

# THE IMPACT OF FINANCIAL LIBERALIZATION ON PRIVATE INVESTMENT IN GHANA

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## ABSTRACT

*Ghana's financial sector policies have largely been influenced by changes in global economic thoughts. Prior to the 1980s when it was fashionable in the development literature to advocate for interventionist policies, the country's financial system was heavily regulated beyond the mere enforcement of contracts and fraud preventions. Later in the 1980s when the new orthodox became the order of the day, the country once again began a major policy experiment with these policies. The objective of this study is to examine the effects of the financial sector reforms on private investment in Ghana. To achieve this, a simple econometric model was developed and estimated using data from 1980 – 2007. It came out from the study that private investment responded marginally to the financial liberalization policies in Ghana. The general conclusion of the study is that financial liberalization will not have favorable effects on private investment unless foreign and unproductive assets such as cash and gold are channeled to the banking sector in developing countries.*

**JEL:** G11, G21, F62

**KEYWORDS:** Financial Engineering, Investment, Interest Rates, Financial Deepening, Liberalization, Economic Growth

## INTRODUCTION

Ghana's major attempt at liberalizing its economy began in 1983 when the government of the Provisional National Defense Council (P. N. D .C.) started implementing the Structural Adjustment and the Economic Recovery Program. As part of this broad policy, financial sector reform policies were initiated in 1986 to liberalize the hitherto repressed financial sector.

The financial policies that were implemented in Ghana were expected among other things to: 1.) Increase the flow of funds through the organized banking system. 2.) Stabilize interest rates on borrowing thereby giving investors predictable expectations about the future. 3.) Improve the process of self-finance within enterprises and households through positive real yields. 4.) Deepen the stock and bond markets as well as intermediation by the trust and insurance companies. In effect, the reforms were to secure effective mobilization and efficient allocation of loan-able funds. However, almost three decades after its implementation, little seems to have been achieved.

Ghana, like many other developing countries has limited domestic resources for its economic development. Consequently, all efforts must be made to mobilize the available resources if the country's aim of achieving sustainable growth and accelerated poverty reduction are to be met. However, it appears the mobilization of resources has not been effective even after the financial reforms.

Available statistics indicate that even though saving as a percentage of GDP was 13.68% in 1970 it systematically dropped to 3.31% by 1983 whilst investment as a percentage of GDP was 2.04% by 1996. The behavior of these ratios even under the reform period, suggest an opinion contrary to what McKinnon and Shaw hypothesized in 1973. It seems wealth holders, in behaving rationally, prefer holding their wealth in foreign, unproductive and government securities than in real domestic assets.

Most of the studies on private investment in Ghana have focused on trends and determinants. As such, the substitutability of bank deposits to domestic, foreign and unproductive assets and the general response of private investment to financial liberalization remain to a large extent unexplained. Indeed the proposition favoring the private sector response to financial reforms appears to rest more on theory than on proven facts. Without such information however, Ghana will be handicapped when it comes to designing policies intended to stimulate investment.

The objective of the study is to analyze the effects of financial sector reforms on private investment in Ghana. The study thus, seeks to examine how wealth holders readjust their portfolio when real interest rates change. More specifically, the study pursues the following objectives: 1;) Develop a structural model to analyze the effect of financial liberalization on private investment in Ghana. 2.) Test empirically, the effect of interest rates changes on assets demand. In this respect, an attempt is made to determine whether financial liberalization has a positive or negative effect on real assets demand, foreign assets demand or financial assets demand in Ghana. In pursuit of the above objectives, the following hypothesis is postulated: Financial liberalization has a positive and significant effect on domestic assets demand and investment.

The rest of the paper is organized as follows. The next section reviews related literature on interest rates, investment and financial liberalization followed by a discussion on the data and methodology used for the study. Next, we discuss the results of the empirical tests and provide the concluding remarks in the final section.

## LITERATURE REVIEW

This section reviews both the theoretical and empirical literature on interest rates, investment and financial liberalization. The relationships between interest rates and investment as portrayed by theory are varied and ambiguous when looked as a whole. Three major theories that dominated the literature before the advent of McKinnon-Shaw hypothesis were the Classical, the Keynesian and the neoclassical models.

In the traditional Classical Non-Monetary Model of Capital Accumulation and Growth, the equilibrium capital intensity and the marginal productivity of capital are determined by *productivity and thrift*. Thus, for any given profitability level, investment expenditure varied negatively with interest rate. This inverse relationship between investment and interest rate was reemphasized by the Keynesians. Using the concept of Marginal Efficiency of Investment (MEI), they argued that investment projects could be ranked by the rate of interest that would discount the present value of the project to zero and concluded that the lower the interest rate the more investment businesses are willing to undertake.

In the 1960s however, the above relationship was challenged by the neoclassical economists who rationalized that if the real return on physical capital falls relative to the return on money, wealth-holders would raise the accumulation of real money balances in their portfolio and reduce investment. To them, capital accumulation and money balances were perfect substitutes. They rather established a negative relation between investment and inflation by arguing that inflation dilutes the return and value of real money balances.

McKinnon and Shaw (1973) supported the positive correlation between investment and interest rate but used complimentary and debt-intermediation hypothesis to explain the relationship. They rationalized that an increase in the deposit rate raises real money demand and hence supply of credit by the financial intermediaries which then accelerates investment accumulation and economic growth. To them, financial institutions are more efficient in mobilizing and disbursing loan-able funds, reducing cost and increasing investment and productivity than the curb markets.

The above propositions have been tested variously by different scholars. Reviewing the theoretical literature, James Tobin (1965) rationalized that economic agents increase savings during periods of low rates mainly because capital competes with other products in their portfolio and argued that one such product is public debt. He concluded that the non-monetary theory offered no portfolio choice to economic agents.

Most of the recent studies however are concentrated on economic growth with emphasis on savings mobilization, investment and efficient allocation of resources. Maxwell Fry (1980) using quantitative estimation carried out a study that sort to combine investment, savings and growth in sixty-one developing countries and came to the conclusion that holding institutional interest rate (particularly deposit rates) below their market equilibrium adversely affected savings, investment and growth. He found savings in developing countries to be positively affected by the real rate of interest and real money demand, where money demand was defined broadly to include savings and time deposits. He was of the view that under disequilibrium interest rate conditions, higher savings which raise real money demand also increase the real supply of credit which is an important determinant not only of new investments but also capacity utilization of the capital stock. According to him, two main channels through which real deposit rates affected growth were the volume of savings and the capacity utilization of capital which is measured by the incremental capital/output ratio (ICOR). In his view therefore, the real credit available remains the sole agent for adjusting savings to growth.

Dornbusch and Reynoso (1989) in discussing the importance of financial factors in economic development contended that growth in per capita income emanated from two ingredients, first from the accumulation of physical capital and secondly from the more efficient use of resources. They further argued that financial factors exerted influence on growth through both channels, that is, by increasing savings and allocating it to projects with high returns. However, they were of the view that financial factors can only be important if the economy was not financially stable. They thus wrote “but while we believe that there is no significant gain in economic performance between a situation of stable real interest rates of  $-1$  or  $-2$  percent, the financial regime can become a dominant determinant of performance when it deteriorates significantly.” (Dornbusch and Reynoso 1989, p.204)

Ross Levine and Robert King (1992) in a similar study investigated the relationship between financial indicators and economic growth in 119 developing countries. Using the ratios of M1 to GDP, liquid liabilities of the financial system to GDP, quasi-liquid liabilities of the financial system to GDP and the ratio of claims on the private sector by the central bank and deposit taking banks to GDP as indicators of the size of the financial system, they observed in a larger number of their cross-country econometric specifications that, both the average and initial size of the financial system acted positively and significantly in the growth process. However, when common indicators of monetary, fiscal and trade policies were simultaneously introduced into the regression, the initial financial size variable frequently became insignificant at 5% level, yet it was highly correlated with the efficiency of investment but not the level of investment. They also used pooled cross-country, time series analysis and observed that the pooled results were importantly different from the average cross section results. Indeed the average size of the financial system had no significant coefficient. They established that the financial indicators were linked to growth through two channels; the investment channel and the efficiency channel and noted that the average financial size indicator was positively related to growth through the investment channel while it was negatively related to growth through the efficiency channel.

Galbis (1977) spearheading the neo-liberalists idea, represented financial indicators by financial deepening and interest rates and assessed their importance in the economic development of less developed countries. He argued that the Keynesian and the neoclassical schools of thought provided misguided analysis on financial policies in these countries. He tested the hypothesis that inflation and low interest

rates tended to retard investment and economic growth using data from nineteen Latin American countries from the period 1961 to 1973. Between these periods, he documented that the average annual rate of inflation ranged from under 3% for El Salvador, Guatemala, Honduras and Panama to over 50% for Uruguay and Chile. At the same time, the rate of economic growth ranged from 1.1% for Uruguay to 7.8% for Panama. He thus concluded that though the empirical results confirmed the existence of a close correlation between money and price, it offered little support for the neoliberal view that inflation was detrimental to growth either because it lowered the investment effort or it resulted in misallocation of resources.

In 1989, Bela Balassa summarized some of the available empirical evidences indicating that higher real interest rate increases the extent of financial intermediation and raises the rate of economic growth in developing countries. He noted that excessively high interest rates had unfavorable economic effects and suggested that such a situation can be avoided if the liberalization of the financial sector takes place under appropriate conditions including monetary stability and government supervision of the banks.

In a study for the International Monetary Fund (IMF), Lanyi and Saracoglu (1983) once again confirmed the positive relationship between financial reforms and economic growth. Availability of data and pure membership in IMF were the criteria for selecting the twenty-one countries for a cross-section study with data from 1971 to 1980. For any one country over time, the real deposit rate varied a great deal ranging from positive to negative or vice versa. For the period 1971-80, the IMF calculated the average real interest rate for each country on a fairly common asset, usually a thirty-day deposit deflated by the rate of change in its consumer price index (CPI). Countries were then classified according to whether their average rate over the period was positive, moderately negative or highly negative and were put in groups 1, 2 and 3, respectively. For the countries with negative real interest rates, real financial growth positively correlated with real GDP growth. Similarly, for those who maintained positive real deposit rate, there was high growth in real financial assets as was expected.

A survey into the literature also revealed that, domestic assets compete with foreign assets and money when there is financial liberalization. One of such studies was by Morisset (1991) who used a three-stage Least-Squares (3SLS) estimation to determine the effects of financial liberalization on assets demand for Argentina over the 1961-82 period. He found that the coefficient for real interest rate was positive on financial savings and negative on real savings and capital flight. This suggests that the buildup in deposits following the liberalization in 1977 came from the repatriation of capital invested abroad and the reduction of demand for public bonds and capital goods. Thus, the study confirmed the idea that an increase in the real interest rate re-allocated portfolio in favor of domestic monetary assets from foreign assets and domestic capital goods. He also found that Argentinean banks only used part (25.8%) of mobilized bank credit to finance productive investments, albeit he admitted that aside this, the policy also improved the efficiency of investment. Again, the estimated coefficient for income was positive on financial savings but not significant on real savings. At the same time, the effect of real private debt was positive on financial savings and negative on real savings. He deduced that the increase in external debt led to capital flight during the sample period and rationalized the positive correlation to be due to liquidity effect, corruption and policies such as overvaluation of the domestic currency that simultaneously promoted foreign borrowing and capital flight.

One other literature which is worth reviewing is a study by Asante (2000) on the determinants of private investment in Ghana. Asante formulated a model based on the Keynesian, neoclassical and uncertainty to identify the determinants of private investment in Ghana and concluded that public investment did not crowd-out private investment. His study also revealed that the McKinnon-Shaw hypothesis seems prevalent than the neoclassical theory in Ghana.

From the foregone literature review, it can be inferred that deregulating the financial markets coupled with financial engineering and deepening significantly improve investment performance and encourage domestic and financial assets demand whilst unnecessary governmental interference distorts and in fact retards investment, financial and domestic assets demands in developing countries.

## DATA AND METHODOLOGY

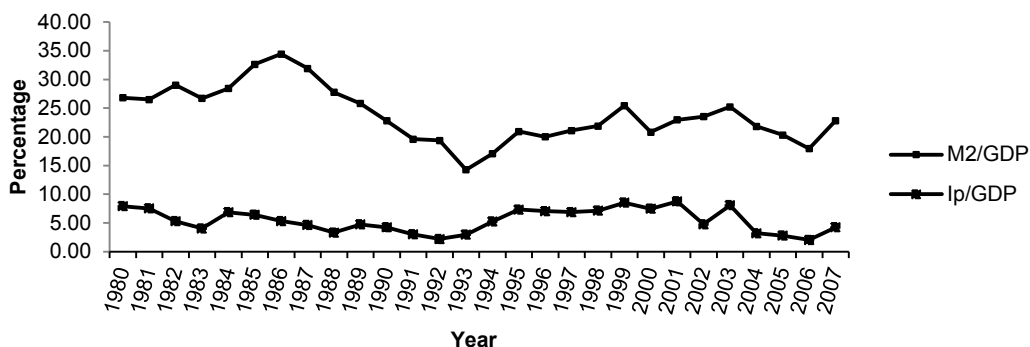
Virtually all the data used in this paper are obtained from secondary sources from 1980 to 2007. The primary sources of the data are the International Financial Statistics (IFS) CD ROM and Bank of Ghana Quarterly Bulletin. From these two sources, data for income, savings, money supply, public investment, inflation and interest rates are derived. Data for private investment came from Ghana Statistical Service and Bank of Ghana Quarterly Bulletin whilst the data for private wealth stock was constructed by cumulatively adding time series for private savings from the same two sources. Again, the Bank of Ghana data was enriched with data from Debt Tables of the World Bank for the external finance statistics. In estimating the model, all the variables as a percentage of GDP, except inflation and real interest rates, are used. In the case of GDP however, its growth rate is used.

An interesting observation about the data relates to the relationship between financial deepening indexed by money supply (M2) and private investment as portrayed in Figure 1 below. As can be seen in the figure, the early part of 1980s experienced a negative relationship between money supply and private investment. This can partly be explained by the overvaluation of the exchange rates, political instability and the high inflation rates that existed at the time. Under such conditions, the nominal value of money could be increasing yet the amount of real goods and services that can be bought may remain unchanged or even decrease.

Again the figure depicts a positive relation between money supply and private investment following deregulation in the mid 1980s except in 1992 where because of the general elections after over fifteen years of military dictatorship and political instability, private investment decreased whilst M2 increased.

It is important to note however that the performance of both M2 and private investment continued to improve afterwards. The ratio of M2 to GDP in 1993 was 11.3% whilst Ip/GDP ratio was just about 3%. By 2003, the M2/GDP and the Ip/GDP ratios had risen to 17.16% and 8.07% respectively. This could be attributed to the confidence investors had in the country following the transition from dictatorship to democracy in 1992.

Figure 1 Financial Deepening and Private Investment in Ghana



*This figure shows the relationship between financial deepening and private investment behavior in Ghana*

The study uses a methodology that is based on the Simple Portfolio Choice Theory (Assets Choice Theory) and the Accelerator Model of Investment with some modifications to incorporate the McKinnon-

Shaw hypothesis. To this extent the methodology follows the one developed by Morisset (1991) with some changes to suit the circumstances in Ghana.

The theory of portfolio choice posits that, asset demand depends on disposable income, the level of wealth and the rate of return on the asset relative to the return on alternative assets, and argues further that, changes in any of these determinants may create portfolio readjustments. As a result, changes in real interest rates following financial reforms generate portfolio rearrangements.

The proponents of financial liberalization have argued that an increase in real interest rates would bring about portfolio shift in favour of bank deposits emanating from the unproductive assets (e.g. cash and gold) or the curb market. However, this notion has been challenged especially in developing countries. Khatkhate (1988) for instance, has argued that private investment in developing countries is mostly the demand for capital accumulation by capital owners so that this form of savings would tend to decline when interest rates rise. Thus in reality, the increase in bank deposits could either come from the curb market or from real savings since it is not all that obvious that deposits are closer substitutes to unproductive assets than capital goods in developing countries. Indeed in these countries, an increase in the interest rate tends to reduce savings in capital goods and increase savings in financial assets and unless the latter effect significantly outweighs the formal effect, private investment may not record any upward change.

In determining whether the positive effect suggested by McKinnon-Shaw dominates the shift in portfolio from capital good into monetary assets as interest rate rises, we consider the following budget constraint facing the private sector:

$$S_{pt} + C_{pt} = M_t + H_t + F_t \quad (1)$$

It is assumed here that the private sector at any point in time, can invest its funds in three assets: real domestic money (M), real domestic assets (H) and real foreign assets (F). In investing in these assets the private sector is constraint by the amount of real private savings ( $S_p$ ) and real credit available to the sector ( $C_p$ ).

The demand for real money asset is defined as the real money stock while capital flight is used as a proxy for savings in foreign assets. In this regard the definition used by the World Bank (1985) will be most appropriate. The Bank defines capital flight as the gross capital inflows and current account deficit (CA) less increases in official foreign reserves ( $\Delta R$ ); where capital inflows are the sum of net direct foreign investment ( $i^*$ ) and changes in gross public and private debt ( $\Delta d$ ). The assumption here is that the difference between these inflows and the extent to which they are used to finance the current account deficit and an increase in reserves is taken to reflect the net foreign claims by the private sector.

Finally the difference between the financing available to the private sector and the two components represents real domestic assets (H), so that;

$$H_t = S_{pt} + C_{pt} - M_t - F_t \quad (2)$$

Intuitively, this can be rationalised as the amount of capital stock ( $i_p$ ) and public bonds (b) held by the private sector.

We specify the demand for assets function using the standard portfolio model as:

$$M = \beta_{10} + \beta_{11}y + \beta_{12}r + \beta_{13}C_p + \beta_{14}r^* + \beta_{15}INF + \beta_{16}W \quad (3)$$

$$H = \beta_{20} + \beta_{21}y + \beta_{22}r + \beta_{23}C_p + \beta_{24}r^* + \beta_{25}INF + \beta_{26}W \tag{4}$$

$$H = \beta_{30} + \beta_{31}y + \beta_{32}r + \beta_{33}C_p + \beta_{34}r^* + \beta_{35}INF + \beta_{36}W \tag{5}$$

Where  $y$  is defined as the real income,  $r$  as the domestic real interest rate representing the return on money,  $r^*$  as the foreign interest rate defining the return on foreign assets,  $INF$  as the expected inflation rate which is positively correlated with the domestic assets and enter the equation to represent portfolio shifts towards domestic assets (capital goods and government bonds) as the expected real rate of return falls (see Tobin 1965) and  $W$  as the net real wealth of the private sector. Credit to the private sector ( $C_p$ ) has been added to the model to take account of the presence of liquidity constraints on portfolio decisions of the private investor. The expected signs of the parameters are summarised in Table 1 below.

Since the assets are gross substitutes, each rate of return will have a positive influence on the underlying asset to which it is associated and a negative impact on the other assets. It is also assumed that changes in GDP levels affect the demand for money directly through the transactionary demand while at the same time it inversely affects the demand for foreign assets since an increase in GDP open up more investment opportunities for the local investors. It is also expected that as the real wealth of the private sector increases, their demand for all assets (including foreign assets) increase as well. Again, due to the presence of liquidity constraints in Ghana, it is expected that an increase in credit to the private sector ( $C_p$ ) will in general encourage the accumulation of assets since economic agents will have more current resources.

Table 1: Expected Signs of the Parameters of Equations 3-5

Variable	$y$	$r$	$C_p$	$r^*$	$INF$	$W$
M	$\beta_{11} > 0$	$\beta_{12} > 0$	$\beta_{13} > 0$	$\beta_{14} < 0$	$\beta_{15} < 0$	$\beta_{16} > 0$
H	$\beta_{21} > 0$	$\beta_{22} < 0$	$\beta_{23} > 0$	$\beta_{24} < 0$	$\beta_{25} > 0$	$\beta_{26} > 0$
F	$\beta_{31} < 0$	$\beta_{32} < 0$	$\beta_{33} > 0$	$\beta_{34} > 0$	$\beta_{35} > 0$	$\beta_{36} > 0$

*This table shows the expected signs of the independent variables real income(y), domestic interest rates (r), credit to the private sector, foreign interest rates (r\*) inflation (INF) and private sector net wealth (W).*

The three assets demand equations are linearly dependent based on the budget constraint in equation (1). This means that once an agent has determined his holdings of any two assets, his demand for the third would implicitly be determined making the following restrictions valid:

$$\beta_{1j} + \beta_{2j} + \beta_{3j} = 0 \text{ for } j = 1,2,4,5 \text{ and } 6 \tag{6}$$

$$\beta_{1j} + \beta_{2j} + \beta_{3j} = 1 \text{ for } j = 3 \tag{7}$$

Consequently, any of the three equations can be expressed as a linear combination of the other two. In this study, the foreign assets demand function will be omitted so as to be able to focus on the impact of financial liberalization on portfolio shift between financial savings and real savings.

However, the model fails to take into account the McKinnon-Shaw hypothesis, which assumes a direct positive relationship between demand for money and demand for capital in developing countries. This relationship can be introduced into the model by considering the following budget constraint facing the financial system.

$$C_p = M - R - C_g \tag{8}$$

Where  $C_p$  = Credit to the private sector  
 $C_g$  = Credit to the public sector  
 $R$  = Reserve  
 $M$  = Money stock

Introducing equation (8) into the model harmonises the assets demand theory with the McKinnon-Shaw hypothesis. The total impact of a deregulation of interest rates after a financial liberalization on the domestic assets can be derived as:

$$\text{Let } A = \beta_{10} + \beta_{11}y + \beta_{12}r + \beta_{13}C_p + \beta_{14}r^* + \beta_{15}INF + \beta_{16}W$$

$$\text{and } Z = \beta_{20} + \beta_{21}y + \beta_{23}C_p + \beta_{24}r^* + \beta_{25}INF + \beta_{26}W$$

So that equation (3) becomes:

$$M = A + \beta_{12}r + \beta_{13}C_p \tag{3a}$$

And Equation (4) becomes:

$$H = Z + \beta_{22}r + \beta_{23}C_p$$

Substituting equation (8) into (3a) give:

$$M = A + \beta_{12}r + \beta_{13}[M - R - C_g + \pi]$$

$$\Rightarrow M - \beta_{13}M = A + \beta_{12}r + \beta_{13}[-R - C_g + \pi]$$

$$\Rightarrow M(1 - \beta_{13}) = A + \beta_{12}r + \beta_{13}[-R - C_g + \pi]$$

$$\Rightarrow M = \frac{\beta_{12}r}{(1-\beta_{13})} + \frac{A+\beta_{13}[-R-C_g+\pi]}{(1-\beta_{13})} \tag{3b}$$

Substituting equation (8) into (4a) also gives:

$$H = Z + \beta_{22}r + \beta_{23}[M - R - C_g + \pi] \tag{4b}$$

Substituting the M in equation 4b with equation 3b gives:

$$H = Z + \beta_{22}r + \beta_{23}\left\{\frac{\beta_{12}r}{(1-\beta_{13})} + \frac{\beta_{13}[-R-C_g+\pi]}{(1-\beta_{13})} - R - C_g + \pi\right\} \tag{9a}$$

Taking the partial derivative of equation (9a) with respect to r gives:

$$\frac{\partial H}{\partial r} = \beta_{22} + \frac{\beta_{23}\beta_{12}}{(1 - \beta_{13})} \tag{9}$$

In this expression, the first term represents the substitution effect suggested by neoclassical while the second term reflects the complementary effect as postulated by McKinnon and Shaw. A rise in the interest rate leads to portfolio reallocation of assets holders in favour of domestic money from domestic assets and foreign assets. With the increase in money, domestic credit supply to the private sector will be expected to increase as well. Thus the total impact of a change in interest rate on domestic assets depends on whether the increase in domestic credit emanating from the McKinnon-Shaw effect is greater or less than the reduction from capital goods. Finally, we follow the Shaw's debt intermediation hypothesis and add external debt available to the private sector to the model.

In effect the above model will help us to determine which asset is closest to bank deposits in Ghana by looking at the coefficients  $\beta_{12}$ ,  $\beta_{22}$  and implicitly  $\beta_{32}$ . Again we will be able to determine whether the banks in Ghana have been able to perform their intermediary role effectively or not by looking at the coefficients of  $\beta_{13}$ ,  $\beta_{23}$  and implicitly  $\beta_{33}$ .



The model so far developed stresses the substitution and complementary effects originating from changes in real interest rates on asset markets. However, most studies on investment in developing countries see private investment as the demand for capital goods. Consequently, the flexible accelerator model has been used as a theoretical basis for explaining the behaviour and determinants of private investment in these countries. Under the accelerator model, investment is explained as the response to deviations of the actual capital stock from the desired level.

$$I_p = \lambda(K_p^d - K_{p-1}) \quad (10)$$

Where:

$K_p^d$  = desired capital stock of the private sector

$K_{p-1}$  = past year's capital stock of the private sector

In the long run however, the desired capital stock that the private sector wishes to have is assumed by the accelerator model to be proportional to the expected output.

$$K_p^d = \delta Y^d \quad (11)$$

Where:

$Y^d$  is desired level of output.

Substituting equation (11) into equation (10) gives:

$$I_p = \lambda(\delta Y^d - K_{p-1}) \quad (12)$$

The above equation assumes a partial adjustment of the actual capital stock to the desired capital stock at any point in time. This lag in the adjustment of the actual capital stock to the desired capital stock is represented by ( $\lambda$ ). The reason for the partial adjustment is that, in increasing investments, firms incur adjustment cost aside the direct investment cost. As the adjustment cost rises, it is optimal that investors adjust the actual capital stock to the desired capital stock slowly. It can also be argued that the larger the gap between the existing capital stock and the desired capital stock, the greater a firm's rate of investment. Theoretically,  $\lambda$  may be influenced by credit conditions in the economy. One would expect for instance that, less investment would be undertaken when credit to the private sector or even external finance (EDT) available for private investment were lower than if they were higher. A linear relationship of this theory can be expressed as:

$$\lambda = \lambda_0 + \frac{\lambda_1 C_p + \lambda_2 EDT}{K_p^d - K_{p-1}} \quad (13)$$

Equation (13) indicates that the speed of adjustment is influenced positively by the total financing available to the private sector measured in relative terms with respect to the size of the discrepancy between desired and actual private capital stock.

Substituting equation (13) into equation (12) gives

$$I_p = \alpha_{10} + \alpha_{11}y + \alpha_{12}C_p + \alpha_{13}EDT + \alpha_{14}K_{p-1} \quad (14)$$

All the parameters in the equation are expected to be positive since a rise in the resources available increases the speed of adjustment.

Finally, we introduce into equation (14) real interest rate and public investment ( $I_g$ ). We also incorporate public external debt into the real assets demand functions on the assumption that by increasing the liquidity of the financial system, an increase in external debt increases the credit available to the private sector.

Theoretically, the effect of public investment on private investment is ambiguous. On one hand and especially when public investment involves useful infrastructure such as schools, roads, electricity and water, public investment may be complementary to private investment and will thus have a positive sign. On the other hand, public investment may detract from, substitute for or crowd out private investment when it competes with it for available credit to the extent that it leads to higher rates, credit rationing or heavier tax burden.

The general conclusion from the model is that, an increase in the real interest rate raises financial savings, which in turn increases the amount of bank credits available to the private sector. Because of the liquidity constraints in developing countries, the increase in credit to the private sector will be expected to influence positively, the speed of adjustment between desired and actual capital stock.

## EMPIRICAL RESULTS

The complete model so far developed consists of three behavioral relationships (equations 3, 4 and 14). Three Least Squares (3SLS) estimation technique is used to estimate the three equations using data from 1980 to 2007. This is because it is not inappropriate to assume the exogeneity of all the explanatory variables. On the whole, the model appears to perform quite well yielding some interesting results. The 3SLS results of the three equations are summarized in tables 2 – 4 below. The most fascinating aspect of these results concerns the real interest rates.

In Table 2 we present the summary statistics of the financial assets demand (M) function. The estimated coefficient for real interest rate appeared to be negative on financial savings ( $\partial M_2/\partial r = -0.4152$ ) and significant at 1% which is contrary to what was expected. This could be attributed to lack of confidence by the public in the financial system due to the unorthodox monetary policies and bad legislations that were implemented in Ghana in the early 1980s. Of particular importance were the demonetization of the existing currency in March 1979 and the 1982 demonetization of the fifty-cedi notes. Also of importance was the enactment of AFRC Decree 17 which made it a duty for any bank or financial institution at the request of the Armed Forces Revolution Council (AFRC) or any of its arms, to give any information on the account, deposit or any securities of any person without the knowledge or approval of the that person (Gockel 1995). Though these measures had their own merits, they depressed the confidence of the public in the traditional commercial banking system and have since contributed greatly to the low financial intermediation in the country.

Consequently, people began having confidence in the informal financial sector but that was short-lived as the dubious activities of certain non-bank financial intermediaries in the early 1990s waned the little confidence the public had in them. A case of interest was the activities of Pyram and Resource 5000 financial institutions, which were paying outrageously high rates on deposits but could not sustain themselves. Again, savings in Ghana like many other developing countries come from two sources; the corporate sector and the household sector. With the liberalization, household savings were expected to rise while corporate savings decline. However, due to low income levels of households in Ghana and the attendant high consumption propensities, household savings could not rise much as compared to the fall in corporate savings.

One other explanation for the negative relationship between money supply and interest rates in Ghana was the deliberate pricing policy of the banks in keeping deposit rates low and lending rates high as a hedge against inflation. For instance, when the discount rate dropped from 30% in 1990 to 20% in 1991, the banks responded by decreasing the deposit rate from 16% to 15.05% and rather increased the lending rates from 30.25% to 31.5%. Under such a condition, surplus-saving units are discouraged from saving in financial assets since the rates being paid do not reflect their real market values.

The results pertaining to the other variables also need to be highlighted. The coefficient of the real income variable in the financial savings function was positive and significant at 5% significant level although its magnitude was less than one. This means that a one percent change in income will bring about a less than one percent change in the demand for money in Ghana because of the high consumption propensities. The index for wealth ( $W_{p-1}$ ) and inflation also had the expected sign and were highly significant. As inflation was an index for the return on real assets, it was expected that a rise in its value would lead to a decline in the value of competing assets, in this case financial savings ( $\partial M/\partial INF = -0.0198$ ) and foreign assets demand ( $\partial F/\partial INF = -0.2557$ ). In effect, all the variables in the money demand equation seem significant within the standard confidence levels, in explaining the behavior of financial savings.

Table 2: Financial Assets Demand Equation Results

Variable	Coefficient	Std. Error	t-Statistics
Constant	4.2131	2.0142	5.0144
y	0.3541**	0.1098	1.9801
r	-0.4152***	0.0699	-2.0146
$C_p$	0.6114**	0.2557	2.0402
INF	-0.2174***	0.0447	-2.7981
$W_{p-1}$	0.8321**	0.2132	3.5214
EDT	0.4124***	0.0125	1.2450

This table shows the regression estimates of the financial assets demand ( $M$ ) function:  $M = \beta_{10} + \beta_{11}y + \beta_{12}r + \beta_{13}C_p + \beta_{15}INF + \beta_{16}W_{p-1} + \beta_{17}EDT$ . \*, \*\*, \*\*\* indicate significance at the 10, 5 and 1 percent levels respectively.

The result of the real assets demand function is presented in Table 3. It shows that real income, credit to the private sector, inflation and real wealth had the expected signs and were significant (at most at 5% confidence level). On the contrary, real external debt, which was to have a positive impact on assets demand because of liquidity constraints, rather had a negative sign. This could be attributed to the dollarization of the Ghanaian economy due mainly to the high inflation rates and mounting external debts during the period.

Real interest rates however, had a positive impact on real assets ( $\partial H/\partial r = 0.5821$ ) and was highly significant. This implies foreign savings have a negative relationship with real interest rates ( $\partial F/\partial r = -0.1669$ ) in Ghana.

Table 3: Domestic Assets Demand Equation Results

Variable	Coefficient	Std. Error	t-Statistics
Constant	-2.1416	2.0655	-0.5110
Y	0.3354**	0.1084	1.7891
R	0.5821**	0.1100	2.5871
$C_p$	0.1141**	0.3341	1.5812
INF	0.2211***	0.0540	3.1011
$W_{p-1}$	0.6541**	0.1658	2.2541
EDT	-0.0994***	0.0524	2.2100

This table shows the regression estimates of the domestic assets demand ( $H$ ) function:  $H = \beta_{20} + \beta_{21}y + \beta_{22}r + \beta_{23}C_p + \beta_{25}INF + \beta_{26}W_{p-1} + \beta_{27}EDT$ . \*, \*\*, \*\*\* indicate significance at the 10, 5 and 1 percent levels respectively.

Lastly, we present the results of the private investment equation in Table 4A. It reveals a significant positive relationship between real interest rate and private investment ( $\partial I_p/\partial r = 0.2413$ ). Thus at 1% confidence level, we cannot accept our null hypotheses that real interest rates have no significant effect on private investment and real assets demand in Ghana.

The data thus seems to support the McKinnon-Shaw hypothesis. However, giving that real interest rates had a negative impact on broad money demand suggests the reform policies had their significant impact

on investment and domestic assets through the efficiency effect than the volume effect. Indeed the estimated coefficient of the flow of credit on private investment was positive ( $\partial I_p/\partial C_p$  0.0812) but less than unity, indicating that only a part (8.12%) of the bank credit to the private sector has been used to finance productive investment in Ghana.

To test the efficiency effects of the policy, we adopt the procedure used by Gelb (1989) in finding out the relationship between incremental output-capital ratio (IOCR) and real interest rate on deposit in Ghana. The estimate equation for Ghana using data from 1980 to 2007 is presented in Table 4B below. As expected, the results prove the existence of a positive correlation between interest rates and the quality of investment in Ghana. The results suggest that financial liberalization had a greater impact on investment and domestic assets through the efficiency effect (29.64%) than the volume effect (8.12%).

Table 4A: Results of efficiency of Investment Equation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.1761**	0.429777	2.784662	0.0101
R	0.2964***	0.020034	1.798765	0.0841
R-squared	0.1146	Mean dependent var		0.7352
Adjusted R-squared	0.0792	S.D. dependent var		1.8668
S.E. of regression	1.792	Akaike info criterion		4.0755
Sum squared resid	80.234	Schwarz criterion		4.1713
Log likelihood	-53.014	F-statistic		3.2357
Durbin-Watson stat	1.511	Prob(F-statistic)		0.0841

Dependent Variable: ICOR. This table shows the least squares regression estimates for the efficiency effect of financial liberalization (ICOR). The data includes 27 observations after adjusting for endpoints. \*, \*\*, \*\*\* indicate significance at the 10, 5 and 1 percent levels respectively.

Another important result worth commenting on pertains to the relationship between public and private investments. The results suggest a substitution relationship between public sector investment and private investment. The estimated coefficient of government investment was negative and significant at 1%. This suggests that that public investment crowded out private investment in Ghana contrary to the econometric findings of Asante (2000). This is not surprising as rising inflation coupled with public sector investment finance through taxes and debt issuance lowered the resources available to the private sector and suppressed its investments in Ghana during the period.

Table 4B: Private Investment Equation Results

Variable	Coefficient	Std. Error	t-Statistics
Constant	4.4413***	0.8814	2.1109
y	0.1101***	0.0210	1.3214
R	0.2413***	0.0321	2.1147
C <sub>p</sub>	0.0812***	0.0410	0.3564
INF	0.6841**	0.1147	2.2541
I <sub>g</sub>	-0.0412***	0.0889	-2.1123
EDT	0.1105***	0.0412	0.2147

This table shows the regression estimates of the private investment ( $I_p$ ) function:  $I_p = \alpha_{10} + \alpha_{11} y + \alpha_{12} r + \alpha_{13} C_p + \alpha_{15} INF + \alpha_{16} I_g + \alpha_{17} EDT$ . \*, \*\*, \*\*\* indicate significance at the 10, 5 and 1 percent levels respectively.

Overall, the results have shown that problem of low financial intermediation and deficit financing through the banking system still persist while a greater proportion of the limited credit available to the private sector are directed towards the unproductive assets. Again due to weak financial intermediation and inefficient financial systems, the reforms impacted less significantly on private investment.

## CONCLUSION

The purpose of the study has been to analyze the effect of financial liberalization on private investment in Ghana. In the process, the available literature on financial reforms, interest rates and investment were

reviewed. A simple model based on the portfolio choice theory was also developed and tested using data from 1970 to 1997.

One basic conclusion of the model is that, the effects of financial liberalization on private investment cannot be determined a priori. The effect depends on whether the negative substitution effect suggested by the neoclassical is greater or less than the positive complementary effect postulated by the authors in favor of the McKinnon-Shaw hypothesis.

Even though private investment seems to have performed relatively well in developing countries that have pursued financial liberalization policies, it responded marginally in the case of Ghana. This marginal response seems to have come from the efficiency effect rather than from volume effect. This is because the model established a negative relationship between savings and real interest rate while the incremental output-capital ratio (IOCR) had a positive relationship with real interest rate. It therefore appears the neoclassical argument dominates the McKinnon-Shaw debate on the effect of rising interest rates on investment in Ghana.

We also document that real domestic assets are closer substitute to deposits than foreign assets in Ghana since the coefficient of the domestic assets with respect to real interest rates is higher than that of the foreign assets.

It appears the financial liberalization program did not have the expected impact on private investment because of the way the policies were pursued. McKinnon (1993), in his book 'The Order of Economic Liberalization', enumerated the optimal order of how fiscal, monetary and exchange rate policies should be sequenced under financial liberalization for an efficient result.

Evidence from Ghana indicates that this optimal order was not considered when the policy was implemented. In her case, broad fiscal policies, indexed by Value Added Tax reform was implemented in the last quarter of 1998 long after monetary and exchange rate policies have been initiated.

Again, the government continued to inefficiently engage in direct business and production activities that crowded-out the private sector. Indeed, it was not until 1988 that the government started disengaging itself from these activities by implementing the state owned enterprises divestiture program.

Generally, the paper succeeded in its stated objectives. However, it has a natural limitation of inconsistent and conflicting data when arrays of publications are used to derive the variables. Also, resource constraint prevented us from collaborating the results with primary sources via interviews and questionnaire. Another interesting extension of the paper would be to test the model prior to the implementation of the reforms and compare the results.

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