# Analysis of factors affecting the development of an emerging capital market: The case of the Ghana stock market

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# Contents

# List of tables

# List of appendixes

# List of figures

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# Abstract

The study looks at the institutional factors affecting the development of the Ghana stock market. Additionally, the study analyses the impact of the listing of Ashanti Goldfields corporation on the development of the Ghana stock market.

The study establishes that the institutional factors particularly the legal and regulatory framework that ensure the protection and security of investors are in place, and that the call-over system of transactions is very transparent.

The study also finds that the delivery and settlement of transactions are performed satisfactorily by brokers, however the introduction of a centralized clearing system would significantly improve upon the clearing and settlement procedures. The study further establishes that the entry into and exit from the GSE are without any significant restrictions.

Analysis of the structure of the GSE shows among others that many of the local investors can be described as low income investors. A sizeable percentage has no formal education and the knowledge of local investors about the capital market is quite poor. Foreign investors have come from Europe, America, the Far East etc. With the exception of Nigeria, no foreign investors on the GSE have come from sub-Saharan Africa.

Using the law of one price and the random walk test, the study establishes that the GSE is "weak-form" inefficient. Additionally, the study finds that the listing of AGC has had tremendous impact on the GSE in many ways including improving market liquidity and market turnover.

The study recommends a campaign to educate the Ghanaian public about the activities of the GSE and to promote investment in general. There is need for the government to give fiscal incentives in the form of taxation in favour of listed companies, and to pursue prudent macroeconomic policies, particularly in the area of inflation management. A regular review of the legal and regulatory framework within which the investment laws operate is necessary to boost the confidence of investors.

# I. Introduction

The role of long-term capital in the economic development of a nation cannot be over emphasized. Most economic managers recognize that a well organized capital market is crucial for mobilizing both domestic and international capital. In many developing countries, however, capital has been a major constraint in economic development.

Dailami and Atkin (1990) describe the provision of funds to finance domestic capital formation as a key factor in the prospects for long-term economic growth in developing countries. The authors observe that the reality of a much reduced supply of foreign funds from previous sources, such as commercial banks, compels governments in many developing countries to pay increased attention to capital market development as a way of improving domestic resource mobilization, enhancing the supply of long-term capital and encouraging the efficient use of existing assets. They contend that the ongoing debt crisis is serving to focus attention on the importance of equity rather than debt, particularly in the financing of risky projects with long gestation periods.

As Pardy (1992) observes, securities markets have an important role to play in financial liberalization and deepening. The author contends that apart from providing a means of diversifying risk for both capital raisers and investors, securities markets could play other roles. For example, they are a mechanism for capital allocation and corporate monitoring, and a means for government to exercise market-based rather than direct fiscal and monetary policies.

Demirgùc-Kunt (1992) observes that in the poorest developing countries, firms rely mostly on internal resources and informal credit markets for financing. Commercial banks are the main financial institutions. The author contends that the loan contracts of commercial banks are generally short term, and formal direct credit markets for long-term debt or equity do not exist, thereby constraining both corporate and economic growth.

Engberg (1975) recognizes the need for capital markets even for less-developed economies. He contends that capital markets can significantly raise the level of domestic savings and contribute to a more efficient allocation of such savings among competing uses. The author emphasizes that through the capital market, a variety of financial assets, carrying different risks, yields and liquidity, is added to the traditional types of financial assets such as demand and savings deposits.

He further observes that the availability of this wider range of financial assets will induce people to increase their rate of current savings. The reason is that the capital market enables savers to achieve a better wealth composition and also permits adjustments to be made in the wealth composition with speed and at low cost whenever circumstances change. Moreover, competition among the users of capital market funds, including business, government and individuals, will tend to increase the efficiency with which capital is used, with direct effect on the growth rate of the economy.

In Ghana, the capital market has not yet played its role in capital mobilization, though if properly organized it could be a source of the much needed capital necessary for economic growth. The main sources of capital for the country's economic development are donors, and these have leveled off at about 9% of GDP over the last several years. Additional supply of capital is urgently required to maintain the momentum of the growth in GDP.

Also in Ghana, an organized capital market can serve as a medium for transferring part of the business ownership of foreign corporations to the citizens. The market could, moreover, be used to transfer the ownership of about 300 state owned enterprises through the government's privatization exercise and thereby improve efficiency as well as increase public ownership in them.

Central to the efficient functioning of a capital market is the development of the stock market. The emerging capital markets of Southeast Asia have successfully used the stock market to mobilize huge savings and channelled such savings to appropriate investments (see Table 1).

**Table 1: Capital mobilization by emerging markets of Asia**

| | Market capitalization (Billions of US$) | No of listed firms |
|---|---|---|
| India | 39 | 2435 |
| Indonesia | 7 | 116 |
| Korea | 111 | 669 |
| Malaysia | 49 | 282 |
| Philippines | 12 | 163 |
| Thailand | 24 | 214 |

Source: IFC's Emerging Markets Data Base 1990.

The Ghana Stock Exchange (GSE) was incorporated in July 1989 as a company limited by guarantee. The need for a stock exchange for Ghana had been considered as far back as 1968; a rudimentary market was set up in 1971 but it experienced a false start. Trading on the GSE actually commenced on 12 November 1990 with 11 listed companies. This number has grown to 18 over the six-year period, a rate of about one company per year. There are no listings on the second and third official lists. The slow pace of listing on the GSE reflects the pace of growth of the capital market of Ghana.

This study attempts to identify and analyse the factors affecting the development of this capital market and to make the necessary recommendations.

# II. Literature review

There has been considerable interest in the development of capital markets in many developing countries in the last twenty years or so, and, evidence of the role of financial markets in economic development is well documented. Goldsmith (1969), in a study of 36 countries drawn from both developed and developing countries over the 100-year period 1860-1963, shows evidence of a positive relationship between the ratio of financial institutions' assets to GNP and output per person. Goldsmith presented data showing that (with some exceptions) periods of more rapid growth in the economy have been accompanied by an above average rate of financial development.

Other researchers, including Barro (1989) and Romer (1989), have used cross-country data spanning several years to show very significant differences in per capita output growth rates and financial market development. Levine (1990) shows that stock markets accelerate growth by (1) facilitating the ability to trade ownership of firms without disrupting the productive process occurring within firms, and (2) allowing investors to hold diversified portfolios.

Having seen the important role that capital markets (and for that matter stock markets) can play in the economic development of a nation, we turn our attention to the literature on the factors that may affect the faster development of the capital market of the developing countries.

Demirgùc-Kunt and Levine (1993) indicate traits of characteristics of stock market development as (1) *traditional characteristics*, which include market capitalization, the amount of new capital raised through stock offerings, the number of listed companies and turnover; (2) *institutional characteristics*, which include regulations, information disclosure, transparency rules and trading costs; and (3) *asset pricing characteristics*, which is the efficiency with which the market prices risk and the degree of integration into world stock markets.

Pardy (1992) contends that there are two basic building blocks necessary for a thriving securities market: (1) a *macroeconomic* and *fiscal* environment conducive to the supply of good quality securities and sufficient demand for them; and (2) a *market infrastructure* capable of supporting efficient operation of the securities market. Under the first pre-condition, the author indicates that the demand for and supply of securities is crucially linked to the state of the macroeconomy. If the macroeconomy is conducive to profitable business operation, a sufficient number of sound businesses can develop to a stage where access to securities markets is useful for their continued growth. This means that if there are not sufficient profitable businesses with good prospects for the future, there is little reason to have a securities market.

The second precondition, i.e., the market infrastructure that will make the securities market operate in an efficient, fair and stable manner, is broken into three:

1. The ***institutional infrastructure***, which provides the operational basis for the market, relates to intermediaries that provide trading, investment management and financial advisory services; market and market-related service providers for stock exchanges, over-the-counter markets, market information services, transaction clearance and settlement systems, and securities transfer, registration and custody; and providers of ancillary services such as accounting and auditing, legal advice, and financial valuation and debt rating services.
2. The ***regulatory infrastructure*** relates not only to the government body that has the power and responsibility to supervise the market, but also includes self-regulatory organizations such as stock exchanges, accounting standards boards, and accounting and auditing professional associations and similar organizations. It also includes their rules and regulations, procedures, and facilities such as stock exchange listing and trading rules or accounting and auditing standards, plus the monitoring and enforcement of these rules.
3. The ***legal infrastructure*** provides the basis for the operational and regulatory framework. It provides for property rights, contractual relationships, forms of incorporation, and rights and responsibilities of participants in the market. It also specifies the powers and responsibilities of the government supervisory authority and self-regulatory organizations.

The first precondition for sound securities market development put forward by Pardy recognizes the importance of taxation (fiscal environment). The author finds that differential effective tax rates on either income or capital gains from different financial instruments will distort capital raising and investment decisions. Pardy supports this conclusion by observing that quite a number of developing countries with state ownership of commercial banks have tax rates that discriminate in favour of savings and demand deposits as opposed to securities investment, and in favour of borrowing from banks as opposed to raising capital from the public. For capital market development, these taxation differentials must be removed.

Demirgùc-Kunt and Huizinga's (1992) study has implications for the design of tax policy related to foreign portfolio investment in developing countries. They indicate that the existence of foreign tax credits for dividend taxes paid suggests that a country should tax capital gains lightly in comparison with repatriated dividends.

Lyon (1992) finds that differing tax treatment of equity and debt can create divergent costs in the use of retained earnings, new share issues and debt finance.

In the literature, another factor that affects the development of the capital market is information disclosure or transparency of transaction. Versluysen (1988) indicates that in markets for publicly offered securities, investor access to information pertaining to their prospective investments is more limited than that of professional intermediaries. Investors can therefore be protected by the compulsory disclosure of financial data and other relevant information relating to the issues of securities.

Pardy (1992) also contends that a company that raises funds from the public must be required to disclose sufficient information to allow an educated investor to make a reasoned investment decision so that the aggregate of investors' decisions may be a good assessment of a company's worth. This requires an effective legal infrastructure to specify and enforce disclosure standards for all companies issuing securities for the public. Those companies that have securities listed for secondary trading on a market such as a stock exchange should be subjected to additional disclosure requirements imposed as listing rules.

Chuppe and Atkin (1992) contend that information asymmetries abound in financial markets. The managers of a firm know more about that firm's market prospects and investment opportunities than do outsiders. Financial market professionals often have access to information that is not widely available. In an unregulated market, the possibility exists that unsuspecting investors will be harmed by those with access to information not available to the public at large. This is important for the economy because lack of public confidence in securities markets would cause the supply of funds to the markets to dry up, thus depriving the economy of the benefits of a functioning market.

The authors further observe that these information asymmetries are the basic justification for a large number of regulations. Disclosure requirements for public companies must ensure that financial information is available for investors in a way that facilitates inter-company comparisons. It must be noted, however, that disclosure is only effective if there are good accounting standards in place, standards that allow investors to assess the financial health of enterprises.

A study by Cheung and Krinsky (1994) confirms underpricing by investment bankers in an environment of information asymmetry.

The literature summarized above shows that many factors may affect the development of capital markets in the developing countries. Identifying the negative factors for rectification will therefore quicken capital market development.

# III. The problem and the need for the study

Many factors affect the development of the capital market. The capital market consists of the primary and the secondary markets. The primary market is the one in which underwriters help companies raise capital in the form of initial public offerings or by issuing seasoned stocks and bonds to investors. The secondary market is the one in which shareholders can resell their shares to other interested buyers on the stock exchange or the over-the-counter market. Many factors affect the development of both the primary and the secondary markets.

There is abundant evidence that most Ghanaian businesses lack long-term capital. The business sector has depended mainly on short-term financing such as overdrafts to finance even long-term capital. Based on the maturity matching concept, such financing is risky. All such firms need to raise an appropriate mix of short- and long-term capital. There are about 300 state-owned enterprises in diverse business areas to be privatized. The need for a quicker development of a well organized and functioning capital market has become extremely important. In the light of these developments, it is necessary to identify and analyse all the negative factors that impinge on the development of the capital market in Ghana, especially the stock market, and to make the necessary policy recommendations to rectify the situation sooner than later.

# IV. Objectives of the study

The main objective of this study is to analyse the institutional (including regulatory and legal) factors that affect the development of the Ghana Stock Exchange.

Other objectives are:

- To assess the efficiency of the Ghana Stock Exchange by
  - testing for the law of one price using the Ashanti Goldfields Corporation (AGC), which has simultaneous listing on the London Stock Exchange (LSE) and the Ghana Stock Exchange.
  - testing the random-walk hypothesis
- To analyse the impact of the listing of AGC on the development of the Ghana Stock Exchange.
- To make policy recommendations that will promote effective development of Ghana's capital market.

# V. Methodology and results

We analyse the effect of the institutional factors on the development of the GSE by examining the following institutional characteristics:

- The legal and regulatory framework
- Information disclosure requirements
- Transparency of transactions
- Accounting and auditing standards
- Transaction costs
- Delivery and settlement
- Barriers to entry and exit
- Taxation of investment income
- Market structure
- Public knowledge of securities markets

## The legal and regulatory frameworks

In order to ensure orderly and equitable dealings in securities, as well as the protection and security of investors, all capital markets especially the emerging ones operate within a framework of laws and regulations enacted by the country. The extent to which these laws are enforced will have a direct bearing on the development of the stock market.

In Ghana, the various laws enacted in connection with the securities market include the Securities Industry Law (SIL) 1993 (PNDCL 333). This law mainly spells out the establishment of the Securities Regulatory Commission and how the commission should function. Two provisions for regulating transactions on the exchange as well as membership of the exchange are the Ghana Stock Exchange Listing Regulation 1990 LI 1509 and the Ghana Stock Exchange Membership Regulations 1990 LI 1510. The establishment of the Securities Regulatory Commission (SRC), whose function is to maintain surveillance over the securities market, is to ensure fair and equitable dealings in securities. SRC has the authority to license stock exchanges, unit trusts, mutual funds, and securities dealers and investment advisers. It is also responsible for protecting the securities market against abuses such as insider trading practices. Takeovers, mergers and acquisition of companies are subject to the review, approval and regulation of the commission.

Other laws that protect the securities market directly or indirectly include the Companies Code of 1963 (Act 179), the Bank of Ghana Act, 1963 (Act 182), the Banking

Law of 1989 (PNDCL 225) and the Financial Institutions (Non-Banking) Law, 1993 PNDCL 328. This list of laws and regulations indicates that the legal and regulatory framework of the securities market and for that matter the stock market is adequately taken care of compared with those of even industrialized nations.

Moreover, the study found evidence of the enforcement of the regulations. A notable case was the suspension and the imposition of fines against three brokerage firms, Databank Brokerage Limited, EBG Stock Brokers and SDC Brokerage, Ltd., in early December 1995 for contravening the rules governing the operations of the financial market.

Databank Ltd was suspended from dealing on the floor of the GSE for a number of trading days, while the memberships of EBG Stock Brokers and SDC Brokerage, Ltd., in the council of the GSE were terminated.[1] (See Appendix A.)

## Information disclosure requirements

Public disclosure of relevant information about securities is important for both pricing efficiency and market confidence. If investors are to make sound judgements about the value of securities, they must be fully informed of relevant facts.

The study found that the disclosure policies governing listed companies on the Ghana Stock Exchange, as enshrined in Legislative Instrument (LI) 1509, are quite comprehensive. Various regulations under this legislative instrument touch on information to be disclosed to the general public.

For example, Regulation 55 requires that every listed company make available to the public information necessary for informed investing, and that listed firms take reasonable steps to ensure that all who invest in the company's securities enjoy equal access to such information. Regulation 56 requires a listed company to make immediate public disclosure of all material information concerning its affairs, except in exceptional circumstances. A listed company is also required to release material information to the public in a manner designed to obtain its fullest possible public dissemination. Regulation 57 requires that if listed companies become aware of a rumour or report, which may be true or false, that contains information that is likely to have or has had effect on the trading of the company's securities or might have a bearing on investment decisions, the company is required to publicly clarify the rumour or reports as promptly as possible.

Information disclosure on financial reports is well covered in Regulations 43 and 44. Regulation 43 binds listed companies to give to the exchange a half-yearly report as soon as figures are available and in any event not later than six months after the end of the first half-yearly period in the financial year. Under Regulation 44, listed companies are expected to give to the exchange a preliminary annual financial statement as soon as figures are available and in any event not later than three months after the end of the financial year. Information to be disclosed in both half-year and annual financial statements includes turnover, consolidated operating profit/loss, income from associated companies, extraordinary items, minority interests, operating profit as percentage of turnover, operating profit as percentage of issued capital and reserves at end of year, earnings in cedis per ordinary share and dividends, including amount per share, date payable etc.

For firms wanting to list on the exchange, the information disclosure requirements are that the company must provide the background of the company, especially the history, the line of business, the capitalization, the distribution of shares such as authorized and issued capital, and the distribution of shareholders. Other information such as dividend records, fiscal year end, date of annual meetings and any pending legal actions must all be disclosed.

The study found through interviews of the officials of the Ghana Stock Exchange and the stockbrokers that to a large extent all the information disclosure requirements are being enforced by the GSE.

## Transparency of transactions

Transparency of trading and other procedures allows efficient price setting and confidence in the fairness of the market. Fragmented or privately conducted trading with limited disclosure of quantity and price means that each new transaction in effect must be based on relatively expensive search costs and there is a risk of the transaction going out of line with prevailing prices. Opaque trading procedures engender suspicion of market manipulation and may reduce the rate of investment.

On the GSE, all buying and selling of shares are done through brokers or licensed dealing members (LDMs) who have the license to buy and sell shares on behalf of their clients on the exchange.

The study found that the call-over system of trading on the GSE is quite transparent as trading is opened to members of the public. There is therefore transparency of pricing. To further demonstrate transparency, brokers fill in a bargain slip in triplicate. One copy is for the stock exchange, and one copy goes to each of the brokers making the transaction. This slip has information on price, quantity and the security involved. It may be interesting to note that all brokers interviewed felt strongly that there is transparency in trading on the GSE. Despite these measures, however, one cannot rule out collusion between brokers in price establishment, although there is no evidence of such practice.

To further assure public confidence in trading on the GSE, a surveillance unit to monitor compliance by all parties involved in trading is in place at the GSE. It has been realized that this department needs to expand in the near future, as the surveillance duties are currently performed only by the general manager who already has a busy schedule.

## Accounting and auditing standards

Users of accounting information include the government, the regulatory agencies, the financial communty, professional organizations, chartered accountants and accounting firms, the investing public, industry association, and the general public.

These users may have both coinciding and conflicting needs for the various types of financial statements and reports. In meeting these needs, accountants and auditors prepare a single set of general purpose financial statements and reports that present objective, unambiguous and complete economic facts of the existence and operations of the enterprise. In order to narrow the areas of differences and minimize the dangers of bias, misinterpretation, inexactness and ambiguity, accountants and auditors have adopted generally accepted accounting and auditing principles or standards. These standards allow financial statements and reports to be reasonably compared between enterprises and between accounting periods.

The Council of the Institute of Chartered Accountants of Ghana adopts the Statements of Accounting Standards of the International Federation of Accountants (IFAC). Since accounts of listed companies are prepared by reputable firms, accounts submitted to the GSE can be expected to be of internationally acceptable accounting and auditing standards. Interviews with officials of GSE confirm that this is the case.

## Transaction costs

Unreasonably high costs of transactions will affect market development since investors aim at minimizing cost to increase their returns. For companies going public through share issue and subsequently seeking listing on the exchange, the main costs are:

- underwriting fee
- legal and accounting expenses
- brokerage commissions
- cost of printing and advertising prospectus
- fees for the GSE (including listing fees, application fees, and annual fees)

For individuals buying and selling shares on the stock exchange, the main cost is brokerage commissions.

A latent cost is the interest forgone when payment is made to the broker while the investor waits, sometimes for a couple of weeks or more, before the stock is purchased.

The study found that for firms going public, the cost of going public as percentage of capital raised decreased as more capital is raised. It is also cheaper to raise capital through private placement than through public issue (see Table 2).

**Table 2: Cost of going public**

| Firm | Capital raised | Expenses incurred | Ratio of exp. to cap.raised | Type of issue |
|---|---|---|---|---|
| Home finance Co. | ¢1312.45 million | ¢30.8 million | 2.345 % | Private |
| Ashanti Goldfields[a] | $62.25 million | $2.146million | 3.45 % | Private |
| Mechanical Lloyd | ¢486 million | ¢56.46 million | 11.6 % | Public |
| Super Paper Prod. | ¢630 million | ¢56.38 million | 8.95 % | Public |

Source: From the files of the various companies

[a] This flotation was carried out in August 1995 on the London Capital Market at a price of $20.75 per share. Three million shares were successfully floated.

Underwriting fees, legal and accounting expenses, cost of printing and advertising, etc., are negotiable with the firm providing such services, but again they fall with higher capitalization. (See Appendix B for details of flotation costs for Home Finance Co., Mechanical Lloyd Co., and Super Paper Product Co.) Brokerage commissions as set by the GSE range from ¢800 for minimum purchases to 1% ) of value purchased) for values over ¢10 million (see Appendix C). Application fees, listing fees and annual fees payable to the GSE range between .003% and 2.42%, depending on the amount of capital to be raised (see Appendix D).

Another source of cost that may be encountered in initial public offering is underpricing; this cost estimation was beyond this study, however.

It was interesting to note that no brokerage firm dealing on the GSE paid any interest on client funds deposited with them while the clients waited for the purchase of shares by brokers on their behalf. This means that if clients wait for as long as one month before their shares are purchased, they earn no interest on the funds deposited with the broker. Interestingly, almost all the brokerage firms manage funds. There is therefore no reason why these brokerage firms should not pay interest on clients' unused funds.

Based on the current treasury bill rate of about 45%, investors lose as much as 0.125% per day of their unused funds with brokers. It is expected that this practice would affect the development of the stock market, especially as clients become aware that brokerage houses invest such funds in short-term investments such as overnight money markets, treasury bills, etc.

## Delivery and settlement

Under delivery and settlement, the study was interested in transactional clearance and settlement systems, securities transfer, registration, and custody. In some emerging capital markets, investors in securities have expressed concern about purchasing securities but not receiving either their certificates or their dividends. In other situations, investors who have sold their securities continue to receive dividends. This obviously shows poor securities transfer, registration and custody.

The study established that in delivery and settlement on the GSE, the original certificates are surrendered while transfer forms with standard information are transferred to the other party. Delivery and settlement is to be completed within 14 days as stipulated by the exchange. The study found that the 14-day delivery and settlement deadline was strictly adhered to. The study also found that the regulation requiring brokers to send transactions results to their clients within 48 hours was adhered to. This was easilly checked by the GSE because each broker filed returns on payment of levies and commission by their clients with the GSE.

The study found that the licensed dealing members were in favour of a centralized delivery and settlement system. It was also learned that the GSE is planning to introduce a centralized manual clearing system in the near future.

# Barriers to entry and exit

Excessive barriers especially to foreign investors hamper the development of any stock exchange. Purchasing of shares on the Ghana Stock Exchange has been described as without any significant restrictions by the International Finance Corporation (IFC) (see IFC 1995 Factbook). For comparison of entry and exit barriers of the GSE with other emerging capital markets see Appendix E.

Generally all listed stocks are freely available to foreign investors. However, any one external resident portfolio investor whether individual or institutional can hold only up to 10% of any security approved for listing. Further, the GSE requires that the total holdings of all external residents in one listed security should not exceed 74%. Ghanaians resident outside Ghana and foreigners resident in Ghana may invest without any limit.

There is free and full foreign exchange remittability for dividends, interest and capital gains. Initial capital invested may also be remitted without any restrictions. The analysis indicates that there are virtually no barriers of entry to or exit from the GSE. It seems therefore that barriers to entry and exit are not an important factor in the development of the GSE, since investors can move in and out of the market without any restrictions.

# Taxation of investment income

In the classical Modigliani-Miller concept of perfect capital markets, financing decisions made by firms are irrelevant. Firms are indifferent between drawing on retained earnings, issuing new shares or issuing debt. However, in an imperfect financial market like Ghana's, one of the factors that influences firms' choice of financing is the taxation of income.

Differences in effective tax rates on income from different financial instruments can influence how individuals or corporate bodies make their financial and investment decisions. Such differences may also determine whether an individual should invest in securities or demand deposits or whether a corporate body should raise funds through equity or debt instruments.

Ghana’s withholding taxes on investment income are shown in Table 3.

**Table 3: Withholding taxes on investment income in Ghana**

| | Interest income | Dividend income | Capital gains |
|---|---|---|---|
| Individual | 0% | 10% | 0% |
| Corporate | 10% | 10% | 0% |

Source: Survey data.

Individuals in Ghana investing in debt securities do not pay any taxes on interest from such investment. However, a tax of 10% is deducted on dividend income from investment in equities. Capital gains are not taxed. For corporate bodies, dividend income and interest income are taxed at 10%, while capital gains are tax-free. It is worth noting that interest expense for corporate bodies is tax deductible.

These figures show that at the individual level, debt instruments have an advantage over equity instruments since interest incomes are not taxed. At the corporate level, incomes from debt and equity instruments are taxed at par at 10%. However, firms raising capital by issuing debt instruments may deduct their interest payments as allowable business expense. This makes debt capital relatively cheaper than equity capital at the corporate level on the Ghana capital market. Combined with the high cost of raising equity capital from the capital market, this may explain partially why many firms resort to short-term borrowings (such as overdraft) on the financial markets of Ghana. (See Appendix F for a comparison of withholding taxes for emerging markets.)

# Investor profile

The study examined the composition of market participants, including individuals and institutions both domestic and foreign. The volume of transactions of each group and the social standing of individual investors were also analysed.

For this purpose, questionnaires were sent to 6 of the 11 brokerage houses. The six selected were the first brokerage houses to be established and account for about 80% of the brokerage services in Ghana. The questionnaires were completed by the appropriate officials of the brokerage houses after an initial briefing of the required information. (See Appendix G for sample questionnaire.)

The analysis of the questionnaire responses by the brokers is presented below under various subheadings. Results are as at November 1995.

## *Local versus foreign investment value*

The ratio of local versus foreign investors in terms of value of investments on the GSE is as shown in Table 4.

**Table 4: Proportion of local and foreign investment in Ghana Stock Exchange**

| Type of investor | Value of investment |
|---|---|
| Local investors | 57% |
| Foreign investors | 43% |

Source: Survey data

The results indicate that foreign investors play quite a significant role on the GSE. The ratio of the value of investment by foreigners to local investors is about 2:3. The results are interesting in the sense that whereas the number of local investors may be many times the number of foreign investors, the foreign investors come in with more investible funds compared with the local investors. This observation correlates highly with the income level of the local people compared with the income level of the countries where the foreign investors have come from (see section below on foreign investors).

## *Local individual versus institutional investment*

The analysis of questionnaire responses showed that in terms of value, local individual investors hold the same value of investments as do institutions (Table 5). On the other hand, local institutions are not active in share trading compared with the individuals. The institutions rarely go to the market to trade. This finding may be attributed to the thin volume of share trading on the GSE. Institutional demand for shares is usually far higher than the individual investor demand for shares. This means that institutions can only be very active when trading volumes increase substantially.

**Table 5: Individual and institutional investment in GSE**

| Type of investment | % of investment |
|---|---|
| Local individual investment | 50 |
| Local institutional investment | 50 |

Source: Survey data.

## *Profession of local individual investors*

Table 6 shows that farmers and artisans (including carpenters, masons, electricians, etc.) do not play a significant role in investment on the GSE. This result is probably to be expected. Most farmers and artisans are illiterate and may not even know about the existence and working mechanisms of the stock market. The low figure perhaps reflects the few educated ones among them.

**Table 6: Profession of investors in GSE**

| Profession of investors in GSE | % of investment |
|---|---|
| Farmers | 2.8 |
| Artisans (carpenters, masons, electricians, etc.) | 5.0 |
| Small business owners, (storekeepers, retailers, etc.) | 34.2 |
| Office clerks, teachers, etc. | 15.0 |
| Middle managers | 18.8 |
| Chief executives | 11.7 |
| Pensioners | 12.5 |

Source: Survey data.

Although small business owners may not be highly educated, they tend to have extra funds for investment. If these business owners could be educated through workshops, seminars, etc., they could even play more active role in investment on the GSE.

Teachers, clerks, etc., form the bulk of employees of the country but they are among the most poorly paid. Therefore despite the large size of the group, their aggregate investment in shares is minimal. The investment value of middle managers may be expected. The number of middle managers in the work force is quite small but they are well paid and well educated. Most of them understand how the stock market works and therefore invest part of their funds in it. The size of their investment is quite significant. The number of chief executives is comparatively much smaller but they are the most well paid. Their role here therefore is not unexpected.

The role of pensioners seems interesting and significant. One would have expected them to play a less significant role since they are not in active work service. It is speculated that these pensioners may avoid speculative stocks and invest more in income earning stocks.

## *Age profile of local investors on the GSE*

According to the brokerage firms, investors fall into the age categories shown in Table 7.

**Table 7: Age of GSE investors**

| Age | % of investment on GSE |
|---|---|
| Above 50 years | 23.8 |
| Middle aged, 36-49 years | 45.0 |
| Young adults, 25-35 years | 26.2 |
| Young people, 18-24 years | 5.5 |

Source: Survey data.

In interpreting the figures in Table 7, we recognize that most young people are unemployed. They may be in school or they may be learning a trade. It is not expected therefore that they will have substantial investment on the GSE. The result above is thus within our expectation.

In the middle age, many individuals have settled down and looking ahead in life, planning for their retirement through investments. The fact that they form the largest investment group on the GSE is not unusual. Young adults are in their early years of employment. They form the bulk of employees. At that age, they are risk loving and may invest more in growth stocks. It is not unusual that they contribute about 26% of the activity on the GSE. The age group above 50 years is likely to invest more in income stocks since they are approaching their retirement age and cannot afford to risk their savings.

## *Income distribution of local investors*

Brokers estimates of their clients' annual incomes are given in Table 8.

**Table 8: Income levels of GSE investors**

| Income group | % distribution |
|---|---|
| Low income (below ¢1.5 M/annum, i.e., below US$1,500/annum) | 15.9 |
| Middle income (¢1.5M-3M/annum, i.e., $1,500-$3,000 per annum) | 28.3 |
| Upper middle income (¢3M-5M/annum, i.e., $3,000-$5,000 per annum) | 28.3 |
| High income (above ¢5M, i.e., above $5,000 per annum) | 27.5 |

Source: Survey data.

Note: The exchange rate at the time of the survey was ¢1000/US$.

The low income group has the least activity on the GSE. Although this group is large, individually they do not have much investable funds. The investments of the middle income, upper middle income and high income groups are fairly even at about 28% each. This is an interesting result. Whereas the number of the middle income group may be far larger than the upper middle income and high income groups, members within the middle income and the high income groups earn more and have more investable funds, thus compensating for their lower numbers.

## *Educational background of local investors*

The educational background of investors, as reported by the brokers, is shown in Table 9.

**Table 9: Educational background of GSE investors**

| Educational background of GSE investors | % distribution |
|---|---|
| No formal education | 11.3 |
| Secondary school leavers or equivalent | 33.7 |
| Sixth form, technical education or equivalent | 31.0 |
| University or equivalent | 24.0 |

Source: Survey data.

One can infer that the ability of many individual investors to make fundamental as well as technical analyses of the market is limited. The need for quality market intermediaries to provide trading, investment, financial and other advisory services to the investors on the GSE cannot be overemphasized. Without this foundation, the GSE may not develop as quickly as expected.

## *Knowledge about stock markets*

According to the brokers, investors' knowledge of the market could be classified as shown in Table 10.

**Table 10: GSE investors' knowledge of stock markets**

| | % of investors |
|---|---|
| No knowledge | 23.3 |
| Fairly good knowledge | 59.2 |
| Highly knowledgeable | 17.5 |

Source: Survey data.

The analysis here shows that local investors who are highly knowledgeable about the stock market are lacking. The knowledge of many Ghanaian investors may be described at best as average. More than a fifth of the investors do not have any knowledge at all of the capital market and how it works. This lack of knowledge definitely will affect the development of Ghana's capital market. Strong market advisory intermediaries are needed to provide the necessary advisory services for the numerous investors with weak analytical skills (this is to be linked to the educational background of investors on the GSE noted above).

## *Value of local individual portfolio investment*

Table 11 indicates that local individual investors on the GSE may be described as small investors, as about 80% of the individual portfolios are valued at less than $5,000. This is not unexpected given the low level of incomes of individuals in the country.

**Table 11: Value of GSE investment by local individuals**

| | % composition |
|---|---|
| Below ¢1 million investment ($1,000) | 18.0 |
| ¢1M-2M investment ($1,001-2,000) | 16.2 |
| ¢2M-3M investment ($2,001-3,000) | 19.2 |
| ¢3M-4M investment ($3,001-4,000) | 24.1 |
| Over ¢5M (above $5,000) | 22.5 |

Source: Survey data

## *Numerical portfolio composition of individual local investors*

The survey shows that more than 80% of the local individual investors on the GSE spread their investments over more than one company (Table 12). From theory, as the number of investments in a portfolio increases, the unique risk reduces. It is perhaps gratifying to note that 60% of the individual investors have at least four investments in their portfolio given that there are only 18 listed companies on the GSE. We expect the number of investments in individual portfolios to increase as more firms list on the GSE.

**Table 12: Numerical composition of individuals' stock portfolio**

| | % distribution |
|---|---|
| One company only | 15.0 |
| 2-3 companies | 25.2 |
| 4-5 companies | 29.0 |
| 6-7 companies | 21.0 |
| Over 7 companies | 9.0 |

## *Local Institutional investment*

The number of institutional clients of the major brokerage firms interviewed ranged from 4 to 35, with an average of 14 institutions. As indicated earlier, these institutions are quite inactive in trading on the GSE. It is expected, however, that as the number of listed firms increases, institutions will take active part in the trading.

## *Value of local institutional investment*

Table 13 indicates that about 80% of the institutional investments are valued at $20,000 or more. Compared with other emerging capital markets, the value of investments by the institutions is quite low. It is expected that as the market grows, local institutions will increase their investment value on the market.

**Table 13: Value of local institutional investment**

| | % distribution |
|---|---|
| Below ¢5 million ($5,000) | 7.4 |
| ¢6-10 million ($6,000-10,000) | 5.0 |
| ¢11-20 million ($11,000-20,000) | 8.6 |
| ¢21-50 million ($21,000-50,000) | 14.4 |
| Above ¢50 million (above $50,000) | 64.6 |

Source: Survey data.

## *Number composition of local institutional investments*

As shown in Table 14, nearly 90% of the local institutions spread their investments among four or more companies listed on the GSE. The institutions reduce unique risk by employing such investment strategy. (Compare with 60% of individual investors having portfolios with four or more companies.)

**Table 14: Portfolio composition of local insttutional investors**

| | % distribution |
|---|---|
| One company | 3.8 |
| 2-3 companies | 7.0 |
| 4-5 companies | 25.5 |
| 6-7 companies | 17.5 |
| Over 7 companies | 46.2 |

Source: Survey data.

## *Foreign investors*

All the major brokers interviewed had foreign investors as part of their clientele. These investors were from the United States, the United Kingdom, Turkey, Germany, South Africa and Japan. Others have come from Saudi Arabia, Holland, Canada, Nigeria, France and Switzerland. It is interesting to note that apart from Nigeria, no foreign securities investors came from any sub-Saharan African country to invest on the GSE.

The questionnaire analysis also showed that the listed firms most patronized by the foreign investors in order of popularity were Ashanti Goldfields Corporation, Unilever, Guinness Ghana, Ltd., Stanchart, Pioneer Tobacco Co., Accra Brewery and Kumasi Brewery Ltd. The study did not investigate why these firms are most patronized, but one can speculate that these are firms of multinationals and are therefore known through the parent companies. The case of AGC as the most popular among foreign investors is expected since it has a dual listing on both the London Stock Exchange and the GSE and also because it accounts for almost 90% of the capitalization of the GSE.

### *Problems of GSE: From brokers' point of view*

The survey requested the brokers on the GSE to enumerate their opinions on the problems that needed attention for the development of the Ghana Stock Market. These were listed as:

1. Lack of any effective educational campaign
2. Lack of national awareness
3. Poor patronage in the market/small client base
4. Need for a centralized clearing and settlement system
5. Manual clearing system is slow
6. Poor capitalization of brokerage firms
7. Low number of listed firms
8. Poor performance of most listed firms
7. Stamp duty on foreign investors
8. General economic climate

The concerns expressed by brokers of the GSE echo those of most emerging stock markets, especially those in Africa. There is lack of awareness because there are usually no educational programmes packaged with the establishment of such markets, which are entirely new to the people. There is poor patronage because incomes are quite low for a high percentage of the population.

A centralized clearing and settlement system would not only quicken the settlement process, it would also reduce the cost. The concern of poor capitalization, which was expressed by the non-bank brokerage firms, can be solved by having the brokerage firms go public. It is interesting to note that none of the brokerage firms doing business on the GSE are publicly held companies.

Many emerging markets face a dearth of new listings, according to the brokers. This problem is usually tackled by governments introducing incentives such as lower tax rates, etc., to listed firms.

## Public knowledge of securities markets

In an environment like Ghana's, lack of knowledge and unfamiliarity with negotiable instruments by the populace are expected to be significant constraint to the development of the securities markets. The study found that the short courses the GSE runs on a continuing basis throughout the year are helping to educate the participants about securities. There are five such courses, designed to meet the needs of both professionals and non-professionals on various aspects of the securities industry, that are conducted about every other month. The courses are: Basic Securities, Advanced Securities, Securities Selling and Investment Advice, Securities Trading, and Directors Course. The duration of the courses ranges between 3 and 10 days, usually 3 hours per day.

The basic securities course is for those individuals interested in knowing about the securities market in Ghana. The advanced securities course is a foundation course for securities market professionals, as well as others in law, banking, accounting, insurance, finance and economics, who need an in-depth understanding of the securities markets, instruments, trading, legal issues and analysis of financial statements.

The securities selling and investment advice course is a specified course designed for those seeking licensing as sales representatives and investment advisers. Course four securities trading, which is also a specialized course, is for prefessionals who want to have an in-depth knowledge of trading on the stock exchange as well as those who intend to seek licensing as authorized dealing officers of stockholding firms.

The directors' course, which has been conducted only once (in 1992) is specially designed for directors of stockbroking firms. This covers the roles and responsibilities of stockbroking firms according to the regulations and laws of the securities industry and the Ghana Stock Exchange.

The efforts of the GSE in this area are commendable. Over the four-year period from 1991 to 1994, 1,682 people have been taken through the five courses (see Appendix H for course participant statistics). It is interesting to note that other African stock exchanges, such the Lagos, Nairobi, Harare, etc., do not run such courses. The effort of the GSE therefore is unique and will help the faster development of the Ghana stock market. However, in comparison with the level of knowledge of the population, the education of the public through the above program is slow. There is need for other institutions, such as the universities, banks, brokerage houses, etc., to add to the effort of the GSE through similar programmes of education. Only through such collective effort can any educational programmes make any meaningful impact.

# VI. Efficiency of the GSE

Market efficiency has perhaps generated more discussion among financial economists than any topic. A market is said to be efficient if it speedily and correctly incorporates information into prices. Market efficiency therefore depends on the ability of traders to devote time and resources to gather and disseminate information. Markets that are more efficient attract more investors, which translates into increased market liquidity.

We analysed the efficiency of the Ghana Stock Exchange under objective two by testing for

- The law of one price (test for arbitrage)
- The random walk hypothesis

## The test for the law of one price

On 14 March 1994, the Ashanti Goldfields Corporation floated[2] shares on both the local and the London primary securities markets at a strike price of $20 (¢18,700) per share. This share offer closed on 16 and 18 April, respectively, on the local and the international capital markets. In this flotation 22.7 million shares were sold, with 18.8 million shares coming from the government out of its 55% shareholding in the company. The remaining 3.9 million shares came from Lonrho. An additional 1.2 million shares off-loaded by the Ghana government, called the “Ghanaian second round”, were also offered at a price of $20 (¢18,700) on the local market solely for Ghanaians from 17 May to 24 June 1994. Meanwhile, trading in the shares of AGC commenced on 26 April and 17 May, respectively, on the London Stock Exchange (LSE) and the Ghana Stock Exchange.

At the end of the flotation in June 1994, the AGC share register stood as follows[3]

| | |
|---|---|
| London share register | 19,503,266 shares |
| Accra share register | 64,396,734 shares |
| Total | 83,900,000 shares |

The dual listing of AGC on both the London stock market and the GSE presents an opportunity for testing the law of one price. We expect that if the pricing of AGC on the GSE is efficient there should be no opportunity for arbitrage. That is, the price of AGC on the LSE should be the same as the price on the GSE after considering such costs as brokerage commissions, foreign exchange transfer costs, etc. This test is therefore carried out by comparing the end of day trading quotes of AGC on both the LSE and the GSE (see Appendix I for the London and Accra closing prices). In this study, tests are carried out using both daily and weekly closing prices. The need for the test on weekly prices is due to lack of price changes on daily basis on the GSE. It is expected that one week (there are three trading days in a week) is long enough to observe some price movements in shares on the market.

Thus, using the traditional parity relationship test in the foreign exchange market, we state that,

$P_t$ = $\alpha + ß(e_t P^*_t) + u_t$

where $P_t$ = AGC closing share price on day t on the Ghana Stock Exchange expressed in cedis

$P^*_t$ = AGC closing share price on day t on the LSE in pounds sterling

$e_t$ = market exchange rate (bureau rate) on day t expressed as cedis/pound sterling

$\alpha$ = the intercept

$ß$ = parameter

$u_t$ = error term

We hypothesize that, $\alpha = 0$, $ß = 1$

## The random walk test for weak-form efficiency

A market in which prices always "fully reflect" available information is said to be "efficient" . Our analysis of the efficiency of the GSE is based on the efficient markets hypothesis (EMS). This hypothesis states that markets always adjust instantaneously to take account of all available information, so no individual analyst has more information than the information that is already reflected in the security's price. The efficient markets hypothesis suggests three categories of efficient markets:

- Weak-form market efficiency in which current share prices fully reflect all information about past share prices.
- Semi-strong form market efficiency, in which share prices also reflect all publicly available information, e.g., company reports and company public profits forecasts.
- Strong form market efficiency, in which share prices also reflect information that is not published (such as the possibility of a technological breakthrough in a company's research laboratories).

In this study, we test for the weak form efficiency, which is based on the random walk hypothesis. The proposition of the random walk hypothesis is that share prices (or market returns) do not follow any systematic pattern over time but rather follow a random walk. This is to say that the direction of change as well as the size of change in market returns is random and cannot be predicted from past information about the share prices.

The test for random walk is by examining whether market returns[4] have historically followed a random walk (see Figure 1 for GSE weekly market returns). Thus $R_{t+1} - R_t$ is independent of $R_t - R_{t-1}$. This means that tomorrow's returns change (and therefore

**Figure 1: GSE cumulative market returns**

tomorrow's returns) cannot be predicted by looking at today's returns change. (See Appendixes J and K for daily and weekly returns figures calculated from GSE closing prices 1993-1995. Also see note 2.)

The most frequently used test for studying patterns in market returns (stock prices) is the serial correlation test (runs test may also be used). Serial correlation tests measure the correlation between returns in one period and those of the prior period. A positive correlation shows that there are trends in yield movements. A negative correlation indicates a tendency towards reversals in returns movements. Positive or negative results indicate possible existence of potentially profitable trading strategies. A zero correlation means that no trading strategy can yield potential profits. A zero correlation is consistent with the random walk hypothesis.

In this test for efficiency of the GSE, we are interested in the efficiency of the GSE in two periods: the period before the listing of AGC (see trading session 216-350 in Figure 1) and the period after the listing of AGC (beyond trading session 350 in Figure 1). We are interested in the efficiency of the market in the post AGC listing period because there are pricing efficiency gains to be made by the GSE due to the listing of AGC on the LSE. The test is carried out using both daily and weekly market returns figures as found in Appendixes J and K.

Thus, we express the serial correlation test as

$$R_t = \alpha + \beta_1 R_{t-1} + \ldots \beta_n R_{t-r} + u_t$$

$$R^*_t = \alpha + \beta_1 R^*_{t-1} + \ldots \beta_n R^*_{t-r} + u_t$$

where,

$R_t$ = the cumulative GSE market returns before the listing of AGC

$R^*_t$ = the cumulative GSE market returns after the listing of AGC

$t$ = 1...10

$u_t$ = error term

The coefficients are expected to be zero according to the random walk test.

# VII. Results for the law of one price

Results using daily price quotations (see Appendix I for figures used for regression) are shown below.

**Ordinary least squares estimation[5]**

Dependent variable is Accra daily price of AGC ($AP_d$)
220 observations used for estimation from May 1994 to December 1995

| Regressor | Coefficient | Standard error | T-ratio |
|---|---|---|---|
| C | 24,207 | 3393.8 | 7.1329 |
| $LP_d$ | -.0004993 | .0382 | -.0131 |
| | | | |
| R-sq. | 0.9849 | F-statistic F(3,214) | 4666.6 |
| R-bar-sq. | 0.9847 | S.E. of regression | 325.2670 |
| Residual sum of sq. | 2.26E-07 | Mean of dep. var. | 22373.8 |
| SD of dep. var. | 2625.4 | Max. of log-likelihood | -1568.4 |
| DW-statistic | 2.0123 | | |

**The following results are based on weekly data:**

Dependent variable is $AP_w$
81 observations used for estimation from May 1994 to December 1995

| Regressor | Coefficient | Standard error | T-ratio |
|---|---|---|---|
| C | 18461.7 | 2623.2 | 7.0379 |
| $LP_w$ | .1805 | .0816 | 2.2117 |
| | | | |
| R-sq. | 0.9483 | F-statistic F(3,214) | 4666.6 |
| R-bar-sq. | 0.9463 | S.E. of regression | 614.4286 |
| Residual sum of sq. | 2.83E+07 | Mean of dep. var. | 22268.0 |
| SD of dep. var. | 2629 | Max. of log-likelihood | -617.2785 |
| DW-statistic | 1.9709 | | |

The results show that for the daily price quotations of AGC, the intercept $\alpha$ is significantly different from zero, i.e., $\alpha$ is not zero. ß, on the other hand, is not significant, i.e., it is not significantly different from zero. The results indicate that the alternative hypothesis is true: $\alpha$ is not equal to zero and ß is not equal to 1.

The results of the weekly quotations of AGC on the Accra and London markets also show that the intercept $\alpha$ is not zero and ß is not equal to 1 as hypothesized. We therefore conclude that the AGC share price on the London Stock Exchange is not the same as the

**Figure 2: UK and Ghana interest rates**

AGC trading price on the GSE. The law of one price does not hold for the trading of AGC shares on the London and the Ghana stock exchanges. In effect, the London and the Accra markets are segmented.

The reasons for the departure from the law of one price in the trading of AGC shares on the London and Accra markets may include the following. First, the duration of trading on the two markets is different. Trading on the LSE is from morning to evening, Monday through Friday; thus there is constant updating of information, which is incorporated into the trading. Trading on the GSE, on the other hand, is conducted only on Mondays, Wednesdays and Fridays from 10am to about 11.30am. With the call-over system the effective trading time devoted to trading in the shares of any one company is approximately 5-10 minutes. With such a disparity in trading durations, it appears the information content of the AGC stock at the two different locations cannot be the same.

Second, a look at short-term interest rates shows a marked disparity between UK and Ghana interest rates. While UK has enjoyed consistently lower interest rates, Ghana has had abnormally high interest rates over the observed period (see Figure 2 and Appendix L). With such disparity in interest rates between the two countries, it is not unusual that the price of AGC should be different on the LSE and the GSE. This is because common stocks have interest rate risk, which arises from the fact that the estimated values of the shares on the different markets are the present values of all future cash dividends. Thus when prevailing interest rates are markedly different in the two countries, the stock prices in the two markets are likely to be different since the expected future dividends are discounted with different interest rates in the two markets. The two markets are in effect segmented.

**Figure 3: AGC London minus Accra price**

While it is admissible that the differential nominal interest rate argument may not be fully persuasive and may be superseded by arbitrage between Accra and London, market efficiency issues make it still quite important in explaining the price difference on the two markets.

Differential taxation on dividends and capital gains is a third source of disparity between prices on the London and the Accra prices of AGC. Whereas dividends and capital gains are taxed at 10% and 0% in Ghana, they are taxed at 25% in the UK. Since dividend income and capital gains are important components of the value and returns of common stocks, different taxation on dividend and capital gains in the two countries could be a source of deviation from the law of one price.

# Transaction costs

Interviews with brokers showed that the main transaction costs[6] in the international trading of AGC shares include brokerage commissions (local and foreign), GSE levy, funds transfer to UK or to Ghana (commission and cable transfer cost), and phone calls and faxes to UK. Based on a minimum trading volume of 100 shares, our analysis shows that the transaction cost in the trading in AGC shares between the Ghana and the UK market is ¢2,650 per share.

Figure 3 plots the difference in AGC share prices on the London and Accra markets over the period May 1994 to December 1995.

The range is from negative ¢1,000 to about positive ¢7,000. Figure 3 also shows that London prices look more attractive than those in Accra. The transaction cost analysis means that any price differential of ¢2,650 or more between London and Accra can create a profitable arbitrage trading. Table 15 appears to confirm the favourable price trends on the London market, as the direction of AGC share transfer is only from the Accra register to the London register. The question at this point is whether the high demand from the London end is purely based on the price differential or shortage of AGC shares on the London market or some other expectations. It is possible that because of lack of activity on the Ghana market, the high demand for the AGC shares on the London market is being met from the supply from the Ghana market.

**Table 15: Monthly transfer of AGC shares between the Accra and London registers by shareholders**

| Period | Accra to London | | London to Accra | |
|---|---|---|---|---|
| | No of applicants | No of shares transferred | No of applicants | No of shares transferred |
| May 1994 | - | - | - | - |
| June 1994 | 6 | 33,410 | - | - |
| July 1994 | 5 | 33,517 | - | - |
| August 1994 | 5 | 350,004 | - | - |
| Sept. 1994 | 5 | 40,514 | - | - |
| October 1994 | 15 | 302,903 | - | - |
| November 1994 | 7 | 754,510 | - | - |
| December 1994 | 4 | 60,000 | - | - |
| January 1995 | 5 | 19,135 | - | - |
| February 1995 | 254 | 15,060 | - | - |
| March 1995 | 7 | 40,000 | - | - |
| April 1995 | 2 | 10,000 | - | - |
| May 1995 | 11 | 11,365 | - | - |
| June 1995 | 4 | 8,127 | - | - |
| July 1995 | 6 | 13,500 | - | - |
| August 1995 | 6 | 14,153 | - | - |

Source: Barclays Bank Accra (Registrar of AGC).

# Market efficiency

## *Serial correlation test for efficiency of the GSE before the listing of AGC*

The results of the serial correlation test for k=1 to 10 for both daily and weekly market returns before the listing of AGC are shown in Table 16. The results indicate that the first-order serial correlations[7] are highly significant. This means that there was serial dependence among the daily changes in returns on the Ghana Stock Exchange before the listing of AGC. We conclude that the random walk hypothesis does not hold for the GSE.

**Table 16: Efficiency test of Ghana Stock Exchange: Serial correlation coefficients**

| Lag | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Daily market returns figures before listing of AGC | | | | | | | | | | |
| | 1.1168[a] | .007128 | -.0428 | -.0867 | .1944 | -.3088[b] | .1236 | .0515 | -.1160 | .0790 |
| | (11.8467) | (.0505) | (-.3026) | (-.6128) | (1.3836) | (-2.1778) | (.8197) | (.3272) | (-.7373) | (.7707) |
| | R-bar sq.=.9974, | | DW=1.9951 | | | | | | | |
| Daily market returns figures after listing of AGC | | | | | | | | | | |
| | 1.1280[a] | -.0802 | .0683 | -.2761[a] | .2102[b] | -.0461 | .0193 | -.1077 | .1880[c] | -.1115[c] |
| | (16.9986) | (-.8051) | (.6866) | (-2.7714) | (2.0767) | (-.4559) | (.1945) | (-1.0833) | (1.9083) | (-1.7114) |
| | R-bar sq.= .9883, | | DW= 1.9902 | | | | | | | |
| Weekly market returns figures before listing of AGC | | | | | | | | | | |
| | 1.5295[a] | -.5338[b] | -.0348 | -.0269 | .0350 | .1428 | -.3727 | .3596 | -.1696 | .1246 |
| | (10.8295) | (-2.0452) | (-.1293) | (-.1005) | (.1376) | (.5689) | (-1.4845) | (1.4690) | (-.7286) | (.9602) |
| | R-bar-squared = .9963,DW-statistic = 2.1504 | | | | | | | | | |
| Weekly market returns figures after listing of AGC | | | | | | | | | | |
| | 1.1261[a] | -.1890 | .0469 | .0089866 | -.0634 | .0876 | -.0002314 | -.2534 | .2551 | -.0523 |
| | (8.8146) | (-.9961) | (.2491) | (.0478) | (-.3398) | (.4730) | (-.001255) | (-1.3654) | (1.3154) | (-.4058) |
| | R-bar-sq. = .9516, DW-statistic = 2.0090 | | | | | | | | | |

1. Data for first serial correlation are computed GSE cumulative daily market returns. Data used for test before AGC listing are from 1 January 1993 to 13 May 1994. There are 135 observations for the first lag, 134 for the second lag and so on.
2. Data for second serial correlation, i.e., after AGC's listing are from 17 May 1994 to 31 December 1995. There are 245 observations for the first lag, 244 for the second lag and so on.
3. Data for the third and fourth serial correlations are computed weekly market returns figures. Data for test before AGC are from January 1993 to 13 May 1994. There were 67 observations for the first lag, 66 for the second lag and so on. Data for the test after AGC are from 17 May 1994 to December 1995. There were 82 observations for the first lag, 81 for the second and so on.
4. a,b,c denote statistically significant at the 1, 5 and 10% level, respectively.

That is to say that the GSE was not efficient in pricing shares before the listing of AGC.

## *Serial correlation test after the listing of AGC*

The results of the serial correlation test after the listing of AGC k=1 to 10 is also shown in Table 16. The daily market returns show that the first order serial correlation is significantly different from zero. The fourth and fifth coefficients are also significant, and for the weekly market returns, again the first order serial correlation is highly significant. The random walk model does not hold. We conclude that the GSE is not efficient even after the listing of AGC. Investors may be trading on impulse rather than on analysed market information.

In trying to explain why the GSE is not efficient, the following questions may be posed: Do traders devote enough time and resources to gather investment information? To what extent can local investors analyse investment information? Do companies divulge enough information for investors compared with those of the industrialized nations?

At this early stage of development of the Ghana stock market, participants are very few and trading volumes are very thin. Many brokerage houses are barely breaking even. One can easily speculate that not much time and resources will be devoted on information gathering and analysis by either brokers or investors. The cost of any elaborate information gathering and processing could be prohibitive.

Another reason the GSE is inefficient could be the poor ability of investors to analyse and interpret investment information. In Ghana the proportion of investors who can actually analyse and make quality investment decisions are few (see questionnaire analysis under market structure). If a market has participants who cannot make quality investment decisions, an inefficient market should be expected.

Although companies are bound by law to divulge all necessary information, the question is are they giving out enough information for investment analysis? Are investors capable of assessing the information they do get? Thus, even if we assume that the listed companies do give information to investors, the question of analysis comes up again. From the foregoing it is not surprising that the GSE is inefficient.

# VIII. The impact of the listing of AGC on the GSE

Objective three of the study, pertaining to the impact of AGC on the GSE, is important because of the high market concentration of the GSE due to listing of AGC (capitalization of AGC alone is about 90% of the capitalization of the GSE; see Table 17). Because of the size of AGC and also because of the dual listing of AGC on both the GSE and the LSE, it is expected that AGC will influence such fundamental market attributes as liquidity, efficiency, trading costs and volatility of the GSE — hence the need for this objective. The analysis of impact is based on the traditional indicators (see Demirguc-Kunt and Levine, 1995).

**Table 17: Distribution of capitalization of listed firms on GSE**

| Company | Market capitalization (billions of Cedis) | (% of total MC) |
|---|---|---|
| Accra Brewery Ltd | 9.24 | 0.51 |
| AGC | 1594.10 | 88.42 |
| CFAO | 2.18 | 0.12 |
| EIC | 3.23 | 0.18 |
| Fan Milk Ltd | 6.78 | 0.38 |
| GGL | 13.63 | 0.76 |
| KBL | 3.60 | 0.2 |
| MGL | 0.81 | 0.04 |
| MLC | 1.26 | 0.07 |
| MOGL | 17.42 | 0.97 |
| PTC | 4.80 | 0.27 |
| PZ | 1.12 | 0.06 |
| SCB | 85.26 | 4.73 |
| SCOA | 1.41 | 0.08 |
| SPPC | 1.85 | 0.10 |
| UNIL | 51.75 | 2.87 |
| UTC-E | 4.39 | 0.24 |
| Total | 1802.82 | 100.00 |

Source: Ghana Stock Exchange, August 1994.

The traditional indicators of impact are:

- market capitalization
- value traded
- turnover ratio

- market capitalization/GDP
- value traded/GDP

Other considerations include the removal of 5% trading limits; changes in the number of trading days per week; and changes in the information system on the trading floor.

## Market capitalization

Market capitalization, one of the traditional indicators of market development, is used in this study to assess the impact of the listing of AGC on the Ghana Stock Exchange. To do so we define three time periods. First, the period before the flotation of AGC shares, i.e., before mid-March 1994. Second, the period during the flotation of AGC shares, i.e., mid-March to mid-May 1994. Third, the period beyond the listing of AGC shares, i.e., after mid-May 1994. In order to see the influence of AGC in the analysis, the post listing of AGC market capitalization of the GSE does not include the market capitalization of AGC.

Figure 4 shows the market capitalization of the GSE from May 1993, i.e., one year before the listing of AGC, to the end of 1994, i.e., about seven and half months after AGC's listing. It is interesting to note from the graph three distinct periods of market capitalization growth. From May 1993 up to mid-February 1994 there is a gradual growth in market capitalization of the GSE. The period just before the flotation of AGC shares is marked by a sharp increase in market capitalization of the GSE even though no new additional companies were listed on the exchange. The market capitalization grew from about ¢104 billion to ¢240 billion, an increase of about 130% within a period of two months. After the listing of AGC, the market capitalization without AGC's capitalization drops marginally, but stays almost flat from June to December 1994 and beyond. (See also Appendix M.)

The impact of AGC on the GSE is evident from this analysis. The numerous advertisements on the flotation of AGC both within and outside the country had a spillover effect on the GSE. We conclude that the listing of AGC has had tremendous impact on the growth of the market capitalization of the GSE.

## Value traded

Value traded is the sum of the number of shares traded multiplied by their prices. This shows the cash value of activity on the market. Value traded is an important indicator of liquidity or ability to buy or sell quickly without substantially moving prices. Figure 5 shows the daily value traded from May 1993 to the end of 1994. (See also Appendix N.) Again in order to observe the influence of AGC, value traded figures for AGC are excluded. From Figure 5, it is evident that the period after the listing of AGC shows more market activity, i.e., generally there are higher traded values. We conclude that the listing of AGC on the GSE has improved the liquidity of the GSE.

**Figure 4: GSE market capitalization**

**Figure 5: Value traded on GSE**

**Figure 6: Market capitalization/GDP**

**Figure 7: Value traded/GDP**

## Turnover ratio

The turnover ratio is defined as the value of total shares traded divided by market capitalization, that is, the value traded per unit market capitalization. This is also a measure of stock market liquidity since it is the ratio of capital being traded to total market capital. (The turnover ratio graph is not shown, but is similar to Figure 5.) Again, the period after the listing of AGC shows higher turnover ratios, indicating more liquidity on the GSE after AGC's listing.

## Market capitalization/GDP

Market capitalization/GDP ratio is a measure of stock market size in relation to the total economy. The magnitude of this ratio indicates the ability to mobilize capital and consequently diversify risk.

Figure 6 (also see Appendix O) shows the end of year market capitalization/GDP ratios from 1991 to 1994 (the capitalization of AGC is not included in the 1994 figures). From the figure, the slope for 1994 is much steeper than all the previous years. The market size improved markedly with the listing of AGC in May 1994.

## Total value/GDP

Total value/GDP measures the size of the market activity in relation to the total economy. Since this is a ratio of organized trading in equities to national output, it shows the liquidity of the GSE to the total economy. Figure 7 (also see Appendix P) shows the value traded/GDP for the years 1991 to 1994. The values of AGC are excluded for 1994. The graph shows a sharp rise in the ratio for 1994, the year in which AGC was listed, indicating the positive impact of AGC on the development of the GSE. This measure reinforces the market capitalization/GDP measure in the previous section.

## Other considerations for measuring AGC impact on GSE

### *Removal of 5% trading limits*

The GSE regulation that share prices were not to vary by more than 5% during any one trading session was scrapped with effect from 23 May 1994. The rule, which had been introduced in October 1991, stipulated that unless there was justification, prices of shares should not change by more than 5% from previous closing price.

The commencement of the trading in AGC shares on 17 May and the removal of the 5% cap on 23 May were not coincidental. With the trading of AGC, which is listed on both the GSE and the LSE, the GSE assumes international dimensions. The continued maintenance of such a cap would mean that the GSE operated under restrictions and therefore pricing of shares on the GSE are managed. The removal of the 5% cap was a direct consequence of the listing of AGC on the GSE.

## *Changes in the number of trading days*

With effect from the 23 May 1994, the number of trading days on the GSE was increased from two times a week to three times a week. This additional day per week intended to improve the market liquidity. The timing of the increase again coincides with the AGC listing. AGC introduces an international dimension to the GSE and hence increased liquidity is critical.

## *Hooking of GSE to Reuters*

GSE trading results may be accessed on Reuters screens using the codes IZBU, IZBV, IZBW, IZBX and IZBY. The decision to hook the GSE to Reuters was the direct result of the listing of AGC on GSE. With the listing of AGC on both the GSE and the LSE, it is essential that market information especially on AGC is made instantly available around the globe.

## *Other factors*

Although the focus has been on the impact of AGC on the GSE, it is possible that other factors unrelated to the AGC listing may have improved the performance of the GSE in the period under consideration. For example, the exchange's international membership to outside associations such as the Federation Internationale des Bourses Valeurs (FIBV), African Venture Capital Association (AVCA), etc., might have opened the market to more participation in the period.

# IX. Summary of results and conclusions

The study investigated the institutional factors impinging on the development of the GSE. The study also tested the weak-form efficiency and the law of one price. Finally, the study looked at how the listing of Ashanti Goldfields Corporation has influenced the development of the Ghana stock market.

The study established that the legal and regulatory infrastructure needed for the securities market in general and the stock market in particular is in place, with laws and regulations necessary to protect investors and the integrity of the GSE. These include the Stock Exchange Membership Regulation 1991, the Stock Exchange Listing Regulation 1990, and the Securities Industry Law (SIL) 1993. The Securities Regulatory Commission (SRC), which is to serve as a watchdog of the securities industry, has also been formed.

Generally all the brokers interviewed were quite satisfied with the transparency of pricing of shares on the GSE. It appeared, however, that the surveillance department of the GSE may need to be expanded as activity increases in the near future.

The study found that the listed firms on the market complied to the information disclosure guidelines set by regulation. For example, financial reports, the amount of dividends declared, ex-dividend dates, etc., were regularly filed with the GSE. However, the ability of many investors to use the information in investment decisions appeared weak. Hence the inability of the market to price the financial assets efficiently.

On transaction cost, as expected, the higher the capital raised by a firm going public, the lower the proportion of cost of flotation to total capital raised. Private placement was also found to be cheaper than public placement for the same amount of capital raised. Investors suffer interest cost on their unused funds because brokers do not pay any interest on clients' unused funds. This practice is expected to have a negative impact on the development of the GSE.

The delivery and settlement of transactions were performed satisfactorily by brokers. The need for a centralized settlement system is apparent, however. Such a system will not only reduce the settlement time but also reduce the settlement cost.

Entry and exit by foreign investors are fairly easy compared with barriers existing in other emerging markets. Dividend income and the initial capital are easily remittable. The 10% tax on dividend income and interest income and the tax-free capital gains look relatively more attractive than the taxation of many emerging markets.

The market structure shows that while the value of local to foreign investment is about 3:2, the local institutional to individual investment by value is about 1:1. Farmers and artisans play an insignificant investment role on the GSE. Middle aged investors (aged 36-49 years) provide the highest proportion of investment on the GSE.

Most of the investors have a low level of formal education. This translates into the generally poor knowledge about the capital market. There is therefore an urgent need for an intensive educational programme for the population if the stock market is to play the role it is expected to play in the economic development of the nation.

Both individual and institutional investment on the GSE can be termed as small investment. As much as 75% of individual portfolio investment value is below $5,000. Most institutional investment (35%) is below $50,000.

The study established that the law of one price does not hold for the pricing of AGC shares on the LSE and the GSE. The random walk test for weak form efficiency also showed that the GSE is inefficient.

The listing of AGC on the GSE has tremendously improved the liquidity of the market. Measures such capitalization, turnover ratio, capitalization to GDP and value traded to GDP have all shown dramatic improvement as evidence of the improvement in liquidity of the stock market.

In conclusion, the most significant factors impinging on the development of the Ghana stock market as far as the local people are concerned are lack of national awareness, lack of knowledge about stock markets and low incomes of the bulk of the people. This translates into the low number of listed stocks, the low rate of listings, poor patronage in the market and other limitations. The need for a massive educational campaign cannot be over emphasized.

The macroeconomic environment seems very important for foreign investors. If more foreign investors are expected to play an active role on the Ghana stock market, then serious attempts should be made to bring the current inflation of 60% and the rapidly depreciating currency to sanity levels so that their capital base is not eroded.

# X. Policy recommendations

A number of recommendations spring from the findings of the study, ranging from education about and promotion of the exchange to streamlining transactions and encouraging the development of investment trusts and funds. Sound macroeconomic policies are also needed. The recommendations are:

1. ***Mount an intensive education and promotion campaign***: The greatest challenge to the GSE is to improve the level of knowledge of the local investors. A programme of continuous education for the investor, the intermediary, the issuer and the regulator is extremely important for the successful development of the Ghana stock market. This education campaign should involve the development of financial journalists and improvements in the quality of financial market publications.

   Financial education should be strengthened in the secondary schools and particularly in the universities. As markets become more sophisticated, there is increasing need for investment advisors and other personnel who are capable of analysing complex financial concepts such as options and other derivatives.

   Radio and television should be used to reach more people explaining financial investments in securities in both english and local languages.
2. ***Provide fiscal incentives***: The current tax laws favour the use of debt instruments compared with equity. If the number of firms on the stock market is to grow, then there is need to provide incentives for firms who may want to be listed on the Ghana Stock Exchange. One such incentive is differential taxation in favour of listed companies. Such an incentive will help increase the number of listed companies on the exchange and improve liquidity of the market.
3. ***Provide incentives for market research***: Greater access to quality research on information useful for investment analysis can be expensive. The introduction of research cost reimbursement packages to brokerage and other intermediaries providing such services will improve the availability of investment information, which will in turn make the market more efficient.
4. ***Establish a centralized settlement system***: The establishment of a centralized clearing and settlement system sooner than later will substantially improve the present settlement system and cut costs at the same time.
5. ***Pay interest on clients' unused funds by brokers***: The practice whereby brokers do not pay interest on investors' unused funds is not only unfair but unethical for money accepting financial institutions. Since most of the brokerage firms are either merchant banks or non-bank financial institutions that actually invest such funds in short-term financial instruments, there is no reason why the owners of such funds should not

benefit from the accrued interest of their own funds. If this practice is allowed to continue, the development of the GSE may be compromised.

6. ***Follow prudent macroeconomic policies***: There is need for the Ghana government to follow prudent macroeconomic policies. The high interest and inflation rates, budget deficits, etc., that have become persistent not only create financial instability, but also feed uncertainty, which affects stock market development.
7. ***Integrate the GSE with the international financial system***: Because of the current trend of globalization of economies, the management of the GSE must aim at integrating the GSE into the international capital markets. If we are to succeed in this direction, the regulatory authorities must enforce the various regulations on securities. If this is done, both local and foreign investors will feel very protected and freely commit more of their financial resources to the GSE.

   The brief suspension of and the imposition of fines against three brokerage houses of the GSE for irregularities in late November 1995 is a sign that the regulatory authorities are enforcing the rules of the game. This is expected to raise investor confidence and integrate the market internationally.
8. ***Regularly review primary and secondary market regulations***: Primary market regulatory activities on new issues including disclosure, accounting and listing standards must be reviewed periodically to conform to changing international standards. Secondary market activities, such as surveillance and supervision of dealers to maintain high standards, must be monitored to boost investor confidence.
9. ***Encourage the development of investment trusts and funds***: The fact that most of the investors on the GSE are small investors and also unsophisticated points to the need to encourage brokerage managers to develop funds and unit trusts, including pension funds and index funds.
10. ***Nurture a progressive and sound banking system***: The banking sector is vital to the development of the capital markets. A progressive and sound banking system is required to quicken the development of the financial market.
11. ***Improve the communication infrastructure***: There is need for the government to improve the physical infrastructure, particularly the telecommunication infrastructure, which is the pivot around which business on the financial market revolves.
12. ***Encourage additional cross-listing***: There is a positive spillover effect of the international cross-listing of AGC to the GSE. Other well managed and qualified firms must therefore be encouraged through incentive packages to move to international cross-listing.

# Notes

1. Databank Ltd was alleged to have contravened the GSE regulation that any one external resident portfolio investor cannot hold more than 10% of any listed security. Further to this, the total holding of all external residents in one listed company should not exceed 74%. This regulation was alleged to have been breached when the government sold its shares in seven listed companies – Unilever, EIC, GGL, KBL, PTC, SCB and ABL – in 1994.
   EBG Stockbrokers, Ltd., on the other hand, was alleged to have broken the clearing and settlement rules. GSE investigations showed that transactions between EBG and Databank took more than the stipulated 14 calendar days.
2. March 14, April 16, May 17 and June 24 1994 correspond with trading sessions 333, 341, 350 and 365, respectively.
3. Information made available by Barclays Bank Ghana Ltd, registrar of Ashanti Goldfields Corporation.
4. Market return $R_{mt} = \sum w_{it} r_{it}$ (portfolio return) where, $w_{it}$ = weight of stock *i* on the stock market on day *t* measured as capitalization of stock on day *t* divided by total market capitalization on the same day.
   $r_{it}$ = return of stock i on day t, measured as
   $d_{it+1}/p_{it} + (p_{it+1} - p_{it})/p_{it}$
   where, $d_{it+1}$ = dividend on day $t$+1, of stock *i*,
   $p_{t+1}$ and $p_t$ are price of stock i on days $t$+1, and $t$
   NB. Since we are considering daily and weekly figures
   $d_{it+1}/p_{it}$ = zero
5. The computer software used for the statistical analysis is Microfit.
6. Calculation of transaction cost based on current stock price of ¢31,000 and minimum of 100 shares per trading:

| | | |
|---|---|---|
| Brokerage commission - local and foreign | = | ¢54,250+54,250 |
| (it is assumed the two are the same) | = | ¢108,500 |
| GSE Levy (0.05% of stock value) | = | ¢1,550 |
| Funds transfer ($60 +0.75% of value) | = | ¢119,250 |
| Fax (P & T rate) | = | ¢12,600 |
| Phone (5 minutes to UK) | = | ¢23,000 |
| Total | = | ¢264,900 |
| Transaction cost per share | = | 2,650 |

7. The high values of the first order serial correlation are typical of thinly traded markets. Time-varying risk premium is another source of serial correlation in stock returns.

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# Appendix A: Evidence of regulation enforcement on the GSE by the Security Regulatory Commissioner

(Letter issued by the commissioner and printed in the local papers in early December 1995)

**BANK OF GHANA**

NOTICE TO BANKS AND THE PUBLIC
NOTICE NO. BG/GOV/SEC/95/29

REMEDIAL MEASURES AT THE
GHANA STOCK EXCHANGE

Following some recent occurrences at the Ghana Stock Exchange, the Governor in his capacity as the Securities Regulatory Commissioner has, in accordance with Section 30 (1) of the Securities Industries Law 1993, directed the Council of the Ghana Stock Exchange to take some remedial measures as follows:

1. that the membership of the EBG Stockbrokers Limited of the Council of the Ghana Stock Exchange should be terminated:

   EBG Stockbrokers have been fined for some irregularities and this is inconsistent with their continued membership of the Council.

2. that the membership of the SDC Brokerage Limited of the Council of the Ghana Stock Exchange should be terminated:- The irregularities at the SDC and the continuing investigations make it inappropriate for the Company to continue to be a member of the Council.

3. that Mr. Afare Donkor's membership of the Council should be terminated:-

   This is in view of his connection with SDC affairs.

4. that Databank Brokerage Limited should be suspended from the Exchange.

Out of four cases of irregularities reported to the Securities Regulatory commissioner, three involve the Databank Brokerage Limited, two of which attracted fines imposed by the Exchange.

These measures are intended to enhance public confidence in the Ghana Stock Exchange.

A. Bernasko
The Secretary

8th December 1995

# Appendix B: Cost of going public by 3 firms listed on the GSE

**Super Paper Products Company, Ltd.***

**Total capital raised: ¢630,000,000**

| Type of expense incurred | Amount | Expense as % of capital raised |
|---|---|---|
| Application and listing fee | 5,180,000 | 0.8222 |
| Valuation fee | 1,200,000 | 0.1905 |
| Advertising | 25,000,000 | 3.9683 |
| Printing of prospectus | 15,000,000 | 2.3810 |
| Registrar's fee Miscellaneous | 5,000,000 | 0.7937 |
| Total cost incurred | 56,380,0008.9492 | |

**Mechanical Lloyd Company Limited****

**Total capital raised: ¢486,000,000**

| Type of expense incurred | Amount | Expense as % of capital raised |
|---|---|---|
| Application for listing on the GSE | 1,300,000 | 0.2675 |
| Listing on the GSE | 2,700,000 | 0.5556 |
| Cost of printing prospectus | 6,917,000 | 1.4233 |
| Publicity and advertising | 20,292,000 | 4.1753 |
| Registrar's fees | 1,000,000 | 0.2058 |
| Commission and brokerage charges | 18,221,731.50 | 3.7493 |
| Public flotation expenses | 6,000,000 | 1.2346 |
| Petty cash | 29,000 | 0.006 |
| Total cost incurred | 56,459,731.50 | 11.6172 |

**Home Finance Company *****

**Flotation capital raised: ¢1,312,450,000**

| Type of expense incurred | Amount | Expense as % of capital raised |
|---|---|---|
| Listing and annual fees to GSE | 5,240,000 | 0.3993 |
| Valuation and accounting fee | 13,124,500 | 1 |
| Advertisements | 5,418,550 | 0.4129 |
| Printing of prospectus | 3,140,250 | 0.2393 |
| Registrar's fees | 3,847,150 | 0.2931 |
| Total cost incurred | 30,770,450 | 2.3445 |

* Flotation was in second quarter of 1992 by public placement.
** Flotation was in second quarter of 1994 by public placement.
*** Flotation was in first quarter of 1995 by private placement.

# Appendix C: Ghana Stock Exchange brokerage commissions

Ordinary and preference shares

| Value Traded (¢) | Commission | Cumulative commission |
|---|---|---|
| First 10,000 | ¢800 flat | |
| 10,001-30,000 | ¢900 flat | |
| 30,001-50000 | ¢1,500 flat | |
| 50,001-0.5m | 2.5% | ¢12,750 max |
| 500,001-1m | 2.0% | ¢22,750 max |
| 1,000,001-5m | 1.75% | ¢92,750 max |
| 5,000,001-10m | 1.5% | ¢167,750 max |
| Over 10m | 1% | |

Government and corporate bonds

| Value Traded (¢) | Commission | Cumulative commission |
|---|---|---|
| First 10,000 | ¢800 flat | |
| 10,001-30,000 | ¢900 flat | |
| 30,001-50000 | ¢1,500 flat | |
| 50,001-0.5m | 2.5% | ¢12,750 max |
| 500,001-1m | 2.0% | ¢22,750 max |
| 1,000,001-5m | 1.75% | ¢92,750 max |
| 5,000,001-10m | 1.5% | ¢167,750 max |
| Over 10m | 0.25% | |

Source: Ghana Stock Exchange.

# Appendix D: Ghana Stock Exchange fees

**Application fees**

| Market capitalization ¢ | Founder members ¢ m | Other members ¢ m | Non members ¢ m |
|---|---|---|---|
| 30m or less | .05 | .2 | .35 |
| 31-100m | .15 | .45 | .75 |
| 101-500m | .25 | .60 | 1.00 |
| .51-1b | .40 | .75 | 1.15 |
| 1.1-2b | .45 | .90 | 1.35 |
| 2.1-2.5b | .55 | 1.05 | 1.60 |
| 2.51-5b | .60 | 1.20 | 1.80 |
| 5.1-10b | .90 | 1.80 | 2.70 |
| 10.1-20b | 1.20 | 2.10 | 3.00 |
| 20.1-50b | 1.69 | 2.70 | 3.71 |
| 50.1-100b | 2.03 | 3.04 | 4.05 |
| 100.1-200b | 2.36 | 3.38 | 4.39 |
| 200.1-500b | 2.70 | 3.70 | 4.70 |
| 500.1-1000b | 3.00 | 4.50 | 6.50 |
| 1000.1-1500b | 4.00 | 6.00 | 8.50 |
| 1500.1-2000b | 5.00 | 7.00 | 10.75 |
| Over 2000b | 7.00 | 10.00 | 13.00 |

Listing fees (original and additional)

| Market capitalization | Founder members | Other members | Non members |
|---|---|---|---|
| 30m or less | .10 | .50 | .90 |
| 31-100m | .30 | 1.15 | 1.85 |
| 101-500m | .55 | 1.50 | 2.45 |
| .51-1b | .75 | 2.25 | 3.75 |
| 1.1-2b | 1.50 | 3.00 | 4.50 |
| 2.1-2.5b | 1.80 | 3.60 | 5.40 |
| 2.51-5b | 1.90 | 3.80 | 5.65 |
| 5.1-10b | 2.64 | 4.82 | 7.20 |
| 10.1-20b | 3.24 | 6.00 | 8.40 |
| 20.1-50b | 4.46 | 8.10 | 10.80 |
| 50.1-100b | 5.27 | 9.45 | 12.15 |
| 100.1-200b | 6.08 | 10.80 | 13.50 |
| 200.1-500b | 7.00 | 12.50 | 15.00 |

*cont. next page*

*Appendix D cont.*

| Market capitalization | Founder members | Other members | Non members |
|---|---|---|---|
| 500.1-1000b | 8.00 | 14.00 | 25.00 |
| 1000.1-1500b | 13.00 | 20.00 | 36.00 |
| 1500.1-2000b | 20.00 | 28.00 | 47.00 |
| Over 2000b | 25.00 | 36.00 | 60.00 |

**Annual fees**

| Market capitalization | Founder members | Other members | Non members |
|---|---|---|---|
| 30m or less | 0.05 | 0.20 | 0.35 |
| 31-100m | 0.15 | 0.45 | 0.75 |
| 101-500m | 0.25 | 0.60 | 1.00 |
| .51-1b | 0.40 | 0.75 | 1.15 |
| 1.1-2b | 0.45 | 0.90 | 1.35 |
| 2.1-2.5b | 0.55 | 1.05 | 1.60 |
| 2.51-5b | 0.72 | 1.44 | 2.16 |
| 5.1-10b | 0.98 | 1.95 | 2.93 |
| 10.1-20b | 1.30 | 2.26 | 3.38 |
| 20.1-50b | 1.95 | 2.99 | 3.90 |
| 50.1-100b | 2.27 | 3.38 | 4.55 |
| 100.1-200b | 2.60 | 3.90 | 5.20 |
| 200.1-500b | 3.50 | 4.50 | 6.00 |
| 500.1-1000b | 5.00 | 9.00 | 12.00 |
| 1000.1-1500b | 8.00 | 15.00 | 18.00 |
| 1500.1-2000b | 12.00 | 20.00 | 22.00 |
| Over 2000b | 16.00 | 25.00 | 30.00 |

Source: Ghana Stock Exchange.

# Appendix E: Investment regulations summary for entering and exiting Emerging Markets (as of end 1994)

| Entry | Exit | |
|---|---|---|
| Availability of stocks to foreign investors | Repatriation of Income | Repatriation of Capital |
| *Free entry* | | |
| Argentina | Free | Free |
| Bangladesh | Free | Free |
| Botswana | Free | Free |
| Brazil | Free | Free |
| Czech Republic | Free | Free |
| Costa Rica | Free | Free |
| Ghana | Free | Free |
| Greece | Free | Free |
| Hungary | Free | Free |
| Malaysia | Free | Free |
| Mexico | Free | Free |
| Pakistan | Free | Free |
| Peru | Free | Free |
| Poland | Free | Free |
| Portugal | Free | Free |
| South Africa | Free | Free |
| Turkey | Free | Free |
| *Relatively free entry* | | |
| Chile | Free | After 1 year |
| Indonesia | Some restrictions | Some restrictions |
| Jamaica | Free | Free |
| Kenya | Free | Free |
| Korea | Free | Free |
| Sri Lanka | Some restrictions | Some restrictions |
| Thailand | Free | Free |
| Trinidad and Tobago | Free | Free |
| Venezuela | Some restrictions | Some restrictions |
| Zimbabwe | Free | Free |
| *Special classes of shares* | | |
| China | Free | Free |
| Philippines | Free | Free |
| *Authorized investors only* | | |
| Colombia | Free | Free |
| India | Free | Free |

*cont. next page*

*Appendix E cont.*

| Availability of stocks to foreign investors | Repatriation of Income | Repatriation of Capital |
|---|---|---|
| Jordan | Free | Free |
| Mauritius | Free | Free |
| Taiwan | Some restrictions | Some restrictions |
| *Closed* | | |
| Nigeria | Some restrictions | Some restrictions |

Key to entry:
1. Free entry: No significant restrictions to purchasing stocks.
2. Relatively free entry: Some registration procedures required to ensure repatriation rights.
3. Special classes: Foreigners restricted to certain classes of stocks, designated for foreign investors.
4. Authorized investors only: Only approved foreign investors may buy stock.
5. Closed: Closed, or access severely restricted (e.g., for non-resident nationals only).

Key to exit:
1. Repatriation of income: Dividends, interest, and realized capital gains.
2. Repatriation of capital: Initial capital invested.
3. Free: Repatriation done routinely.
4. Some restrictions: Typically requires some registration with or permission of Central bank, Ministry of Finance, or an Office of Exchange Controls that may restrict the timing of exchange release.

Source: IFC 1995 Factbook, Emerging Markets Data Base, p. 265.

# Appendix F: Withholding Taxes for Emerging Markets

| Market | Interest (%) | Dividends (%) | Long-term capital gains on listed shares (%) |
|---|---|---|---|
| *Latin America/ Caribbean* | | | |
| Argentina | 0 | 0 | 0 |
| Barbados | 15 | 15 | 0 |
| Brazil | 10 | 15 | 0 |
| Chile | 10 | 10 | 10 |
| Columbia | 0 | 0 | 0 |
| Costa Rica | 8 | 5 | 0 |
| Jamaica | 15 | 15 | 0 |
| Mexico | 15 | 0 | 0 |
| Panama | 0 | 10 | 0 |
| Peru | 0 | 0 | 0 |
| Trinidad & Tobago | 25 | 25 | 20 |
| Venezuela | 0 | 0 | 1 |
| *Asia* | | | |
| China | 0 | 20 | 0 |
| India | 20 | 20 | 0 |
| Indonesia | 15 | 15 | 0 |
| Korea | 12.9 | 16.125 | 0 |
| Malaysia | 20 | 0 | 0 |
| Pakistan | 10.5 | 10 | 0 |
| Philippines | 20 | 25 | 0 |
| Sri Lanka | 0 | 15 | 0 |
| Taiwan | 20 | 20 | 0 |
| Thailand | 15 | 10 | 0 |
| *Europe/Mid East* | | | |
| Cyprus | 0 | 30 | 0 |
| Czech Republic | 0 | 0 | 0 |
| Greece | 15 | 0 | 0 |
| Hungary | 0 | 10 | 20 |
| Jordan | 0 | 0 | 0 |
| Poland | 0 | 15 | 0 |
| Portugal | 0 | 12.5 | 0 |
| Turkey | 0 | 0 | 0 |
| *Africa* | | | |
| Botswana | 15 | 15 | 0 |
| Cote d’Ivoire | 5 | 12 | 20 |
| Ghana | 10 | 10 | 0 |

*cont. next page*

*Appendix F cont.*

| Market | Interest (%) | Dividends (%) | Long-term capital gains on listed shares (%) |
|---|---|---|---|
| Kenya | 10 | 10 | 0 |
| Mauritius | 0 | 0 | 0 |
| Morocco | 20 | 15 | 0 |
| Namibia | 0 | 10 | 0 |
| Nigeria | 10 | 10 | 20 |
| South Africa | 0 | 15 | 0 |
| Swaziland | 10 | 15 | 0 |
| Tunisia | 15 | 0 | 0 |
| Zimbabwe | 15 | 15 | 10 |

Source: IFC 1995 Factbook, Emerging Markets Data Base.

# Appendix G: Questionnaire sent to brokers on the Ghana Stock Exchange

MARKET STRUCTURE

1. How do you categorize your clients in terms of value of investments? (Give percentages)
   a. %    local investors
   b. %    foreign investors

Local investors

2. What type of local investors do you have as your clients? (Give percentages in terms value of investments)
   a. %    individuals
   b. %    institutions

Individual investors

3. What kind of work do your clients do? (Give percentages)
   a. %    farmers,
   b. %    artisans, e.g., carpenters, masons, electricians etc.
   c. %    small business owners, storekeepers, retailers, etc.
   d. %    office clerks, etc.
   e. %    middle managers
   f. %    chief executives, managing directors, etc.
   g. %    pensioners
4. What is the age profile of the local individual investors? Give rough percentages
   a. %    above 50 years
   b. %    middle aged 35-49 years
   c. %    young adults 25-35 years
   d. %    young people 18-24 years
5. What income group do your clients belong? (Give percentages)
   a. %    low income (below 1.5 million cedis/annum)
   b. %    middle income (between 1.5m-3m cedis/annum)
   c. %    upper middle income (between 3m-5m cedis/annum)
   d. %    high income group (above 5 million cedis/annum)
6. What is the educational background of your clients?
   a. %    no formal schooling
   b. %    secondary school leavers
   c. %    sixth form or technical education
   d. %    university education or equivalent
7. Do your clients have a good working knowledge of the capital market? e.g., the various instruments, the ability to read and interpret company statements, financial statements, etc. (give percentages)
   a. %    no knowledge
   b. %    fairly good knowledge
   c. %    highly knowledgeable
8. What is the value of individual portfolio investment? (Give percentages
   a. %    below 1 million cedis investment
   b. %    between 1-2 million cedis investment

c. % between 2-3 million cedis investment
d. % between 3-4 million cedis investment
e. % over 5 million cedis investment

9. What is the number of investments in an individual portfolio of investments? (Give percentages)
   a. % portfolio made up of one company
   b. % portfolio made up of 2-3 companies
   c. % portfolio made up of 4-5 companies
   d. % portfolio made up of 6-7 companies
   e. % portfolio of over 7 companies

Local institutional investors

10. How many local institutional investors are your clients?
11. Do these institutions actively buy and sell shares on the Ghana Stock Exchange?
    a. yes b. no
12. What is the value of the institutional portfolio investment?
    a. % below 5 million cedis
    b. % between 6-10 million cedis
    c. % between 11-20 million cedis
    d. % between 21-50 million cedis
    e. % above 50 million cedis
13. What is the number composition of investments in an institutional portfolio investment? (Give percentages)
    a. % portfolio made up of one company
    b. % portfolio made up of 2-3 companies
    c. % portfolio made up of 4-5 companies
    d. % portfolio made up of 6-7 companies
    e. % portfolio of over 7 companies

Foreign Investors

14. Do you have any foreign investors as your clients?
    a. Yes b. No
    If yes
    Which countries have they come from? ( list 5 countries with the highest number of investors first)
15. Which listed companies are more patronized by the foreign investors? (list 5 with the most patronized first)
16. How do your foreign clients get market information?
    a. b. c.

BUYING AND SELLING BY A STOCKBROKER

17. What is the average waiting period between order to buy/sell put by a client and purchase/sell by stockbroker?
    Give number of days .............
18. What is the system of payment by client?
    a. money deposited with broker into security account before purchase of shares
    b. payment made after purchase of shares
    If answer to 17 is (a) does money deposited yield any interest during the waiting period?
    a. Yes (indicate percent interest given)
    b. No
19. How many days does it take a broker to send a purchase or sale report to a client?
    .........days.
20. How many days does it take a client to receive the report of purchase?
    .........days.

SECURITY TRADING

21. How do you describe trading on the Ghana Stock Exchange?
    a. very transparent (every transaction is made known to the public)
    b. some trading is conducted privately outside the GSE (e.g. over the counter market).
22. How do you determine prices in 21(b)? Describe process
23. Which body oversees that quantity and price declared by a broker is correct?
24. How long does it take to deliver and settle purchases of shares between two brokerage firms?
25. How long does a buyer of securities wait before his name goes into the registrar's books?
26. Some investors never receive their certificates. Why?

DIVIDENDS

27. Do all your clients receive their dividends?
    a. Yes b. No
    If no why
    If yes how do you know?
28. Some investors have sold their securities but receive dividend. Why?

INVESTMENT BANKING/MANAGEMENT

29. Which companies have gone public with your firm as the leading brokerage firm? List
30. What was the percentage cost to total issued value of the cost items listed below? Please note the list below may not necessarily exhaust the cost items.
    a. Listing fee payable to GSE
    b. Application fee
    c. registration fee
    d. valuation fee
    e. advertising
    f. printing
    g. brokerage fees
    h. solicitors( to the issue, trustee, company)
    i. reporting accountant
    j. registrar's fee
    k. etc.
31. Indicate period between date of offer to public and date of first trading on the GSE.
32. Does your brokerage firm provide investment or funds management service?
    a. yes
    b. no

MARKET ANALYSIS

33. Do you provide any kind market analysis for your clients
    a. Yes
    b. No
34. How do your clients receive market information?
35. What do you see as the main impediments to the development of the GSE?

ASHANTI GOLDFIELDS CORPORATION (AGC)

36. Do your clients buy and sell between the London Stock Exchange and the Ghana Stock Exchange?
37. What are the main transaction costs for such transactions?
    a. b. c.
38. Why would local holders of AGC shares want to sell on the London Stock Market and not on the local market?

# Appendix H: Participants in courses run by the GSE

| | Year | | | | |
|---|---|---|---|---|---|
| Type of course | 1991 | 1992 | 1993 | 1994 | Total |
| Basic Securities | 154 | 152 | 120 | 228 | 654 |
| Advanced Securities | 164 | 103 | 105 | 203 | 575 |
| Securities Selling and Investment Advice | 55 | 25 | 43 | 103 | 226 |
| Securities Trading | 4 | 23 | 31 | - | 58 |
| Directors | - | 35 | - | - | 35 |
| Total | 377 | 338 | 299 | 534 | 1548 |

Source: Ghana Stock Exchange.

# Appendix I: Analysis of AGC prices in London and Accra

| Trading dates of the Ghana Stock Exchange | AGC price on the London Stock Exch. (Quoted in £) | Exchange rate (bureau rate cedis/£) | AGC price in London converted into cedis | AGC price in Accra (cedis) Quoted on the GSE |
|---|---|---|---|---|
| 23/05/94 | 14.625 | 1371.25 | *20055 | 20700 |
| 25/05/94 | 15 | 1373.75 | 20606 | 20700 |
| 27/05/94 | 15.09375 | 1375 | 20754 | 20700 |
| 30/05/94 | 15.09375 | 1375 | *20754 | 20700 |
| 1/06/94 | 15.03125 | 1372 | 20630 | 20700 |
| 3/06/94 | 15.09375 | 1375.5 | 20761 | 20700 |
| 8/06/94 | 14.96875 | 1377.5 | *20619 | 20700 |
| 10/06/94 | 14.90625 | 1380 | 20571 | 20700 |
| 13/06/94 | 14.625 | 1380.5 | *20190 | 20700 |
| 15/06/94 | 14.40625 | 1386.75 | 19978 | 20700 |
| 17/06/94 | 14.46875 | 1387.5 | 20075 | 20000 |
| 20/06/94 | 14.1875 | 1392.5 | *19756 | 20000 |
| 22/06/94 | 14.0625 | 1404.4 | 19749 | 20000 |
| 24/06/94 | 14 | 1408 | 19712 | 20000 |
| 27/06/94 | 13.59375 | 1411 | *19181 | 20000 |
| 29/06/94 | 13.5625 | 1414.6 | 19186 | 20000 |
| 4/07/94 | 12.9375 | 1421 | *18384 | 19200 |
| 6/07/94 | 12.9375 | 1426.6 | 18457 | 19200 |
| 8/07/94 | - | 1434 | - | 19200 |
| 11/07/94 | 12.875 | 1439 | *18527 | 19200 |
| 13/07/94 | - | 1445 | - | 19200 |
| 15/07/94 | - | 1464 | - | 19000 |
| 18/07/94 | 12.6875 | 1485 | *18841 | 19000 |
| 20/07/94 | 12.875 | 1515 | 19506 | 19000 |
| 22/07/94 | 13 | 1532 | 19916 | 19000 |
| 25/07/94 | 12.96875 | 1550 | *20102 | 19000 |
| 27/07/94 | 13.125 | 1547 | 20304 | 19000 |
| 29/07/94 | 13.0625 | 1515 | 19790 | 19000 |
| 1/08/94 | 13 | 1444 | *18772 | 19000 |
| 3/08/94 | - | 1442 | - | 19000 |
| 5/08/94 | 12.96875 | 1452 | 18831 | 19000 |
| 8/08/94 | 12.96875 | 1453 | *18844 | 19000 |
| 10/08/94 | 13.0625 | 1468 | 19176 | 18980 |
| 12/08/94 | 13 | 1476 | 19188 | 18980 |
| 15/08/94 | 12.9375 | 1480 | *19148 | 18980 |

| Trading dates of the Ghana Stock Exchange | AGC price on the London Stock Exch. (Quoted in £) | Exchange rate (bureau rate cedis/£) | AGC price in London converted into cedis | AGC price in Accra (cedis) Quoted on the GSE |
|---|---|---|---|---|
| 17/08/94 | - | 1482 | - | 19000 |
| 19/08/94 | 12.75 | 1482 | 18896 | 19000 |
| 22/08/94 | 12.75 | 1491 | *19010 | 19000 |
| 24/08/94 | 12.65625 | 1490 | 18858 | 19000 |
| 26/08/94 | 12.65625 | 1485 | 18795 | 19000 |
| 29/08/94 | - | 1486 | - | 19000 |
| 31/08/94 | 12.6875 | 1490.6 | *18912 | 19000 |
| 2/09/94 | 12.5625 | 1492 | 18743 | 18600 |
| 5/09/94 | 12.4375 | 1497 | *18619 | 18600 |
| 7/09/94 | 12.5625 | 1500 | 18844 | 18400 |
| 10/09/94 | 12.5625 | 1513.4 | 19012 | 18400 |
| 12/09/94 | 12.46875 | 1516 | *18903 | 18000 |
| 14/09/94 | 12.53125 | 1528.4 | 19153 | 18000 |
| 16/09/94 | 12.40625 | 1533 | 19019 | 18000 |
| 19/09/94 | 11.96875 | 1532 | *18336 | 18000 |
| 21/09/94 | 12.21875 | 1536 | 18768 | 18000 |
| 23/09/94 | 12.5 | 1540 | 19250 | 18000 |
| 26/09/94 | 12.5 | 1546 | *19325 | 18400 |
| 28/09/94 | 12.75 | 1546 | 19712 | 19000 |
| 30/09/94 | 12.75 | 1549.6 | 19757 | 19300 |
| 3/10/94 | 12.78125 | 1547 | *19773 | 19500 |
| 5/10/94 | 12.71875 | 1552 | 19740 | 19500 |
| 7/10/94 | 13.09375 | 1557 | 20387 | 19700 |
| 10/10/94 | 13.6875 | 1556 | *21298 | 19700 |
| 12/10/94 | 13.46875 | 1561 | 21025 | 19700 |
| 14/10/94 | 13.65625 | 1567.4 | 21405 | 19950 |
| 17/10/94 | 13.53125 | 1568.4 | *21222 | 19950 |
| 21/10/94 | 13.3125 | 1590.4 | 21172 | 19970 |
| 24/10/94 | 13.25 | 1598 | *21174 | 19990 |
| 26/10/94 | 13.15625 | 1607 | 21142 | 20000 |
| 28/10/94 | 13.09375 | 1623 | 21251 | 20000 |
| 31/10/94 | 12.96875 | 1628 | *21113 | 20001 |
| 2/11/94 | 13.15625 | 1629 | 21432 | 20001 |
| 4/11/94 | 13.84375 | 1634 | 22621 | 20050 |
| 7/11/94 | 13.78125 | 1637.4 | *22565 | 20060 |
| 9/11/94 | 13.71875 | 1642.4 | 22532 | 20100 |
| 11/11/94 | 13.75 | 1645.6 | 22627 | 20205 |
| 14/11/94 | 13.78125 | 1647.4 | *22703 | 20210 |
| 16/11/94 | 13.59375 | 1648.4 | 22408 | 20310 |
| 18/11/94 | 13.65625 | 1657.4 | 22634 | 20420 |
| 21/11/94 | 13.65625 | 1659.6 | *22664 | 20420 |
| 23/11/94 | 13.40625 | 1666 | 22335 | 20420 |
| 25/11/94 | 13.59375 | 1668.4 | 22680 | 20420 |
| 28/11/94 | 13.59375 | 1670.4 | *22707 | 20420 |
| 30/11/94 | 13.5625 | 1659 | 22500 | 20600 |
| 5/12/94 | 13.46875 | 1629 | *21941 | 20600 |
| 7/12/94 | 13.25 | 1628 | 21571 | 20600 |
| 9/12/94 | 13.09375 | 1635 | 21408 | 20600 |

| Trading dates of the Ghana Stock Exchange | AGC price on the London Stock Exch. (Quoted in £) | Exchange rate (bureau rate cedis/£) | AGC price in London converted into cedis | AGC price in Accra (cedis) Quoted on the GSE |
|---|---|---|---|---|
| 12/12/94 | 13.03125 | 1634 | 21293 | - |
| 14/12/94 | 13.1875 | 1642 | *21654 | 20600 |
| 16/12/94 | 13.375 | 1650 | 22069 | 20600 |
| 19/12/94 | 13.4375 | 1650 | *22172 | 20600 |
| 21/12/94 | 13.71875 | 1645 | 22567 | 20600 |
| 23/12/94 | 13.84375 | 1635 | 22635 | 20600 |
| 28/12/94 | 13.90625 | 1640 | *22806 | 20600 |
| 30/12/94 | 13.8125 | 1643 | 22694 | 21000 |
| 4/01/95 | 13.78125 | 1640 | *22601 | 21000 |
| 6/01/95 | 13.6875 | 1646 | 22530 | 21000 |
| 9/01/95 | 13.46875 | 1649 | *22210 | 21000 |
| 11/01/95 | 13.46875 | 1650 | 22223 | 21001 |
| 13/01/95 | 13 | 1655.6 | 21523 | 21001 |
| 16/01/95 | 13 | 1657 | *21541 | 21051 |
| 18/01/95 | 13.46875 | 1658 | 22331 | 21170 |
| 20/01/95 | 13.28125 | 1662 | 22073 | 21180 |
| 23/01/95 | 13.25 | 1662 | *22022 | 21300 |
| 25/01/95 | 13.28125 | 1665 | 22113 | 21340 |
| 27/01/95 | 13.125 | 1668.4 | 21898 | 21340 |
| 30/01/95 | 13.125 | 1669.6 | *21914 | 21350 |
| 1/02/95 | 13.28125 | 1670 | 22180 | 21350 |
| 3/02/95 | 13.1875 | 1675 | 22089 | 21350 |
| 6/02/95 | 13.3125 | 1677.4 | *22330 | 21350 |
| 8/02/95 | 13.4375 | 1681 | 22588 | 21350 |
| 10/02/95 | 13.46875 | 1683 | 22668 | 21350 |
| 13/02/95 | 13.28125 | 1684.4 | *22371 | 21350 |
| 15/02/95 | 13.28125 | 1687.8 | 22416 | 21350 |
| 17/02/95 | 13.3125 | 1694 | 22551 | 21350 |
| 20/02/95 | 13.25 | 1697.6 | *22493 | 21350 |
| 22/02/95 | - | 1699.4 | 22570 | 21350 |
| 24/02/95 | 13.375 | 1701.6 | 22759 | 21350 |
| 27/02/95 | 13.28125 | 1707 | *22671 | 21350 |
| 1/03/95 | 13.4375 | 1708 | 22951 | 21350 |
| 8/03/95 | 13.3125 | 1709.4 | *22756 | 21350 |
| 10/03/95 | 13.65625 | 1711 | 23366 | 21350 |
| 13/03/95 | 13.65625 | 1715 | *23420 | 21350 |
| 15/03/95 | 13.71875 | 1719 | 23583 | 21350 |
| 20/03/95 | 13.84375 | 1732 | *23977 | 21380 |
| 22/03/95 | 13.78125 | 1743 | 24021 | 21380 |
| 24/03/95 | 14.03125 | 1755 | 24625 | 21380 |
| 27/03/95 | 14.40625 | 1769 | *25485 | 21400 |
| 29/03/95 | 14.875 | 1781.6 | 26501 | 21400 |
| 31/03/95 | 15.1875 | 1787 | 27140 | 21400 |
| 3/04/95 | 15.78125 | 1789.4 | *28239 | 21400 |
| 5/04/95 | 15.75 | 1792 | 28224 | 22000 |
| 7/04/95 | 15.71875 | 1797 | 28247 | 25200 |
| 10/04/95 | 15.6875 | 1800 | *28238 | 26000 |
| 12/04/95 | 15.65625 | 1798.6 | 28159 | 26000 |
| 18/04/95 | 15.5625 | 1802.6 | *28053 | 27000 |
| 19/04/95 | 15.5625 | 1802.6 | 28053 | 26000 |

| Trading dates of the Ghana Stock Exchange | AGC price on the London Stock Exch. (Quoted in £) | Exchange rate (bureau rate cedis/£) | AGC price in London converted into cedis | AGC price in Accra (cedis) Quoted on the GSE |
|---|---|---|---|---|
| 21/04/95 | 15.5625 | 1802 | 28044 | 26200 |
| 24/04/95 | 15.625 | 1795 | *28047 | 26200 |
| 26/04/95 | 15.53125 | 1803 | 28003 | 26200 |
| 28/04/95 | 15.53125 | 1813 | 28158 | 26500 |
| 2/05/95 | 15.65625 | 1816 | *28432 | 26500 |
| 3/05/95 | 15.625 | 1820 | 28438 | 26500 |
| 5/05/95 | 15.9375 | 1820 | 29006 | 26700 |
| 8/05/95 | 15.9375 | 1822 | *29038 | 26700 |
| 10/05/95 | 15.65625 | 1826.2 | 28591 | 26700 |
| 12/05/95 | 15.53125 | 1830.6 | 28432 | 26700 |
| 15/05/95 | 15.53125 | 1828 | *28391 | 26700 |
| 17/05/95 | 15.4375 | 1832.6 | 28291 | 26700 |
| 19/05/95 | 15.46875 | 1835 | 28385 | 26700 |
| 22/05/95 | 15.40625 | 1837 | *28301 | 26700 |
| 24/05/95 | 15.3125 | 1840.4 | 28181 | 26700 |
| 26/05/95 | 15.25 | 1847.6 | 28176 | 26700 |
| 29/05/95 | 15.25 | 1849 | *28197 | 26700 |
| 31/05/95 | 14.375 | 1854 | 26651 | 26700 |
| 2/06/95 | 14.15625 | 1853.6 | 26240 | 26000 |
| 6/06/95 | 14 | 1855 | *25970 | 25500 |
| 7/06/95 | 13.96875 | 1856 | 25926 | 25200 |
| 9/06/95 | 13.90625 | 1857 | 25824 | 25200 |
| 12/06/95 | 13.9375 | 1861 | *25938 | 25200 |
| 14/06/95 | 13.53125 | 1863.2 | 25211 | 25200 |
| 16/06/95 | 14.15625 | 1910 | 27038 | 25200 |
| 19/06/95 | 13.96875 | 1910 | 26680 | 25200 |
| 21/06/95 | 14.59375 | 1920 | *28020 | 25200 |
| 23/06/95 | 14.59375 | 1930 | 28166 | 25300 |
| 26/06/95 | 14.78125 | 1930 | 28528 | 25300 |
| 28/06/95 | 14.71875 | 1935 | *28481 | 25400 |
| 30/06/95 | 14.625 | 1940 | 28373 | 25550 |
| 3/07/95 | 14.21875 | 1940 | 27584 | 25600 |
| 5/07/95 | 14.21875 | 1880 | *26731 | 25400 |
| 7/07/95 | 14.125 | 1910 | 26979 | 25550 |
| 10/07/95 | 14.3125 | 1910 | 27337 | 25410 |
| 12/07/95 | 13.96875 | 1930 | *26960 | 25410 |
| 14/07/95 | 13.875 | 1930 | 26779 | 25350 |
| 17/07/95 | 13.84375 | 1930 | 26718 | 25000 |
| 19/07/95 | 13.78125 | 1935 | *26667 | 25000 |
| 21/07/95 | 13.8125 | 1950 | 26934 | 25100 |
| 24/07/95 | 13.84375 | 1930 | 26718 | 25200 |
| 26/07/95 | 14.09375 | 1930 | *27201 | 25200 |
| 28/07/95 | 14.03125 | 1930 | 27080 | 25200 |
| 31/07/95 | 13.90625 | 1925 | 26770 | 25200 |
| 2/08/95 | 13.75 | 1930 | *26538 | 25300 |
| 4/08/95 | 13.96875 | 1930 | 26960 | 25300 |
| 7/08/95 | 13.78125 | 1920 | 26460 | 25300 |
| 9/08/95 | 13.75 | 1930 | *26538 | 25300 |
| 14/08/95 | 13.46875 | 1930 | 25995 | 24800 |
| 16/08/95 | 13.75 | 1930 | *26538 | 24800 |

| Trading dates of the Ghana Stock Exchange | AGC price on the London Stock Exch. (Quoted in £) | Exchange rate (bureau rate cedis/£) | AGC price in London converted into cedis | AGC price in Accra (cedis) Quoted on the GSE |
|---|---|---|---|---|
| 18/08/95 | 13.8125 | 1940 | 26796 | 24800 |
| 21/08/95 | 13.78125 | 1940 | 26736 | 24800 |
| 23/08/95 | 13.71875 | 1940 | *26614 | 25000 |
| 28/08/95 | 13.5625 | 1940 | 26311 | 25000 |
| 30/08/95 | 13.4375 | 1945 | *26136 | 24900 |
| 13/09/95 | 13.0625 | 1990 | *25994 | 24100 |
| 15/09/95 | 13.03125 | 1995 | 25997 | 24100 |
| 18/09/95 | 13.125 | 2040 | 26775 | 24100 |
| 20/09/95 | 13.21875 | 2050 | *27098 | 24100 |
| 22/09/95 | 12.8125 | 2090 | 26778 | 24100 |
| 25/09/95 | 12.875 | 2130 | 27424 | 24100 |
| 27/09/95 | 12.78125 | 2150 | *27480 | 24100 |
| 29/09/95 | 12.9375 | 2170 | 28074 | 24100 |
| 2/10/95 | 12.90625 | 2160 | 27878 | 24100 |
| 4/10/95 | 12.75 | 2150 | *27413 | 24100 |
| 9/10/95 | 12.25 | 2160 | 26460 | 24100 |
| 13/10/95 | 12.78125 | 2180 | 27863 | 24000 |
| 16/10/95 | 12.375 | 2175 | 26916 | 24000 |
| 18/10/95 | 12.4375 | 2180 | *27114 | 24000 |
| 20/10/95 | 12.375 | 2180 | 26978 | 24000 |
| 25/10/95 | 12.34375 | 2200 | *27156 | 24015 |
| 27/10/95 | 12.34375 | 2205 | 27218 | 24100 |
| 30/10/95 | 11.25 | 2200 | 24750 | 24150 |
| 1/11/95 | 11.15625 | 2235 | *24934 | 23000 |
| 3/11/95 | 11.625 | 2240 | 26240 | 23000 |
| 6/11/95 | 11.875 | 2250 | 26719 | 23800 |
| 8/11/95 | 12.34375 | 2280 | *28144 | 23800 |
| 10/11/95 | 12.3125 | 2285 | 28134 | 24000 |
| 13/11/95 | 12.1875 | 2310 | 28153 | 24000 |
| 15/11/95 | 11.96875 | 2360 | *28246 | 24000 |
| 17/11/95 | 11.75 | 2420 | 28435 | 23800 |
| 20/11/95 | 12.125 | 2430 | 29464 | 23800 |
| 22/11/95 | 11.59375 | 2430 | *28173 | 23800 |
| 24/11/95 | 11.84375 | 2430 | 28780 | 23800 |
| 27/11/95 | 11.6875 | 2430 | 28401 | 25000 |
| 29/11/95 | 11.96875 | 2380 | *28486 | 23800 |
| 6/12/95 | 12.65625 | 2050 | 25945 | 24100 |
| 8/12/95 | 13.25 | 2200 | *29150 | 24250 |
| 11/12/95 | 13.53125 | 23000 | 31122 | 24300 |
| 18/12/95 | 13 | 2300 | 29900 | 24300 |
| 20/12/95 | 13.09375 | 2300 | 30116 | 24300 |
| 22/12/95 | 13.0625 | 2300 | *30044 | 24320 |
| 27/12/95 | 12.90625 | 2300 | 29684 | 24400 |
| 29/12/95 | 12.84375 | 2300 | *29541 | 24400 |

Source: AGC price in London from the *Financial Times* of London Market Exchange rate figures is average of 5 bureau rates AGC price in Accra from the Ghana Stock Exchange
*London AGC prices marked with asterisks with corresponding Accra price were used to run regression based on weekly data.

# Appendix J: Daily market returns of the GSE from 1993-1995

| Trading session | Daily mkt-rtn | C'lative mkt-rtn | Trading session | Daily mkt-rtn | C'lative mkt-rtn |
|---|---|---|---|---|---|
| 215 | 4.3648 | 4.3648 | 264 | -0.2025 | 49.0036 |
| 216 | 4.0580 | 8.4228 | 265 | 1.3352 | 50.3387 |
| 217 | 4.0604 | 12.4832 | 266 | 0.6975 | 51.0362 |
| 218 | 4.0871 | 16.5703 | 267 | 0.7145 | 51.7507 |
| 219 | 5.7004 | 22.2706 | 268 | 0.3829 | 52.1336 |
| 220 | 3.7959 | 26.0665 | 269 | 1.2199 | 53.3536 |
| 221 | 2.3443 | 28.4108 | 270 | 1.4858 | 54.8394 |
| 222 | .9233 | 29.3340 | 271 | 2.0433 | 56.8827 |
| 223 | 3.0611 | 32.3951 | 272 | 1.7017 | 58.5844 |
| 224 | .3332 | 32.7283 | 273 | 3.1988 | 61.7832 |
| 225 | -0.6475 | 32.0808 | 274 | 0.5253 | 62.3085 |
| 226 | 3.9584 | 36.0392 | 275 | -0.2145 | 62.0940 |
| 227 | -0.4275 | 35.6117 | 276 | 0.2670 | 62.361 |
| 228 | -5.0086 | 30.6031 | 277 | 0.3831 | 62.7441 |
| 229 | -2.8171 | 27.7860 | 278 | -0.7289 | 62.0153 |
| 230 | -6.1704 | 21.6156 | 279 | 0.7604 | 62.7757 |
| 231 | 10.3744 | 31.9900 | 280 | -0.4243 | 62.3514 |
| 232 | 0.3056 | 32.2956 | 281 | 1.2732 | 63.6246 |
| 233 | 1.5548 | 33.8504 | 282 | -0.1218 | 63.5028 |
| 234 | 0.6479 | 34.4983 | 283 | -1.1474 | 62.3554 |
| 235 | 3.6444 | 38.1428 | 284 | 0.4644 | 62.8199 |
| 236 | 3.5579 | 41.7006 | 285 | 1.3379 | 64.1577 |
| 237 | 0.1831 | 41.8837 | 286 | 0.9089 | 65.0667 |
| 238 | 0.1105 | 41.9942 | 287 | 2.2506 | 67.3172 |
| 239 | -0.7187 | 41.27553 | 288 | 0.4219 | 67.7391 |
| 240 | 0.1615 | 41.4370 | 289 | 0.8536 | 68.5927 |
| 241 | 0.3678 | 41.8048 | 290 | 1.2214 | 69.8141 |
| 242 | 0.1948 | 41.9997 | 291 | -0.4330 | 69.3811 |
| 243 | 0.0574 | 42.0571 | 292 | 0.1690 | 69.55 |
| 244 | -0.9344 | 41.1227 | 293 | 0.1920 | 69.7420 |
| 245 | 1.1260 | 42.2487 | 294 | 2.1819 | 71.9239 |
| 246 | 0.05944 | 42.3082 | 295 | 0.3551 | 72.279 |
| 247 | 0.5739 | 42.8821 | 296 | 0.2317 | 72.5107 |
| 248 | 0.7138 | 43.5959 | 297 | 0.3217 | 72.8324 |
| 249 | 0.3173 | 43.9132 | 298 | 5.7730 | 78.6055 |
| 250 | 0.3475 | 44.2607 | 299 | 1.0709 | 79.6764 |
| 251 | 0.5589 | 44.8196 | 300 | 0.0510 | 79.7275 |
| 252 | 0.2195 | 45.0391 | 301 | 1.5046 | 81.232 |

*Appendix J cont.*

| Trading session | Daily mkt-rtn | C'lative mkt-rtn | Trading session | Daily mkt-rtn | C'lative mkt-rtn |
|---|---|---|---|---|---|
| 253 | -0.1885 | 44.8506 | 302 | -0.2163 | 81.0157 |
| 254 | 0.5066 | 45.3573 | 303 | 0.0145 | 81.0301 |
| 255 | -0.0981 | 45.2592 | 304 | 0.6529 | 81.683 |
| 256 | 0.3455 | 45.6047 | 305 | 5.6289 | 87.3119 |
| 257 | 0.8247 | 46.4294 | 306 | 1.9878 | 89.2997 |
| 258 | 1.4345 | 47.8639 | 307 | 1.5262 | 90.8259 |
| 259 | 1.6229 | 49.4868 | 308 | -0.1688 | 90.6571 |
| 260 | 0.0329 | 49.5198 | 309 | 0.0926 | 90.7493 |
| 261 | 0.2799 | 49.7996 | 310 | 0.1196 | 90.8693 |
| 262 | -0.1418 | 49.6578 | 311 | -0.1008 | 90.7686 |
| 263 | -0.4518 | 49.2060 | 312 | 1.6631 | 92.4316 |

| TS | DMR | CDR | TS | DMR | CDR | TS | DMR | CDR |
|---|---|---|---|---|---|---|---|---|
| 313 | 0.09 | 92.52 | 361 | -.18 | 195.56 | 409 | 0.8177 | 192.14 |
| 314 | 0.03 | 92.55 | 362 | -3.0 | 192.61 | 410 | -.003 | 192.14 |
| 315 | 3.61 | 96.16 | 363 | -.10 | 192.52 | 411 | -.04 | 192.10 |
| 316 | 0.07 | 96.23 | 364 | .005 | 192.52 | 412 | 1.1617 | 193.26 |
| 317 | 0.43 | 96.66 | 365 | -.20 | 192.32 | 413 | -2.794 | 190.47 |
| 318 | 1.39 | 98.05 | 366 | 0.04 | 192.35 | 414 | 3.0286 | 193.50 |
| 319 | -.18 | 97.87 | 367 | 0.05 | 192.40 | 415 | 0.0442 | 193.54 |
| 320 | 0.63 | 98.5 | 368 | -3.4 | 189.01 | 416 | 0.0841 | 193.63 |
| 321 | 0.39 | 98.89 | 369 | 0.02 | 189.03 | 417 | .02201 | 193.65 |
| 322 | 0.13 | 99.01 | 370 | 0.44 | 189.47 | 418 | .0368 | 193.68 |
| 323 | 0.38 | 99.40 | 371 | -.88 | 188.59 | 419 | -.0659 | 193.62 |
| 324 | 0.55 | 99.95 | 372 | 0.95 | 189.54 | 420 | -.0007 | 193.62 |
| 325 | 0.20 | 100.15 | 373 | -.98 | 188.55 | 421 | .1682 | 193.79 |
| 326 | 0.37 | 100.52 | 374 | -.01 | 188.55 | 422 | .0471 | 193.83 |
| 327 | 7.50 | 108.02 | 375 | 0.09 | 188.64 | 423 | .2153 | 194.05 |
| 328 | 2.44 | 110.46 | 376 | 0.04 | 188.68 | 424 | .4559 | 194.50 |
| 329 | 4.26 | 114.72 | 377 | .005 | 188.68 | 425 | .0206 | 194.53 |
| 330 | 8.29 | 123.00 | 378 | -.02 | 188.66 | 426 | .3894 | 194.91 |
| 331 | 2.79 | 125.79 | 379 | -.27 | 188.40 | 427 | .4712 | 195.39 |
| 332 | 6.12 | 131.91 | 380 | -.08 | 188.31 | 428 | -.1122 | 195.27 |
| 333 | 5.19 | 137.10 | 381 | -.03 | 188.3 | 429 | -.0416 | 195.23 |
| 334 | 5.07 | 142.17 | 382 | -.02 | 188.26 | 430 | -.0276 | 195.20 |
| 335 | 5.72 | 147.89 | 383 | .008 | 188.26 | 431 | .1161 | 195.32 |
| 336 | 4.95 | 152.84 | 384 | -.10 | 188.17 | 432 | .6721 | 195.99 |
| 337 | 4.71 | 157.55 | 385 | -.04 | 188.13 | 433 | -.0071 | 195.99 |
| 338 | 4.14 | 161.68 | 386 | .019 | 188.15 | 434 | -.0037 | 195.98 |
| 339 | 2.63 | 164.32 | 387 | .105 | 188.25 | 435 | -.0233 | 195.96 |
| 340 | 6.30 | 170.62 | 388 | .027 | 188.27 | 436 | -.0107 | 195.95 |
| 341 | 4.22 | 174.84 | 389 | .059 | 188.34 | 437 | -.0089 | 195.94 |
| 342 | 2.63 | 177.47 | 390 | .024 | 188.36 | 438 | .0094 | 195.95 |
| 343 | 12.7 | 190.14 | 391 | .021 | 188.38 | 439 | -.0048 | 195.94 |
| 344 | 2.62 | 192.76 | 392 | .024 | 188.41 | 440 | .0148 | 195.96 |
| 345 | 0.56 | 193.32 | 393 | .011 | 188.42 | 441 | 0 | 195.96 |
| 346 | 0.77 | 194.10 | 394 | -1.8 | 186.61 | 442 | -.0026 | 195.96 |

*Appendix J cont.*

| TS | DMR | CDR | TS | DMR | CDR | TS | DMR | CDR |
|---|---|---|---|---|---|---|---|---|
| 347 | 0.15 | 194.25 | 395 | -.004 | 186.6 | 443 | 1.738 | 197.69 |
| 348 | 5.86 | 200.11 | 396 | -.89 | 185.72 | 444 | -.0152 | 197.68 |
| 349 | -.48 | 199.63 | 397 | .064 | 185.78 | 445 | .0015 | 197.68 |
| 350 | .012 | 199.65 | 398 | -1.87 | 183.9 | 446 | 0 | 197.68 |
| 351 | -3.4 | 196.21 | 399 | .130 | 184.04 | 447 | .0128 | 197.69 |
| 352 | .008 | 196.22 | 400 | .021 | 184.06 | 448 | -.005 | 197.69 |
| 353 | -.38 | 195.84 | 401 | .011 | 184.07 | 449 | .2017 | 197.89 |
| 354 | 0.66 | 196.50 | 402 | -.024 | 184.05 | 450 | .496 | 198.39 |
| 355 | -.07 | 196.43 | 403 | .059 | 184.11 | 451 | .0535 | 198.44 |
| 356 | .001 | 196.43 | 404 | 2.06 | 186.17 | 452 | .4798 | 198.92 |
| 357 | -.14 | 196.29 | 405 | 2.77 | 188.94 | 453 | .1589 | 199.08 |
| 358 | -.22 | 196.06 | 406 | 1.40 | 190.35 | 454 | .0004 | 199.08 |
| 359 | -.19 | 195.87 | 407 | .987 | 191.33 | 455 | .0406 | 199.12 |
| 360 | -.13 | 195.74 | 408 | -.006 | 191.33 | 456 | -.032 | 199.09 |
| 457 | -.001 | 199.09 | 504 | .024 | 219.78 | 551 | -0.013 | 210.848 |
| 458 | -.02 | 199.07 | 505 | .005 | 219.79 | 552 | .0167 | 210.864 |
| 459 | -.002 | 199.07 | 506 | -2.61 | 217.18 | 553 | -.0004 | 210.86 |
| 460 | -.002 | 199.07 | 507 | -1.56 | 215.62 | 554 | .0177 | 210.88 |
| 461 | -.001 | 199.06 | 508 | -1.04 | 214.58 | 555 | .0458 | 210.93 |
| 462 | .016 | 199.08 | 509 | .008 | 214.59 | 556 | .0247 | 210.95 |
| 463 | .006 | 199.09 | 510 | .047 | 214.63 | 557 | .0368 | 210.99 |
| 464 | -.004 | 199.08 | 511 | .010 | 214.65 | 558 | .0099 | 211 |
| 465 | .145 | 199.23 | 512 | -.007 | 214.64 | 559 | .0533 | 211.05 |
| 466 | -.008 | 199.22 | 513 | .020 | 214.66 | 560 | .0970 | 211.15 |
| 467 | -.15 | 199.07 | 514 | -.013 | 214.65 | 561 | .0022 | 211.15 |
| 468 | -.05 | 199.02 | 515 | .380 | 215.02 | 562 | -.305 | 210.85 |
| 469 | .003 | 199.02 | 516 | -.09 | 214.93 | 563 | .0244 | 210.87 |
| 470 | -.004 | 199.02 | 517 | .530 | 215.46 | 564 | .0458 | 210.95 |
| 471 | .007 | 199.03 | 518 | .540 | 216.00 | 565 | .0611 | 210.98 |
| 472 | .006 | 199.03 | 519 | .170 | 216.17 | 566 | .0723 | 211.05 |
| 473 | .111 | 199.14 | 520 | -.69 | 215.48 | 567 | .0394 | 211.09 |
| 474 | -.004 | 199.14 | 521 | .520 | 215.99 | 568 | .0941 | 211.18 |
| 475 | -.04 | 199.10 | 522 | -.47 | 215.52 | 569 | .2563 | 211.44 |
| 476 | -.02 | 199.08 | 523 | .0006 | 215.52 | 570 | .136 | 211.58 |
| 477 | .082 | 199.16 | 524 | -.21 | 215.31 | 571 | -4.135 | 207.44 |
| 478 | .006 | 199.17 | 525 | -1.22 | 214.10 | 572 | .0385 | 207.48 |
| 479 | .012 | 199.18 | 526 | .0002 | 214.10 | 573 | 3.0685 | 210.55 |
| 480 | .010 | 199.19 | 527 | .36 | 214.46 | 574 | .0081 | 210.56 |
| 481 | 2.41 | 201.60 | 528 | .35 | 214.80 | 575 | .7491 | 211.31 |
| 482 | 12.78 | 214.38 | 529 | -.003 | 214.80 | 576 | .020 | 211.33 |
| 483 | 2.86 | 217.24 | 530 | -.004 | 214.80 | 577 | .009 | 211.33 |
| 484 | -.013 | 217.23 | 531 | .076 | 214.87 | 578 | -.709 | 210.62 |
| 485 | 3.42 | 220.65 | 532 | .323 | 215.20 | 579 | .0123 | 210.64 |
| 486 | -3.27 | 217.37 | 533 | .048 | 215.25 | 580 | -.0308 | 210.61 |
| 487 | .681 | 218.06 | 534 | .019 | 215.26 | 581 | -.0415 | 210.56 |
| 488 | -.004 | 218.06 | 535 | .04 | 215.30 | 582 | 3.892 | 214.46 |
| 489 | 0 | 218.06 | 536 | -1.72 | 213.58 | 583 | -3.524 | 210.93 |
| 490 | -.007 | 218.05 | 537 | .005 | 213.59 | 584 | .7249 | 211.66 |

*Appendix J cont.*

| TS | DMR | CDR | TS | DMR | CDR | TS | DMR | CDR |
|---|---|---|---|---|---|---|---|---|
| 491 | 1.04 | 219.09 | 538 | .0003 | 213.59 | 585 | .3067 | 211.96 |
| 492 | -.007 | 219.08 | 539 | .0003 | 213.59 | 586 | .5249 | 212.49 |
| 493 | -.005 | 219.08 | 540 | .013 | 213.60 | 587 | .169 | 212.66 |
| 494 | .676 | 219.75 | 541 | .717 | 214.32 | 588 | 0 | 212.66 |
| 495 | .004 | 219.76 | 542 | -.01 | 214.31 | 589 | .125 | 212.78 |
| 496 | -.0005 | 219.8 | 543 | .008 | 214.32 | 590 | -.1866 | 212.60 |
| 497 | .003 | 219.76 | 544 | -.44 | 213.87 | 591 | -.0014 | 212.60 |
| 498 | .001 | 219.76 | 545 | -.05 | 213.82 | 592 | .0518 | 212.65 |
| 499 | .013 | 219.77 | 546 | .046 | 213.87 | 593 | .283 | 212.93 |
| 500 | -.006219.77 | | 547 | -1.45 | 212.42 | 594 | -.0013 | 212.93 |
| 501 | -.02 | 219.74 | 548 | -.79 | 211.62 | | | |
| 502 | .002 | 219.75 | 549 | -.76 | 210.86 | | | |
| 503 | .013 | 219.76 | 550 | -.003 | 210.86 | | | |

TS = trading session; DMR = daily market returns; CDR = cumulative daily market returns

# Appendix K: Weekly market returns of the GSE 1993-1995 (see Figure 1)

| TS | WMR | CWR | TS | WMR | CWR | TS | WMR | CWR |
|---|---|---|---|---|---|---|---|---|
| 216 | 8.94 | 8.94 | 308 | 1.37 | 87.36 | 424 | .719 | 179.70 |
| 218 | 8.76 | 17.70 | 310 | .22 | 87.58 | 427 | .885 | 180.59 |
| 220 | 10.68 | 28.38 | 312 | 1.58 | 89.13 | 430 | -.17 | 180.41 |
| 222 | 3.26 | 31.64 | 314 | .119 | 89.25 | 433 | .73 | 181.14 |
| 224 | 3.50 | 35.13 | 316 | 3.69 | 92.95 | 436 | -.04 | 181.11 |
| 226 | 3.38 | 38.51 | 318 | 1.84 | 94.79 | 439 | -.004 | 181.10 |
| 228 | -5.51 | 33.005 | 320 | .445 | 95.23 | 442 | .012 | 181.11 |
| 230 | -5.24 | 27.77 | 322 | .536 | 95.77 | 445 | 1.67 | 182.78 |
| 232 | -2.03 | 25.73 | 324 | 1.01 | 96.78 | 448 | .008 | 182.79 |
| 234 | 2.22 | 27.96 | 326 | .62 | 97.40 | 451 | .754 | 183.54 |
| 236 | 7.21 | 35.17 | 328 | 11.07 | 108.47 | 454 | .64 | 184.18 |
| 238 | .291 | 35.46 | 330 | 11.67 | 120.14 | 457 | .006 | 184.19 |
| 240 | -.64 | 34.82 | 332 | 9.07 | 129.21 | 460 | -.02 | 184.17 |
| 242 | .602 | 35.42 | 334 | 10.57 | 139.79 | 463 | .022 | 184.19 |
| 244 | -.67 | 34.75 | 336 | 11.01 | 150.80 | 466 | .133 | 184.32 |
| 246 | .875 | 35.63 | 338 | 9.12 | 159.92 | 469 | -.20 | 184.13 |
| 248 | 1.13 | 36.75 | 340 | 9.06 | 168.98 | 472 | .012 | 184.14 |
| 250 | 1.07 | 37.82 | 342 | 7.33 | 176.31 | 475 | .068 | 184.21 |
| 252 | .784 | 38.61 | 344 | 3.41 | 179.72 | 478 | .067 | 184.28 |
| 254 | .208 | 38.82 | 346 | 1.4 | 181.12 | 481 | 2.43 | 186.71 |
| 256 | .291 | 39.11 | 348 | 3.86 | 184.98 | 484 | 16.06 | 202.77 |
| 258 | 2.20 | 41.31 | 350 | -.27 | 184.71 | 487 | .69 | 203.47 |
| 260 | 1.76 | 43.07 | 352 | -3.45 | 181.26 | 490 | -.01 | 203.46 |
| 262 | .154 | 43.22 | 355 | .106 | 181.37 | 493 | 1.03 | 204.48 |
| 264 | -.62 | 42.60 | 358 | -.35 | 181.01 | 496 | .679 | 205.16 |
| 266 | 2.09 | 44.69 | 361 | -.47 | 180.55 | 499 | .016 | 205.18 |
| 268 | 1.18 | 45.87 | 364 | -3.05 | 177.50 | 502 | -.02 | 205.15 |
| 270 | 2.81 | 48.68 | 367 | -.11 | 177.39 | 505 | .042 | 205.19 |
| 272 | 3.86 | 52.54 | 370 | -2.93 | 174.46 | 508 | -5.14 | 200.06 |
| 274 | 3.71 | 56.25 | 373 | -.83 | 173.63 | 511 | .064 | 200.12 |
| 276 | -.096 | 56.15 | 376 | .209 | 173.84 | 514 | -.0004 | 200.12 |
| 278 | .269 | 56.42 | 379 | -.27 | 173.56 | 517 | .811 | 200.93 |
| 280 | .341 | 56.76 | 382 | -.13 | 173.43 | 520 | .017 | 200.95 |
| 282 | 1.21 | 57.97 | 385 | -.12 | 173.31 | 523 | .042 | 200.99 |
| 284 | .435 | 58.41 | 388 | .152 | 173.46 | 526 | -1.42 | 199.57 |
| 286 | 2.27 | 60.68 | 391 | .106 | 173.56 | 529 | .709 | 200.28 |

*Appendix K cont.*

| TS | WMR | CWR | TS | WMR | CWR | TS | WMR | CWR |
|---|---|---|---|---|---|---|---|---|
| 288 | 2.70 | 63.38 | 394 | -1.77 | 171.80 | 532 | .403 | 200.68 |
| 290 | 2.11 | 65.48 | 397 | -.82 | 170.97 | 535 | .012 | 200.70 |
| 292 | .253 | 65.74 | 400 | -1.71 | 169.27 | 538 | -1.72 | 198.97 |
| 294 | 2.41 | 68.14 | 403 | .046 | 169.31 | 541 | .73 | 199.70 |
| 296 | .620 | 68.76 | 406 | 6.39 | 175.71 | 544 | -.44 | 199.26 |
| 298 | 6.04 | 74.81 | 409 | 1.81 | 177.52 | 547 | -1.46 | 197.80 |
| 300 | 1.15 | 75.96 | 412 | 1.12 | 178.64 | 550 | -1.55 | 196.25 |
| 302 | 1.28 | 77.25 | 415 | .10 | 178.74 | 553 | .037 | 196.29 |
| 304 | .662 | 77.91 | 418 | .14 | 178.88 | 556 | .09 | 196.38 |
| 306 | 8.08 | 85.98 | 421 | .102 | 178.98 | 559 | .102 | 196.48 |
| 562 | -.20 | 196.28 | 574 | 3.11 | 195.93 | 586 | 1.569 | 197.47 |
| 565 | .108 | 196.39 | 577 | .779 | 196.70 | 589 | .295 | 197.77 |
| 568 | .21 | 196.60 | 580 | -.72 | 195.98 | 592 | -.137 | 197.63 |
| 571 | -3.79 | 192.81 | 583 | -.078 | 195.91 | 594 | .282 | 197.91 |

TS = trading session; WMR = weekly market returns; CWR = cumulative weekly market returns

# Appendix L: Comparison of UK and Ghana interest rates (91-day treasury bill rates)

| Date | Ghana rates | UK rates | Date | Ghana rates | UK rates |
|---|---|---|---|---|---|
| 23/05/94 | 27 | 4.875 | 13/03/95 | 33 | 6.4375 |
| 30/05/94 | 27 | 4.875 | 20/03/95 | 33 | 6.25 |
| 06/06/94 | 27 | 4.875 | 27/03/95 | 33 | 6.3125 |
| 13/06/94 | 27 | 4.9375 | 03/04/95 | 33 | 6.3125 |
| 20/06/94 | 27 | 4.90625 | 10/04/95 | 33 | 6.50 |
| 27/06/94 | 27 | 4.96875 | 17/04/95 | 33 | 6.50 |
| 04/07/94 | 27 | 4.96875 | 24/04/95 | 33 | 6.625 |
| 11/07/94 | 27 | 4.96875 | 01/05/95 | 33 | 6.625 |
| 18/07/94 | 27 | 5 | 08/05/95 | 33 | 6.3125 |
| 25/07/94 | 27 | 5 | 15/05/95 | 33 | 6.5625 |
| 01/08/94 | 27 | 5.25 | 22/05/95 | 33 | 6.25 |
| 08/08/94 | 27 | 5.50 | 29/05/95 | 33 | 6.25 |
| 15/08/94 | 27.15 | 5.4375 | 05/06/95 | 33 | 6.3125 |
| 22/08/94 | 27.15 | 5.4375 | 12/06/95 | 33 | 6.375 |
| 29/08/94 | 27.15 | 5.3125 | 19/06/95 | 33 | 6.375 |
| 05/09/94 | 27.15 | 5.4375 | 26/06/95 | 33 | 6.375 |
| 12/09/94 | 27.15 | 5.625 | 03/07/95 | 33 | 6.375 |
| 19/09/94 | 27.15 | 5.75 | 10/07/95 | 33 | 6.6875 |
| 26/09/94 | 29 | 5.75 | 17/07/95 | 33 | 6.625 |
| 03/10/94 | 29 | 5.34375 | 24/07/95 | 33 | 6.3125 |
| 10/10/94 | 28.99 | 5.75 | 31/07/95 | 33 | 6.59375 |
| 17/10/94 | 28.99 | 5.50 | 07/08/95 | 33 | 6.625 |
| 24/10/94 | 28.99 | 5.75 | 14/08/95 | 33 | 6.65625 |
| 31/10/94 | 28.99 | 5.875 | 21/08/95 | 33 | 6.59375 |
| 07/11/94 | 29.10 | 5.9375 | 28/08/95 | 33 | 6.59375 |
| 14/11/94 | 29.46 | 5.875 | 04/09/95 | 33 | 6.59375 |
| 21/11/94 | 29.48 | 5.8125 | 11/09/95 | 40.39 | 6.53125 |
| 28/11/94 | 29.50 | 5.8125 | 18/09/95 | 40.50 | 6.5625 |
| 05/12/94 | 29.50 | 6 | 25/09/95 | 40.50 | 6.5625 |
| 12/12/94 | 29.49 | 6.0625 | 02/10/95 | 40.50 | 6.59375 |
| 19/12/94 | 29.50 | 6.0625 | 09/10/95 | 40.50 | 6.625 |
| 26/12/94 | 29.50 | 6.125 | 16/10/95 | 40.50 | 6.625 |
| 02/01/95 | 29.50 | 6.25 | 23/10/95 | 40.50 | 6.59375 |
| 09/01/95 | 29.50 | 6.125 | 30/10/95 | 40.50 | 6.5625 |
| 16/01/95 | 33 | 6.0625 | 06/11/95 | 40.50 | 6.5625 |
| 23/01/95 | 33 | 6.25 | 13/11/95 | 40.50 | 6.53125 |
| 30/01/95 | 33 | 6.25 | 20/11/95 | 40.50 | 6.50 |
| 06/02/95 | 33 | 6.50 | 27/11/95 | 40.50 | 6.34375 |
| 13/02/95 | 33 | 6.50 | 04/12/95 | 40.50 | 6.375 |
| 20/02/95 | 33 | 6.50 | 11/12/95 | 40.50 | 6.3125 |
| 27/02/94 | 33 | 6.50 | 18/12/95 | 40.50 | 6.28125 |
| 06/03/94 | 33 | 6.4375 | 25/12/95 | 40.50 | 6.25 |

TS = trading session; WMR = weekly market returns; CWR = Cumulative weekly market returns

# Appendix M: Market capitalization figures used for Figure 4 (billion cedi)

| TS | MCap | TS | MCap | TS | MCap | TS | MCap | TS | MCap |
|---|---|---|---|---|---|---|---|---|---|
| 247 | 60.58 | 293 | 77.54 | 339 | 193.36 | 385 | 205.36 | 431 | 207.97 |
| 248 | 60.96 | 294 | 79.18 | 340 | 205.29 | 386 | 205.63 | 432 | 207.29 |
| 249 | 61.29 | 295 | 79.70 | 341 | 213.88 | 387 | 205.79 | 433 | 207.14 |
| 250 | 61.54 | 296 | 79.88 | 342 | 220.03 | 388 | 206.22 | 434 | 207.07 |
| 251 | 61.88 | 297 | 80.12 | 343 | 220.92 | 389 | 207.24 | 435 | 206.61 |
| 252 | 62.01 | 298 | 84.18 | 344 | 226.65 | 390 | 207.66 | 436 | 206.40 |
| 253 | 61.83 | 299 | 85.06 | 345 | 227.84 | 391 | 208.08 | 437 | 206.22 |
| 254 | 62.14 | 300 | 85.07 | 346 | 229.48 | 392 | 208.50 | 438 | 206.41 |
| 255 | 59.65 | 301 | 86.28 | 347 | 233.55 | 393 | 208.72 | 439 | 206.31 |
| 256 | 62.25 | 302 | 86.09 | 348 | 239.47 | 394 | 209.64 | 440 | 206.59 |
| 257 | 62.74 | 303 | 86.10 | 349 | 238.03 | 395 | 209.59 | 441 | 206.59 |
| 258 | 63.65 | 304 | 86.64 | 350 | 238.15 | 396 | 210.48 | 442 | 206.53 |
| 259 | 64.64 | 305 | 91.08 | 351 | 234.85 | 397 | 211.55 | 443 | 206.53 |
| 260 | 64.62 | 306 | 92.84 | 352 | 234.68 | 398 | 212.16 | | |
| 261 | 64.80 | 307 | 94.23 | 353 | 226.07 | 399 | 214.29 | | |
| 262 | 64.69 | 308 | 94.04 | 354 | 237.37 | 400 | 214.65 | | |
| 263 | 64.40 | 309 | 94.13 | 355 | 235.76 | 401 | 214.85 | | |
| 264 | 64.23 | 310 | 94.24 | 356 | 235.78 | 402 | 214.50 | | |
| 265 | 65.09 | 311 | 94.13 | 357 | 232.87 | 403 | 215.48 | | |
| 266 | 65.53 | 312 | 95.64 | 358 | 227.97 | 404 | 217.40 | | |
| 267 | 65.95 | 313 | 95.72 | 359 | 224.02 | 405 | 215.53 | | |
| 268 | 66.19 | 314 | 97.03 | 360 | 221.33 | 406 | 215.59 | | |
| 269 | 66.96 | 315 | 100.36 | 361 | 217.35 | 407 | 216.86 | | |
| 270 | 67.90 | 316 | 100.43 | 362 | 218.05 | 408 | 216.69 | | |
| 271 | 69.20 | 317 | 100.86 | 363 | 216.11 | 409 | 214.84 | | |
| 272 | 70.33 | 318 | 102.23 | 364 | 216.20 | 410 | 214.79 | | |
| 273 | 72.59 | 319 | 102.04 | 365 | 211.32 | 411 | 214.03 | | |
| 274 | 72.90 | 320 | 102.67 | 366 | 212.02 | 412 | 214.73 | | |
| 275 | 72.73 | 321 | 103.08 | 367 | 212.93 | 413 | 215.59 | | |
| 276 | 72.92 | 322 | 103.20 | 368 | 215.10 | 414 | 215.79 | | |
| 277 | 73.12 | 323 | 103.61 | 369 | 215.36 | 415 | 214.93 | | |
| 278 | 72.54 | 324 | 104.19 | 370 | 217.04 | 416 | 214.84 | | |
| 279 | 73.08 | 325 | 104.41 | 371 | 217.45 | 417 | 214.41 | | |
| 280 | 72.77 | 326 | 104.80 | 372 | 213.49 | 418 | 215.09 | | |
| 281 | 73.48 | 327 | 113.49 | 373 | 213.76 | 419 | 213.64 | | |
| 282 | 73.38 | 328 | 116.22 | 374 | 212.64 | 420 | 213.62 | | |
| 283 | 73.08 | 329 | 119.92 | 375 | 213.12 | 421 | 212.67 | | |
| 284 | 73.42 | 330 | 129.56 | 376 | 213.82 | 422 | 212.73 | | |
| 285 | 74.36 | 331 | 133.12 | 377 | 213.90 | 423 | 213.45 | | |
| 286 | 75.02 | 332 | 141.17 | 378 | 213.64 | 424 | 213.29 | | |

*Appendix M cont.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 287 | 76.67 | 333 | 148.42 | 379 | 208.91 | 425 | 213.26 |
| 288 | 76.18 | 334 | 155.74 | 380 | 207.26 | 426 | 212.28 |
| 289 | 76.87 | 335 | 164.65 | 381 | 206.80 | 427 | 212.07 |
| 290 | 77.78 | 336 | 172.83 | 382 | 206.24 | 428 | 209.63 |
| 291 | 77.35 | 337 | 181.01 | 383 | 206.35 | 429 | 208.82 |
| 292 | 77.47 | 338 | 188.48 | 384 | 206.14 | 430 | 208.28 |

TS = trading session, MCap = Market capitalization

# Appendix N: Value traded figures used for Figure 5 (million cedis)

| TS | ValT | TS | ValT | TS | ValT | TS | ValT | TS | ValT |
|---|---|---|---|---|---|---|---|---|---|
| 247 | 1.31 | 293 | 15.75 | 339 | 26.50 | 385 | 23.72 | 431 | 9.804 |
| 248 | 4.61 | 294 | 12.06 | 340 | 21.43 | 386 | 9.090 | 432 | 432.5 |
| 249 | 4.73 | 295 | 7.378 | 341 | 42.76 | 387 | 11.49 | 433 | 1.695 |
| 250 | 0.472 | 296 | 7.819 | 342 | 1173 | 388 | 7.480 | 434 | 6.549 |
| 251 | 1.761 | 297 | 11.98 | 343 | 426.0 | 389 | 50.75 | 435 | 26.76 |
| 252 | 4.292 | 298 | 79.11 | 344 | 1945 | 390 | 135.2 | 436 | 1.271 |
| 253 | 2.895 | 299 | 5.869 | 345 | 56.39 | 391 | 334.5 | 437 | 314.6 |
| 254 | 3.339 | 300 | 4.622 | 346 | 85.11 | 392 | 7.805 | 438 | 451.1 |
| 255 | 3.684 | 301 | 2.042 | 347 | 328.6 | 393 | 5.512 | 439 | 662.6 |
| 256 | 4.076 | 302 | 2.257 | 348 | 146.9 | 394 | 303.3 | 440 | 199.1 |
| 257 | 5.225 | 303 | 1.959 | 349 | 41.30 | 395 | 7.766 | 441 | 609.4 |
| 258 | 2.750 | 304 | 1.413 | 350 | 314.9 | 396 | 46.77 | 442 | 2.355 |
| 259 | 25.26 | 305 | 3.469 | 351 | 72.22 | 397 | 36.66 | 443 | 138.3 |
| 260 | 1.870 | 306 | 5.942 | 352 | 54.51 | 398 | 7.705 | | |
| 261 | 2.035 | 307 | 9.838 | 353 | 16.23 | 399 | 166.7 | | |
| 262 | 1.172 | 308 | 1.765 | 354 | 8.987 | 400 | 11.87 | | |
| 263 | 1.927 | 309 | 3.849 | 355 | 8.634 | 401 | 5.105 | | |
| 264 | 4.196 | 310 | 2.412 | 356 | 6.167 | 402 | 19.41 | | |
| 265 | 8.367 | 311 | 5.051 | 357 | 3.438 | 403 | 6.089 | | |
| 266 | 4.911 | 312 | 81.43 | 358 | 2.559 | 404 | 543.9 | | |
| 267 | 2.588 | 313 | 2.407 | 359 | 22.74 | 405 | 8.509 | | |
| 268 | 3.961 | 314 | 24.53 | 360 | 3.113 | 406 | 5.078 | | |
| 269 | 3.688 | 315 | 9.840 | 361 | 33.12 | 407 | 882.2 | | |
| 270 | 9.350 | 316 | 4.826 | 362 | 98.54 | 408 | 203.6 | | |
| 271 | 7.335 | 317 | 3.975 | 363 | 4.336 | 409 | 78.53 | | |
| 272 | 1.921 | 318 | 3.173 | 364 | 5.779 | 410 | 2.639 | | |
| 273 | 1.312 | 319 | 3.937 | 365 | 164.4 | 411 | 12.98 | | |
| 274 | 4.037 | 320 | 8.070 | 366 | 30.89 | 412 | 1193 | | |
| 275 | 13.35 | 321 | 5.155 | 367 | 128.3 | 413 | 8.737 | | |
| 276 | 6.729 | 322 | 2.814 | 368 | 26.56 | 414 | 258.7 | | |
| 277 | 231.8 | 323 | 374.0 | 369 | 61.11 | 415 | 2.857 | | |
| 278 | 7.193 | 324 | 380.1 | 370 | 55.79 | 416 | 16.49 | | |
| 279 | 13.19 | 325 | 44.71 | 371 | 19.08 | 417 | 35.96 | | |
| 280 | 14.76 | 326 | 8.005 | 372 | 34.95 | 418 | 43.10 | | |
| 281 | 16.14 | 327 | 22887 | 373 | 25.90 | 419 | 5.489 | | |
| 282 | 11.32 | 328 | 14.47 | 374 | 12.61 | 420 | 7.720 | | |
| 283 | 13.18 | 329 | 14.06 | 375 | 115.3 | 421 | 5.625 | | |
| 284 | 11.70 | 330 | 12.20 | 376 | 18.28 | 422 | 240.4 | | |
| 285 | 16.70 | 331 | 13.23 | 377 | 9.887 | 423 | 9.402 | | |
| 286 | 7.948 | 332 | 9.571 | 378 | 6.633 | 424 | 25.04 | | |

*Appendix N cont.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 287 | 3.559 | 333 | 27.74 | 379 | 7.367 | 425 | 1.859 |
| 288 | 3.172 | 334 | 21.15 | 380 | 1.974 | 426 | 14.73 |
| 289 | 18.47 | 335 | 11.17 | 381 | 7.852 | 427 | 34.84 |
| 290 | 3.940 | 336 | 17.72 | 382 | 71.41 | 428 | 4.497 |
| 291 | 8.919 | 337 | 15.82 | 383 | 18.10 | 429 | 21.40 |
| 292 | 3.126 | 338 | 403.4 | 384 | 36.35 | 430 | 25.39 |

TS = trading session, Val T = value traded

# Appendix O: Market capitalization/GDP ratios without AGC

| Year-end | Market capitalization ( ¢billions) | GDP ( ¢billions) | MC/GDP |
|---|---|---|---|
| 1991 | 29.62 | 2574.8 | 0.011503806 |
| 1992 | 43.75 | 3008.8 | 0.01454068 |
| 1993 | 95.72 | 3932.4 | 0.024341369 |
| 1994 | 206.53 | 5061.0 | 0.040808 |

Source: Ghana Stock Exchange; GDP figures from the International Financial Statistics.
Note: The GDP figure for 1994 is an estimate based on provisional estimates of real GDP growth of 3.8% and inflation rate of 24.9% as announced in the 1994 budget statement.

# Appendix P: Value traded/GDP ratios without AGC

| Year | Value of shares ( ¢billions) | GDP ( ¢billions) | Value/GDP |
|---|---|---|---|
| 1991 | .10469310 | 2574.8 | .000041 |
| 1992 | .17342720 | 3008.8 | .000058 |
| 1993 | 3.17793449 | 3932.4 | .000808 |
| 1994 | 37.86831549 | 5061.0 | .007482 |

Source: Ghana Stock Exchange; GDP figures from the International Financial Statistics.