Does Stock Market Development Enhance Private Investment in Ghana?

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Abstract: The paper investigates the extent to which stock market development enhances private investment in Ghana. Quarterly times series data for the period 1991(Q1) to 2011(Q4) are used. Stock market development is proxy by market capitalization. The paper adopts the Dynamic Ordinary Least Squares (DOLS) method of estimation. The results for deposit interest rates, GDP per capita, and public investment confirm complementarity hypothesis, accelerator principle, as well as "crowding-in" effect for Ghana in the long-run in their respective cases. Market capitalization also increases private investment in the long-run. However, inflation reduces private investment. In the short-run, one quarter lag and two quarters lag values of private investment and public investment respectively increases private investment, while one quarter lag value of market capitalization reduces current levels of private investment. The paper recommends further development of the stock market since doing so will attract more investors and ultimately enhance private investment.

Keywords: Market capitalisation, private investment, DOLS, Africa, Ghana.

1. INTRODUCTION

Stock market aids long-term investments by making it possible for savers to tie up their investments for long periods of time. It provides the avenue for firms to raise long term funds through the sale of securities. The secondary market of the stock market helps investors to easily, quickly, and cheaply sell their stake in firms in order not to lose their savings for the duration of the investment. This permits firms to raise equity capital on favourable terms. Liquid stock markets thus facilitate long term and more profitable investment projects which could enhance the allocation of capital and long-term growth. Mohtadi and Agarwal (2004) argued that large stock markets lower the cost of mobilizing savings, facilitating investments in the most productive technologies. Block and Hirt (2002) have also shown that, the stock market provides liquidity which contributes to capital formation, and reduces investment risk by offering opportunities for portfolio diversification (Levine, 1991). Bekaert and Harvey (2000) reiterated that, improved risk sharing decreases the cost of equity capital and increases investment.

According to Henry (2000a), and Kim and Singal (2000), a well-developed stock market gives foreign investors the opportunity to invest in domestic equity securities, and domestic investors the right to transact in foreign equity securities. Borensztein *et al.* (1998) also added that the availability of foreign capital inflows promote capital accumulation and better corporate governance which indirectly reduces the cost of internal and external finance. Levine (1999) argues that the presence of more foreign investors in the market exerts pressure to upgrade trading systems and modify legal frameworks to support a greater variety of financial instruments. This then improves stock price performance and also the operating performance of firms listed on the exchange. Henry (2003) and Bekaert *et al.* (2005) detailed three means by which stock market development can enhance the activities of listed firms. First, listed firms sell some of their stock to foreign investors and this opens a new financing channel thereby increasing opportunities for investment and growth. Secondly, the cost of equity capital may fall and make additional projects economically profitable. Thirdly, by making available information on firms' prospects and redistributing investible capital to improve the governance of the firm, it can force the firm's managers to improve profitability, efficiency, or other measures of operating performance.

Stock market development enables firms acquire much needed capital quickly, facilitates capital allocation, investment, and growth. Yartey and Adjasi (2007) for instance reports that, large corporations in certain African countries have made considerable use of stock markets to finance their growth. Many studies such as Fischer and Merton (1984) and Barro (1990) have demonstrated that higher stock returns forecast increased future investment. Montiel (2003) on the contrary argues that financial markets in developing countries such as Ghana, can be characterized by financial repression, government directed credit, and the prevalence of informal financial markets which make the standard investment-stock-return correlations

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doubtful. Studies such as Rama (1993), have argued that without an efficient and, a well-developed financial system, investors may be misled from making optimal investment decisions which may hinder the realization of the acclaimed benefits of stock markets. Notwithstanding, Durham (2002) argues that increases in market capitalisation improve the performance of private investment. However, whether the gains in market capitalisation of GSE have improved the activities of the private sector in the country requires an empirical investigation.

Though a good number of stock markets in Africa are emerging and witnessing rapid growth like the case of Ghana Stock Exchange, Yartey and Adjasi, (2007) report that serious informational and disclosure deficiencies remain prevalent amongst most stocks which make their ability to play a linkage role between the market and the wider economy uncertain. Asiedu (2006) outlined variables such as sustained economic growth, quality public institutions and infrastructure, trade liberalization, and efficient capital markets as ingredients to attract capital flows. These variables the paper emphasised are still conspicuously missing in most African economies. In addition, not many evidence exist in Africa to support the theoretical projections on the role of the stock market in encouraging capital formation and investments. Due to some of the constraints discussed above, it can be deduced that, though the Ghana Stock Exchange has been performing well internationally, but as to whether the tremendous increases in market capitalisation reflect the general performance of many listed firms or just a few remains empirical. In addition, the choice of Ghana as a case study is justifiable considering the significant upward movements in the key market indicators such as stock market capitalization, value of traded securities, as well as the All-share Index (see GSE, December 2013). This study throws light on how the success achieved so far has influenced private investment in the country. Banks seem to attract more funds at the detriment of stock market which is supposed to provide long term investible funds which firms need urgently. Although this study is limited by only one country analysis, some of the findings of this study will inform policy makers in many developing countries that have similar economic structures as Ghana, in the management of interest rate in order to attract funds to the rightful institutions to enhance growth of their economies.

This paper therefore sets out to investigate whether stock market development has promoted private investment in Ghana. Stock market development is proxy by market capitalization. The paper also controls for the effects of deposit interest rates, public investment, economic growth (proxy by GDP per capita), as well as inflation, on private investment. The control variables as stated are important determinants of private investment. Particularly, deposit interest rates is controlled for since bank deposits may serve as a substitute to investments on the stock market, should banks succeed in using the interest paid on them as "bait" to attract deposits from private investors. It is hinted here that, there are other important variables like credit to the private sector and gross fixed capital formation among others that directly influence private investment but could not be added to the model for estimation due to restricted access to data. The study sought to test and validate the following empirical hypothesis:

H_0: stock market development does not enhance private investment in Ghana

H_1: stock market development enhances private investment in Ghana

The rest of the paper is organised as follows; Section 2 reviews related literature, while Section 3 presents the method of study. Section 4 discusses estimated results and the final section concludes the paper and provides policy recommendations.

2. REVIEW OF RELATED LITERATURE

2.1. Theoretical Review

Solow (1956) examines how finance can enhance the capital stock of a country using a steady state closed economy. The study considers that capital stock and labour force are growing at the same rate. When stock market is liberalized to access foreign capital inflows, it will reduce the cost of capital. Agents will respond by driving down the marginal product of capital to the new cost of capital. This is only possible if the capital stock temporarily grows faster than the labour force. Once the marginal product of capital equals the post-liberalization cost of capital, the growth rate of the capital stock will return to its pre-liberalization rate (i.e., the same rate as the labour force). Simply, the theory suggests stock market liberalization will induce a temporary increase in a country's capital stock.

According to Stulz (1999a,b), stock market development reduces the risk associated with investment and increases the average investment rate

of all firms. In addition, it affects specific firms through the "beta" effect. This implies that firms whose equity premia fall should increase their investment by even more than those whose premia rise. The study reports that, the relevant benchmark for pricing the risk of individual stocks switches from the local stock market index to a world market index. Consequently, the equity risk premium falls for firms whose returns are less correlated with the world market than they are with the local market and vice versa. Levine and Zervos (1998a) explains that stock market development allows for increased risk sharing which also leads to more liquid markets, in which trading equities become less costly. Ahimud and Mendelson (1986) and Ahimud *et al.* (1997) added that, increased liquidity reduces the equity premium, which decreases the cost of capital and raises firm's value. Shareholders demand a liquidity premium which consists of two components. These are the premium required for bearing systematic risk, and a compensation for the frictional costs of trading equity. Therefore, increased liquidity apart from increasing risk sharing reduces the equity premium and thus plays a central role in investment boom, improving the value of firms. Beccalli *et al.* (2006) explains that the stock market can be used to instil operational efficiency in firms based on the fact that stock price captures information relating to how firms are being run. This kind of consciousness is likely to cause a company to be better managed. Henry (2000) has therefore concluded that stock market development has the capacity of leading to private investment booms. Rogoff (1999) recommends a substantial shift from debt to equity finance on the basis that, equity finance introduces risk sharing, through reductions in moral hazard with ownership, as well as more efficient resource allocation, through share price signalling.

The concept of stock market liquidity, for instance, has been used to demonstrate how developments in the securities market transmit to economic growth. This liquidity argument is based on the proposition that stock markets enable firms to acquire much needed capital quickly and, by so doing, helps in facilitating capital allocation, investment, and growth (see Levine, 2003; Yartey and Adjasi, 2007). It also assists in reducing investment risk due to the ease with which equities are traded and plays a crucial role in helping to determine the level of economic activities in most economies (Yartey and Adjasi, 2007).

Johnson *et al.* (2000) indicated that firm-specific information in emerging economies sometimes exerts greater influence on stock prices than macroeconomic factors. This is because the firm-specific information influences stock prices and this tends to rise as countries adopt greater capital market openness (Li *et al.* 2004). Stulz, (2005) reported that, several developing countries in the late 1980s and early 1990s, liberalized their stock markets, allowing foreign investors to purchase shares for the first time. When these liberalizations occur, publicly traded firms in the liberalizing countries experience large stock price changes, and firm-specific fundamentals help to explain much of the variation in price changes across firms (Chari and Henry 2004). In a rational asset pricing world, a change in a firm's stock price reflects a change in the firm's expected future profitability and, or the firm's cost of capital.

Gordon's growth model (see Barro and Gordon, 1983) of aggregate valuation explains that the cost of equity capital is related to local market volatility (variance) in closed capital markets. In open markets, the cost of capital is related to the covariance with world market returns. This theory suggests that if the covariance is less than the (domestic) variance, then the cost of equity capital should decrease after liberalisation. This implies that stock market liberalisation in general lowers the cost of capital, (k) and therefore increases aggregate stock prices. Given the decrease in k and holding expected cash flows constant, some investment projects with negative net present values (NPVs) before liberalisation exhibit positive NPVs afterwards, which induce increased private investment. Henry (2000a) argues that 'the ultimate validity of this theory requires the existence of an intermediate empirical link from stock prices to investment'.

Beck and Levine (2000), emphasises how equity markets fund new, innovative enterprises and the comparative advantages of markets with respect to banks. According to the paper, deep and liquid stock markets enable market participants to quickly acquire information regarding productive enterprises, and to more effectively tie managerial compensation with performance (through acquisitions). Stock market provides sources of external financing for market agents and provides information to guide the allocation of resources. It helps diversify the level of liquidity and investment risk, attracts more savings by providing market agents with an extra instrument that may better suit their risk preferences and liquidity needs, and allocates capital to firms as well as prevent the premature withdrawal of physical capital invested in long-term projects.

2.2. Empirical Review

Durham (2000b) sampled 64 lower-income countries for the period 1981-1998 to investigate the effects of stock market development on growth and private investment. The study revealed that stock market development has a more positive impact on growth and private investment for countries with greater levels of per capita GDP, lower levels of country credit risk, and higher levels of legal development. In another perspective, the same paper using a sample of 26 countries of the period 1981-1998, found that lagged equity price appreciation boosts private investment growth in the short-run, but only in higher income countries. Mitton (2006) sampled the annual financial data of 1,141 firms from 28 countries for the period 1980-2000 to find out the impact of stock market development on operating performance at the firm level. The analysis of the operating performances focused on the account of growth, investment, profitability, efficiency and leverage. The study reported that firms whose shares are patronised by foreign investors experience higher growth, greater investment, greater profitability, greater efficiency and lower leverage. Also, Polk and Sapienza (2008) adopted the Catering Theory to examine how stock market development affects corporate investment. The main objective was to find out if stock market mispricing might influence individual firms' investment decisions. Cross-section regression for time-series data was used as the basis for the analysis. The study reported that firms with high discretionary accruals have relatively low stock returns in the future, suggesting that they are overpriced. It was seen that there is a positive relation between discretionary accruals and firm investment. It was also found that firms with high abnormal investment have low stock returns on average and vice versa. Finally, it was found that when this abnormal-investment premium is relatively high, overinvesting firms have a particularly high increase in subsequent abnormal investment and particularly low subsequent abnormal returns. Chari and Henry (2007) set out to find if stock market development has any influence on the cost of capital and for that matter investment in the USA, using cross-section regression. The study showed that increased liquidity reduces the cost of capital and increases investment.

Using a sample of 11 developing countries for the period 1977–1994, Henry (2000a) focuses on short-term indirect dynamics to find out whether stock market development has the capacity to lead to private investment booms. He argues that, largely consistent with the standard valuation, stock market liberalisation in general lowers the cost of capital, (k) and therefore increases aggregate stock prices in emerging markets. Given the decrease in k and holding expected cash flows constant, some investment projects with negative net present values (NPVs) before liberalisation exhibit positive NPVs afterwards, which induce increased private investment. The paper found that 9 countries that liberalized their stock markets experienced growth rates of private investment above their non-liberalization median in the first year after liberalizing, where as in the second and third years after liberalization, 10 of 11, and 8 of 11 countries, respectively, witnessed the same growth trends.

Ezeoha, *et al.* (2009) investigated the relationship between stock market development and the level of investment flows in Nigeria, a country with a high degree of macroeconomic instability. The paper examines whether the stock market plays a uniform role in attracting both domestic and foreign investments. Macroeconomic quarterly data for the period 1970-2006 was used. The Johansen multivariate cointegration method was adopted to examine the long-run trends in the variables. While controlling for other variables, a vector error correction model was used in estimating the relationship between investment growth on one hand, and stock market development on the other. The study revealed that stock market development in Nigeria over the years has been able to spur growth in domestic private investment flows. In a related study, Asante (2000) employed the Ordinary Least Squares approach and cross-sectional analysis to model private investment behaviour in Ghana using time series data over the period 1970 to 1992. The paper found among others, a positive and significant public-private investment relationship suggesting a "crowding-in" effect of public investment on private investment. GDP growth rate had negative significant sign contrary to expectation but marginally significant in a few trials thus rejecting the accelerator theory of investment in Ghana.

Finally, Akpalu (2002) modelled the determinants of private investment in Ghana. Specifically, public investment, real GDP, Consumer Price Index (CPI), lending rate, credit to the private sector and GDP per capita were used as explanatory variables. The paper used time series data from 1970-1994. Adopting the Engle-Granger Two Step procedure and the Johansen multivariate test, the study revealed that in relative terms private investment in the short-run responds

more to real per capita GDP, credit availability and public investment. Public investment 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, even though the short-run coefficient was not statistically significant. The results indicated a confirmation of the accelerator theory of investment in Ghana. The Consumer Price Index however was found not to be significant in both situations.

3. METHODOLOGY

3.1. Model Specification and Data

Following Galbis (1979), Gupta (1984), Oshikoya (1994), Asante (2000), and Fowewe (2008) the equation below is specified to analyse the effect of stock exchange development on private investment in Ghana:

$$lnPI_t = \lambda_0 + \lambda_1 lnDIR_t + \lambda_2 lnMC_t + \lambda_3 lnPUB_t \\ + \lambda_4 lnGDP_t + \lambda_5 lnINFL_t + e_t \tag{1}$$

where PI refers to private investment, DIR represents deposit interest rate, MC refers to market capitalization as a percentage of GDP (used as a proxy for stock exchange development) and PUB represents, public investment. GDP refers to Gross Domestic Product per capita and INFL represents inflation. ε_t is the error term and *ln* denotes natural logarithm. λ_0 refers to the constant while the coefficients of the regressors are as $\lambda_1 (i = 1, 2, \ldots . 5)$. The time variant nature of the variables in the model is represented as t.

3.2. Data Sources

The paper uses quarterly data on all the variables from 1991(Q1)-2011(Q4). Annual data on all variables are obtained from the World Bank, World Development Indicators data set (2015). To derive quarterly data, the quadratic-match averaging method was used within EViews 9. The method performs a proprietary local quadratic interpolation of the low frequency data to fill in the high observations.

3.3. Definition of Variables and a Prior Expectations

Private sector investment covers gross outlays by the private sector (including private non-profit agencies) on additions to its fixed domestic assets. Deposit interest rate is the rate paid by commercial or similar banks for demand, time, or savings deposits. The loanable fund theory of interest rate explains that high deposit interest rate will increase the supply of loanable funds, reduce lending rate and increase borrowing. This will eventually increase investment. Theoretically, λ_1 is expected to be positive. Market capitalization is the total market value of shares traded on the exchange. It is calculated by multiplying the total number of shares outstanding (for all listed companies) by the market price per share which represents the current value of a company. High value of market capitalisation will enhance private investment. Hence, a positive relationship is expected between market capitalization and private investment. GDP per capita is gross domestic product divided by midyear population. According to the flexible accelerator theory, increases in GDP lead to increases in investment, since there is a fixed relationship between the level of output and the desired capital stock in the economy. Hence, a positive relationship is expected between GDP per capita and private investment. Public investment covers gross outlays by the public sector on additions to its fixed domestic assets. Gross Fixed Capital Formation, public sector (% of GDP) was used as a proxy for Public investment. The relationship between public investment and private investment may be positive (see World Bank, 1995; and Aschauer, 1989b), negative (see Blejer and Khan, 1984; and Gupta, 1984), or unclear (see Oshikoya, 1994). This paper however expects a positive relationship between public investment and private investment. Inflation rate is measured by the consumer price index. It is expected to have a negative relationship with private investment since it contracts the supply of credit available to fund capital investment, thereby damaging the economy.

3.4. Estimation Strategy

The stationarity properties of the variables used in equation (1) are examined. This is a necessary pre-condition for cointegration analysis, and subsequent estimations of long-and short-run results. The paper makes use of the parametric Augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1978; 1981) and the non-paramteric Phillips-Perron (PP) (Phillips and Perron, 1998) stationarity test procedures. The null hypothesis of unit root, hence, non-stationarity is examined against the alternative hypothesis of no unit root, implying stationarity. The test is done with both a constant but no trend and with a constant and trend. In addition, the test is done at both the levels and first difference. Investigating stationarity properties of variables is necessary to avoid spurious regressions.

Next to investigate cointegration, the Dynamic Ordinary Least Squares (DOLS) estimation procedure by Stock and Watson (1993) is used. This procedure makes use of a single equation process to investigate long-run relationship. It is also suited to handle possible problems of simultaneity that may exist between independent variables in a regression equation. The use of leads and lags of the change in the dependent variable allows the prevention of simultaneity and sample bias. Also, an asymptotically efficient estimator able to eliminate feedback in the cointegration system is provided by DOLS. Finally, DOLS is appropriate as it is able to accommodate variables that are *I*(0) or *I*(1) or even possess mixed unit root properties, and sometimes more. The general form of the DOLS model is specified as follows:

$$E_t = B^{'}X_t + \sum_{q=-m}^{m} \eta_q \Delta X_{t-q}^{I} + \varepsilon_t \qquad (2)$$

where E is the dependent variable, X is a vector of independent variables, B refers to a vector of long-run coefficients and X^I is a subset of *I*(1) variables. m represents the number of leads and lags in the model while the error term is given by ε_t. η is the coefficient of the subset of *I*(1) variables. t represents the time variant nature of the variables. Δ refers to the difference operator.

4. EMPIRICAL RESULTS AND DISCUSSION

4.1. Unit Root and Cointegration Results

The test is done using the ADF and the PP procedures. Also, the test is done using both the constant and the constant and trend, at both the levels and first difference. The unit root results are provided in Table **1**.

The results indicate mixed stationarity properties of the variables in equation (1). That is, some of the variables are integrated of order one (*I*[1]), while others are integrated of order zero (*I*[0]). In other words, some of the variables are stationary at the levels while others become stationary after differencing. The mixed results is irrespective of whether the test is done with a constant and trend or with a constant but no trend, as well as whether it is done within the ADF or PP framework. The implication is that, a shock to any of the variables is likely to be temporal, since the variables are mean reverting, at most, after first differencing. Therefore, the variables in equation (1) will not produce spurious regression results. Moreover, the mixed stationarity properties of the variables lend support to the use of the DOLS method to investigate cointegration. Since the PP method is robust over the ADF method, the results obtained using the former method is the basis for the cointegration method chosen.

The cointegration test is done using the Engle-Granger *tau* and *z*- statistics. The results are given in Table **2**.

From the results, there is evidence of cointegration since both the *tau* and the *z* statistics are statistically significant at 1 per cent level of significance. The implication is that, all linear combinations of both the regressor and the regressand do not contain unit root and hence, are stationary. Also, the derived cointegration error term is orthogonal to the whole profile of the stochastic regressor residuals, since leads

Table 1:   Unit Root Test Results

Variable	ADF				PP			
	Level		First Difference		Level		First Difference	
	Trend	**No Trend**	**Trend**	**No Trend**	**Trend**	**No Trend**	**Trend**	**No Trend**
lnPI	-5.221***	-4.242***	_	_	-3.875**	-2.654*	_	-4.556***
lnDIR	-2.552	-0.947	-2.543	-2.503	-1.973	-1.062	-4.602***	-4.609***
lnGDP	-3.029	-0.827	-3.867**	-3.862***	-2.899	0.062	-5.157***	-5.215***
lnINF	-4.375***	-2.329	_	-3.621***	-2.607	-2.234	-5.081***	-5.108***
lnMC	-2.462	-2.495	-4.489***	-4.578***	-1.913	-2.208	-6.868***	-7.078***
lnPUB	-4.380***	-4.253***	_	_	-3.037	-2.639*	-5.106***	-5.154***

Source: Authors.
Note: *** (**) indicates rejection of the null hypothesis of unit root at 1 per cent (5 per cent) levels of statistical significance. The Mackinnon (1996) ADF-statistics at 1, 5 and 10 per cent are given as -3.508326, -2.895512, and -2.584952 respectively; while the Mackinnon PP-statistics is -3.503879, -2.893589, and -2.583931 at 1, 5 and 10 per cent levels of significance respectively.

and lags are used. The test is done using three (3) leads and three (3) lags. The lag selection is done using the SIC method.

Table 2:   DOLS Test for Cointegration

Test statistic	Value
Engle-Granger tau-statistic	-7.217719***
Engle-Granger z-statistic	-126.6321***

Note: H_0: no cointegration; H_1: cointegration.
Note: *** indicates rejection of the null hypothesis at 1 per cent level of statistical significance.

4.2. The Estimated Long-Run Results

The estimated long-run results are shown in Table **3**.

Contrary to the neoclassical theory of user cost of capital, the study supported the McKinnon-Shaw (1973) "complementarity" hypothesis for the case of Ghana. That is deposit interest rate has a positive impact on private sector investment in Ghana. The effect of a 1 per cent increase in deposit interest rate is an improvement of approximately 0.45 per cent in private sector investment. The result is consistent with Asante (2000), Frimpong and Marbuah (2010), and Abebrese and Kamasa (2013) for Ghana, as well as Ajidi and Lawanson (2012) for Nigeria. As part of the financial reforms in 1992, interest rates were liberalized and this may have helped banks to mobilize more funds for the private sector to invest. High deposit interest rate implies high capital accumulation and therefore more investible funds to support private sector investment.

GDP per capita has a positive and significant impact on private sector investment in Ghana. This confirms the accelerator principle. The accelerator principle posits that an increase in national income is associated with an increase in investment. The underlying assumption is that, there is a fixed relationship between the level of output and the desired capital stock in the economy. With a coefficient of 0.200, the impact of a 1 per cent increase in GDP per capita is an approximately 0.2 per cent increase in private sector investment. The results confirm the findings of Mbanga (2002), Akpalu (2002), Fowowe (2008), Ayentimi *et al.* (2012), and Abebrese and Kamasa (2013).

In addition, the results revealed that inflation is detrimental to private sector investment growth in Ghana. Here, a percentage increase in inflation results in a 0.375 per cent reduction in private sector investment. The coefficient is statistically significant at 1 per cent level of significance. This confirms the study of Hellerstein, (1997) which explained that inflation makes nominal values uncertain, increasing transactions and information costs, which directly inhibits investment planning. This can also be explained from the fact that inflation distorts the activities of financial intermediaries and makes them reluctant to provide long-term financing for capital formation and growth. Blume, (1978) has also argued that higher inflation contracts the supply of credit available to fund capital investment.

Market capitalization is revealed to impact positively on private investment in the long-run. The results reveal that the effect of a 1 per cent increase in market capitalization is a 0.042 per cent improvement in

Table 3:   Long-Run Results

Variable		Coefficient		Standard Error	
LNDIR		0.448***		0.028	
LNGDP		0.200***		0.010	
LNINF		-0.375***		0.026	
LNMC		0.042***		0.013	
LNPUB		2.025***		0.077	
C		-5.333***		0.256	
R-squared	0.997	Sum square residual	0.031234	Mean dependent var	2.482387
R-bar squared	0.992	S. E of regression	0.032267	S. D. dependent var	0.363210
Jarque-Berra	3.392 (0.183)	Long-run Variance	0.000906		

Source: Author
Note: LNPI is the dependent variable.
***implies the coefficient is statistically significant at 1 per cent level of significance.

private sector investment. It can therefore be argued that stock market development enhances private investment in Ghana. The result is consistent with those of Johnson *et al*. (2000) who concluded that firm-specific information in emerging economies sometimes exerts greater influence on stock prices than macroeconomic factors. Stulz, (2005) also reported that when countries attract foreign investors to purchase shares, stock price change and firm-specific fundamentals improve. Chari and Henry, (2004) found a change in a firm's stock price to impact positively on the firm's expected future profitability and, or the firm's cost of capital. Here, the null hypothesis that stock market development does not enhance private investment in Ghana is rejected.

The study revealed that the effect of a 1 per cent increase in public investment results in a 2.025 per cent increases in private sector investment in the long-run. The coefficient is statistically significant at 1 per cent level of significance. Public investment being positive indicates that private sector investment and public investment are complementary. That is,

increasing public investment creates an investment-friendly private investment environment. Such an environment encourages private investment. Put specifically, public provision of roads, rail, and air transport infrastructure, information and telecommunication technology (ICT), excellent education and health facilities, research and development institutions among others, is likely to stimulate private investment. Hence public investment "crowds-in" private investment.

4.3. The Estimated Short-Run Results

The estimated short-run results are shown in Table **4**.

The short-run results indicate both one and two quarter's lag value of private investment improves current levels of private investment, even though only the former is statistically significant at 1 per cent level of significance. The results also show that deposit interest rates reduce private investment in both one and two period lags in the short-run, even though the

Table 4:   Short-Run Results

Variable		Coefficient	Standard Error
D*lnPI*1		0.740***	4.892
D*lnP*2		0.032	0.171
D*lnDIR*1		-0.155	-0.751
D*lnDIR*2		-0.093	-0.453
D*lnGDP*1		0.374	0.950
D*lnGDPI*2		0.164	0.451
D*lnINF*1		-0.108	-0.966
D*lnINF*2		0.103	0.939
D*lnMC*1		-0.132*	-1.676
D*lnMC*2		0.066	1.044
D*lnPUB*1		0.135	0.458
D*lnPUB*2		0.526**	1.699
C		-0.017	-0.692
ecm (-1)		-0.181***	-5.927
R-squared	0.694	F-statistics 12.22780	Mean dependent -0.006609
R. bar squared	0.637	Log Likelihood 81.95954	S. D. dependent 0.165940
Sum square residual	0.698739	Akaike AIC -1.618084	
S. E. Equation	0.099910	Schwarz SC -1.212948	

Source: Author
Note: LNPI is the dependent variable.
***(*) implies the coefficient is statistically significant at 1(10) per cent level of significance respectively.

coefficient is not statistically significant. Also, the short-run coefficients of GDP per capita are positive but statistically insignificant. In addition, one quarter lag period inflation reduces current levels of private investment, while two quarter lag period of inflation improves private investment, but none of the coefficients is statistically significant. One quarter lag and two quarter lag values of public investment and market capitalization respectively improves private investment, even though their coefficients are statistically insignificant.

Although the coefficient of market capitalization in the short-run is statistically significant at 10 per cent level of significance, a percentage change in one quarter lag value of market capitalization reduces private investment by 0.132 per cent. The second quarter lag value of the coefficient of the public investment variable is positive (0.526) and statistically significant at 5 per cent level of significance. Therefore, in the short-run, two quarters public investment complements current levels of private investment. This implies some level of permanency and lingering positive effect of public investment on private investment in the short-run. The result confirms that of Asante (2000) but contradicts Akpalu (2002) for Ghana.

It must also be stated that the error correction term is negative and statistically significant at 1 per cent level of significance. This provides further proof of cointegration relationship. It also shows a moderate speed of adjustment to long-run equilibrium every quarter after a short-run shock. That is, long-run equilibrium will adjust by 18.1 per cent every quarter following any short-run shock.

5. CONCLUSION AND POLICY RECOMMEN-DATIONS

The paper examined the effect of stock exchange development on private investment in Ghana using quarterly data for the period 1991(Q1) to 2011(Q4). The Dynamic Ordinary Least Squares (DOLS) method was adopted. The results show deposit interest rates, GDP per capita, market capitalization, and public investment increase private investment in the long-run. However, inflation reduces private investment. In the short-run, one quarter lag and two quarters lag values of private investment and public investment respectively increases private investment, while one quarter lag value of market capitalization reduces current levels of private investment. The results on deposit interest rates, GDP per capita, and public

investment provides support for complementarity hypothesis, accelerator principle, as well as "crowding-in" effect for Ghana in their respective cases.

For policy purposes, although stock market development improves private investment in Ghana, a coefficient of less than one per cent is nothing to write home about considering the successes chalked by the GSE. The study encourages operators of the GSE to increase their efforts in attracting some Small and Medium Scale Enterprises to the stock under the Ghana Alternative Market, in order to boost the development of the stock market, and also help provide the needed capital for such firms. In addition to listing of more firms on the exchange, it is recommended that Private Enterprise Federation intensifies education of its members on the potentials of listing on the stock market, and eventually encourage them to do so. Currently only 33 firms are listed on the stock market so the spread of benefits can impact on few firms. Most entrepreneurs believe in self-owned businesses and fear shareholders may take over what they have toiled for all their lives. Private Enterprise Federation has closer ties with such entrepreneurs more than the stock exchange and therefore can enlighten them and bring them on board.

In addition, given how market capitalization is determined and the fact that the paper finds it has a positive relationship with private investment, The paper adds that stock markets equally provide an avenue for growing companies to raise capital at a lower cost, while positively influencing individual savings in the economy. Therefore, a developed stock market will ensure firms are less dependent on bank financing, hence, reducing the possibility of credit risks.

Although deposit interest rate has contributed positively to growth of private investment, the study recommends that the Ghana Stock Exchange should intensify its education in order to attract more investor on the bourse. This is because deposit interest rate is low in Ghana averaging 8% compared to 21% on Treasury bill. The deposit interest rate does not really attract investors to save with the banks. It implies an opportunity for listed firm to attract these funds which enable them have access to long term funds that they need baldly to resuscitate their dying firms if only policy makers would manage the treasury bill rate. When the bourse is able to mobilise these funds, it will improve on the operations of firms and generate more growth in private investment.

Finally, following from the results obtained and discussed earlier, the paper recommends to policy makers to control the levels of inflation since growing inflation increases uncertainties associated with returns on investment, eventually discouraging private investment.

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