some enterprises was reduced to 45% maximum (1991) from 55% previously (Asante, 2000).

In spite of the policies above, private investment trends in Ghana have generally not been impressive. Over the years, the government of Ghana is working hard to instil confidence among investors and to create a favourable environment for Foreign Direct Investment (FDI). Yet, according to the UN investment policy review of Ghana, FDI trends have not been sustained. In 1970, the annual inflow of FDI was as high as \$68 million, but started declining in 1971, even reducing to negatives figures in the mid-1970s. However, not only did gross fixed capital double but also, FDI started picking up during the period 1991 to 1995 after the introduction of the ERP (UN Investment Policy Review of Ghana, 2003). FDI has also been affected by external factors such as the credit crunch. FDI increased from about \$2.3 billion in 2006 to \$5.3 billion in 2007. By the end of December 2008, FDI for the year was about \$4.4 billion, down by 16% on the previous year (The State of the Ghanaian Economy, 2008).

The crucial question to ask here is that: why is investment continually fluctuating despite government's relentless effort to make the investment climate more favourable? Clearly, investment in the country has been growing at a much slower and unstable rate than expected. This slow and unstable growth rate of investment in Ghana is a matter of concern

given the positive relationship between the level of investment and economic growth. It is therefore imperative to assess empirically the factors that affect private investment in Ghana.

Research Objective

Like most developing countries, Ghana has undergone different economic regimes that have severely conditioned capital accumulation. In order to contribute to the discussion of what actually determines the capital stock of private firms in Ghana, the main objective of the study is to ascertain the factors that affect private investment in Ghana.

The specific objectives are:

1. To examine private investment trends in Ghana.
2. To identify the factors that inform private investment decisions in Ghana.

The study covered the years 1980 to 2010, basically because of data availability and the interest in the factors that affect investment in recent years

LITERATURE REVIEW

The chapter looks critically at the theories put forward by economists to explain private investment behaviour. It also examines empirical studies on private capital formation. Finally, various investment strategies and policies implemented in Ghana are reviewed.

Theories of Investment

A very important aspect of investment is its multivariate nature. Investment activities are undertaken by different economic units such as the government, private firms and individuals who have different objectives. With such a variety of investors and objects of investment, it is virtually impossible to use a single theory to explain what determines investment. It is therefore not surprising that despite the level of attention devoted to investment behaviour, the literature has not yet provided a complete framework for explaining investment behaviour in developing countries such as Ghana.

Keynes (1936) was the first to posit an independent investment function of the economy. As stated in chapter one, Keynes argued that ex-ante savings and ex-ante investment, in general, cannot be equal because they are undertaken by different decision makers with different motivations (Asante, 2000). Although Keynes agreed with the classical economists that investment is determined by interest rate, he asserted that savings was largely dependent on income rather than interest rate. Therefore there is the likelihood that savings will not always be equal to investment at a certain interest rate. Keynes (1936) argued that investment is constrained not by low saving but by low credit supply: "The investment market can become congested through shortage of cash. It can never become congested through shortage of saving."

The accelerator theory of investment which Keynes did not envisage has become popular today. Samuelson stressed the reciprocal relationship between investment and production, proposing the hypothesis of the "accelerator". It is interesting that the effect of the accelerator describes the opposite of that of the multiplier effect. While the multiplier effect shows a

multiple increase in income due to an increase in investment, the accelerator shows a multiple increase in investment due to an increase in income. Stated differently, the accelerator theory explains that a change in income will change investment by a multiple amount. Samuelson explains that when income or consumption of people increases, more goods will have to be produced to meet the increase in demand. Therefore a multiple amount of capital will be required to increase production since he assumes that the already available stock of capital is fully utilised. It is clear that this kind of investment is a type of induced investment where income is an inducing factor. The accelerator can also be perceived as the numerical relationship between changes in investment due to changes in income or consumption. In other words, induced investment will increase when national income increases or it will fall to zero if the national income remains unchanged *ceteris paribus*.

An important element of the accelerator theory of investment worth mentioning is the capital-output ratio. The theory assumes that the ratio of capital to output is held constant and therefore investment is dependent upon changes in income. The capital-output ratio also depicts the magnitude of the accelerator. This means that a large capital-output ratio will imply a large accelerator and a small capital-output ratio will imply a small accelerator effect. If the capital-output ratio is 5, an increase in income will increase investment 5 times and if the capital-output ratio is 10, an increase in income increases investment 10 times, *ceteris paribus*. In essence, investment is a function of income so that if income increases, there is incentive to increase the stock of capital but if income falls, disincentive will mean disinvestment all other things held constant.

Basically, the general form of accelerator model is the flexible accelerator model which assumes that the desired capital stock is proportional to the level of expected output (Blejer and Kahn, 1984; Ramirez, 1994). The underlying idea of the model is that the greater the difference between the existing capital stock and the desired capital stock, the greater the profitability of a firm's rate of investment. Although the flexible accelerator was quite a success in explaining investment behaviour, especially in industrial countries, it has not enjoyed the same level of success in developing countries. As Ndikumana (2000) rightly said, "The main underlying assumptions of these models however (such as the assumption of perfect capital markets, absence of liquidity constraints, and abstraction from the role of government) are highly questionable in the context of developing economies." The Hall and Jorgenson neoclassical model with no costs of adjustment is also another popular literature that emerged in 1967. Hall and Jorgenson (1967) explain the problem of a profit maximizing firm which employs capital as the only input to production, where: $y = f(k)$

The neoclassical theory originated by Jorgenson can be divided into two parts. The first part developed by Jorgenson considers the optimal capital stock of a firm under constant returns to scale with a given output. However, the weaknesses of this earlier version of the neoclassical theory informed a latter version. For example, the assumption that output is given exogenously is inconsistent with what happens under perfect competition. The weaknesses of the earlier version informed a modified version. In the modified version, writers like Lucas, and Treadway introduced the cost of installing new investment goods into the firm's optimization problem.

But the weakness here is that firms can control the rate of investment and not the stock of capital since the theory assumes a given capital stock to the firm at each point in time.

Hall-Jorgenson neoclassical model assumes that the firm can simply increase its stock of capital by renting capital in a market where an amount of capital can be rented for an amount of time. The model assumes that there are no taxes or any kind of capital market restrictions. For this model, the optimizing firm chooses its capital stock with the features of the economic environment in mind. Examples of such features include: the firm's production function, tax considerations, depreciation rates and a comparison of interest rates to the productivity of a firm's capital stock. An interesting aspect of this model worth mentioning is how it explains investor's response to the profitability of an investment venture. The model asserts that an investor must be indifferent between earning an interest rate from putting his money in the bank and earning a certain rental rate for capital that he purchased and rented. The model also assumes that depreciation increases geometrically. Thus a gain in purchasing and renting capital is given by income from renting, loss from depreciation plus capital gain from the change in the purchase price of capital. Put differently, "...the cost of buying one unit of capital... is equal to the opportunity cost in lost interest plus the value lost in depreciation... (Abel (1981)-Hayashi (1982))" In short, the Hall-Jorgensen model of gross investment asserts that, $i_{t-1} = k_t - k_{t-1} + \delta k_{t-1}$

where "i" represents gross investment from the previous period, "k_t" is the current level of capital stock, "k_{t-1}" is the previous level of capital stock and "δ" represents the depreciation rate of capital. The essential weaknesses of this model are quite clear. How can a firm change its stock of capital overnight without incurring any cost of adjustment? In reality, no firm can adjust its level of capital stock radically to suit a change in the prevailing economic environment without incurring huge variable adjustment cost. In fact, Jorgenson was aware of some of the weaknesses of the theory and therefore he recommended an explicit incorporation of installation cost with constant returns to scale. Hayashi (1982) explained how Jorgenson (1967) asserted that:

"A derivation of this model incorporating installation cost explicitly with constant returns to scale in both production and installation is obviously much more satisfactory than the original version. (Jorgenson [12, pp. 223-224])"

Moreover, in Jorgenson (1963), he had mentioned that the value of the desired capital stock for a typical firm depends positively on the demand level. Also, Jorgenson et al (1971) posited the neoclassical approach, which is a version of the flexible accelerator model. In this approach, the desired or optimal capital is proportional to output and the cost of capital which depends on real rate of interests (Asante, 2000). According to the neoclassical theory, investment is inversely related to the user cost of capital. This user cost of capital depends on real interest rate, the rate of depreciation and the price of capital goods. Simply put, if real interest rate falls, the user cost of capital falls and therefore there is an incentive to invest.

The "q" theory developed by a US economist James Tobin (1969) is also another popular theory in the literature on investment. It is worth noting that the Tobin's q is sometimes referred to as "Tobin's-q" or simply "q", where q stands for quotient. According to him, the investment

behaviour of firms is determined by the ratio of the market value of capital to its replacement cost. It is this ratio that Tobin referred to as the “q”.

$Q = \text{Market value of capital} / \text{Replacement cost of capital}$.

The numerator represents the value at which capital is exchanged in the market while the denominator represents the replacement cost of capital. The theory suggests that the best position for a firm is the state of equilibrium at which the “q” is equal to unity (1). The theory identifies delivery lags and increasing marginal cost as factors that can cause q to differ from unity. If the quotient is greater than one, it suggests that it is rational for the firm to increase the level of investment because the profit generated by capital is more than the cost of using capital. On the other hand if “q” is less than 1, it is not worthwhile for the firm to increase the stock of capital because the capital used by the firm is not being recouped. Since the cost of using capital is higher than the profits generated by capital, a rational firm will sell off some of its unproductive capital so that it will move towards the state of equilibrium. Put differently, a firm that has a value greater than what it would cost to reproduce the capital of that firm should expand while a firm that is worth less than the cost of replacing their capital should shrink. When $q = 1$ is the state of equilibrium or ideal position instead of $q > 1$ because at $q = 1$ the opportunity of greater profit is fully utilized. In short, the decision rule is that:

If $Q > 1, i > 0$ and if $Q < 1, i < 0$

Where “Q” represents quotient and “i” represents investment.

The work of Tobin (1969) inspired the Abel-Hayashi marginal q model which subjected Tobin’s theory to rigorous mathematics. In the “marginal q” Abel (1981) and Hayashi (1982) emphasize that private investment decision is determined by the ratio of the market value of an additional unit of capital to its replacement cost. It is worth noting that the marginal q as explained above is different from the Tobin’s (average) q.

“Now define ‘marginal q’ as the value of an additional unit of capital inside the firm divided by the after-tax purchase price of an additional unit of capital (Hayashi, 1982).”

While the average q refers to the ratio of the market value of an existing stock of capital to its replacement cost, the marginal q refers to the market value of an additional unit of capital to its replacement cost. Their analysis considers the dynamics of the change in the marginal quotient and three important facts are purported by their mathematical analysis. First, where the quotient is equal to 1, investment takes place at a rate exactly equal to the rate of depreciation. At $q = 1$, the value of a unit of capital in the firm matches the after-tax cost of a unit of capital so that there is no tendency for investment to change. Secondly, the investment ratio increases monotonically where the quotient is greater than 1. This means that so long as $q > 1$ firms will always find it rational to invest *ceteris paribus*. Thirdly, the rigorous mathematics reveals that the relative strength of investment ratio and the quotient depends on the magnitude of the adjustment cost (Abel (1981)-Hayashi (1982)). In other words, unlike Jorgenson, this model takes the adjustment cost of the firm into account. The higher the adjustment cost of the firm the more difficult it will be for the investment ratio to respond to the quotient. A useful assumption in this model is the assumption of perfect capital markets. It is useful because it makes analysis quite simple in the sense that the financial activities of the firm are not

considered. However, the problem here is that the assumption of perfect capital market deviates from what exists in reality.

The Mckinnon-Shaw hypothesis which is also called “neoliberal” (Galbis, 1979) emphasizes that high real interest rate and financial deepening are responsible for boosting investment in the economy. The argument is that financial markets in developing countries suffer repressive controls such as regulations that keep real interest rate below the equilibrium determined by the market. Therefore if financial markets are liberalized, higher real interest rate will result in higher savings and hence more loanable funds for investment. Mckinnon (1973) refers to this occurrence as the “conduit effect”. It is clear that their analysis of what increases investment contradicts the argument of the neoclassical theory. Unlike the neoclassical theory, the “neoliberal” approach asserts a direct relationship between real interest rate and investment. In other words, although the demand for investment may fall upon an increase in the interest rate, the actual level of investment will increase because of the increase in availability of funds for investment. However, this would be the case only when there is lack of funds for investment so that demand for funds exceeds the supply of funds.

In recent years, uncertainty has been introduced into the literature on the theories of investment. According to Asante (2000), this is due to the argument that investment is irreversible (Pindyck, 1991). This theory asserts that the decision rule to invest when the market value of capital is at least equal to its cost of replacement is limited. This is because should economic conditions change adversely, it will be difficult for a firm to dispose some of its assets. Therefore there is the argument here that the rigidities associated with disinvestment represent an opportunity cost that must be incorporated as part of the cost of capital. Yaw Asante reveals the words of Pindyck (1991): “the value of the unit must exceed the purchase and installation cost, by an amount equal to the value of keeping the investment option active.

Empirical literature

Profit is the linchpin of private investment. Put differently, private capital formation is primarily determined by profit motive. Empirical studies on the determinants of private investment are broad.

To begin, Attar and Temel (2002) investigated private investment in the manufacturing sector of Turkey. The empirical results showed that in the long run, private manufacturing investment responds positively to an increase in the manufacturing sector’s real income and negatively to an increase in public investment or cost of capital.

Acosta and Loza (2005) in their empirical analysis of potential macroeconomic factors that may affect investment decisions in Argentina, found that investment decisions seem to be determined, in the short run, by shocks in returns (exchange rate, trade liberalization), and in aggregate demand. Besides, there is evidence of a “crowding-out” effect of public investment. But in the long run, the capital accumulation path seems to be closely dependent on both well-developed financial and credit markets, as well as on perspectives of fiscal sustainability.

Bhattacharyya (2003) in his paper: “Determinants of Private Corporate Investment: Evidence from Indian Manufacturing Firms” used theoretical conceptualization of alternative Investment-accelerator relationships within the neoclassical theory of Jorgenson, and firm level panel data

to determine corporate investment decision in India. His results showed that internal funds (retained earnings) are relatively more important than profitability when it comes to firms' investment decisions. And the quantum of retained earnings is relatively more significant for new capital formation in relation to the retained earnings ratio. Therefore, so long as sufficient amounts of internal funds are available, firms do not mind paying high dividends. There is also evidence that financial strength vis-à-vis credit worthiness of firms to outside creditors is important from the point of view of firm investment decision.

Seruvatu and Jayaraman (2001) examined private investment in Fiji. Their analysis showed that in the long term, the variation in private investment is underpinned by the terms of trade performance of the country. The occurrence of a coup also has a significant negative impact on private investment. This explains why investment (and hence economic growth) is generally low in war torn areas. Investment undoubtedly thrives well in a politically stable environment.

Samuel (1996) by comparison of a number of models elucidated how firms' investment expenditure comes by. He finds that the main determinant of investment is cash flow. He also finds that corporate managers pay greater attention to the availability of internal sources of funding and cost of capital than to the evolution of the share prices of their firm on the stock market. The fundamentals are thus found to be more important than the perception on the stock market.

Serven (1997) in his study of 86 developing countries examined data on terms of trade, realexchange rates, property rights and civil liberties. He 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.

Nabi (1989) estimated an investment equation for Pakistani firms that had differential access to the capital market. He found that investment behaviour of Pakistani firms having access to the formal capital market could be explained by the output accelerator. However, only the liquidity variable explained investment behaviour of firms who were excluded from the capital market.

Hoshi et al. (1991) provided evidence of how information and incentive problems in the capital market affect investment behaviour of Japanese manufacturing firms. They concluded that investment was relatively more sensitive to internal liquidity for the independent firms.

Elsewhere in Africa, Zeufack (1997) studied the investment behaviour of manufacturing firms in Cameroon between 1988 and 1992. The findings reveal a negative influence of uncertainty on investment, a high adjustment speed and strong capital-profitability elasticity. By separating his sample of 68 firms into two sub-samples one comprising firms whose majority shareholders were Cameroonian (private, local) and another comprising firms whose majority shareholders were foreigners (private, foreign) Zeufack demonstrates that investment behaviour on the part of firms depends on whether they are local or expatriate. One of the most interesting findings from the analysis is that private foreign firms are more responsive to perception of uncertainty than indigenous firms. Attention should be paid to this behavioural difference when designing policies aimed at promoting private investment. Inflation is normally construed as a reasonable proxy for uncertainty.

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 are proportional to private investment. Private investment however, was negatively affected by public debt. Specifically, a 1% increase in the lagged debt to GDP ratio reduced private investment by 0.3%. The study also establishes a negative effect 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 (Frimpong and Marbuah, 2010).

Quattara (2005) investigates the determinants of private investment in Senegal over the period of 1970-2000. He tests the variables for unit root, using two, relatively, new tests namely Dickey-Fuller generalised least square de-trending test proposed by Elliot et al (1996) and the Ng-Perron test following Ng and Perron (2001). The long run private investment equation is derived using Johansen cointegration techniques and the newly developed Bounds test approach proposed by Pesaran et al (2001). In both cases, the results indicate that public investment, real income and foreign aid flows affect positively private investment, whilst the impact of credit to private sector and terms of trade is negative.

Gnansounou (2010) investigated the factors explaining investment behaviour by private firms in Benin, using a capital demand function. This function was estimated using data from a panel of 123 firms in Benin and covering 1997-2003. The findings showed that demand uncertainty and, more importantly, the fluctuations in the imports of manufactured goods from Nigeria have a negative effect on investment by private firms in Benin. The investment behaviour of these firms strongly hinges on the cost of capital utilization: when this cost is high, it weighs negatively on the purchase and installation of new production infrastructure. The magnitude of the effect of this cost of capital utilization and of the demand uncertainty which investment firms face depends on the nature of their activities.

In the case of Ghana, Pattilo (1998), using a model inspired by Bertola (1988) and a panel of 200 manufacturing firms in Ghana over two years (1994 and 1995), shows that due to demand uncertainty, firms wait for the marginal productivity of capital to go beyond a threshold specific to each firm before investing. The level of this threshold rises as uncertainty rises. Pattilo (1998) showed that uncertainty has a negative effect on the level of investment.

Asante (2000) in his paper "Determinant of private investment behaviour" analysed private capital formation in Ghana using time series and cross-sectional data over the period 1970-1992. The results suggest that policies that address only some components of macroeconomic instability may not be enough to revive private investment. The growth of real credit to the private sector has a positive and statistically significant effect on private investment. Private investment and public investment are found to be complementary. It means government should expand the level of infrastructure to boost the private sector. The political dummy

representing democracy was highly significant and detrimental to private investment in Ghana. We can conclude that a politically stable environment is necessary for investment and hence growth.

In a similar inquiry, Akpalu (2002) used annual time series data from 1970 – 1994, on Private Investment, Public Investment, Real GDP, Consumer Price Index (CPI), Lending Rate, Credit to the private sector and GDP per capita to model the determinants of private investment. He used the Engle-Granger Two Step procedure and the Johansen multivariate test. The study reveals that in relative terms private investment in the short-run responds more to real per capita income growth, credit availability and public investment. Public investment, in contrast to Asante (2000), was found to crowd-out private investment. There was also a significant negative relationship between cost of capital and private investment in both the short and long run. Further, a significant positive relationship between real GDP and private investment was found in both the short and long run models but was not significant in the short-run. This result indicates a confirmation of the accelerator theory of investment in Ghana.

Finally and most recently, Frimpong and Marbuah (2010), using modern time series econometric techniques such as unit root tests, cointegration and error correction techniques within an Autoregressive Distributed Lag (ARDL) framework studied about private sector investment in Ghana. Their study reveals that private investment is determined in the short-run by public investment, inflation, real interest rate, openness, real exchange rate and a regime of constitutional rule, while real output, inflation, external debt, real interest rate, openness and real exchange rate significantly influenced private investment response in the long-run.

RESEARCH METHODOLOGY

The study is about the determinants of private investment in Ghana. In our quest to find the determinants of private investment in Ghana, five major investment theories were considered; namely: the Keynesian investment multiplier, the accelerator model, the neoclassical model, Tobin Q model and Neoliberal hypothesis (McKinnon-Shaw hypothesis)

The research involves only secondary data. The data covers the period from 1980 to 2010. The data on real GDP growth rate (in 2006 constant prices) and inflation (year-on-year) were obtained from the Bank of Ghana Research Department for the period 1980 to 2010. Data on Private investment (% of GDP), Public investment (% of GDP), External debt stocks (% of GNI), Domestic credit supply to the private sector (% of GDP) and Trade (% of GDP) were also obtained from the World Development Indicators 2011 (WDI 2011) for the period 1980 to 2010. Data on Real interest rate (%) was obtained from Bank of Ghana. Also, data on Real exchange rate [where $RER = e * P^f / P^d$ where e = nominal exchange rate, P^f = foreign price level (proxied by US CPI) and P^d is domestic price level (using Ghana's CPI)] was obtained from International financial statistics, 2011 (IMF) for the same period. Finally, data on corporate tax (thousand Ghana Cedis) was obtained from Bank of Ghana for the period 1983 to 2010. Corporate tax as a percentage of GDP was computed based on data from bank of Ghana.

Based on the theoretical and empirical review, the variables that we found to determine private investment in Ghana are: Real GDP, Public investment, Credit Supply to the Private Sector,

Inflation, External debt, Real interest rate, Openness of the economy, Real exchange rate, corporate tax and democracy. Thus the Private investment function in Ghana is formulated as;

$$PINV = f(RGDP, PUBINV, CRPS, INFL, ETD, RIR, OPENNESS, RER, TAX, DUMMY)$$

The explicit econometric model of private investment in Ghana is formulated as:

$$PINV_t = \beta_0 + \beta_1GDP_t + \beta_2PUBINV_t + \beta_3CRPS_t + \beta_4INFL_t + \beta_5ETD_t + \beta_6RIR_t + \beta_7OPENNESS_t + \beta_8RER_t + \beta_9TAX + \beta_{10}DUMMY_t + \mu_t$$

Where: PINV = Private Investment; RGDP = Real Gross Domestic Product; PUBINV = Public investment; CRPS = Credit to Private Sector; INFL = Rate of inflation (proxy for macroeconomic uncertainties/instability); ETD = External Debt/GDP; RIR = Real Interest Rate; OPENNESS = Trade Liberalisation (Trade as a percentage of GDP); RER = Real Exchange Rate; Dummy (a proxy for Democracy); μ_t is the error term; t is time.

And DUMMY = 1 for years greater than 1992 = 0 otherwise

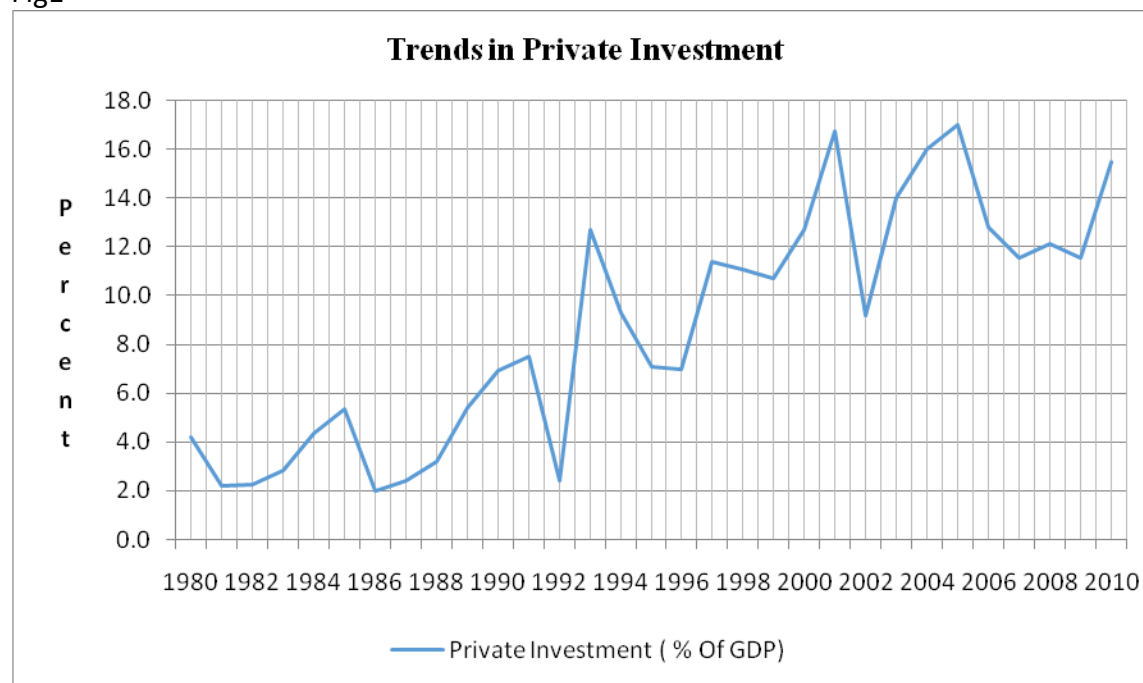
PRESENTATION AND ANALYSIS

This chapter is made up of three sections. These are: trend analysis of private investment and its determinants, simple linear regression results as well as correlation analysis. Here, data is analysed in line with our research objectives.

In this section we analyse trends in the data used for the study.

4.1.1 Trends in Private Investment

The graph below shows the trends in private investment for the period 1980 to 2010 in Ghana Fig1



From the graph, private investment fell from 4.2% in 1980 to 2.2% in 1981 and rose marginally to 2.3% in 1983. Private investment averaged at 2.4% from 1980 to 1983, the lowest for the period under study and according to Asante (2000) “corresponded to the period during which the balance of payments and current account had the worst performance”. It then rose from

5.37% in 1985 to 7.08 in 1995 reaching a record level of 17% of GDP in 2005. It then fell marginally from 17% to 15.5% of GDP in 2010. Political upheavals in the 1970s and 1980s, ineffective monetary management coupled with high levels inflation (120.75% in 1983) reduced business confidence. Also, over valuation of the Cedi reduced the competitiveness of the export sector. All these developments consequently dampened private investment in the 1970s and early 1980s. The introduction of the Economic Recovery Programme in 1983 and intensified democracy has evidently boosted business confidence in the country, and explains the higher levels of private investment in the early 2000s.

4.1.2 Trends in GDP Growth

The graph below shows the GDP growth rate for the period 1980 to 2010 in Ghana.

Fig 2

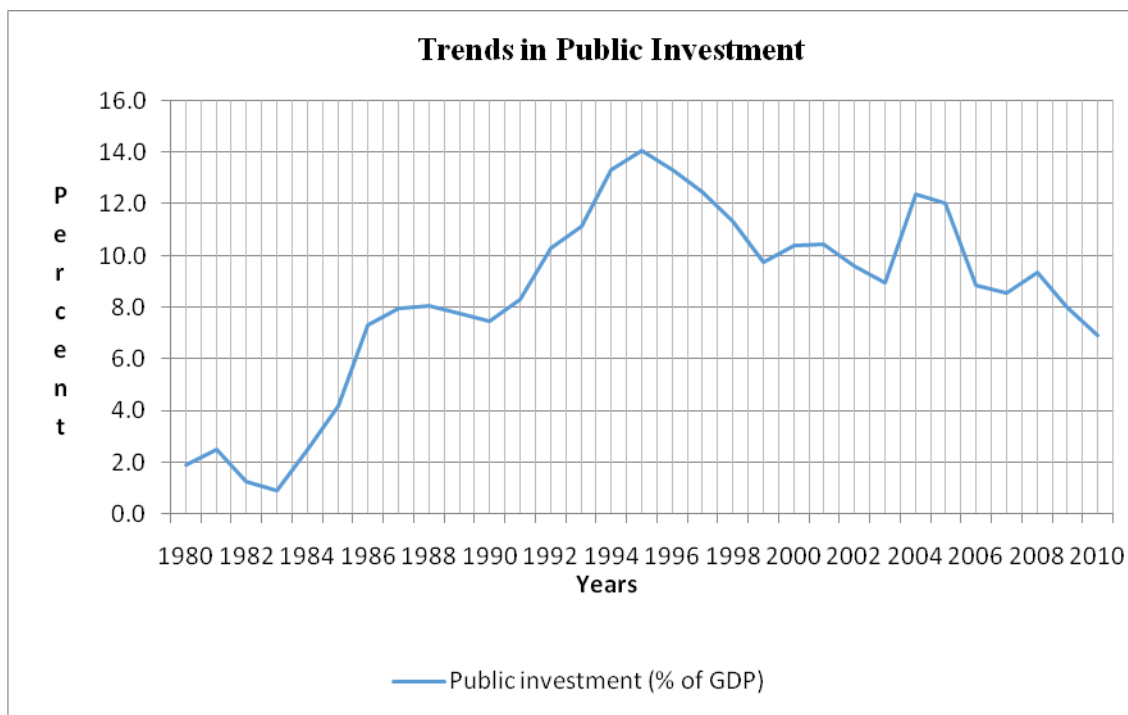


The GDP growth rate was averaged at negative 3.33% from 1980 to 1983. The series of coup d'états in the late 1970s and early 1980s coupled with accelerating inflation that reduced business confidence may have been the reason for the negative growth. Because Ghana was an agrarian economy at that time, the negative growth in output (0.2% for agricultural output) led to a famine in 1983. The GDP growth rate then rose sharply from negative 4.05% in 1983 to a record level of 8.64% in 1984. Perhaps, the introduction of the Economic Recovery Programme in 1983 may have yielded this result. It then increased steadily averaging 5.05% from 1985 to 2010.

4.1.3 Trends in Public Investment

The graph below displays the public investment trends for the period 1980 to 2010 in Ghana.

Fig 3

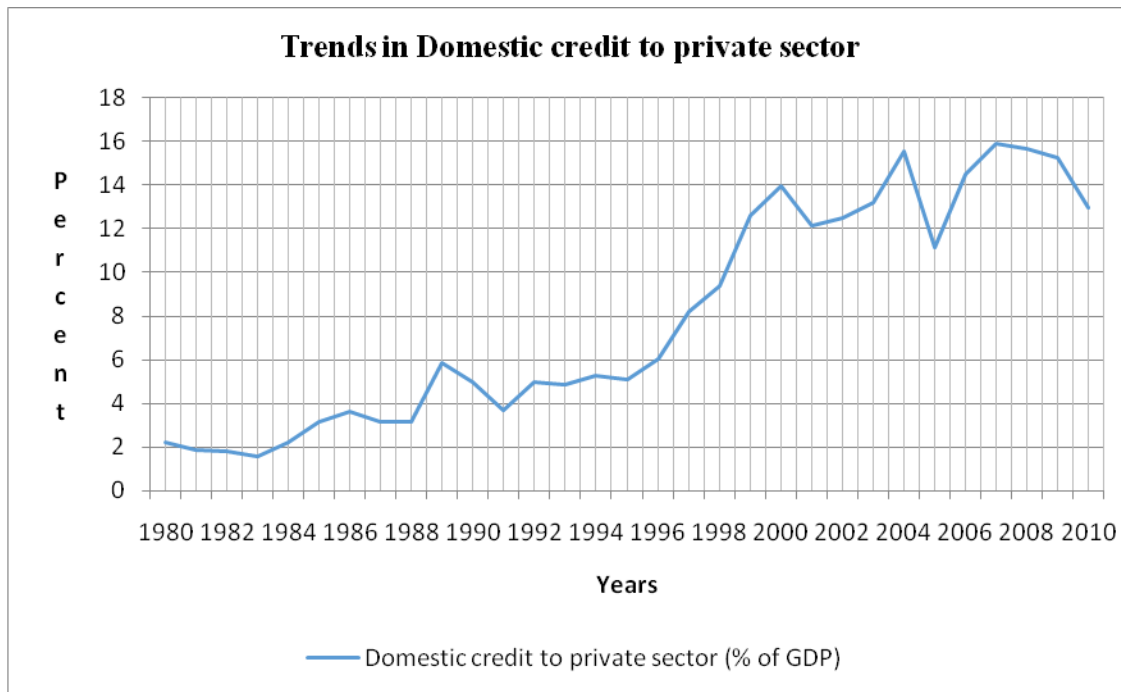


Public investment rose steadily from 0.9% of GDP in 1983 to 14.05% of GDP in 1995. It then declined sharply to 9.75% of GDP in 1999, and averaged 9.58% from 2000 to 2010. The huge government debt in the 1990s that culminated in the adoption of HIPC in 2001, and the need to exercise fiscal discipline in view of the debt may have been the reason why public investment was relatively lower in the early 2000s.

4.1.4 Trends in Domestic Credit to the Private Sector

The graph above displays credit supply to the private sector as a percentage of GDP for the period 1980 to 2010.

Fig 4

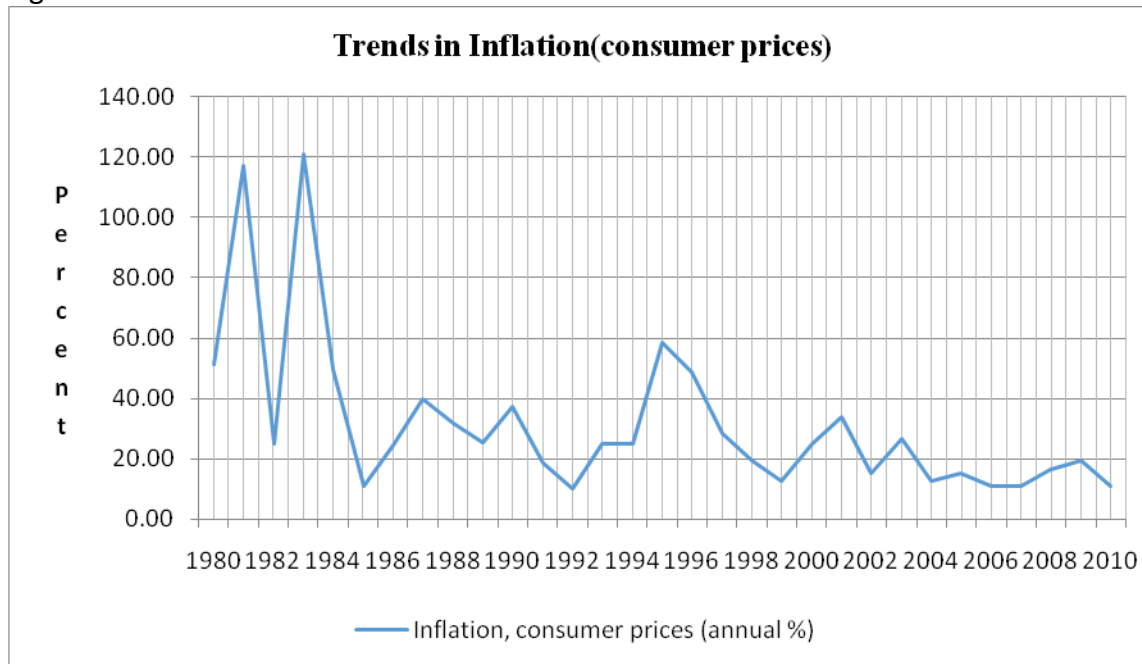


Credit growth to the private sector has a significant effect on private sector capital formation. According to a survey by Asante in 2000, 69% of firms contacted claimed that the problem of getting access to credit is a major challenge to investment. Credit supply increased from 2.19% in 1980 to 4.93% of GDP in 1990; to 13.97% in 2000; and finally to 12.95% of GDP in 2010. After independence, credit was controlled by mandating banks to lend to specific sectors of the economy. This, as depicted in the graph, retarded the private investment in Ghana. The financial sector liberalization since 1989 has ensured efficient allocation of credit, and in turn spurred private investment remarkably.

4.1.5 Trends in Inflation

The graph below shows inflation (year-on- year) in Ghana for the period 1980 to 2010.

Fig 5



During this period, Ghana experienced a double- digit inflation averaged 31.40% with a standard deviation of 26.79%. This average growth rate of general price levels is invariably high by any standard. Most research attributes Ghana’s high inflation to demand pressures emanating from monetization of fiscal deficits. Ghana after independence established a central bank and the central bank became an important source of financing for government’s budgets (Kwakye, 2010). From the graph, inflation rate rose sharply from 51.33% in 1980 to 116.90% in 1981, and then fell to 25% in 1982 and skyrocketed again to 120.75% in 1983. Private investment in view of the high inflation was very low. It fell from 4.2% of GDP in 1980 to 2.3% in 1982, and then rose marginally to 2.9% of GDP in 1983. The accelerating inflation in this period severely taxed savings, retarding the flow of funds to the private sector. The susceptibility of the economy to high rates of inflation is due to the intractability of the causes and ineffectiveness of inflation management.

Inflation has decreased continuously from 58.54% in 1995 to 10.79% in 2010, reaching a single digit level since June 2010. A critical look at the graph reveals higher inflation in the 1980s and 1990s than the 2000s. The reason is before 2007, monetary policy was conducted under a monetary targeting framework, whereby money supply was used as an intermediate route to the ultimate inflation target. This chart was ineffective in achieving inflation target because of the huge deficit financing, and the weak link between money supply and inflation. In 2007, the Central Bank adopted an Inflation Targeting framework that involves direct targeting without any intermediation. This yielded a relatively better result and explains the rapid disinflation being experienced recently in the country.

4.1.6 Trends in External Debt Stocks

The graph below shows the trends in external debt(% of GNI) for the period 1980 to 2010.

Fig 6

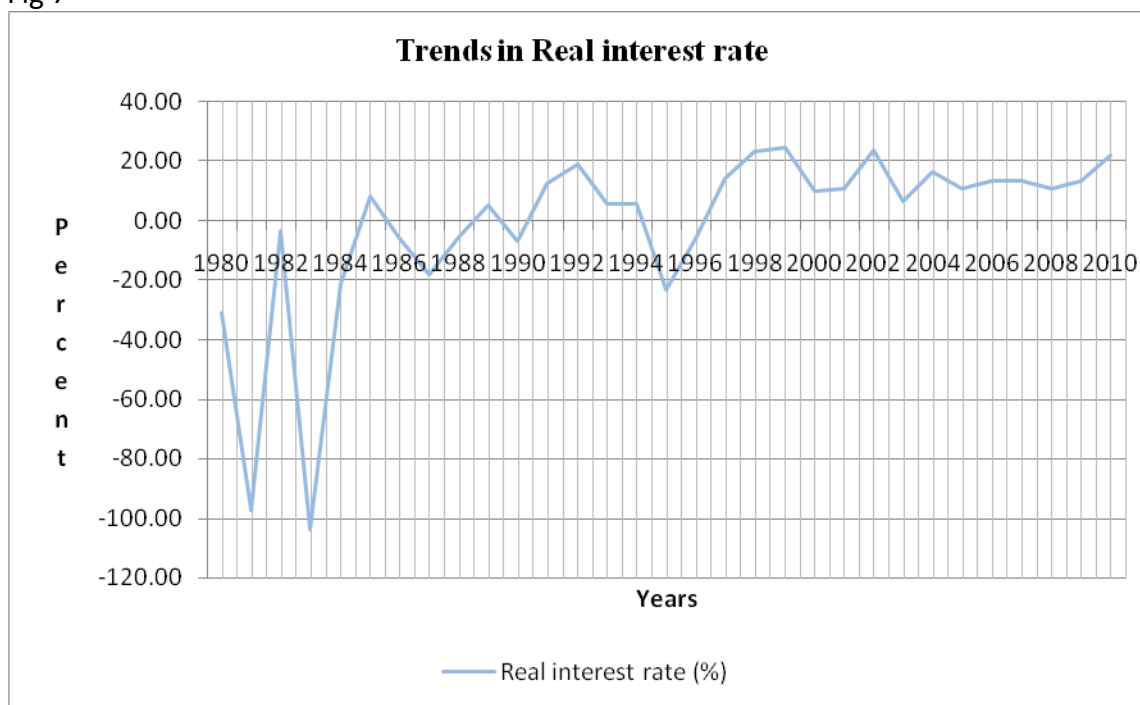


The effect of external debt on private investment works in such a way that the higher the external debt of the economy, the more difficult it becomes for the private sector to invest for the fear of higher tax burden in the future. Therefore evidence from the graph shows that between 1980 and 1992, the external debt was rising. On the other hand a contradiction to this seemed to have happened between 1993 and 1994. External debt fell from 121.95% in 2001 to 115.45% of GDP in 2002. But after 2004, external debt for Ghana dropped to its lowest level mainly due to Ghana’s HIPC Initiative where most of our external debts were cancelled and private investment started rising.

4.1.7 Trends in Real Interest rate

The graph below shows trends in real interest rate in Ghana for the period 1980 to 2010.

Fig 7

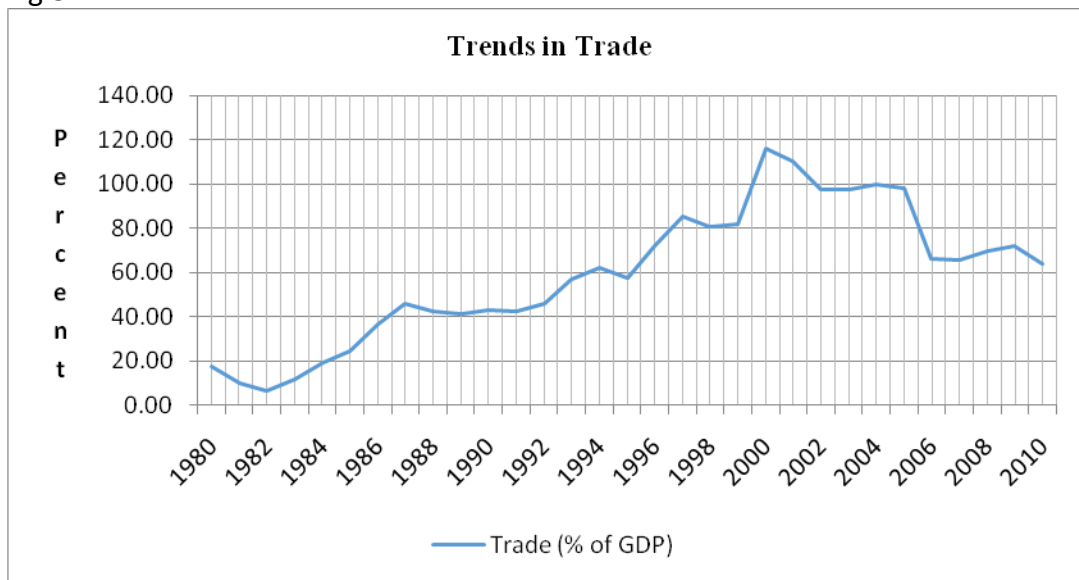


The real interest rate averaged -51.41% between 1980 and 1984. This period was associated with accelerating inflation that taxed returns on investment. In view of this, investors were reluctant to invest because the higher inflation negated their real returns. With support from the International Monetary Fund and World Bank, financial liberalization in Ghana began in the late 1980's, under the Financial Sector Adjustment Programme (FINSAP). Interest liberalization under the FINSAP was implemented gradually. All sectorial credit allocations were also phased out. Interest rate controls were gradually relaxed and full liberalization was achieved. After the FINSAP, real interest rate has risen steadily from -6.96% in 1990 to 21.77% in 2010.

4.1.8 Trends in Trade

The graph below shows trends in trade for the period 1980 to 2010.

Fig 8

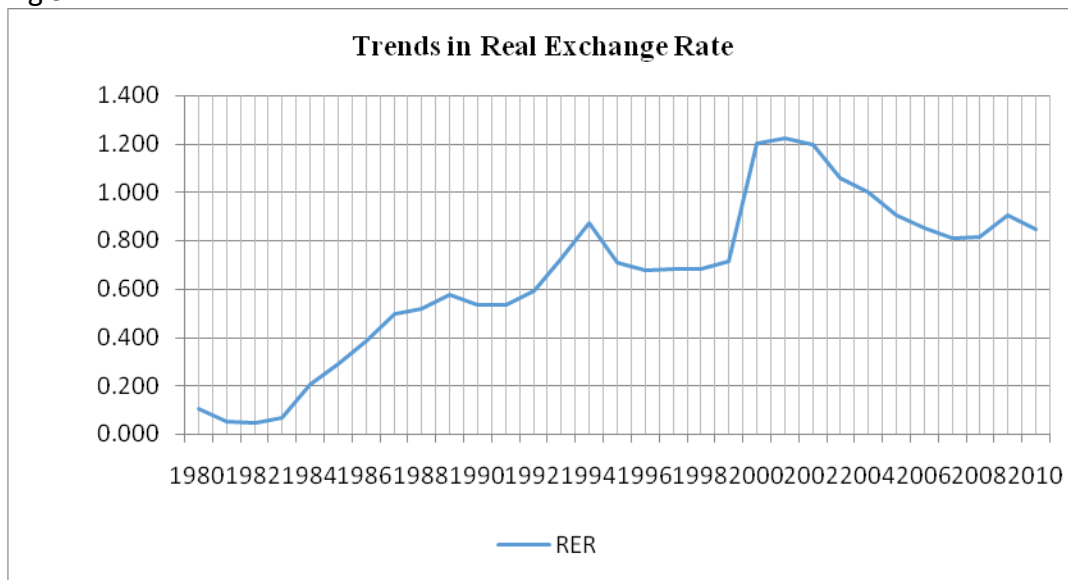


From the graph, trade fell from 17.62% in 1980 to 6.32% of GDP. Trade to GDP ratio rose steadily from 6.32% to 85.4% in 1997, reaching its peak in 2000 at 116.05%. It then fell sharply from 116.05% in 2000 to 63.68% in 2010.

4.1.9 Trends in Real Exchange Rate

The graph below shows trends in real exchange rate in Ghana for the period 1980 to 2010.

Fig 9



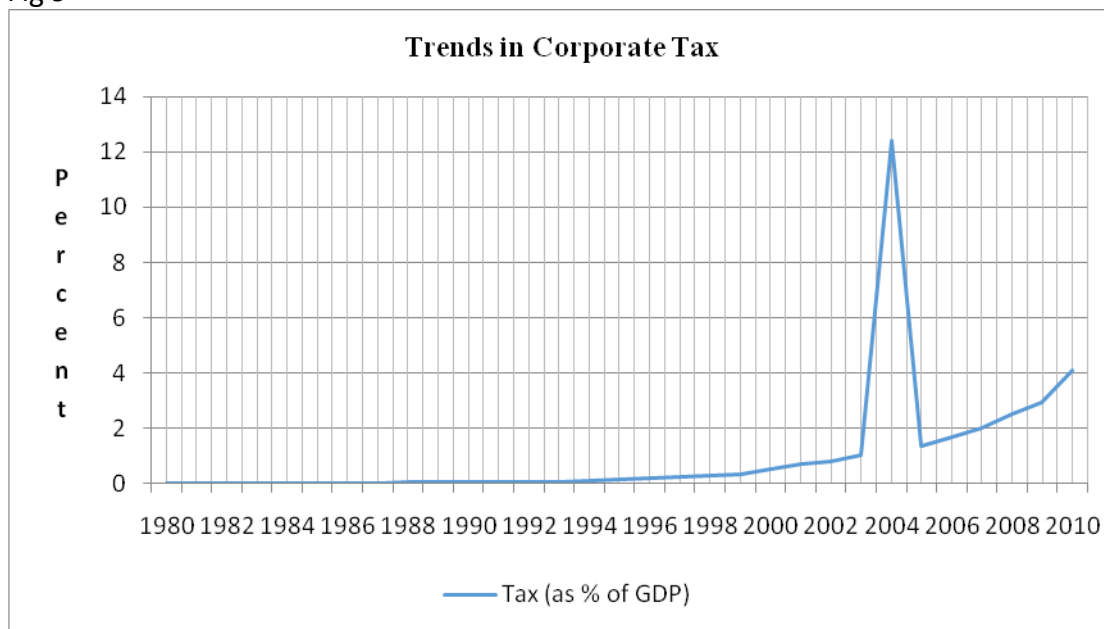
From the graph, the spikes in real exchange rate occurred between 1992 and 1995 and lastly between 1999 and 2007. The reason for the spikes is due to the depreciation of the real exchange rate in 1992 and 1999 by 0.592% and 0.714% respectively which lead to over-

valuation of the cedi. Therefore export incentives were ineffective which sternly affected private investment to fall. The reason for the over- valuation was due to the policy taken by the monetary authorities to encourage imports of raw materials into the economy. This affected import of raw materials for private investment which improved private investment.

4.1.10 Trends in Corporate Tax

The graph below shows trends in corporate tax in Ghana for the period 1980 to 2010.

Fig 9



As the graph shows, corporate tax was infinitesimal from 1980 to 1998, started to rise marginally afterwards, and peaked at 12.39% of GDP in 2005. It then fell to 4.08% in 2010. The Minerals and Mining Act of 1986 provided tax incentives to investors. The incentives included, among others, corporate tax allowances, capital allowances under which companies could write off between 40% and 100% of capital investment against tax. This may have explained the low corporate tax receipts in the late 1980s and 1990s.

4.2 Regression Results

The thrust of the study is to find the determinants of private investment in Ghana. Based on the methodology, the private investment model contains the following variables: real GDP growth rate (GDPG), public investment as a % of GDP (PUBINV), credit supply (CRSP), inflation (INFL), external debt to GDP ratio (ETD), real interest rate (RIR), trade as a % of GDP (OPENNESS), real exchange rate (RER), corporate tax (TAX) and Democracy (DUMMY). The result of the simple linear regression using OLS estimator is shown in table 4.2.1. The regression was estimated using EVIEWS 5 software.

Table 4.2.1 Regression Results

Sample: 1980-2010 Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Const	6.390913	2.571721	2.485072	0.0219 **
GDPG	0.080176	0.178444	0.449307	0.6580
PUBINV	-0.629535	0.240313	-2.619646	0.0164 **
CRSP	-0.658539	0.343800	-1.915472	0.0698 *
INFL	0.016178	0.090599	0.178568	0.8601
ETD	-0.068204	0.037741	-1.807171	0.0858 *
RIR	0.032226	0.087679	0.367544	0.7171
OPENNESS	0.159144	0.063318	2.513411	0.0206 **
RER	4.819836	4.343720	1.109610	0.2803
TAX	0.426297	0.211843	2.012332	0.0578 *
DUMMY	5.908889	1.887757	3.130110	0.0053 ***
R-squared	0.876628			
Adjusted R-squared	0.814941			
F-statistic	14.21107			
Prob(F-statistic)	0.000001			
Durbin-Watson stat	2.036708			

*** means significant at 1% level

** means significant at 5% level

* means significant at 10% level

From the regression, R^2 is 0.8766 and adjusted R^2 is 0.8149. The adjusted R^2 shows that about 82% of the variation in private investment is jointly explained by the specified determinants while the R^2 shows that about 88% of the variation in private investment is accounted for by the aforementioned factors. Also, the overall regression is statistically significant with F-statistic of 14.21107 as shown by the P-value (F) of 0.000001. This means that the independent variables jointly explain the variation in the dependent variable.

The regression had no problem of heteroskedasticity and there was also no autocorrelation, although multicollinearity is a problem. Attempting to solve the problem by transformation did not yield a better result (as shown by table 2b in appendix B). However, the problem didn't generally affect the result.

To begin with, the constant coefficient is large (due to the multivariate nature of investment as stated in Chapter 2) and positive as expected. It is also statistically significant at 5% level. Specifically, if Ghana were to increase the exogenous variable(s) by 1%, private investment, on the average, will increase by approximately 6.39%.

The coefficient of real GDP growth rate has its expected theoretical sign; positive. Thus a 1% growth in real GDP will increase private investment by 0.08% in Ghana. This suggests the workability of the accelerator theory in Ghana. The result is also in consonance with empirical studies by Frimpong and Marbuah (2010), Outtarra (2005) and Asante (2000). However, unlike

the result of Frimpong and Marbuah (2010) which was statistically significant at 1% level, the coefficient in this result is not statistically significant. The reason for the difference can be attributed to the fact that this work employed simple linear regression while Frimpong and Marbuah (2010) made use of a more sophisticated econometric method: ARDL (time series models).

Public investment to GDP ratio has a negative coefficient and statistically significant at 5% level. This shows that public investment crowds out private investment in Ghana. Perhaps, the negative impact of non-infrastructure investment more than offsets the positive externality associated with investment in infrastructure. Specifically, 1% increase public investment will decrease private investment by 0.6585%. In other words, if the government of Ghana increase its purchases buy 100 million Ghana cedis, the feedback on economy will crowd out 65.85 million Ghana cedis. This result is consistent with the one obtained by Acosta and Loza (2005) in their study of private investment in Argentina. However, this result contradicts that of Asante (2000). He found that public investment complements private investment at 1% level of significance.

Credit supply to the private sector has a negative coefficient and is marginally significant at 10% level. Based on the literature, the expected sign of the coefficient of credit supply is positive (that is $\beta_3 > 0$). However, our results show that if credit supply increases by 1%, private investment will fall by about 0.66%. Therefore the negative coefficient which shows that credit supply to the private sector is negatively related to private investment is inconsistent with economic theory as discussed in the literature review and methodology above. This result is consistent with the one obtained by Ouattara (2005). However, the result is contrary to what has been obtained by Ndikumana (2000), Asante (2000) and Frimpong (2010). Asante had a positive and statistically significant coefficient at 1% level.

Atheoretically inconsistent result was obtained for the coefficient of inflation. The coefficient of inflation was positive but not statistically significant. In other words, although an increase in inflation could cause private investment to increase (based on our data), the marginal impact is not significant. Economic theory posits that high levels of inflation causes macroeconomic instability and therefore retards private investment. Nevertheless, from the results above, 1% increase in inflation brings about 0.016% increase in private investment. This result runs counter to economic reasoning and most empirical works. It however matches the results obtained by Frimpong and Marbuah (2010) where inflation was found to propel private investment in Ghana. Acosta and Loza (2005) had a similar outcome for Argentina. In Ghana, the reason for the positive relationship between inflation and private investment can be attributed to the fact that higher prices stimulate production and supply. Moreover, higher production is associated with higher real income. From the accelerator model, a higher income increases private investment by a multiple of the initial increase in income. This reiterates the initial suggestion that the accelerator model holds for Ghana.

The parameter of external debt to GDP ratio (β_5) is estimated at -0.068 which is statistically significant at 10% level. Stated differently, external debt is negatively related to private investment as expected. Specifically, 1% increase in external debt to GDP ratio will lead to a decline in private investment by 0.068%. Here, the result obtained is in line with economic

theory, confirming the debt overhang effect in Ghana. Thus, when external debt to GDP ratio increases, private investment will contract because investors fear to be taxed more sometime in the future for the government to service the increased debt. Huge external debt stock relative to the size of the economy causes macroeconomic instability (as being experienced by Greece) which is harmful to private investment. This result is in agreement with most studies in Ghana and Africa, especially that of Frimpong and Marbuah (2010) for Ghana; and Were (2001) for Kenya.

The coefficient of real interest rate is positive but not statistically significant. Although not significant, the result shows that 1% increase in real interest rate will cause about 0.032% increase in private investment. This may suggest the workability of the McKinnon-Shaw hypothesis in Ghana. In other words, higher real interest rate encourages more savings which provide more loanable funds for boosting private investment. Also, based on the data, the insignificant coefficient implies that investors in Ghana do not really take real interest rate into account in their investment decisions. The result, in terms of the positive coefficient, is confirmed by many empirical works including those of Asante (2000) and Frimpong and Marbuah (2010). However, since they used more sophisticated econometric tools, real interest rate was not only positive but also statistically significant at 1% and 5% levels respectively.

The coefficient of openness is positive and statistically significant at 5% level. In other words, a 1% increase in trade to GDP ratio will spur investment by about 0.159%. The reason is that as Ghana's economy opens, for example through trade liberalization, it attracts private investment in the tradable sectors of the economy. The result obtained contradicts that of Asante (2000) and Frimpong and Marbuah (2010). This is because they used data in the 1970s. The post-independence trade policy in the form of import licensing culminated in corruption and rent-seeking activities which could have been the inertia that explains the adverse effect of openness on private investment in their works.

The coefficient of a closely related variable (real exchange rate) is positive but not statistically significant. The result, although not statistically significant, shows that 1% depreciation in real exchange rate will lead to 4.82% increase in private investment. This shows that the depreciation of the cedi makes it more profitable to export and this induces investment in the export sector because exports are relatively cheaper than imports on the world market.

Based on our data, corporate tax has an estimated coefficient of 0.426. The coefficient is positive and marginally significant at 10% level. To be specific, the result suggests that 1% increase in corporate tax will lead to, on the average, 0.426% increase in private investment. This means that private investment and corporate tax are positively related and this is not to be expected based on a priori. This result contrasts most studies in public finance, especially that of Djankov et al (2008). Their result was that corporate tax has a large and significant adverse effect on private investment. To be specific, a 10 percentage point increase in the 1st year effective corporate tax rate reduces aggregate investment to GDP ratio by about 2 percentage points. However, in the United States, the post-war period (1950-2008) showed a positive relationship between private investment and corporate tax. This is in line with our results. The reason is attributed to the fact that as firms retain more and more of their earnings through

reduced corporate tax, they fail to make economic use of their capital and hence a reduction in private investment.

The dummy variable (proxy for constitutional regime) shows a positive and statistically significant estimated coefficient at 1% level. This means that the political environment has an immense influence on private investment. Indeed, this result meets our prior expectation that a politically stable environment provides an incentive for private investment. Frimpong and Marbuah (2010) found a positive but not statistically significant relationship between private investment and the dummy variable. According to Rodrik, "Uncertainty matters a lot.

Indeed it may matter so much as to render insignificant some of the traditional determinants of investment, such as the cost of credit, level of profitability, and tax incentives" (Rodrik, in Serven and Solimano, 1993: 280–281).

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.0 Introduction

This chapter comprises three sections. These are: summary of findings, recommendations and the conclusion of the research.

5.1 Summary of findings

This study examined the determinants of private investment in Ghana. This was done by using trend analysis, simple linear regression and simple correlation analysis.

The work identified ten variables namely: real GDP growth (GDPG), public investment (PUBINV), credit supply to the private sector (CRSP), inflation (INFL), external debt (ETD), real interest rate (RIR), openness of the economy (OPENNESS), real exchange rate (RER), corporate tax (TAX) and democracy (DUMMY). Of these variables, six were statistically significant. The dummy variable was statistically significant at 1% level; public investment and openness were significant at 5% level while credit supply to the private sector, external debt and corporate tax were significant at 10% level. Real GDP growth, inflation, real interest rate and real exchange rate which were not found to be statistically significant were found significant under the simple correlation analysis.

Based on our data, we find that public investment crowds out private investment in Ghana. This means that the negative externality associated with non-infrastructure investment more than offsets any positive externality associated with infrastructure investment.

Openness was found to be positive and statistically significant. This means that trade liberalization is relevant for improving the level of private investment in the economy. Through trade liberalization, private investment is attracted into the tradable sectors of the economy.

External debt to GDP ratio is also found to have a negative and statistically significant impact on private investment. In other words, increasing external debt is a disincentive to private investment because investors fear that future profits will attract higher taxes in order to finance the external debt.

In fact, although significant, credit supply showed a theoretically inconsistent result because it had a negative coefficient. However, the dummy variable (proxy for constitutional regime) was found to have a very large and statistically significant impact on private investment. This shows that private investment behaviour is largely influenced by the prevailing political climate.

Therefore a politically stable environment provides a major incentive for private investment in Ghana.

Based on the results of the simple linear regression, the variables that were not found to be statistically significant were discussed using simple correlation analysis. Of these variables, real exchange rate was found to have the highest strength of linear association with private investment (0.8141). Inflation also showed the weakest association with private investment (-0.4756), while GDP growth and real interest rate had correlation coefficients of 0.4790 and 0.5596 respectively. The aforementioned correlation coefficients were all statistically significant at 5% level.

The constant coefficient is found to be positive and statistically significant. It is the largest coefficient, which indicates that other explanatory variables which have not been explicitly incorporated in our model are also of relevance. In other words, there is more room for further research due to the multivariate nature of investment.

5.2 Recommendations

Based on the findings, we recommend that fiscal policy should be tightened, especially with regards to non-infrastructural investment. This would reduce the crowding out effect of private investment in Ghana.

It is recommended that government policies that seek to encourage private investment should promote free trade. Trade liberalization will allow for increasing private investment in Ghana.

Government should also endeavour to reduce the size of external debt relative to GDP. When this happens, investors will be more confident that government will not levy higher taxes on future returns on private investment. The government could learn from the adoption of the HIPC initiative in 2001.

A stable political environment is recommended because it indicates that the investment climate is favourable. Here, investors are more certain that property rights are protected and contracts will be kept and therefore they will be encouraged to invest.

5.3 Conclusion

The study analyses the determinants of private investment in Ghana using a time series data from 1980 to 2010 and employing simple regression and correlation analysis. The results show that public investment crowds out private investment. It can be concluded that the factors that have a significant impact on private investment in Ghana include: public investment, credit supply to the private sector, external debt, openness of the economy, corporate tax and democracy. Nevertheless, variables like: GDP growth, real interest rate, inflation and real exchange rate were not statistically significant based on our methodology of simple linear regression. Perhaps, more advanced econometric tools like: Johansen cointegration technique and Autoregressive Distributed Lag (ARDL) models would yield better results. Besides, the large and statistically significant coefficient of the constant term informs us that there is, indeed, more room for further research.

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