Does the Stock Market Matter in Ghana? A Granger-Causality Analysis

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Abstract

The views expressed in this Paper are those of the author(s) and do not necessarily represent those of the Bank of Ghana. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

This paper investigates the impact of stock market on economic growth in Ghana. The empirical results indicate that Stock Market development granger cause economic growth in Ghana and the causation is unidirectional from stock market to economic growth. Thus, the study has revealed that the establishment of Ghana Stock Exchange (GSE) matters for economic growth in Ghana. The study recommends that, efforts must be geared towards the improvement of the institutional capacity, regulatory framework of the Exchange and the macroeconomic landscape.

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1.0 Introduction
Lack of long-term investment capital is the major constraint to market growth and development in Ghana. This problem, however, is not restricted to Ghana alone; it is common throughout Sub-Saharan Africa (SSA) and has been traced to the underdevelopment of capital markets, such as stock and security markets, and financial institutions that serve capital markets. Hence, the establishment of Ghana Stock Exchange in 1989 and its subsequent operational activities from 1991 to date and the large momentum it has gained since then, has provoked considerable academic curiosity and interest about importance of its operations to Ghana’s developmental process.

Undoubtedly, Stock Exchanges are expected to increase economic growth by increasing the liquidity of financial assets, making international and global risk diversification possible for would-be international and domestic investors, promoting wiser investment decisions by saving-surplus units based on available information, influencing corporate governance (i.e. solving agency problem by way of increasing shareholders’ interest/value) and channelling more savings to corporations.

Substantial economic literature, dating back to Bagehot (1973) and Schumpeter (1911), has placed much importance on the positive contributions of financial systems to economic growth. Although the direction of causality between the increasing growth in financial sector and a country’s economic growth rate has been doubted and debated more often than not (Robinson, 1952) or regarded as unimportant in small economies like Ghana (Lucas, 1988). Currently, empirical research seems to refute this odd and conflicting view on the potentials of an efficient financial sector and its impact on economic growth.

Historically, the literature focused much on banking, however, there is an expanding and increasing interest in the impact of stock market on economic growth. Levine (1991) and Bencivenga (1995) developed a model which showed that more liquid markets can create long-term investment and hence, economic growth through lower transaction cost. Levine and Zervos (1998) found that stock market liquidity positively predicts aggregate economic growth whiles Rajan and Zingales (1998) established that stock market size is related to growth of financial dependent firms.

There is, however, competing views, which argues that Ghana’s development would be best served by focusing on the reform of the existing credit markets. In support of such a view, the successful bank-based development experiences of countries such as Germany and Japan are frequently cited. On this basis it is contended that stock markets are not necessary institutions for achieving high levels of economic development (Singh, 1990). Some authors take an even more extreme position and argue that stock markets are in fact likely to harm economic development due to their susceptibility to market failure, which is often manifest in the volatile nature of stock markets found in many developing countries (Singh, 1997; Singh and Weis, 1999).

In light of these conflicting views, and the key role that financial reform policy occupies in the transition to a market economy, the time has ripe for an assessment of the contribution that GSE has made to Ghana’s economic development to date.

A more difficult question arises with respect to whether the forward-looking nature of prices could be driving apparent causality between stock markets and growth. Current stock market prices should represent the present discounted value of future
profits. In an efficient equity market, future growth rates of listed companies will, therefore, be reflected in initial prices. This calls for using an appropriate stock market development index as the primary measure of development in order to avoid spurious causality effects.

The stock market development indicators that have been used by different researchers include market capitalisation, which shows the performance of the market; market capitalisation ratio, which relates the size of the market to the whole economy; turnover ratio, which shows the liquidity of the market; as well as volume of trade and value traded. In this study, value of the market capitalisation is used as an indicator of stock market development.

This study provides case-study-based insight into the direction of causality between stock market development and growth. More so, the issue of causality would be addressed using the framework introduced by Granger(1969). Granger causality tests have been used in many studies of financial markets as well as several studies of the determinants of economic growth including savings (Carrol and weil, 1994); money supply (Hess and Porter, 1993) and stock market (Randall, Jan and Nauro, 1999).

The study is structured in the following form.
► The first section deals with the introduction and background of the study.
► Section two briefly describes the stylised facts on Ghana Stock Market.
► Section three deals with methodology, estimation, and discussion of results
► The fourth section concludes the study.

2.0 Stylised Facts of the Ghana Stock Market

2.0.1 The Early Efforts to Establish a Stock Exchange in Ghana
The early efforts to establish a stock exchange in Ghana dates back to 1968, when a government study concluded that establishing a stock exchange was in the best interest of the country. This led to the promulgation of the Stock Market Exchange Act of 1971, which laid the foundation for the establishment of the Accra Stock Market Limited (ASML) in 1971. However, the stock exchange never took off. Various factors were accountable for the failure. The unfavourable macroeconomic environment, political instability, and the lack of government support undermined the viability of the stock exchange.

Prior to the establishment of the Ghana Stock Exchange in November 1990, two stock brokerage firms, namely National Trust Holding Company Ltd (NTHC) and National Stockbrokers Ltd, now Merban Stockbrokers Ltd, did over-the-counter (OTC) trading in shares of some foreign-owned companies. The OTC trading was established in response to the Ghanaian government’s decree of 1975 known as the “Investment Policy Decree”. This decree required foreign firms operating in Ghana to divest themselves of not less than 40% of their equity capital to indigenous Ghanaians.

This was an attempt to arouse the consciousness regarding equity investments as well as effective indigenisation of economic activity. To facilitate the implementation of the Investment Policy Decree, the NTHC was established in 1976 as the nucleus of a
capital market to provide buying, selling and management of equity stocks and debentures. Merban and the NTHC, in the absence of a recognized stock exchange, provided brokerage services to the investing public through a ready mechanism for the purchase and sale of shares. Apart from the National Investment Bank, there were no indigenously owned enterprises that were trading on the OTC. The companies listed by then were largely subsidiaries of transnational corporations incorporated in Ghana.

The major weakness of the OTC trading was that it was out of reach of indigenous and small firms that could not be traded on the OTC. Also, the design and implementation of the government’s decree to divest 40% foreign ownership in domestic firms was met with less enthusiasm from the private sector. As a result, the OTC existed primarily to serve the interest of the foreign companies in Ghana. The need to establish a Stock Exchange was presented in a 1989 report on the feasibility of a Ghanaian Stock Exchange.

2.0.2 The Establishment of the Ghana Stock Exchange (GSE)
The Ghana Stock Exchange was incorporated in July 1989 as a private company under the Ghana companies’ code, 1963(Act179). However, the status of the company was changed to a public company under the company’s Code in April 1994. The exchange was given recognition as an authorized stock exchange under the stock Exchange Act of 1971. Trading on the floor of the exchange commenced on November 12, 1990.

The GSE is a private sector initiative and is not funded by government. The exchange has no shareholders but it has two categories of members, Licensed Dealing Members and Associate Members. A Licensed Dealing Member is a corporate body licensed by the exchange to deal in listed securities. An Associate Member is an individual or corporate body, which has satisfied the Exchange’s membership requirements, but is not licensed to act as a stockbroker on the exchange. Members of the exchange rose from three initially to 53 by December 1998. It commenced operations with three brokerage firms and 11 listed companies. The number of listed companies increased from eleven (11) in 1990 to third-teen (13) in 1991, to nineteen (19) in 1995, to twenty-two (22) in 1996 and then to twenty-five (25) as at February 2003. Currently, the number of listed Companies has increased further to twenty-six (26) as at November 2003 (see Table 1A). The increasing number of listed Companies shows the height at which the Ghana Stock Exchange has reached in terms of raising equity capital for these financial dependent firms.

A Council governs the exchange with representation from Licensed Dealing Members, listed companies, the banks, insurance companies, money markets and the general public. The Council sets the policies of the exchange, and its functions include preventing frauds and malpractice, maintaining good order among members, regarding stock market and granting listing.

2.0.3 Trading Practices and Operations of the GSE
Trading is carried out on the floor of the exchange under the call-over system with a limited auction. Trading is done in lots of 100 shares, with the exception of the Ashanti Goldfields Company (AGC) shares, which trade in lots of 10 shares. Trading takes place three times a week on Mondays, Wednesdays and Fridays starting 10:00 a.m. The average period of trading is about two hours. OTC trading is also allowed in AGC’s shares.
The financial instruments currently traded on the exchange are ordinary shares and bonds. There are currently 13-licensed stock brokerage firms trading on the exchange. Common shares of 25 companies are listed and traded on the exchange with four corporate bonds, one cedi and three-dollar denominated bonds issued by Home Finance Company (HFC).

Securities on the exchange can be purchased by anybody provided he/she is 18 years and above and of sound mind. Resident foreigners are also allowed to buy securities on the exchange. Non-resident Ghanaians and foreigners can purchase up to 10% of any security approved for listing on the exchange. Furthermore, the total holdings of all external residents in one listed security shall not exceed 74%. This restriction applies to only non-resident foreigners and does not apply to externally resident Ghanaians.

The commission rate is fixed and regulated by the government. The prevailing delivery and settlement system is centralized but not automated. Currently, the settlement period is T+3 business days. It is also strictly delivery versus payment.

2.0.4 Performance of the Ghana Stock Exchange

The Ghana Stock Exchange has been in existence for almost fourteen years now. Even though it is a relatively new emerging market it has not done badly. For instance, it was voted the best performing market amongst all emerging markets by Birinyi Associates, a research Group in the USA in 1994. It was also voted the best performer among all stock markets in Africa in 1998 in terms of capital appreciation by Standard Chartered Bank London Limited. Ghana Stock Exchange is currently one of the World’s best performing stock market as indicated by the performance of the equities listed on the market (see figure 2) and the GSE all share Index in 2003 financial year (see trend as shown in Figure 1).

The GSE All-Share Index, which is a measure of the general performance of the stock exchange, has increased from 77 points in 1990 (77.65 on Nov. 12 1990) to around 900 points at the end of the December 1999. The Index reached a number of record levels in 1998, hitting an all-time high level of 1201.08 points. The first half of 1998 saw a bullish market on the GSE with seven out of the twenty-one listed companies out-performing the GSE All-Share Index during the year.

Additionally, the GSE All Share Index continued its upward trend in 2000 with 903.17 high (about 16.55% change). The Index increased further to 1025.78 points as at February, 2001 with a percentage increase of 11.42% and to 1395.31 points with percentage change of 45.96% in 2002 respectively. Again, the All Share Index gained 2158.1 points to end the year 2003 at 3553.4 points. This indicates that the All Share Index appreciated by 154.7% hitting all time high. Cumulatively, the Index grew 92.9% during the first five months in 2004. This high growth rate of the Index was partly due to good macroeconomic management and policies pursued by the monetary authorities in the country since 2001 to date and also the entry of Aglogold into the market on April, 2004 has added an international touch to the market. The available market statistics show that GSE is one of the best performing Stock Exchanges on the continent at the moment.
The Stock market is living up to expectation as a leader in raising long-term equity capital for financially distressed firms. The Exchange raised, a record high of Market capitalization of 11, 978.76 billion and turnover of 26.04 billion by November 2003. The Exchange shows a promising future for raising long-term capital, which hitherto was not available. The exchange has no branches and is located in Accra.

Table 1A : NUMBER OF LISTED COMPANIES: 1990-2003

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Listed Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>11</td>
</tr>
<tr>
<td>1991</td>
<td>13</td>
</tr>
<tr>
<td>1995</td>
<td>19</td>
</tr>
<tr>
<td>1996</td>
<td>22</td>
</tr>
<tr>
<td>2003</td>
<td>26</td>
</tr>
</tbody>
</table>


The remarkable increase in the prices of shares on the market was mainly due to high demand for equity shares on the market. As at January 2004, holders of equities from the top ten listed companies gained considerably from share price appreciation(see figure 2). This notable performance of the listed equities on the market led to a significant increase in the market capitalization to 13, 243.68 billion in January 2004.

The market surpassed the performance of most of the stock exchanges in the sub-region in 2003. The Ghana Stock Market experienced bullish market activities and this led to significant gains on the part of both investors and listed firms.
2.0.5 Market Size

The market capitalization and its growth rates are indicators of market size and performance of the stock market in relation to the economy. Market size is measured by the market capitalization ratio (see figure 3), that is, the market capitalisation of listed companies divided by gross domestic product.

The market capitalization ratio was 1.5% in 1990. This increased to 39.76% in 1994. More so, in absolute terms, the market capitalisation of the Exchange increased considerably from 3,205.39 billion in 1999 to 3,904.0 billion in 2001. This figure increased again to 6,183.8 billion in 2002. The market capitalisation has been on the increase since then, as it recorded a remarkable increase to end 2003 at 12,616.8 billion. This high record was achieved as a result of the stable macroeconomic environment that has characterized the Ghanaian economy since 2001 to date. With the merger between Anglogold South Africa and Ashanti Goldfields into Anglogold Ashanti, and their subsequent entry into the market, the market capitalisation increased from 17,950.5 billion in March 2004 to 95,645.7 billion in April 2004 (representing about 432.8% change).

This new capitalisation figure makes GSE one of the best Stock Markets in the World and Africa in particular. In addition, the turnover in terms of both volume and value has improved significantly over the years. The turnover in terms of value traded was 93.35 billion in 1997, this figure increased to 134.01 billion in 1998. This reached a record high in 2003 ending the year at 389.30 billion. For the month of March in 2004 alone, turnover was 20.5 billion, and this figure increased immensely to 36.4 billion in April 2004 as a result of Anglogold entry into the market. The upward trend in the turnover (value traded, see figure 5) shows that liquidity of Ghana Stock Exchange has improved significantly since its inception. All these evidences go to attest the fact that Ghana Stock Exchange is serving as a platform on which long-term equity capital can be raised and accumulated by cash-trapped firms for investment and economic growth in Ghana.

Moreover, the trend in market capitalization of the listed firms is very encouraging. The individual companies on the market have seen their share of the market in terms of market capitalization increased over the years. For instance, ABL started with a market capitalization of about 0.8 billion in 1991 when it was first listed on the
market, this figure increased to ₵17.28 billion, and ₵91.8 billion in 1996 and 2003 respectively. Mobil Oil Ghana Limited also started with a market capitalization of ₵1.44 billion initially, this amount increased to ₵75.33 billion in 2000, and the figure increased further to ₵141.75 billion in 2003.

Standard Chartered Bank also raised about ₵6.03 billion as market capitalization initially on the market in 1991, this was increased to ₵505.01 billion in 2002 and was further increased to ₵1,073 billion in 2003 financial year. These figures show an interesting performance of the listed companies from the time they were listed on the Exchange to date.

Ashanti Goldfields(now Anglogold Ashanti Ltd) raised ₵1,762 billion when it first entered the market in 1994, this figure increased to ₵2,129.54 in 2001, the figure further increased to ₵3,754.48 billion in 2003. After merging with Anglogold, the market capitalisation of Anglogold Ashanti(AGA) more than doubled to ₵78,877.38 billion in April 2004. This evidence validates the intermediation role that GSE is playing in the growth process in Ghana (See Table 1B).

Table 1B: TRENDS IN MARKET CAPITALIZATION OF SELECTED LISTED FIRMS AT GSE (in Billions of cedis)

<table>
<thead>
<tr>
<th>Firms/Year</th>
<th>1991</th>
<th>1996</th>
<th>2000</th>
<th>2002</th>
<th>2003</th>
<th>2004 (May)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABL</td>
<td>0.80</td>
<td>17.28</td>
<td>52.38</td>
<td>68.18</td>
<td>91.80</td>
<td>199.56</td>
</tr>
<tr>
<td>BAT</td>
<td>0.55</td>
<td>7.62</td>
<td>27.65</td>
<td>69.13</td>
<td>359.49</td>
<td>539.37</td>
</tr>
<tr>
<td>EIC</td>
<td>0.60</td>
<td>2.15</td>
<td>13.50</td>
<td>23.00</td>
<td>52.50</td>
<td>86.94</td>
</tr>
<tr>
<td>FML</td>
<td>2.90</td>
<td>7.99</td>
<td>16.81</td>
<td>35.31</td>
<td>75.16</td>
<td>140.44</td>
</tr>
<tr>
<td>GBL</td>
<td>0.56</td>
<td>3.96</td>
<td>39.04</td>
<td>14.46</td>
<td>487.97</td>
<td>501.33</td>
</tr>
<tr>
<td>GGL</td>
<td>2.40</td>
<td>32.31</td>
<td>105.73</td>
<td>123.35</td>
<td>663.76</td>
<td>1421.51</td>
</tr>
<tr>
<td>MGL</td>
<td>0.32</td>
<td>0.90</td>
<td>3.60</td>
<td>4.57</td>
<td>4.95</td>
<td>4.95</td>
</tr>
<tr>
<td>MOGL</td>
<td>1.44</td>
<td>23.90</td>
<td>75.33</td>
<td>79.91</td>
<td>141.75</td>
<td>162.81</td>
</tr>
<tr>
<td>PZ</td>
<td>0.31</td>
<td>9.92</td>
<td>11.20</td>
<td>56.14</td>
<td>75.60</td>
<td>92.40</td>
</tr>
<tr>
<td>SCB</td>
<td>6.00</td>
<td>72.00</td>
<td>340.56</td>
<td>505.01</td>
<td>1073.38</td>
<td>1583.64</td>
</tr>
<tr>
<td>UNIL</td>
<td>6.20</td>
<td>50.00</td>
<td>100.00</td>
<td>300.31</td>
<td>877.56</td>
<td>1290.63</td>
</tr>
<tr>
<td>(AGA)</td>
<td>-</td>
<td>2409.00</td>
<td>2099.00</td>
<td>3434.00</td>
<td>3754.48</td>
<td>78877.38</td>
</tr>
</tbody>
</table>

Source: GSE Market Statistics from 1990-2004

The importance of the market capitalization is that the size of the market should be positively related with the ability to mobilize capital and diversify risk in an economy. The market size, which measures the depth of the market, increased from ₵30.46 billion at the end of 1990 to ₵3,247.87 billion in December 1999(See Figure 4). Between 1993 and 1994 there was a remarkable increase in the market capitalization from ₵95.72 billion in 1993 to ₵1,968.43 billion in 1994. This was as a result of the offloading of Government shares in Ashanti Goldfields Company Ltd in March 1994. Since 1994, there has been a gradual rise in total market capitalization.
The market capitalization ratio, which was 1.5% in 1990, fell to 0.9% in 1991 and rose to 1.5% again. This increased to 39% in 1994 the highest rate ever and has since declined to 15% at the end of 1999. However, the ratio is still higher than the 1990 figure by almost ten times (see figure 3). This shows a generally rising market capitalization ratio indicating an increasing ability of the market to mobilize financial resources and diversify risk. It must be noted that the 1994 figure is an outlier in the trend of market capitalization growth because of the AGC factor on the market. Total market capitalisation increased from 3654.61 billion in 2000 to 3904.03 billion in 2001, this increased further to 6183.84 billion in 2002. The total market capitalisation hit a record in 2003 at 12,616.8 billion, and this figure increased again to 96,441.28 billion in May 2004. This huge increase in the market capitalisation of the market was partly due to the entry of Aglogold Ashanti into the market in April 2004.
2.0.6 Market Concentration

The concentration of the market is the share of the market capitalization accounted for by the dominant companies in the market. High concentration is not desirable since it may adversely affect the liquidity of the market. The GSE is highly concentrated with only three companies (AGC, SCB and SSB) accounting for about 90% of the total capitalization of the market in the early stages of the market. AGC (now merged with Anglogold, south Africa) alone accounted for about 65% of the market’s capitalization in 1999. These three companies, AGC, SCB and SSB, represent 11.54% of the total number of listed securities on the market but constitute about 80% of the total market capitalization. The two dominant firms AGC and SCB put together accounts for about 75% of the capitalization of the market. More importantly, the market, experienced lower concentration in 2003 compared with previous figures, market concentration decreased by about 50% using AGC’s market capitalization as a ratio of total market capitalization of the market.

Trend of market shares however show a decreasing concentration, especially when we compare 1999 capitalization figures to that of 1994 where AGC alone accounted for over 90% of the total market capitalization. Although AGC accounts for a high percentage of the market capitalization it may not be the best performing share on the market. In 1999 for instance, SSB (now merged with Societal Generale) share accounted for the highest volume of trading as well as the highest value traded share on the market, taking about 50% of the total value traded and over 30% of the volume of shares that changed hands. This made the share of SSB more liquid than any other shares listed on the market and therefore more attractive to investors, especially those who hold for speculative purposes.

As at November 2003, Ghana Breweries Limited was the best equity on the market with a share price change of 43.49%, followed by SSB (now GS-SSB) with 31.25% price change. The rest are UNIL, MOGL and GCB with 23.76%, 22.45% and 20.05 respectively. The changes in the prices of the best performing equities are shown below. The figure indicates that, the dominant role played by some few firms on the market has changed significantly.
2.0.6.1 Market Concentration: The case of AGC

High concentration is not desirable since it may adversely affect the liquidity of the market. GSE is highly concentrated with AGC alone accounting for about 90% of total market capitalization when it was first listed on GSE in 1994. This figure decreased from 90% to 88% in 1995 and further decreased to 73% in 1998. This trend shows decreasing concentration in terms of the share of market capitalization of the dominant company listed on the GSE. The data available shows that between 1994 and 1998, concentration on the market reduced by about 17% and this serves as a relief for liquidity improvement on the Exchange (see figure 6). GSE experienced lower market concentration in 2003 compared with previous figures, market concentration decreased by about 50% using AGC’s market capitalization as a ratio of total market capitalization of the market.
This remarkable performance of the exchange which led to reduction in the concentration ratio was due to the improvement of the performance of the other listed equities notably Standard Chartered Bank, Accra Brewery Limited and SSB and others.

Recent development at the GSE has raised questions as to what impact would the tremendous increase in market capitalization of AGC due to the merging of Anglo-gold South Africa and Ashanti Goldfields have on the Ghanaian economy. Although AGC accounts for a high percentage of the total market capitalization it may not necessarily be the best performing equity or most active equity on the market. However, high concentration on the market may render the market inactive and for that matter illiquid. Lack of liquidity on the exchange would affect ability of the listed firms on the market in raising the needed long-term capital to finance investment and production. This would reduce the alternative ways of sourcing investment funds by making listed firms borrow funds only from Banks, which are short-term in nature. Investors on the other hand, would also have fewer options to invest their funds.

Finally, with the current improvements in the macroeconomic landscape as evidenced by the declining trend in the rate of inflation (now 11.5% according to the end of the first quarter, 2004 release) and stable exchange rate of the Cedi against all the currencies of the Country’s major trading partners, the Stock market serves as a safe haven and can therefore provide opportunities for listed companies to issue more new shares on the exchange. With this investment friendly environment as witnessed further by the declining trend in the short-term interest-bearing assets (Government 91-day treasury bill rates is now at 16.5% according to May, 2004 release), investors have the chance to invest in equities on the exchange and take advantage of higher investment returns in the form of higher dividends and capital gains. This condition if continues, would prepare the necessary grounds for a strong and viable capital market to emerge, which would provide the necessary impetus for economic growth in Ghana.
3.0 Methodology, Estimation, and Discussion of Results

3.0.1 Model Specification
We choose, in this study, to employ a Vector Auto-regressive Model, which was developed by Sims (1972) based on Granger’s (1969) definition of causality. In Sim’s approach, granger-causality relationship is expressed in two pairs of regression equations, by simply twisting independent variables as follows:

\[ X_t = \theta_{11} X_{t-1} + \theta_{12} X_{t-2} + \theta_{13} X_{t-3} + \ldots + \theta_{1p} X_{t-p} + \theta_{21} Y_{t-1} + \theta_{22} Y_{t-2} + \ldots + \theta_{2p} Y_{t-p} + u_{1t} \]  \hspace{1cm} (1)

\[ Y_t = \theta_{21} Y_{t-1} + \theta_{22} Y_{t-2} + \theta_{23} Y_{t-3} + \ldots + \theta_{2p} Y_{t-p} + \theta_{11} X_{t-1} + \theta_{12} X_{t-2} + \ldots + \theta_{1p} X_{t-p} + u_{2t} \]  \hspace{1cm} (2)

\[ X_t = \theta_{11} X_{t-1} + \theta_{12} X_{t-2} + \theta_{13} X_{t-3} + \theta_{14} X_{t-4} + \ldots + \theta_{1p} X_{t-p} + u_{1t} \]  \hspace{1cm} (3)

\[ Y_t = \theta_{21} Y_{t-1} + \theta_{22} Y_{t-2} + \theta_{23} Y_{t-3} + \theta_{24} Y_{t-4} + \ldots + \theta_{2p} Y_{t-p} + u_{2t} \]  \hspace{1cm} (4)

Equations (1) and (2) are called unrestricted and (3) and (4) are restricted. According to Granger’s definition of causal relationships:

Y does not cause X if \[ \theta_{21} = \theta_{22} = \theta_{23} = \ldots = \theta_{2p} = 0 \]  \hspace{1cm} (5)

And X does not cause Y if \[ \theta_{11} = \theta_{12} = \theta_{13} = \ldots = \theta_{1p} = 0 \]  \hspace{1cm} (6)

In order to judge whether these conditions hold, Sims employ the following F-statistics to be applied to equations (1) and (2) relative to equations (3) and (4):

\[ F = \frac{(R^2_{UR} - R^2_R)}{m} \left( \frac{1 - R^2_{UR}}{(n - 2m - 1)} \right) \]  \hspace{1cm} (7)

Where \( R^2_{UR} \) is the unrestricted R-squared, \( R^2_R \) is restricted R-squared, \( n \) is sample size and \( m \) is the number of restrictions.

With Sims test, the direction of causality is judged as follows:

The result of F-test - Direction of causality
i) (5) holds, (6) does not hold: - X causes Y (X → Y)
ii) (5) does not hold, (6) holds: - Y causes X (Y → X)
iii) Both (5) and (6) hold: - Feedback between X and Y (X ↔ Y)
iv) Neither (5) nor (6) hold: - X and Y are independent

3.0.2 Data Sources
Our data set consists of quarterly observations for the period 1991:1 to 2003:4. The source of data has been IMF International Financial Statistics (IFS), Ghana Stock Exchange Monthly Market Statistical Quarterly Digest, Bank of Ghana Annual Reports, Bank of Ghana Quarterly Economic Bulletin and Ghana Annual Budget Reports. Since information on quarterly real GDP and GDP growth rates were not available, annual real GDP rates were interpolated into quarterly real GDP using the non-linear interpolation method.

All the variables are measured in domestic currency units. Log of Market capitalization(MC) and market capitalization ratio(MCR) were used in this study as a
stock market development indicator since data on other indicators are not available, and log of Real GDP (LRGDP) was used to represent the real sector.

3.0.3 Estimation and Discussion of Results

3.1.2.1 Unit Root Test
The study tests for unit roots using a procedure that has been proposed by Dickey-Fuller (1987). This approach is robust to a wide variety of serial correlation and time dependent heteroskedasticity and accommodates models with drift and time trend so that it may be used to discriminate between unit root non-stationarity and stationarity about a deterministic trend. ADF and Phillips-Peron with three lags test statistics were calculated for each series and the result are reported in the table below (Table 1C).

Table 1C: UNIT ROOT TEST (variables in levels)

<table>
<thead>
<tr>
<th>Method</th>
<th>Variable</th>
<th>Lag Length</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADF</td>
<td>MC</td>
<td>3</td>
<td>-0.464415</td>
</tr>
<tr>
<td>Phillips Peron</td>
<td>MC</td>
<td>3</td>
<td>-0.643357</td>
</tr>
<tr>
<td>ADF</td>
<td>LRGDP</td>
<td>3</td>
<td>3.388072</td>
</tr>
<tr>
<td>Phillips Peron</td>
<td>LRGDP</td>
<td>3</td>
<td>5.077797</td>
</tr>
<tr>
<td>ADF</td>
<td>MCR</td>
<td>3</td>
<td>-1.238576</td>
</tr>
<tr>
<td>Phillips Peron</td>
<td>MCR</td>
<td>3</td>
<td>-0.818663</td>
</tr>
</tbody>
</table>

Note: * and ** indicate Significance at 1% and 5% levels respectively.

The results call for the rejection of the null hypothesis of no unit root at both 1% and 5% in level variables. The results indicate that the variables involved are both non-stationary and therefore has deterministic trends in levels as reported in Table 1A. Hence, the variables were differenced to remove the trend components from the observations. The unit root test performed on the differenced variables indicate that the two variables are now stationary at 5% significance level (i.e. 95% confidence interval) and for that matter do not have unit root( See Table 1D).
Table 1D: UNIT ROOT TEST (variables are differenced)

<table>
<thead>
<tr>
<th>Method</th>
<th>Variable</th>
<th>Lag Length</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADF</td>
<td>DMC</td>
<td>3</td>
<td>-3.646259**</td>
</tr>
<tr>
<td>Phillips Peron</td>
<td>DMC</td>
<td>3</td>
<td>-12.93163**</td>
</tr>
<tr>
<td>Phillips Peron</td>
<td>DLRGDP</td>
<td>3</td>
<td>-3.089992**</td>
</tr>
<tr>
<td>Phillips Peron</td>
<td>DLRGDP</td>
<td>3</td>
<td>-3.004806**</td>
</tr>
<tr>
<td>Phillips Peron</td>
<td>DMCR</td>
<td>1</td>
<td>-4.32839**</td>
</tr>
<tr>
<td>Phillips Peron</td>
<td>DMCR</td>
<td>1</td>
<td>-6.05243**</td>
</tr>
</tbody>
</table>

Note: ** indicates Significance at 5% level.

3.0.4 Granger–Causality Test
The results of the Granger-Causality test between the real sector and the stock market in this particular instance Ghana Stock Exchange (GSE) is reported in the Table below (Table 1E).

Table 1E: PAIRWISE GRANGER - CAUSALITY TEST(1992:1 - 2003:4) LAGS: 5

<table>
<thead>
<tr>
<th>Null Hypothesis:</th>
<th>Observations</th>
<th>F-Statistic</th>
<th>Probability Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLRGDP does not Granger Cause DMC</td>
<td>39</td>
<td>1.36655</td>
<td>0.26668</td>
</tr>
<tr>
<td>DMC does not Granger Cause DLRGDP</td>
<td>39</td>
<td>2.85900</td>
<td>0.03299**</td>
</tr>
<tr>
<td>DLRGDP does not Granger cause DMCR</td>
<td>36</td>
<td>1.39391</td>
<td>0.25925</td>
</tr>
<tr>
<td>DMCR does not Granger Cause DLRGDP</td>
<td>36</td>
<td>3.02377</td>
<td>0.02498**</td>
</tr>
</tbody>
</table>

Note: ** indicates Significance at 5% level.
The result of the Granger-Causality Test indicates that Stock Market performance in Ghana Granger-Causes economic growth in Ghana. That is Stock Market development predicts economic growth in Ghana. However, the result is not true in the reverse causality. From the test, economic growth does not predict Stock Market development, this may be as a result of the low levels of income evidenced in almost all the developing countries including Ghana.

In more technical sense, the results show unidirectional causality from Stock Market performance to economic growth at 5% significance level. This positive result may be due to the current development at Ghana Stock Exchange (GSE) and the renewed interest in the market, which has seen trading activities picking up tremendously recently. However, the relationship could still be improved upon with the listing of many small and medium scale enterprises in Ghana.

4.0 Summary and Conclusion
The empirical evidence suggests that the establishment of Ghana Stock Exchange (GSE) has impacted positively on economic growth in Ghana since it became operational. The All Share Index which is a measure of general performance of the stock exchange has performed remarkably well over the years, the index appreciated by 154.7% in the first half of 2004 hitting an all time high. Year to date index returns stands at 95.76% in local currency and 91.5% in US dollars, making the exchange the best stock market in the World currently in terms of performance.

Market capitalisation which also measures the size of the market increased tremendously since the inception of the market. The market capitalisation increased from 17,950.5 billion in March 2004 to 95,645.7 billion in April 2004(representing about 432.8% change). This new figure makes the GSE one of the best stock markets in the World now and in Africa in Particular.

Market capitalisation ratio which relate the size of the market to the economy remains high, moving from 1.5% in 1990 to 39.76% in 1994 and finally settled at 21% in 2003, which is still higher than the 1990 figure, this is encouraging for the economy of Ghana.

Market concentration has also reduced immensely. Concentration was 90% in 1994, this reduced to 88% in 1995 and further reduced to 73% between 1994 and 1998, concentration reduced by 18% and for 2003, concentration reduced by about 50%. More so, the number of listed companies increased from 11 in 1990 to 22 in 1996 and to 26 in 2003. The empirical results therefore indicate that stock market development granger-caused economic growth in Ghana for the period 1990 to 2003.

4.1 Policy Recommendations
In order to enable the stock market take full advantage of various opportunities and cope adequately with challenges, the following must be taking into accounts:

► Bank of Ghana should continuously maintain its independence in order to continue the good policies the Bank is currently pursuing, which has stabilized the current macroeconomic environment.
There is the need to establish a very strong secondary market for the numerous small and medium scale enterprises that cannot meet the strict and stringent requirements of registration at the market.

This further calls for the need to establish a venture capital industry where these small, medium-scale enterprises can source funds. With GSE already in place, the many small and medium scale firms can use the stock market as a launching point where they can raise investment capital (long-term capital) through Initial Public Offerings (IPO) or buy-outs to expand their operations and production at large.

There is also the need to develop an effective legal system to protect private property and increased public education and advertisement. The operation of licensed stockbrokers are concentrated in the capital city (Accra), there is the urgent need for Licensed Stock Brokers to establish regional offices especially in all the major regional capital in order to reach a wider pool of investors in the country.

Finally, Government should divest the remaining state enterprises on the divestiture list through GSE and also, should list its new debt instruments on the exchange in order to promote a strong bond market in Ghana.

REFERENCE


Robinson, J. (1952)”The Rate of Interest, and Other Essays. London: Macmillan.
