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Macroeconomic Determinants of Stock Market Performance in Ghana: Evidence from an ARDL Approach

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Abstract

This study investigates the impact of selected macroeconomic variables on the performance of the Ghana Stock Exchange (GSE) using annual data from 1990 to 2012. The analysis employs the Autoregressive Distributed Lag (ARDL) bounds testing approach to examine both the long-run and short-run dynamics between the GSE All Share Index and five key macroeconomic indicators: real interest rate, inflation, money supply, exchange rate, and real GDP. The results indicate that in the long run, inflation, exchange rate, and real GDP exert significant negative effects on stock market performance, while money supply exerts a statistically insignificant but positive effect. In the short run, inflation and exchange rate remain significant, with real interest rate and money supply contributing marginally. The error correction term is negative and statistically significant, confirming stable adjustment to long-run equilibrium. These findings highlight the importance of maintaining macroeconomic stability to foster investor confidence and long-term capital market development in Ghana.

Keywords

Ghana Stock Exchange, Macroeconomic Variables, ARDL, Stock Market Performance, Inflation, Exchange Rate

1. Introduction

Over the years, various governments in Ghana have implemented numerous programs and policies aimed at establishing a stable and constructive macroeconomic environment to promote private investment. One significant development in this regard is the establishment of the Ghana Stock Exchange (GSE), which was conceptualized in the late 1980s and formally commenced operations in 1990 (Isshaq et al., 2009). A critical issue that persists is the need for empirical evidence demonstrating the relationship between macroeconomic variables and the Ghana Stock Exchange All-Share Index. Such evidence is essential to build investor confidence and encourage participation in the stock market (Adjasi & Biekpe, 2005). While previous research has explored these relationships in more developed economies, few studies focus specifically on Ghana using a robust dynamic time-series approach.

This study contributes to the literature by applying the ARDL bounds testing methodology to assess both short-run and long-run effects of macroeconomic variables on stock market performance in Ghana. It fills an important gap by providing localized, data-driven insights with policy relevance.

2. Literature Review

2.1. Theoretical Framework

Understanding the impact of macroeconomic fundamentals on stock market performance requires grounding in several key economic theories.

Monetarist Theory posits a direct relationship between money supply and general price levels, arguing that inflation—if not matched by output growth—erodes the real value of future cash flows and reduces the attractiveness of equities (Friedman, 1970). According to this theory, inflation has a negative impact on stock market performance.

Keynesian Theory emphasizes that macroeconomic instability, such as inflation and exchange rate volatility, can depress investment by increasing uncertainty and lowering aggregate demand. High interest rates, in particular, increase the cost of borrowing and reduce business profits, negatively impacting stock valuations (Keynes, 1936).

The McKinnon-Shaw Financial Liberalization Hypothesis argues that positive real interest rates are essential for encouraging savings and investment in financial instruments like stocks (McKinnon, 1973; Shaw, 1973). Hence, an efficient financial sector with market-driven interest rates should enhance stock market development.

The Portfolio Balance Approach suggests that exchange rate movements influence asset allocation. A depreciating local currency reduces the return on domestic assets in foreign currency terms, potentially leading to capital outflows and lower stock prices (Dornbusch & Fischer, 1980).

Lastly, the Efficient Market Hypothesis (EMH) assumes that financial markets are efficient in processing information. In a semi-strong form efficient market, publicly available macroeconomic data are immediately reflected in asset prices (Fama, 1970). Deviations from this theory may explain why macroeconomic shocks have prolonged effects on equity markets in developing countries.

2.2. Empirical Evidence

Fama (1981) found that inflation and interest rates significantly affect stock returns in the U.S., while Solnik (1987) observed that exchange rate depreciation affects equities through its effect on inflation expectations. In emerging markets, Bhattacharya and Mukherjee (2003) found limited short-run causality between stock indices and macroeconomic variables.

In Ghana, Adam and Tweneboah (2008) used Johansen cointegration and impulse response techniques to demonstrate a long-run relationship between macroeconomic variables and stock market performance. Adjasi and Biekpe (2005) found that exchange rate volatility negatively affects stock returns in African countries, including Ghana.

3. Methodology

3.1. Data and Sources

This study utilizes annual time-series data from 1990 to 2012. The dependent variable is the GSE All Share Index, representing stock market performance. Independent variables include:

- Real Interest Rate (RIR)
- Inflation Rate (INF)
- Money Supply (M2)
- Exchange Rate (EXCH)
- Real GDP (GDP)

Data sources include the World Bank's World Development Indicators and Bank of Ghana annual bulletins.

3.2. Model Specification

The ARDL bounds testing approach, proposed by Pesaran et al. (2001), is employed due to its suitability for small sample sizes and its flexibility in handling variables with mixed integration orders. The ARDL model is specified as:

$$\ln\left(\mathrm{GSEt}\right)=\beta_0+\sum\beta_i\mathrm{RIRt}+\sum\beta_j\ln\left(\mathrm{INFt}\right)+\sum\beta_k\ln\left(\mathrm{M2t}\right)+\sum\beta_l\ln\left(\mathrm{EXCHt}\right)+\sum\beta_m\ln\left(\mathrm{GDPt}\right)+\varepsilon_t\ln\left(\mathrm{GSEt}\right)$$
$$=\beta_0+\sum\beta_i\mathrm{RIRt}+\sum\beta_j\ln\left(\mathrm{INFt}\right)+\sum\beta_k\ln\left(\mathrm{M2t}\right)+\sum\beta_l\ln\left(\mathrm{EXCHt}\right)+\sum\beta_m\ln\left(\mathrm{GDPt}\right)+\varepsilon_t$$

The model is estimated in two stages: first, a bounds test for cointegration is conducted, followed by estimation of long-run and short-run dynamics using an error correction model.

3.3. Unit Root and Bounds Test

To validate the use of the ARDL bounds testing methodology, it is important to examine the stationarity properties of the variables included in the model. The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were employed to determine the order of integration of each variable. The results, summarized in **Table 1**, show that while some variables are stationary at level (I(0)), others become stationary only after first differencing (I(1)). This mix of integration orders justifies the application of the ARDL model, which is robust to such scenarios.

Table 1. Unit root test results.

Variable	ADF Level (p-value)	PP Level (p-value)	Order of Integration
GSE Index	0.221	0.264	I(1)
Real Interest Rate	0.042	0.050	I(0)
Inflation Rate	0.172	0.193	I(1)
Exchange Rate	0.210	0.220	I(1)
Money Supply (M2)	0.180	0.191	I(1)
Real GDP	0.023	0.028	I(0)

The results indicate that real interest rate and real GDP are stationary at level, while the remaining variables—GSE index, inflation, exchange rate, and money supply—are stationary at first difference. None of the variables are integrated of order two (I(2)), which meets the critical requirement for ARDL estimation.

To determine the existence of a long-run equilibrium relationship among the variables, the ARDL bounds testing procedure developed by Pesaran et al. (2001) was applied. The null hypothesis of no cointegration was tested using the F-statistic. The outcome is presented in Table 2.

Table 2. ARDL bounds test results.

Test Statistic	Value	5% Critical Bounds (I(0)/I(1))
F-statistic	5.21	2.62/3.79

The calculated F-statistic (5.21) exceeds the upper bound critical value at the 5% level, indicating that the null hypothesis of no long-run relationship can be rejected. This confirms the existence of cointegration among the variables and justifies the estimation of both long-run and short-run dynamics within the ARDL framework.

Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests indicate that some variables are stationary at level while others become stationary after first differencing. The ARDL bounds test confirms a long-run relationship among the variables at the 5% significance level.

4. Empirical Results and Discussion

4.1. Long-Run Estimates

Variable	Coefficient	Std. Error	Significance
RIR	−0.0089	0.0154	NS
INF	−1.3209	0.5190	**
EXCH	−1.3857	0.4962	**
GDP	−17.9696	2.1989	***
M2	+1.1887	1.1064	NS

Discussion:

Inflation and exchange rate depreciation significantly reduce stock market performance, likely by increasing investment risk and eroding investor confidence.

The highly significant negative effect of GDP is counterintuitive but may reflect the disconnect between economic growth and capital market depth in Ghana. Money supply shows a positive but statistically insignificant impact, suggesting limited financial sector responsiveness. The results of the ARDL estimation provide important insights into the macroeconomic forces shaping the performance of the Ghana Stock Exchange. In the long run, inflation, exchange rate, and real GDP exhibit statistically significant and negative relationships with the GSE index. These findings are consistent with theoretical expectations and align with empirical evidence from similar studies in emerging and developing markets (Adam & Tweneboah, 2008; Adjasi & Biekpe, 2005). The negative long-run impact of inflation suggests that sustained price increases reduce the purchasing power of investors and lower real returns on equity investments. Inflation also increases the cost of doing business and distorts investment planning, thereby affecting firm performance and investor confidence. This supports the monetarist view that inflation is harmful to asset prices and financial stability (Friedman, 1970). Additionally, high inflation may lead to tighter monetary policy, including higher interest rates, which further dampens equity prices. The significant negative effect of exchange rate depreciation on the stock market is also expected. Exchange rate instability introduces uncertainty in investment valuation and increases the cost of imports, thereby affecting listed companies' profitability—particularly those dependent on foreign inputs. According to the portfolio balance theory, exchange rate volatility discourages foreign investment, leading to capital flight and declining equity demand (Dornbusch & Fischer, 1980). Interestingly, real GDP has a highly significant negative coefficient in the long run, which appears counterintuitive. In theory, economic growth should enhance stock market performance by improving corporate earnings and investment prospects. However, in Ghana's case, this may reflect structural issues such as: The disconnect between GDP growth and capital market participation, where growth is concentrated in sectors not listed on the GSE; A narrow and illiquid equity market that does not capture broader economic activity; Economic growth driven by informal sectors or foreign direct investment in extractive industries, which have limited stock market exposure. The positive but insignificant coefficient for money supply implies that liquidity expansion alone does not necessarily boost equity prices. This may indicate inefficiencies in the transmission mechanism of monetary policy or the dominance of interest-bearing assets in investor portfolios. It may also reflect limited financial inclusion and weak retail participation in Ghana's equity market.

4.2. Short-Run Dynamics

Variable	Coefficient	Std. Error	Significance
dINF	−1.3209	0.5190	**
dEXCH	−1.3857	0.4962	**
dGDP	−17.9696	2.1989	***
dM2	+1.1887	1.1064	NS
ECM (−1)	−0.1366	0.0780	**

The significant error correction term confirms a stable long-run equilibrium path. Inflation and exchange rate remain important short-run determinants of market behavior.

4.3. Diagnostic and Stability Tests

- No serial correlation (LM test $p > 0.05$);
- No heteroskedasticity;
- Normality confirmed (Jarque-Bera test);
- Model stability verified (CUSUM & CUSUMQ).

5. Conclusion and Policy Recommendations

5.1. Conclusion

This study has empirically examined the macroeconomic determinants of stock market performance in Ghana using ARDL bounds testing and annual data from 1990 to 2012. The results reveal that inflation, exchange rate, and real GDP significantly and negatively affect the GSE in the long run, while money supply and interest rate exhibit weak or insignificant effects. These results confirm the vulnerability of the GSE to macroeconomic instability and suggest a limited role for traditional monetary policy tools in influencing stock returns directly.

The negative GDP coefficient challenges conventional economic assumptions, highlighting a potential disconnect between macro-level growth and stock market expansion. Structural factors, including weak investor participation, lack of financial literacy, and underdeveloped institutions, may explain this anomaly.

5.2. Policy Recommendations

1) Strengthen Macroeconomic Stability

Ghana must maintain low inflation and reduce exchange rate volatility through prudent monetary and fiscal policies. Stable macroeconomic conditions improve investor confidence and promote capital inflows.

2) Link Economic Growth to Capital Market Development

Policymakers should promote initiatives that translate GDP growth into market growth, including SME access to equity financing, improved disclosure standards, and public-private partnerships for capital market education.

3) Improve Financial Sector Infrastructure

Modernizing trading platforms, expanding the product base (e.g., ETFs, REITs), and strengthening regulation can enhance market efficiency and resilience.

4) Promote Investor Inclusion and Education

Expanding retail participation through financial literacy campaigns, tax incentives, and digital platforms will deepen market liquidity and broaden the investor base.

5) Foster Foreign Participation

Ghana should pursue stable exchange rate policies and enhance transparency to attract sustainable foreign portfolio investment.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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