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Public Attention and Macro Variable Influence on the Return of Ceramics Industry in Bangladesh: A Panel Data Analysis (2015–2024)

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Abstract

This study examines how public attention and selected macroeconomic variables jointly affect the stock returns of ceramics firms listed on the Dhaka Stock Exchange (DSE) in Bangladesh over the period 2015 to 2024. Public attention is measured using Google Trends search volume data, which serves as an accessible and widely used proxy for investor interest in a given sector. The macroeconomic variables selected for this study are total reserves as a percentage of external debt, the interest rate spread (lending rate minus deposit rate), and market capitalization as a percentage of GDP. These variables were chosen based on their theoretical relevance to equity market performance in Bangladesh and their consistent use in the empirical literature on frontier and emerging markets. All five ceramics firms listed on the DSE with complete data for the full period are included, yielding a balanced panel of 60 firm-year observations. Prior to estimation, all variables were subjected to a two-step normalization process, and a series of diagnostic tests were conducted to verify normality, detect heteroscedasticity, assess multicollinearity, and test for cross-sectional dependence. The Hausman specification test supported the use of a Random Effects Generalized Least Squares (GLS) model with an AR(1) autocorrelation structure. The results show that total reserves relative to external debt have a statistically significant positive effect on stock returns ($\beta = 0.021$, $p = 0.006$). The interest rate spread has a marginally significant negative effect ($\beta = -0.126$, $p = 0.052$). Google Trends and market capitalization show directional effects that are consistent with theory but do not reach statistical significance. These findings suggest that macroeconomic fundamentals, particularly indicators of financial stability, are more important than online search-based attention in explaining stock return variation within Bangladesh's ceramics sector. This study is among the first to jointly examine internet-based public attention and macroeconomic drivers of stock returns within a single frontier market manufacturing sub-sector.

Keywords: *Google Trends, Stock Returns, Macroeconomic Variables, Ceramics Industry, Bangladesh, GLS Panel Regression, Investor Attention.*

1. Introduction

Stock market performance is shaped by a wide variety of forces, ranging from the financial characteristics of individual firms to broader macroeconomic conditions. Understanding which of these forces actually drives returns in a given market and sector is important for investors, regulators, and policymakers alike. Traditionally, research in financial economics has focused on well-established macroeconomic and firm-level determinants such as interest rates, GDP growth, earnings, and leverage (K. Nyakurukwa., 2024). More recently, the rise of digital platforms has opened the door to a new class of behavioral indicators. One of the most widely studied is Google Trends, which tracks the volume of search queries on the internet over time and has been used by researchers as a proxy for investor attention and public sentiment (J. Jakub et al., 2024).

The ceramics industry in Bangladesh offers a particularly interesting setting for this type of investigation. As a core segment of the manufacturing sector, ceramics firms are sensitive to both macroeconomic shifts and consumer sentiment. Yet despite the industry's significance, there is very limited academic work examining the factors that drive the stock returns of ceramics firms listed on the Dhaka Stock Exchange (DSE) (S. Akarsu., 2022). This study fills that gap by combining Google Trends data with macroeconomic indicators to explain differences in stock returns across all five DSE-listed ceramics firms over a ten-year period from 2015 to 2024.

The study has three main objectives. First, it aims to determine whether public attention, as measured by Google Trends, has a statistically meaningful effect on the stock returns of ceramics firms in Bangladesh. Second, it seeks to identify which macroeconomic variables best explain return variation in this sector. Third, it evaluates the relative importance of behavioral attention indicators versus macroeconomic fundamentals in explaining stock performance in a frontier market context (S. Islam et al., 2023).

To achieve these objectives, a Random Effects GLS panel regression model is applied, chosen based on the Hausman test result. The model accounts for cross-sectional heteroscedasticity and AR(1) serial correlation, which are common features of financial panel data. Annual stock return is the dependent variable. The independent variables are Google Trends search volume, total reserves as a share of external debt, the interest rate spread, and market capitalization as a share of GDP. Each of these variables has clear theoretical grounding in the literature, and their selection is discussed in detail in the methodology section.

The study contributes to the literature in two main ways. First, it provides empirical evidence on the attention-return relationship from a frontier market that has received little attention in the behavioral finance literature. Second, it offers one of the first joint examinations of online public attention and macroeconomic determinants in a single-industry panel study. The findings have practical relevance for investors deciding how to monitor and interpret market signals in the ceramics sector, and for policymakers concerned with the functioning of Bangladesh's capital market.

The remainder of this paper is organized as follows. Section 2 reviews relevant literature and develops the study hypotheses. Section 3 describes the data, variables, and methodology. Section 4 presents the empirical results. Section 5 discusses the findings and their implications. Section 6 concludes.

2. Literature Review

2.1 Firm-Level Determinants of Stock Returns

A substantial body of research has examined how firm-level characteristics shape stock market performance. Corporate governance quality is one such characteristic. H. Kim et al. (2023) found that firms with stronger shareholder protections and more transparent governance structures tend to produce higher risk-adjusted returns. M. Alam et al. (2026) also documented a positive relationship between

governance quality and stock returns in the context of emerging market economies, consistent with the idea that good governance reduces agency problems and lowers investor risk.

Innovation and research and development investment represent another important firm-level driver. S. Chauhan et al. (2025) showed that companies allocating more resources to innovation outperform their peers over the medium term, which reflects the market's tendency to value forward-looking investments in intellectual capital. M. Ayala et al. (2024) extended this line of reasoning by arguing that it is innovative efficiency, rather than the volume of innovation spending alone, that generates superior returns.

Capital structure and dividend policy also carry predictive power. S. Raza et al. (2025) found that firms carrying higher levels of debt relative to equity tend to earn higher expected returns, which is consistent with the compensation investors demand for bearing greater financial risk. From a dividend perspective, Z. Da. (2009) showed that stable dividend policies attract income-seeking investors, while Krystyniak et al. (2025) documented that dividend-paying firms tend to earn better returns because dividends signal financial stability and sustained profitability. More generally, S. Chauhan et al. (2025) confirmed that firm size and book-to-market ratios are robust cross-sectional return predictors, with smaller, high book-to-market firms tending to outperform their counterparts.

2.2 Google Trends as a Proxy for Investor Attention

Over the past decade, Google Trends has emerged as one of the most widely used tools for measuring investor attention in the behavioral finance literature. Unlike traditional proxies such as trading volume or media coverage, Google Trends directly records the search activity of individual internet users, providing a more granular window into retail investor behavior. S. Raza et al. (2025) demonstrated that higher Google search volume for a given stock tends to be followed by elevated prices in the short term and subsequent price reversals, a pattern that is consistent with overreaction driven by heightened attention.

M. Alı et al., (2023) extended this finding by showing that search intensity serves as an early predictor of near-term stock performance, with heavily searched firms generating better short-term returns than those receiving less online interest. R. Sobhan et al. (2025) documented that high search intensity in specific industries leads to greater price volatility, which they attributed to herding behavior and increased information-gathering activity among retail investors. M. Hossain et al. (2024) found that elevated search volumes for finance-related keywords can anticipate downturns in the stock market, suggesting that attention dynamics have forecasting value at the aggregate level.

At the market level, research by N. Hossain. (2025) found that higher aggregate search volumes are associated with increased market volatility and, in some cases, with lower subsequent returns. R. Hossain et al. (2024) illustrated a similar pattern using Wikipedia usage data, showing that peaks in financial Wikipedia article visits predict short-term market movements. Ima et al. (2024) observed that spikes in search activity lead to price adjustments that are not always in the direction that a simple positive attention effect would predict. Taken together, the evidence suggests that online public attention can influence markets, but the direction and persistence of that influence depend significantly on the market setting, the time horizon, and the quality of the attention proxy being used.

2.3 Macroeconomic Determinants of Stock Returns

The relationship between macroeconomic conditions and stock market performance is one of the most well-established topics in financial economics. Total reserves as a share of external debt serve as a key indicator of a country's ability to meet its external obligations. F. Akter et al. (2026) found that strong reserve positions are associated with lower financial vulnerability, greater macroeconomic stability, and higher stock returns. A. Amin et al. (2022) confirmed that countries with robust foreign exchange reserves experience lower market volatility and better investor outcomes over time.

GDP growth is another fundamental driver of equity market performance. N. Hossain et al. (2025) documents a positive association between economic growth and stock returns, which reflects the expansion of corporate earnings that typically accompanies economic expansion. The money supply also plays a role: O. Rahman et al. (2025) found a positive association between broad money growth and market returns, as higher liquidity facilitates investment activity and supports asset valuations.

Inflation and interest rates introduce countervailing pressures. A. Sobhan et al. (2024) found a negative relationship between inflation and stock returns, as rising prices erode real purchasing power, elevate discount rates, and introduce uncertainty into the investment environment. The interest rate spread defined as the difference between lending and deposit rates captures the profitability of financial intermediation and signals the cost of credit in the economy. M. Miah et al. (2023) found that a wider spread is positively associated with market returns when it reflects expanding lending activity and economic growth. However, in frontier market contexts such as Bangladesh, where a high spread often primarily signals elevated borrowing costs and restricted credit access, the effect on equity returns may be negative M. Alı et al. (2023).

Market capitalization as a share of GDP is a standard indicator of the overall depth and development of an equity market. O. Rahman et al. (2025) found that higher market capitalization is associated with greater liquidity, improved price discovery, and stronger investor participation all of which contribute to better stock market outcomes over the long run.

2.4 Methodological Considerations: GLS for Panel Data

Generalized Least Squares (GLS) regression is well suited for financial panel data because it directly accommodates two pervasive features of such data: heteroscedasticity (where the variance of the error term differs across observations) and autocorrelation (where error terms in adjacent time periods are correlated). Ima et al., (2024) demonstrated that GLS produces more efficient and consistent coefficient estimates than Ordinary Least Squares (OLS) when these conditions are present. F. Akter et al. (2026) applied GLS in a panel analysis of firm-specific return determinants, highlighting its robustness to data volatility. R. Sobhan et al. (2025) also confirmed the appropriateness of GLS in studies that combine Google Trends data with macroeconomic variables, noting that autocorrelation is a common feature of search volume time series.

2.5 Hypothesis Development

While the existing literature has separately examined the effects of investor attention and macroeconomic conditions on stock returns, very few studies have integrated both dimensions within a single empirical framework, and none to the authors' knowledge have done so for Bangladesh's ceramics industry. This study fills that gap by jointly modelling public attention and macroeconomic fundamentals as determinants of ceramics sector returns on the DSE over the period 2015 to 2024. Based on the theoretical arguments and empirical evidence reviewed above, the following hypotheses are proposed:

- H1: Public attention, proxied by Google Trends search volume, has a significant positive effect on the stock returns of ceramics firms listed on the DSE.
- H2: Total reserves as a percentage of external debt have a significant positive effect on stock returns.
- H3: The interest rate spread has a significant negative effect on stock returns in the ceramics sector.
- H4: Market capitalization as a percentage of GDP has a significant positive effect on stock returns.

3. Materials and Methods

3.1 Sample and Data

3.1.1 Industry and Sample Selection

The ceramics industry in Bangladesh was chosen for this study for several reasons. First, it represents an important segment of the country's manufacturing base, contributing meaningfully to both domestic supply and export revenues. Second, the industry is cyclically sensitive, meaning that its stock returns are likely to vary with macroeconomic conditions in ways that make regression analysis informative. Third, all five ceramics firms listed on the DSE were available with complete data for the full ten-year study period, which eliminates selection bias and allows for a balanced panel. The resulting dataset comprises 60 firm-year observations (5 firms × 12 years). While the sample is small by the standards of developed market studies, it represents the entire available population of DSE-listed ceramics firms and is therefore appropriate for the scope of this research. This sample limitation is explicitly discussed in the conclusions section.

3.1.2 Time Frame

The study covers the period from 2015 to 2024, spanning ten years. This period was selected for three reasons. First, financial reporting standards and data availability on the DSE improved noticeably from 2015 onward, making this the earliest point at which complete and reliable data could be assembled. Second, the period includes significant macroeconomic events such as the global commodity cycle, rising inflationary pressures, and the COVID-19 pandemic that generate cross-sectional and time-series variation in both stock returns and the explanatory variables. This variation is essential for regression analysis to produce meaningful coefficient estimates. Third, Google Trends data for Bangladesh's ceramics sector is most consistently available from 2015 onward.

3.1.3 Data Frequency and Sources

Annual data are used throughout this study. Annual frequency is appropriate because it aligns with companies' financial reporting cycles, reduces the noise associated with high-frequency data, and provides a more stable basis for the macroeconomic variables that tend to change on annual or quarterly cycles. Stock return data were collected from the DSE's publicly available database. Macroeconomic indicators including total reserves, the interest rate spread, and market capitalization were obtained from the World Bank's World Development Indicators (WDI) database, which is a widely cited and rigorously validated source in the empirical finance literature (J. Jakub et al., 2024; S. Akarsu., 2022). Google Trends data were extracted directly from the Google Trends platform using ceramics-related search terms specific to Bangladesh.

3.1.4 Variable Descriptions

Table 1 defines each variable used in this study, states the expected direction of its effect on stock returns based on theory, and identifies its data source. The dependent variable is the annual stock return for each ceramics firm, calculated as the percentage change in share price over the year. The four independent variables cover public attention and three macroeconomic dimensions: reserve adequacy, credit market conditions, and equity market development.

Table 1. Variable Descriptions.

Variable	Description & Expected Effect on Return	Source
Dependent Variable		
Stock Return (Return)	Calculated as: (Ending Value − Beginning Value) / Beginning Value × 100	DSE data

Independent Variables		
Google Trends (GT)	Country-level monthly search index for ceramics-related terms, averaged annually. Proxies investor attention and public sentiment.	Google Trends database
Total Reserves (TR) [% of total external debt]	High reserve levels signal macroeconomic stability, reduce borrowing costs, and support investor confidence, positively influencing stock performance.	World Bank WDI
Interest Spread (LR) [lending minus deposit rate, %]	A wider spread raises borrowing costs for firms, constraining investment and profitability. Adversely affects stock returns.	World Bank WDI
Market Capitalization (MC) [% of GDP]	Reflects equity market depth and investor participation. Higher capitalization is associated with greater liquidity and improved returns.	World Bank WDI

Note: All variables were normalized using a two-step procedure before estimation. See Section 3.2.4 for details.

3.2.2 Model Specification

The empirical model is specified as follows in Equation (1):

$$R_{it} = \alpha_i + \beta_1 GT_{it} + \beta_2 TR_t + \beta_3 LR_t + \beta_4 MC_t + \mu_i + \varepsilon_{it} \quad (1)$$

where R_{it} is the normalized annual stock return for firm i in year t; GT_{it} is the normalized Google Trends index for the ceramics sector in Bangladesh in year t; TR_t, LR_t, and MC_t are the normalized values of total reserves, interest spread, and market capitalization in year t (these variables vary only across time, not across firms, because they are measured at the country level); α_i represents firm-specific intercepts; μ_i is the individual-level random effect; and ε_{it} is the idiosyncratic error term.

3.2.3 Choice of Estimator: Random Effects GLS

The choice between fixed effects and random effects estimators was determined by the Hausman specification test. The Hausman test produced a chi-square statistic of 4.21 ($p = 0.379$), which fails to reject the null hypothesis that the individual firm effects are uncorrelated with the regressors. This result supports the use of a Random Effects GLS estimator, which is more efficient than the fixed effects estimator under this condition. A fixed effects estimator was also ruled out on practical grounds, because it cannot identify the effects of variables that are constant across firms (in this case, the three country-level macroeconomic variables). The GLS estimator is preferred over Ordinary Least Squares because it adjusts for serial dependence in the error terms, producing parameter estimates that are more reliable when autocorrelation is present. An AR (1) structure for within-panel autocorrelation is assumed, which is standard practice in empirical financial panel studies (S. Akarsu., 2022).

3.2.4 Validity Tests

Before estimating the model, all variables were subjected to a two-step normalization procedure. Four pre-estimation tests were then conducted to verify that the data satisfy the assumptions required for reliable regression inference. The Shapiro-Wilk test was used to assess the normality of each variable.

The Breusch-Pagan test was applied to check for heteroscedasticity. The Variance Inflation Factor (VIF) was computed to detect multicollinearity among the regressors. The Pesaran CD test was used to examine cross-sectional dependence across firms. Because the GLS estimator with AR(1) disturbances inherently addresses within-panel autocorrelation, a separate autocorrelation test was not required. Full results for all diagnostic tests are reported in the Appendix.

4. Findings

4.1 Descriptive Statistics

Table 2 presents descriptive statistics for all variables across the full panel (N = 60 observations). The mean stock return is −0.043, indicating that ceramics firms on the DSE generated slightly negative average returns over the study period. This outcome reflects the challenging operating environment faced by Bangladesh's manufacturing sector during some years of the study window, including the economic disruption associated with the COVID-19 pandemic. The standard deviation of returns (0.708) and the wide observed range (−2.130 to 3.620) indicate substantial variation in performance, both across firms and across years. This variation is essential for regression analysis to identify the effects of the explanatory variables.

Google Trends values show the highest relative variability in the sample (mean = 10.77, SD = 25.77), with many observations recorded at or near zero. This pattern is consistent with intermittent and low-level internet search activity for ceramics-related terms in Bangladesh, which reflects the country's relatively low but growing internet penetration rate. Total reserves average 55.27% of external debt over the period, with a moderate standard deviation of 12.92, indicating meaningful year-to-year variation around the mean. The interest spread and market capitalization show narrower variation relative to their means.

Table 2. Descriptive Statistics.

Variable	N	Mean	SD	Median	Min	Max
Stock Return	60	-0.043	0.708	-0.075	-2.130	3.620
Google Trends (GT)	60	10.767	25.767	0.000	0.000	128.000
Total Reserves (TR)	60	55.266	12.921	55.900	33.920	77.660
Interest Spread (LR)	60	10.618	2.357	10.030	7.120	13.940
Market Cap (MC)	60	28.099	8.317	27.945	9.320	39.600

4.2 Correlation Analysis

Table 3 presents pairwise correlation coefficients for all variables. The correlation between stock returns and Google Trends is very close to zero ($r = 0.007$, $p = 0.956$), indicating essentially no linear association between raw search activity and returns in this sample. By contrast, total reserves show a statistically significant positive correlation with returns ($r = 0.278$, $p = 0.032$), and the interest spread shows a statistically significant negative correlation ($r = -0.277$, $p = 0.033$). Market capitalization is negatively correlated with returns, though the relationship does not reach statistical significance ($r = -0.233$, $p = 0.073$). A strong positive correlation is observed between the interest spread and market capitalization ($r = 0.834$, $p < 0.001$). This co-movement is noted here because it could potentially affect the precision of the individual regression coefficients. However, the VIF diagnostics reported in Section 4.4 confirm that multicollinearity does not materially distort the estimation results, as all VIF values remain well within accepted thresholds.

Table 3. Pairwise Correlation Matrix (p-values in parentheses).

	Return	GT	TR	LR	MC
Return	1.000				
GT	0.007 (0.956)	1.000			
TR	0.278* (0.032)	-0.217 (0.097)	1.000		
LR	-0.277* (0.033)	-0.384* (0.002)	0.021 (0.875)	1.000	
MC	-0.233 (0.073)	-0.295* (0.022)	0.231 (0.076)	0.834* (0.000)	1.000

4.3 GLS Regression Results

Table 4 presents the main regression results. The overall model is statistically significant at the 1% level (Wald $\chi^2(5) = 15.88$, $p = 0.007$), confirming that the four explanatory variables together explain a meaningful portion of the variation in stock returns. The between-group R^2 of 0.574 indicates that roughly 57% of the cross-firm variation in returns is explained by the model, which is a respectable fit given the small sample and the limited number of predictors.

Table 4. Random Effects GLS Regression with AR(1) (Dependent Variable: Normalized Stock Return).

Variable	Coefficient	Std. Error	z-stat	p-value	95% CI
GT (n_gt)	-0.0016	0.00375	-0.43	0.666	[-0.009, 0.006]
TR (n_tr)	0.02087**	0.00756	2.76	0.006	[0.006, 0.036]
LR (n_lr)	-0.1259†	0.06483	-1.94	0.052	[-0.253, 0.001]
MC (n_mc)	0.00732	0.01825	0.40	0.688	[-0.028, 0.043]
Constant	0.03919	0.66592	0.06	0.953	[-1.266, 1.344]

Note: ** $p < 0.01$; † $p < 0.10$. N = 60 observations; 5 firms; T = 10 years. All variables are normalized. Corr (u_i, Xb) = 0 (assumed under random effects).

Among the four predictors, only total reserves (n_tr) achieves conventional statistical significance. Its positive coefficient ($\beta = 0.021$, $p = 0.006$) indicates that a one-unit increase in normalized total reserves is associated with an increase of approximately 0.021 units in normalized stock returns, holding other variables constant. This finding supports the hypothesis that macroeconomic stability, proxied by strong reserve buffers, reduces investment risk and enhances market confidence in the ceramics sector.

The interest spread (n_lr) carries a negative coefficient ($\beta = -0.126$, $p = 0.052$) that is marginally significant at the 10% level. This directional finding is consistent with the expectation that higher borrowing costs will constrain firm investment and profitability, particularly in a capital-intensive manufacturing sector like ceramics. The result should be treated as suggestive rather than conclusive at conventional thresholds.

Google Trends (n_gt) and market capitalization (n_mc) produce coefficients that are directionally consistent with their respective hypotheses but fail to reach statistical significance ($p = 0.666$ and $p = 0.688$, respectively). This does not necessarily mean that these variables have no effect on stock returns;

rather, the relatively small sample of 60 observations limits the statistical power available to detect effects that may be small or moderate in magnitude. These results are discussed further in Section 5.

4.4 Diagnostic Test Results

The four pre-estimation diagnostic tests confirm that the data broadly satisfy the assumptions required for valid inference. Full results are provided in the Appendix. Normality (Appendix 1): Following the two-step normalization, the Shapiro-Wilk test confirms approximate normality for stock returns ($W = 0.996$, $p = 0.999$), total reserves ($W = 0.998$, $p = 1.000$), interest spread ($W = 0.998$, $p = 1.000$), and market capitalization ($W = 0.998$, $p = 1.000$). The Google Trends variable remains partially non-normal after transformation ($W = 0.875$, $p < 0.001$), which is acknowledged as a limitation. GLS estimation is generally robust to moderate departures from normality in panels of this size, but this result warrants appropriate caution in interpreting the Google Trends coefficient.

Heteroscedasticity (Appendix 2): The Breusch-Pagan test produces a chi-square statistic of 0.00 ($p = 0.953$), strongly supporting homoscedasticity. The error variance is consistent across observations, which means that heteroscedasticity correction is not needed beyond what is already built into the GLS estimator.

Multicollinearity (Appendix 3): The mean VIF across all predictors is 1.85, well below the conventional threshold of 5.00. Individual VIF values range from 1.08 for total reserves to 2.61 for the interest spread. Despite the high bivariate correlation between the interest spread and market capitalization noted in Section 4.2, the VIF results confirm that multicollinearity does not materially distort the coefficient estimates.

Cross-Sectional Dependence (Appendix 4): The Pesaran CD test for stock returns yields a statistic of -1.137 ($p = 0.255$), which fails to reject the null hypothesis of no significant cross-sectional correlation. The mean absolute cross-sectional correlation is 0.42, indicating moderate co-movement across firms. This level of interdependence does not violate the assumptions of the GLS model used here.

Table 5. Summary of Empirical Findings.

Variable	Direction	p-value	Statistical Status	Interpretation
Google Trends (GT)	positive	0.666	Not Significant	H1 Rejected
Total Reserves (TR)	positive	0.006	Significant	H2 Accepted
Interest Spread (LR)	positive	0.052	Not Significant	H3 Rejected
Market Capitalisation (MC)	Positive	0.688	Not Significant	H4 Rejected

5. Discussion

5.1 Theoretical Contributions

This study contributes to several interconnected theoretical debates in the behavioral finance and financial economics literature. The finding that Google Trends exerts a directionally negative though statistically insignificant effect on stock returns is broadly consistent with the Attention Theory of Kahneman (1973) and the attention-based trading models advanced by Barber and Odean (2008), who argue that retail investors disproportionately buy attention-grabbing stocks. In the short run, this attention-driven demand may inflate prices above fundamental values (J. Jakub et al., 2024). The subsequent correction reflected as negative returns following attention spikes aligns with the Overreaction Hypothesis, which predicts that markets overshoot in response to salient information and correct over time.

At the same time, the statistically insignificant coefficient for Google Trends in our regression model raises an important point regarding the Efficient Market Hypothesis (S. Chauhan et al., 2025). Under semi-strong efficiency, stock prices should reflect all publicly available information without systematic delay. If Google Trends represents a publicly observable signal, its failure to significantly predict returns is consistent with efficient price discovery, suggesting that the market in Bangladesh's ceramics sector may be absorbing attention-related information without creating exploitable return anomalies. However, this interpretation must be tempered by the limited statistical power of our sample, which cannot rule out a real but small effect.

The significant positive effect of total reserves on stock returns offers empirical support for the broader macroeconomic stability hypothesis. Strong reserve positions reduce the risk of currency crises and sovereign debt distress, thereby lowering the risk premium demanded by investors and supporting equity valuations.

The marginally significant negative effect of the interest spread aligns with prior evidence from frontier markets that elevated lending-deposit differentials reflect financial market frictions rather than expanding credit activity. When the spread widens due to risk aversion or inadequate competition in the banking sector, firms face higher borrowing costs, which constrains investment and compresses profitability consistent with the negative direction of this coefficient.

5.2 Empirical Contributions and Reconciliation of Findings

The findings of this study are broadly consistent with, but in some respects diverge from, comparable work in other markets. The positive effect of reserve adequacy on stock returns echoes the findings of Ayala et al. (2024), who documented that macroeconomic stability indicators are strongly associated with equity market performance in frontier and emerging market settings. The negative interest spread effect is consistent with evidence from Rahman et al. (2025) on the relationship between borrowing costs and firm performance in Bangladesh's manufacturing sector.

The Google Trends result is more nuanced when placed in comparative context. Ayala et al. (2024), in a systematic review of Google Trends studies, found that most of the evidence supports a positive short-term price effect of higher search volumes, with reversals over longer horizons. However, most of these studies use data from developed markets with high internet penetration and active retail investor participation. Studies conducted in frontier markets, where the representativeness of internet search data is more limited, tend to find weaker or less significant attention effects. This pattern is consistent with the present results. Krystyniak et al. (2025) also noted that the predictive power of search-based attention proxies diminishes when the search index captures general public interest rather than targeted investor behavior. The country-level Google Trends index used in this study may suffer from exactly this limitation.

5.3 Practical Implications

The findings of this study carry concrete implications for three groups of stakeholders: investors, policymakers, and industry participants.

For investors, the most actionable insight is that macroeconomic stability indicators particularly Bangladesh's reserve position relative to external debt should be monitored closely when making sector-level investment decisions in the ceramics industry. A strengthening reserve position, relative to external obligations, has historically been associated with improved stock returns in this sector, and investors would be well advised to incorporate this indicator into their sector analysis. Conversely, periods in which the interest rate spread widens have tended to coincide with weaker returns, suggesting that changes in the banking environment warrant attention as a leading indicator for ceramics sector equities.

The finding that Google Trends does not significantly predict returns in this setting implies that online sentiment analysis, while useful in some markets, should not be the primary basis for investment decisions in Bangladesh's ceramics sector at present. Investors should instead focus on firm-level fundamentals such as profitability ratios, leverage levels, and liquidity positions alongside the macroeconomic indicators identified in this study.

For policymakers, the results reinforce the value of maintaining a sound macroeconomic framework as a foundation for equity market development. Policies that support adequate foreign reserve accumulation, contain inflation, and reduce exchange rate volatility are likely to have positive spillover effects on investor confidence and equity market performance in the manufacturing sector. Additionally, measures that promote greater competition in the banking sector and reduce the lending-deposit rate spread would lower the cost of credit for ceramics manufacturers, which could support both investment activity and stock returns.

For ceramics industry stakeholders and firm managers, the findings highlight the importance of the macroeconomic operating environment in shaping investor perceptions and market performance. During periods of macroeconomic stress, such as those associated with rising interest spreads or declining reserves, ceramics firms may face heightened investor caution regardless of firm-specific performance. Transparent financial reporting and proactive investor communication may help partially offset the dampening effect of adverse macroeconomic conditions on stock returns.

6. Conclusion

This study investigated the joint influence of public attention, measured using Google Trends, and three macroeconomic variables on the stock returns of all five ceramics firms listed on the Dhaka Stock Exchange over the ten-year period from 2015 to 2024. Using a Random Effects GLS panel regression model with AR (1) disturbances, chosen on the basis of the Hausman test and validated through a battery of pre-estimation diagnostics, the study found that total reserves as a percentage of external debt is the sole statistically significant determinant of ceramics sector stock returns ($\beta = 0.021$, $p = 0.006$). The interest rate spread shows a marginally significant negative association with returns ($\beta = -0.126$, $p = 0.052$), while Google Trends and market capitalization produce directionally consistent but statistically insignificant results.

The key conclusion is that macroeconomic fundamentals, particularly indicators of external financial stability, are more important than internet-based public attention in explaining stock return variation in Bangladesh's ceramics sector. The insignificant Google Trends result may reflect the limited representativeness of country-level internet search data as an attention proxy in a frontier market with relatively low internet penetration, the constrained statistical power of a 60-observation sample, or a genuine absence of exploitable attention-driven return anomalies in this sector. These possibilities cannot be disentangled with the data available, and this ambiguity is an important caveat to the interpretation of the Google Trends findings.

This study makes a novel contribution by being among the first to jointly examine online attention and macroeconomic determinants of stock returns within a single frontier market manufacturing sub-sector. It provides a methodological template and a comparative baseline for future work on investor attention and equity market dynamics in South and Southeast Asian frontier markets.

6.1 Limitations

Several limitations should be kept in mind when interpreting these findings. First, the sample of five firms is small and represents a single industry, which restricts both the statistical power of the analysis and the generalizability of the conclusions. Readers should exercise caution in extending these results beyond the ceramics sector or the study period. Second, the use of annual data may obscure intra-year attention

dynamics that are more visible in monthly or weekly data. Third, the country-level Google Trends index may not accurately capture the attention of investors specifically interested in ceramics sector equities, particularly given Bangladesh's relatively low internet penetration rate. Fourth, the model does not include firm-level financial controls such as leverage, return on assets, or firm size, which are established return predictors in the cross-sectional asset pricing literature. Fifth, the strong correlation between the spread of interest and market capitalization limits the precision with which the independent effect of each variable can be estimated.

6.2 Future Research Directions

Several avenues exist for extending and improving on this study. First, moving to higher-frequency (monthly or quarterly) data would allow a more granular examination of the attention-return relationship and would enable researchers to identify the short-term dynamics that annual data may mask. Second, expanding the analysis to multiple industries within Bangladesh would test whether the patterns observed here are specific to the ceramics sector or reflect broader manufacturing sector dynamics. Third, including firm-level financial controls such as leverage, profitability, and liquidity ratios would improve the model's explanatory power and bring the analysis closer to the standard in the cross-sectional returns literature. Fourth, incorporating internet penetration rates as an explicit moderating variable in the Google Trends-return relationship would directly test whether the representativeness of search-based attention proxies depends on the digital infrastructure of the market. Finally, replicating this study in comparable frontier market settings such as Pakistan, Sri Lanka, and Vietnam would help assess whether the findings generalize across the South and Southeast Asian region.

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Appendix

Appendix 1. Normality Test (Shapiro-Wilk).

Variable	Obs	W	V	z	Prob > z
n_return	59	0.99649	0.188	-3.598	0.99984
n_gt	59	0.87536	6.684	4.091	0.00002
n_tr	60	0.99817	0.099	-4.975	1.00000
n_lr	60	0.99816	0.100	-4.968	1.00000
n_mc	60	0.99816	0.100	-4.968	1.00000

Appendix 2. Heteroscedasticity Test (Breusch-Pagan).

Statistic	Value
chi²(1)	0.00
Prob > chi²	0.9532

Appendix 3. Collinearity Test (VIF).

Variable	VIF	1/VIF
n_lr	2.61	0.38281
n_mc	2.53	0.39594
n_gt	1.18	0.84460
n_tr	1.08	0.92211
Mean VIF	**1.85**	

Appendix 4. Cross-Sectional Dependence Test (Pesaran CD).

Variable	CD-stat	p-value	Avg. Joint T	Mean ρ	Mean |ρ|
n_return	-1.137	0.255	4.83	-0.06	0.42