Thesis On

Sensitiveness of Stock Market Returns to Macroeconomic Determinants; An Empirical Study on the Pharmaceutical Industry of Dhaka Stock Exchange

By

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requirements for the degree of
Bachelors of Business Administration

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BRAC University
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Declaration

It is hereby declared that

1. The thesis report submitted is my own original work while completing degree at BRAC University.

2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.

3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.

4. I have acknowledged all main sources of help.

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Letter of Transmittal

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66 Mohakhali, Dhaka-1212

Subject: Submission of the thesis on "Sensitiveness of Stock Market Returns to Macroeconomic Determinants; An Empirical Study on the Pharmaceutical Industry of Dhaka Stock Exchange".

Dear Sir,

I am honored to submit this thesis on "Sensitiveness of Stock Market Returns to Macroeconomic Determinants; An Empirical Study on the Pharmaceutical Industry of Dhaka Stock Exchange". This thesis is prepared as the BBA program's partial requirement under the BRAC Business School, BRAC University. I have put my best effort into preparing this thesis by following thoroughly the guidelines of formal thesis writing. I have tried my best to finish the thesis with the essential data and recommended proposition as compactly and comprehensively as possible.

I am writing to express my heartiest gratitude to you for providing precious advice and appropriate guidelines that helped me prepare this thesis thoroughly. Please call me if you perceive further investigation should be conducted on this thesis.

Sincerely yours,

Ibnat Tasrin

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BRAC Business School

BRAC University

June 16, 2023

Acknowledgement

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Subsequently, I express appreciation towards my esteemed parents. They continually gave me psychological support while I completed the thesis.

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Abstract

The thesis empirically investigates selected macroeconomic determinants' (money supply, exchange rate, industrial production, interest rate, and inflation rate) influence on the stock market returns of the Dhaka Stock Exchange's Pharmaceutical Industry, utilizing monthly data spanning the period from 2015:1 to 2020:12. Ten pharmaceutical companies were selected for this thesis to represent the pharmaceutical industry of the Dhaka Stock Exchange. Scatterplots, correlation analyses and linear regression analyses were conducted to examine the associations. The statistical analyses conducted in this thesis revealed that the effects of the macroeconomic determinants on stock returns were insignificant. The stock markets in Bangladesh are being subject to the control of affluent and politically influential individuals, artificial pricing mechanisms through the establishment of floor prices and market inefficiencies led to the thesis's inconclusive results. The thesis's inability to incorporate data spanning more than six years also had a role in contributing to its inconclusive results. Despite certain limitations, this thesis provides solid evidence on the current state of the Dhaka Stock Exchange.

Keywords: Pharmaceutical Industry, Bangladesh, stock market return, macroeconomic determinants, regression analysis.

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List of Acronyms

ADF	Augmented Dickey-Fuller
APT	Arbitrage Pricing Theory
ARCH	Autoregressive Conditional Heteroscedasticity
ARIMA	Autoregressive Integrated Moving Average
CSE	Calcutta Stock Exchange
DSE	Dhaka Stock Exchange
EPS	Earnings per share
GDP	Gross Domestic Product
OLS	Ordinary Least Square
P/E Ratio	Price to Earnings Ratio
SENSEX	Stock Exchange Sensitive Index
VECM	Vector Error Correction Model

Glossary

Primary Market

The primary market refers to the venue where corporations introduce entirely new securities that have not been traded previously on any exchange. A corporation issues securities to the general population to procure funds to support its objectives.

Discount Rate

To calculate the present value of future cash flows, corporate financiers often use a discount rate. It is the lowest acceptable rate of return that investors anticipate obtaining in relation to the amount of risk involved with the investment.

Demand-Supply Theory

The theory of demand and supply states that the pricing mechanism is contingent upon the interaction between the quantities of goods or services supplied and demanded. If the supply of a particular share exceeds the demand for it, there will be a decrease in prices. In the event of a situation where demand surpasses supply, there will be an increase in prices.

Commercial Balance

Commercial Balance describes the disparity between the monetary worth of a nation's exports and imports during a specified timeframe.

Chapter 01 Introduction

1.1 Origin of the Study

More than just acquiring and saving financial resources is required to guarantee that individuals possess adequate funds to prepare for the future. Inflation, a phenomenon characterized by a general price increase, can erode a currency's purchasing power. Individuals engage in investment activities to generate additional income to compensate for the adverse effects of inflation. This is the fundamental of investment. The stock market represents a potential avenue for investment (Barro, 1990). A stock market facilitates the exchange of financial instruments, including bonds, mutual funds, and shares of companies, whereas a share market is limited to exclusively trading shares. The stock exchange is a fundamental platform offering the necessary infrastructure for trading corporate stocks and other securities. Buying or selling a stock is contingent upon its listing on an exchange. Therefore, it can be considered as the venue where individuals who buy and sell stocks meet. The Dhaka Stock Exchange and the Chittagong Stock Exchange are the two stock exchanges in Bangladesh.

Following the issuance of new securities in the primary market, the shares become available for trading in the secondary market. Secondary market transactions involve the purchase of shares by one investor from another at the current market price. The determination of stock prices occurs within the marketplace, where the intersection of seller supply and buyer demand occurs (Gandhmal & Kumar, 2019). Regrettably, no precise mathematical formula can predict the actual behavior of a stock's price. That being said, there are several factors that influence a stock's value fluctuations.

First, in an efficient market, the determination of stock prices primarily relies on the fundamentals. Fundamentals are, at the primary level, a combination of two parameters: earnings per share (EPS) as an earnings base and price-to-earnings (P/E) ratio as a valuation multiple. The proprietor of common stock possesses a right to earnings, and the earnings per share (EPS) represents the proprietor's return on their investment. The valuation multiple is a metric that conveys anticipated projections regarding forthcoming events. The concept is primarily based on calculating future earnings' current value through discounting (Mayfield & Mizrach, 1992).

Second, it would be advantageous if fundamental factors solely determined stock prices. However, the actuality of the situation is more complex. Macroeconomic determinants including demand-supply, money supply, interest rate, and inflation rate significantly impact fundamental factors, ultimately affecting stock market prices. For example, inflationary pressures directly impact the discount rate, resulting in a reduction in the valuation multiple. This implies that future earnings are likely to be devalued in environments characterized by higher inflation, leading to a decline in stock prices (González et al., 2018).

Third, the financial stability of a respective industry is a significant determinant in deciding stock prices. Companies' share prices tend to correlate with one another when they are all part of the same industry. This is because market circumstances have comparable effects on enterprises within the same sector. However, if two companies compete for the same customer base, negative information about one might benefit the share prices of the other (Black et al., 2003).

Fourth, one cannot dispute that news or unexpected changes inside a firm, industry, or the global economy impact investor emotions, even though it is difficult to measure the exact impacts. The political environment, agreements between nations or businesses, product innovations,

acquisitions, mergers, and other unanticipated occurrences could affect stocks and the stock market (Lehkonen & Heimonen, 2015).

Finally, market sentiment refers to the collective mindset of investors in a particular market, which is reflected in the behavior and price changes of the stocks traded there. People's emotions often influence the stock market. Therefore, it is likely that market sentiment does not accurately represent a company's fundamental value. Regarding the stock market, sentiment is about how people feel, whereas fundamental value is how well a company does. The prevailing feeling among investors is either bullish or bearish. A bull market is a period of rising stock values and increased investor optimism. It is generally associated with a thriving economy and rising confidence levels among investors. A bear market, on the other hand, is characterized by declining stock values and waning investor enthusiasm. It is common during economic downturns when unemployment is high, and prices are on the rise (Maheu & McCurdy, 2000).

Although on a global scale, numerous studies explored the association between macroeconomic elements and stock market returns, according to the author's best knowledge, it is worth noting that there is a significant dearth of research on the role of macroeconomic factors on stock market performance, within the context of the Dhaka Stock Exchange. This thesis endeavors to bridge the existing gap in the literature by conducting an empirical investigation into the influence of macroeconomic determinants on the stock market returns of the Dhaka Stock Exchange's Pharmaceutical Industry during the timeframe spanning from 2015 to 2020.

The paper is structured as follows: The thesis's conceptual foundation is presented in section 1. The literature based on empirical evidence is shown in the next section. The thesis structure and research methods are the main topics of section 3. The results and interpretation of the data are reported in section 4. The last part wrapped up the whole thing.

1.2 Objectives

1.2.1 Broad Objective

The broad purpose of the thesis is to explore the influence of macroeconomic factors on the stock market performance of DSE's Pharmaceutical Industry.

1.2.2 Specific Objectives

1. Gain a deep insight into Bangladesh's stock markets.

2. Analyze the connections between stock market performance and macroeconomic elements.

3. In the context of Bangladesh, identify the exogenous factors that influence the stock market performances.

1.3 Limitations

Due to disorganized data and resource limitations, the research only considered six years and could not include other influential macroeconomic influences, e.g., the balance of trade and GDP. Furthermore, the time constraint prevented a more thorough investigation from being done. The lack of financial backing for this thesis posed a challenge in obtaining crucial data and literature necessary to complete this research.

Chapter 02 Literature Review

2.1 Bangladesh Stock Market: An Overview

Bangladesh's primary stock exchanges are the Dhaka Stock Exchange and the Chittagong Stock Exchange. The Dhaka Stock Exchange was founded in 1954, when the local government recognized the need to create an independent stock exchange in East Pakistan due to the prohibition of trading Pakistani shares and securities on the Calcutta Stock Exchange (CSE). The DSE is situated in Nikunja, Dhaka. As of 2021, the aggregate market capitalization of publicly traded firms on the Dhaka stock exchange exceeded $68 billion. The Dhaka stock exchange and The Nasdaq Stock Market partnership concerning trading technology was announced in January 2023 (Stock Market in Bangladesh: A Review of the First Decade, 2017). The port city Chittagong is home to Chittagong Stock Exchange. The exchange was founded in 1995 and is situated in the Agrabad commercial area of Chittagong. As of 2020, it has a combined market capitalization of over $38 billion.

The DSE and CSE's major responsibilities include a variety of tasks, including but not exclusive to, the registration of companies for trading purposes, the facilitation of trading settlements, the provision of automated trading services for listed securities, market administration, surveillance and control, the publication of a monthly review, the authorization of transactions, the monitoring of listed companies' compliance with regulatory requirements, the investigation of grievances, the management and utilization of the investors protection fund (Rahman & Moazzem, 2011).

2.2 Empirical Literature

Patel (2012) investigated the Indian Stock Market's efficiency concerning macroeconomic elements. Cost of borrowing, inflationary pressure, foreign exchange rate, circulation of money, index of production in industries, prices of silver, gold prices, and fuel prices, as well as the Sensex[1] and S&P CNX Nifty[2] — two broadly used composite stock market indices in India—have all been studied employing monthly data spanning from 1991:1 to 2011:12. The data underwent several statistical analyses, including the Augmented Dickey-Fuller Unit Root, the Granger Causal Analysis, the Johansen Cointegration, and the Vector Error Correction Model. Hence it was discovered that the stock price index and the following elements are highly positively correlated: inflation, silver prices, index of production in industries, circulation of money, and fuel prices. The author also demonstrated that stock price indexes are in a long-run equilibrium concerning all key macroeconomic variables.

Saeed (2012) adopted a multifactor model embedded in the framework of Arbitrage Pricing Theory to examine the impact of economic indicators on the return of stocks over the 2000-2010 period. The five macroeconomic factors studied here are short-term rates of return, amount of money in circulation, manufacturing output, energy prices and rate of exchange. Based on the information readily available from the Karachi Stock Exchange 100 index, nine industries were chosen for this analysis, i.e., energy, jute, textile composites, pharmaceuticals, electrical equipment, cement-based materials, automobiles, leasing, and ceramics. The findings of the diagnostic assessment showed the absence of any econometric issues. The Ordinary Least Square method was applied to examine

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[1] The acronym SENSEX denotes the Stock Exchange Sensitive Index. The SENSEX index is named after the Bombay Exchange (BSE), India's oldest exchange.

[2] The CNX Nifty is a significant index that monitors the performance of 50 highly capitalized and liquid stocks traded on India's National Stock Exchange (NSE).

how factors related to macroeconomics affect stock returns. The results indicated that sector returns are significantly impacted by the economic climate, albeit their effect on the variability of return on investments is comparatively insignificant. Short-term rates of interest mainly drive the variance of sector returns. Meanwhile, exchange rates and oil prices significantly impact specific sectors such as energy, automobiles and electronics.

Analyzing monthly information from 1991–2010 El-Nader and Alraimony (2012) examined how the state of the economy affected returns on the Amman Stock Exchange. Six macroeconomic metrics, quantity of cash in circulation, inflation rate, currency exchange rate, country's GDP, advances and loan rates, and a variable that serves as a dummy, were used to define the state of the economy in that research. Normality tests and unit roots tests were performed on the data. Furthermore, OLS and ARCH models were employed. Due to the presence of severe autocorrelation and a symptom of multicollinearity, the OLS estimates were ineffective and inconclusive. Nevertheless, ARCH (1) exhibited satisfactory performance. The findings indicated that inflation rate, dummy variable, quantity of cash in circulation, currency exchange rate, advances and loan rates negatively impact ASE returns. On the contrary, country's GDP exerts a favorable influence.

The study conducted by Quadir (2012) employed the ARIMA model to analyze the effects of fluctuations in industrial production and the interest rate of the Treasury Bill on the stock returns of the DSE. The study period spanned from January 2000 to February 2007. The stock returns of different firms were not considered separately in the study. Despite the correlation between the response variable (stock price index) and independent variables (interest rate on Treasury bill and fluctuations in industrial production) being positive according to the ARIMA model, the coefficients were statistically insignificant. The author anticipated this result as the model lacked

a considerable number of economic elements that play a crucial role in impacting the stock price, including foreign exchange rate, indices of consumer prices and the commercial balance.

Ali (2011) aimed to analyze the impact of macroeconomic climate shifts on the DSE's stock returns. A regression model with multiple variables was constructed in order to evaluate the association. The author's findings indicated a positive relationship between the measured variable (stock price index) and control variables (average growth in market capitalization and market price-to-earnings ratio). In contrast, the industrial production index, inflation, and foreign remittances had a negative impact. In essence, the lack of directional causation between the macroeconomic elements and stock prices eventually demonstrated the presence of an inefficiently working market.

Heidari et al. (2019) assessed the performance of Iran's pharmaceutical industry stock prices in response to challenges and fluctuations. The pharmaceutical industry can be analyzed through two distinct perspectives: the supply and demand dimensions. The demand side in Iran has been influenced by several factors, including the aging population, increasing urbanization, and evolving consumer preferences. The focus of this study was on the supply side, and its objective was to examine the impact of influential macroeconomic factors, which included healthcare expenses, oil price shocks, and monetary expansion of the pharmaceutical industry. The study utilized behavioral analysis and variance decomposition analysis to investigate the factors that exert influence. Monthly data spanning from 2005:1 to 2016:3 were collected for this purpose. The findings of this research indicated that the rise in the stock price of the pharmaceutical industry is linked to the impact of monetary expansion and healthcare inflation. These two factors were identified as the most significant determinants of the pharmaceutical industry stock performance in Iran.

Chapter 03 Methodology

3.1 Data Sources

This thesis analyses the correlation between stock market returns of the Dhaka Stock Exchange's Pharmaceutical Industry and five macroeconomic variables (money supply, exchange rate, industrial production, interest rate, and inflation rate). The thesis incorporated a prolonged and the most current available timeframe of six years to accurately depict the influence of macroeconomic factors on the movement of the stock market. Ten pharmaceutical companies, i.e., Square Pharmaceuticals, Beximco Pharma, Marico Bangladesh, ACI Formulations, Renata Limited, Orion Infusion, Kohinoor Chemical, Orion Pharma, IBN SINA Pharmaceutical, and Ambee Pharma, were selected for this thesis to represent the pharmaceutical industry of the Dhaka Stock Exchange. The analysis of the thesis was conducted employing secondary data. Share price information was sourced from the Dhaka Stock Exchange Trade Information, while the financial statements of the respective firms were utilized for data on dividends. The thesis collected monthly data on money supply, exchange rate, and interest rate from "Selected Economic Indicators," the weekly publications of Bangladesh Bank. The inflation rate data were procured from the "Monthly Economic Trends" publications of Bangladesh Bank, while the data on industrial production were obtained from the "Monthly Release of Industrial Production Statistics" publications of the Bangladesh Bureau of Statistics **(Appendix 1)**.

3.2 Calculation Method & Data Analysis Technique

Every company's monthly return for six consecutive years, from January 2015 to December 2020, were considered. The thesis employed the following methodology to calculate the monthly stock returns of all ten pharmaceutical companies. The computation involves adding the average monthly dividend to the difference between a share's closing and opening prices of each month

and dividing the sum by the stock's opening price. In simple terms, this $[\frac{(Closing\ price - Opening\ price + dividend)}{Opening\ price} \times 100]$ formula was applied to compute the returns. Finally, the Dhaka stock exchange's pharmaceutical industry's average monthly return over the last six years was obtained by averaging the returns of those aforementioned pharmaceutical companies **(Appendix 2)**.

Scatterplots were utilized to visually examine the association between independent variables and the response variable (stock market return). Subsequently, correlation analyses were conducted for each independent and dependent variable to verify the initial observations made from the scatterplot. linear regressions were performed to determine the extent to which independent variables can account for fluctuations in the dependent variable (the stock market return).

3.3 Defining Variables

According to the abovementioned literature, selecting appropriate independent variables is an essential step. All of the chosen variables were chosen on the basis of prior research. The selected macroeconomic variables were weighed for their potential economic impact on the current state of Bangladesh.

3.3.1 Dependent Variable

3.3.1.1 Stock Market Return

The term "stock market return" applies to the financial gain an investor obtains from their stock investment, which may be derived from the difference between the buying and selling price, the stock dividend, or both.

Section 3.2 outlines the methodology utilized in this thesis for computing the stock market monthly returns.

3.3.2 Explanatory Variables

3.3.2.1 Money Supply (MS)

The money supply is the entire quantity of money in circulation or existence in a nation for a certain period. The monetary base (M0), narrow money (M1), and money Supply (M2) are the three broad categories of the money supply (MS) based on size and account types, respectively. Money in circulation plus bank reserves equals M0. The smallest and most liquid measure; M0 is also known as the monetary base. M0 plus any additional readily convertible monetary assets (money equivalents) is M1. A money equivalent would be something like a checking account at a conventional bank. The money saved in that account is available for withdrawal at any moment. Savings accounts, time deposits, and retail money market funds are added to M1 to complete M2 (Brunner & Meltzer, 1990). This thesis used money supply (M2) as a measure of the money supply since it contains both M0 and M1.

In the past, several studies based on various stock exchanges throughout the globe have proven that increasing the money supply influences the stock market positively. For example, Homa and Jaffe (1971) calculated the link between the money supply and an index of common stock prices to develop a forecasting tool for investment strategies. According to their research, the amount and pace of dividend growth, the guaranteed rate of return, and the risk premium determine every common stock's price. They explained that because the money supply affects the guaranteed rate of return, the average level of stock prices also increases with the rise of the money supply. They concluded that there is a positive correlation between the money supply and stock prices. Hence, the thesis formulates:

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H1. Money Supply is positively related to stock market returns.

3.3.2.2 Exchange Rate (EXR)

Exchange rate fluctuations contribute to economic instability in emerging countries. A domestic currency value is evaluated relative to foreign currencies through the use of exchange rates (Basirat et al., 2014). This thesis used the Interbank Taka-USD Exchange Rate (Average). The initial increase in the price of imported goods relative to home goods caused by a domestic currency depreciation could encourage economic activity. Consequently, domestic exports grow, and imported goods become more expensive. However, research finding by Kandil and Mirzaie (2005) reveal that in developing countries where industrial materials are mostly imported, the cost of raw materials for firms rises after an increase in the exchange rate, driving up the prices of the finished products (which are sold locally).

Giving to different events, exchange rates and the stock market have been shown to have positive and negative correlations in several previous analyses based on various stock exchanges throughout the globe. The result of research by Lakshmanasamy (2021) indicates that the volatility of the US dollar/rupee exchange rate has a considerable negative influence on the returns of the Bombay Stock Exchange. Conversely, in 2003, Chiang and Yang published a paper that discovered a favorable correlation between stock market performance and US dollar/local currency exchange rates across six Asian stock markets (Bangladesh, Japan, Philippines, Vietnam, China, and Indonesia). Hence, the correlation between exchange rate and stock market return might be ambiguous. Therefore, the thesis formulates the following hypothesis:

H2. Exchange rate has a positive/negative relationship with stock market returns.

3.3.2.3 Industrial Production (IP)

The industrial production index is a monthly economic metric comparing real manufacturing, mining, electricity, and natural gas outcomes to a base year. The Bangladesh Bureau of Statistics (BBS) surveys state-owned manufacturing companies and major corporations with significant manufacturing operations to quantify changes in industrial production in Bangladesh. The industrial production index is calculated by compiling monthly production data from 965 sample industries (Industrial Production Statistics (IPS), 2021). The focus of this thesis is the pharmaceutical industry. Hence, the thesis only contains the production index for the pharmaceutical and medicinal chemical sectors.

The Industrial Production Index is often used as a leading economic indicator because of its correlation to other economic variables. Future cash flows and profitability of the businesses would improve if industrial output were up. Therefore, a good correlation between industrial production and stock returns is anticipated (Dincergok, 2016). Because of this, the thesis formulates the following hypothesis:

H3. Industrial production is positively related to stock market returns.

3.3.2.4 Interest rate (IR)

The policy rate refers to the cost of borrowing set by the central bank for the purpose of providing short-term loans to banks. According to Maio and Santa-Clara (2017), the policy interest rate plays a crucial role in determining the interest rates prevailing in the economy. This thesis employed call money (weighted average rate) as a proxy for interest rate, and this rate pertains to the borrowing rate between banks for overnight transactions.

A shift in the interest rate typically takes at least a year to significantly influence the economy, although the stock market often reacts to changes more quickly. In most cases, central banks boost interest rates to slow down inflation and protect price stability. When the Central Bank increases the interest rate, financial organizations usually raise the interest rates they charge their consumers to borrow money since borrowing money becomes more expensive for them. Therefore, households' disposable income declines as bills become more expensive. When households have less disposable income, businesses face the negative consequences of slowing consumer demand. Thus, when interest rates increase, businesses are affected by rising borrowing costs, and revenues fall. This can lower corporations' stock prices (Kasman et al., 2011). Therefore, the thesis formulates the following hypothesis:

H4. Interest rate is negatively related to stock market returns.

3.3.2.5 Inflation Rate (INFR)

The value of money decreases when inflation causes the prices of goods and services to increase. Input costs rise, and consumer buying power declines until wages increase. GDP and employment may be hurt by monetary policy measures to control inflation (Aliyu, 2012).

Numerous studies have investigated the influence of inflation on the return of stocks. Unfortunately, the research studies often yielded inconsistent results, as Sharpe (2002) reported. However, many scholars have observed a correlation between a decline in stock prices and a rise in inflation (Jordà et al., 2019). Since the 1930s, episodes of high inflation have been associated with the lowest real investment returns across virtually all economies. The best real returns are observed when inflation is between 2% and 3%, according to the analysis of S&P 500[3] returns by

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[3] The Standard & Poor's 500 index, commonly called the S&P 500, is a stock market index measuring the performance of 500 large companies listed on the New York Stock Exchange and Nasdaq.

decades. Inflation above this level often indicates a macroeconomic climate in the United States with broader challenges that have miscellaneous effects on stock prices ("Why Does the Federal Reserve," 2020). Hence, the thesis formulates the following hypothesis:

H5. Inflation rate is negatively related to stock market returns.

Variables	Notations	Variable Description	Estimated Effect	Source(s)
Dependent Variable				
Stock Market Return	SMR	$\frac{(Closing\ price - Opening\ price + dividend)}{Opening\ price} \times 100]$ formula was applied to compute the monthly stock returns of all ten pharmaceutical companies. The DSE's pharmaceutical industry's average monthly returns were determined by computing the mean of the monthly returns of ten pharmaceutical companies.		DSE & Annual Report
Explanatory Variables				
Money Supply	MS	Monthly Broad Money Data (Tk. in crore)	**(+)**	Bangladesh Bank
Exchange Rate	EXR	Monthly Interbank Taka-USD Exchange Rate	**(+)/(-)**	Bangladesh Bank
Industrial Production	IP	Monthly Pharmaceuticals and Medicinal Chemical Production Index (Base: 2005-06=100)	**(+)**	Bangladesh Bureau of Statistics
Interest Rate	IP	Monthly Call Money Rate (Weighted Average Rate)	**(-)**	Bangladesh Bank
Inflation Rate	INFR	Monthly Inflation Rate (Base: 2005-06=100)	**(-)**	Bangladesh Bank

Source: Author's Compilation

Table 1 Description of the Study Variables

3.4. Conceptual Framework

The following diagram depicts the conceptual framework of this thesis:
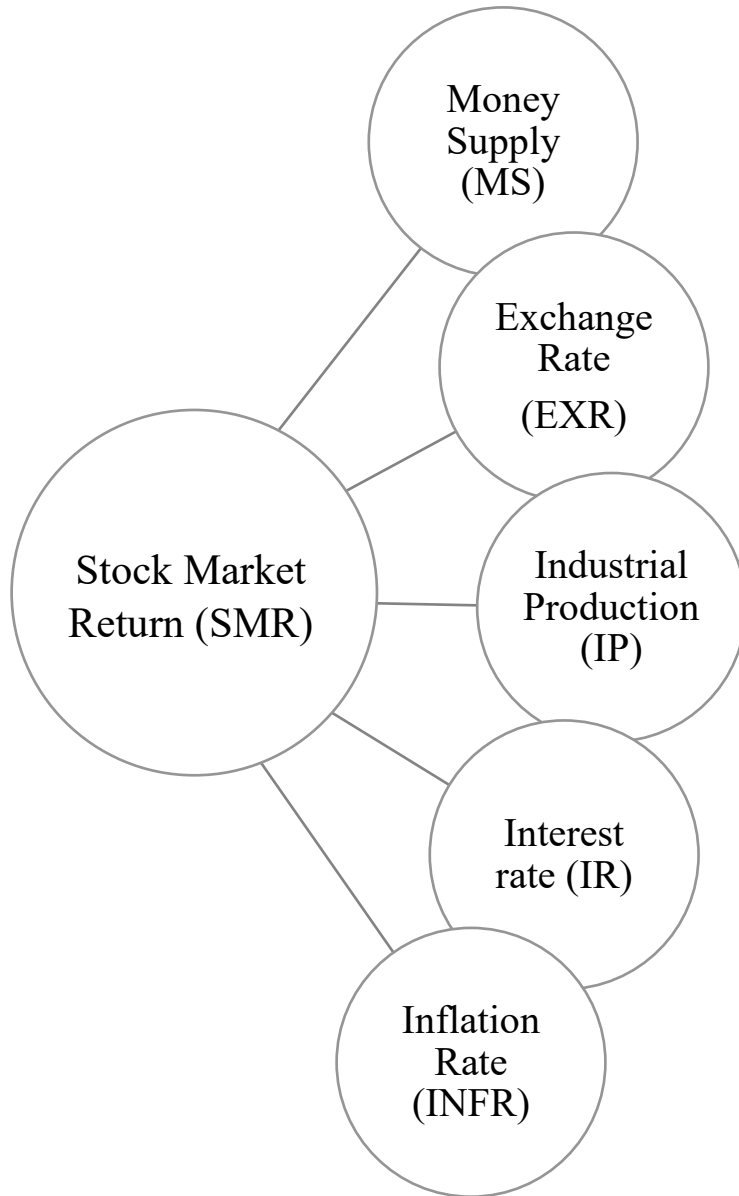
Figure 1 Conceptual Framework

3.5 Econometric Framework

The equation has been formed to estimate the determinants of SMRs:

$$SMR = \beta_0 + \beta_1 MS_1 + \beta_2 EXR_2 + \beta_3 IP_3 + \beta_4 IR_4 + \beta_5 INFR_5 + \varepsilon$$

β_0 = The Intercept

$\beta_1 - \beta_5$ = the coefficients of determinants

ε = Error Term

MS = Money Supply

EXR = Exchange Rate

IP = Industrial Production

IR = Interest rate

$INFR$ = Inflation Rate

Chapter 04 Analysis and Findings

4.1 Impact of Money Supply (MS) on Stock Market Return (SMR)

First, a scatterplot of money supply (MS) to stock market return (SMR) was created and is shown in Figure 02 to observe the connection between money supply (MS) and the stock market return (SMR) visually.
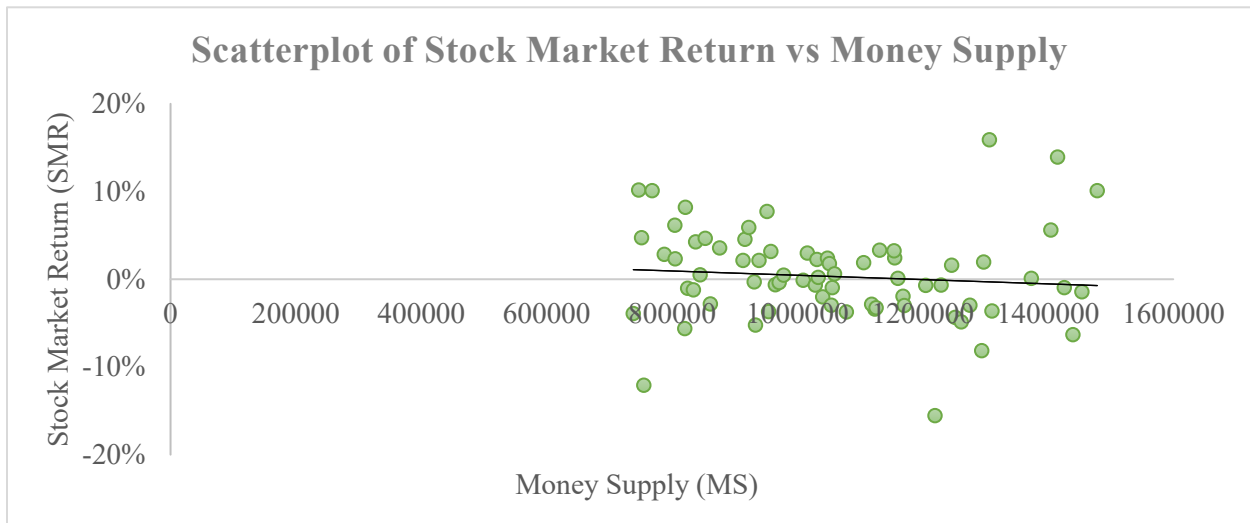
Figure 2 Scatterplot of Stock Market Return vs Money Supply

The y-axis in this graph represents the stock market return, a dependent variable, and the x-axis represents the money supply, an independent variable. The result shows that the scatterplot lacks any recognizable structure, the data points are dispersed throughout, and they form no line of any kind. Accordingly, based on a visual inspection, money supply, the independent variable, really has no linear relationship at all with stock market return, the dependent variable.

To verify the visual evaluation of the scatterplot, a correlation analysis between money supply and stock market return was then performed.

Correlations		Stock Market Return	Money Supply
Stock Market Return	Pearson Correlation	1	-.084
	Sig. (1-tailed)		.245
	N	70	70
Money Supply	Pearson Correlation	-.084	1
	Sig. (1-tailed)	.245	
	N	70	70

Table 2 Correlation Analysis between Stock Market Return and Money Supply

According to the correlation analysis presented, the Correlation Coefficient (r) = -0.084 and Significance (p) = 0.245. The -8.4% correlation displayed in the prior table is not statistically significant. This suggests that there is neither a positive nor a negative relation between money supply (MS) and stock market return (SMR).

Besides the lack of a linear association between money supply and stock market return in the data set employed in this analysis, a Simple Linear Regression was performed to see how much the money supply may account for variations in stock market return (dependent variable).

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.084[a]	.007	-.008	.0587986
a. Predictors: (Constant), MS				

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.002	1	.002	.482	.490[b]
	Residual	.235	68	.003		
	Total	.237	69			
a. Dependent Variable: SMR						
b. Predictors: (Constant), MS						

Table 3 Regression Analysis: Stock Market Return vs Money Supply

Decision: Coefficient of Determination (R^2) =.007. Given the lack of statistical significance in the regression model, it can be inferred that the explanatory power of the money supply concerning the change in stock market return is negligible, accounting for a mere 0.7%. Thus, this is not a good regression model and must accept the null hypothesis.

4.2 Impact of Exchange Rate (EXR) on Stock Market Return (SMR)

To visually investigate the connection between the exchange rate (EXR) and the stock market return (SMR), a scatterplot of the exchange rate (EXR) to stock market return (SMR) was first made and is shown in Figure 03.
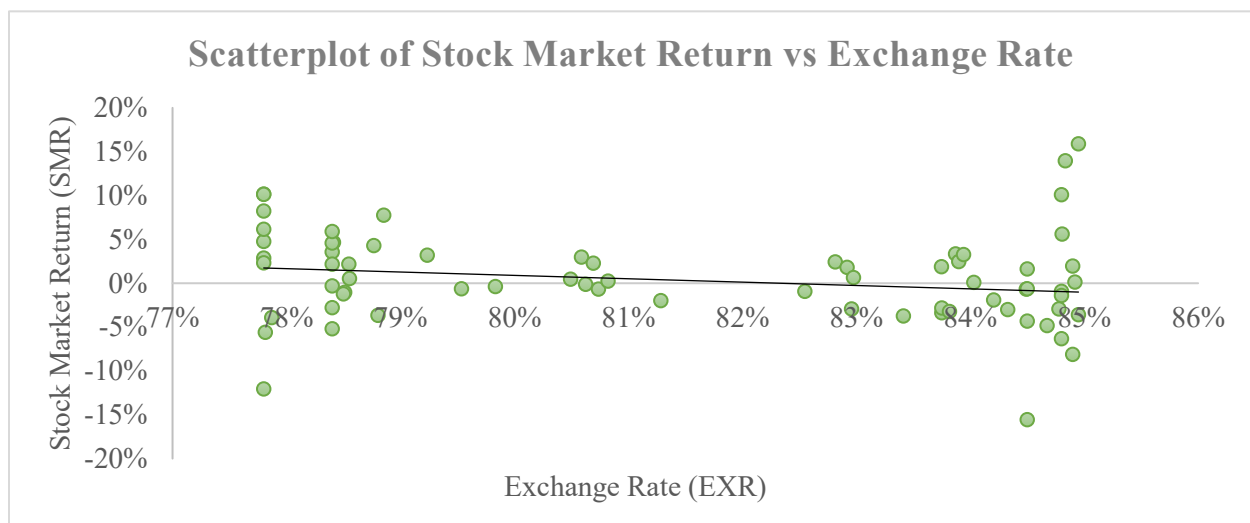
Figure 3 Scatterplot of Stock Market Return vs Exchange Rate

In this graph, the x-axis represents the exchange rate (independent variable) and the y-axis shows the stock market return (dependent variable). The scatterplot lacks any discernible structure, the data points are distributed everywhere, and no line of any type is generated as a consequence. Accordingly, the visual assessment reveals that the independent variable, exchange rate, has no linear connection with the dependent variable, stock market return.

Next, a correlation analysis of exchange rate and stock market return was run to back up the first impressions from the scatterplot.

Correlations		Stock Market Return	Exchange Rate
Stock Market Return	Pearson Correlation	1	-.186
	Sig. (1-tailed)		.062
	N	70	70
Exchange Rate	Pearson Correlation	-.186	1
	Sig. (1-tailed)	.062	
	N	70	70

Table 4 Correlation Analysis between Stock Market Return and Exchange Rate

The Correlation Coefficient (r) = -0.186 and the Significance (p) = 0.062, according to the correlation analysis performed. The prior table's reporting of a -18.6% correlation is also not significant. This implies that there is no association between exchange rate and stock market return, indicating that this correlation model is poor. It confirms the visual interpretation from the scatterplot.

In addition to the absence of a linear association between exchange rate and stock market return in the data set employed for this analysis, a Simple Linear Regression was conducted to determine the degree to which exchange rate may explain variations in stock market return.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.186[a]	.034	.020	.0579820
a. Predictors: (Constant), EXR				

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.008	1	.008	2.425	.124[b]
	Residual	.229	68	.003		
	Total	.237	69			
a. Dependent Variable: SMR						
b. Predictors: (Constant), EXR						

Table 5 Regression Analysis: Stock Market Return vs Exchange Rate

Decision: R^2 = 0.034, which is the coefficient of determination. Exchange rate can only explain 3.4% of the variation in stock market return, which is almost little given that model is insignificant. Thus, this is not a good regression model and must accept the null hypothesis.

4.3 Impact of Industrial Production (IP) on Stock Market Return (SMR)

First, a scatterplot of industrial production (IP) vs stock market return (SMR) was created (Figure 04) to examine the relationship between these two variables graphically.
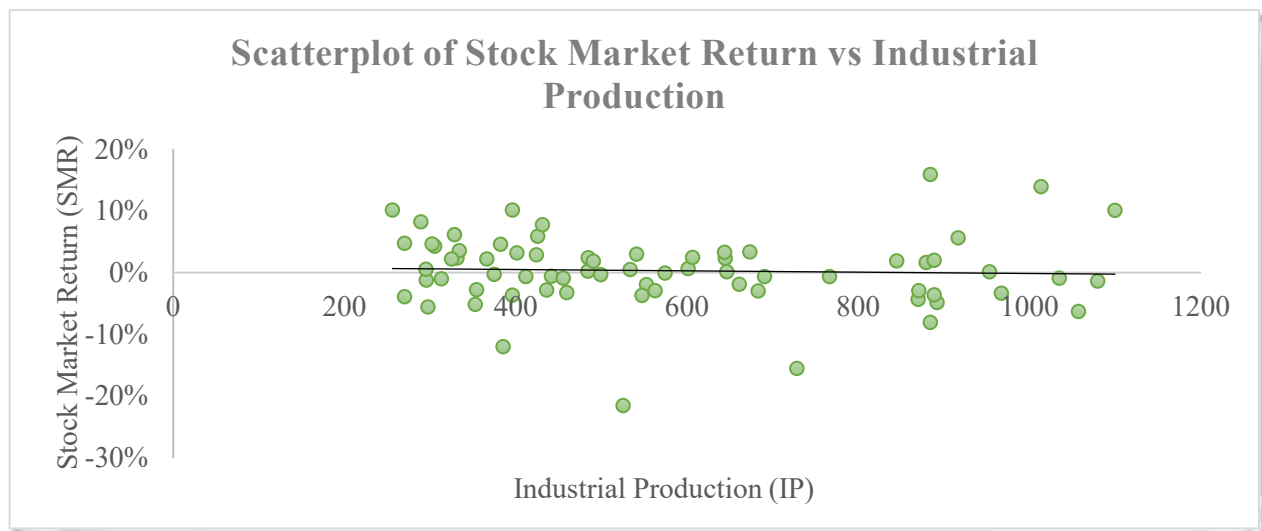
Figure 4 Scatterplot of Stock Market Return vs Industrial Production

The graph's independent variable, industrial production, is shown along the x-axis, and the dependent variable, stock market return, along the y-axis (dependent variable). The scatterplot has

no obvious structure, the data points are randomly distributed, and as a result, no meaningful line can be drawn from the scatterplot. Therefore, the visual examination shows that industrial production and stock market return do not have a linear relationship.

The scatterplot was followed by a correlation analysis of industrial production (IP) and stock market return (SMR) to confirm the initial findings.

Correlations		Stock Market Return	Industrial Production
Stock Market Return	Pearson Correlation	1	-.045
	Sig. (1-tailed)		.356
	N	70	70
Industrial Production	Pearson Correlation	-.045	1
	Sig. (1-tailed)	.356	
	N	70	70

Table 6 Correlation Analysis between Stock Market Return and Industrial Production

The correlation study shows that the Correlation Coefficient (r) is -0.045 and the Significance (p) is 0.356. The -4.5% correlation reported in the analysis is also not significant, suggesting no correlation between industrial production and stock market return, indicating that this correlation model is inadequate. The correlation analysis validated the visual interpretation of the scatterplot.

Despite to finding that industrial production and stock market return did not have a linear relationship in the data set utilized for this research, a Simple Linear Regression was performed to see how much industrial production may explain changes in stock market return (dependent variable).

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.045ᵃ	.002	-.013	.0589472
a. Predictors: (Constant), IP				

ANOVAª						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.000	1	.000	.137	.712[b]
	Residual	.236	68	.003		
	Total	.237	69			
a. Dependent Variable: SMR						
b. Predictors: (Constant), IP						

Table 7 Regression Analysis: Stock Market Return vs Industrial Production

Decision: Coefficient of Determination (R^2) = 0.002, which suggests that industrial production can explain just 0.2% of the change in stock market return. We must accept the null hypothesis since the regression model fails to achieve statistical significance.

4.4 Impact of Interest rate (IR) on Stock Market Return (SMR)

Figure 05 shows a scatterplot of interest rate (IR) against stock market return (SMR) to visualize the relationship between these two variables.

Figure 5 Scatterplot of Stock Market Return vs Interest Rate

The graph's independent variable, interest rate, is shown along the x-axis, and the dependent variable, stock market return, along the y-axis (dependent variable). The data points are scattered randomly over the scatterplot, and no discernible line can be drawn between them. Hence, based

on the visual assessment, there is no linear relation between the interest rate and stock market return.

After that, a correlation analysis of interest rate (IR) and stock market return (SMR) was performed to back up the initial impressions gleaned from the scatterplot.

Correlations		Stock Market Return	Interest rate
Stock Market Return	Pearson Correlation	1	.121
	Sig. (1-tailed)		.158
	N	70	70
Interest rate	Pearson Correlation	.121	1
	Sig. (1-tailed)	.158	
	N	70	70

Table 8 Correlation Analysis between Stock Market Return and Interest rate

Correlation Coefficient (r) = 0.121 and Significance (p) = 0.158, as determined by the correlation analysis presented. The 12.1% correlation is o not statistically significant. This indicates that neither a positive nor a negative affiliation exists between the interest rate and stock market return. The correlation analysis validated the visual interpretation of the scatterplot.

Notwithstanding the conclusion from correlation analysis that interest rates and stock market returns did not have a linear relationship in the data set employed for this thesis, a simple Linear Regression was run to investigate how much interest rate may explain changes in stock market return.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.121[a]	.015	.000	.0585704
a. Predictors: (Constant), IR				

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.003	1	.003	1.017	.317[b]
	Residual	.233	68	.003		
	Total	.237	69			
a. Dependent Variable: SMR						
b. Predictors: (Constant), IR						

Table 9 Regression Analysis: Stock Market Return vs Interest rate

Decision: $R^2 = 0.015$, which is the coefficient of determination. The exchange rate can only explain 1.5% of the variation in stock market return, which is virtually nothing given that the regression model is even insignificant. Thus, this is not a good regression model and must accept the null hypothesis.

4.5 Impact of Inflation Rate (INFR) on Stock Market Return (SMR)

A scatterplot (Figure 6) was constructed to visualize the correlation between inflation rate (INFR) and stock market return (SMR).
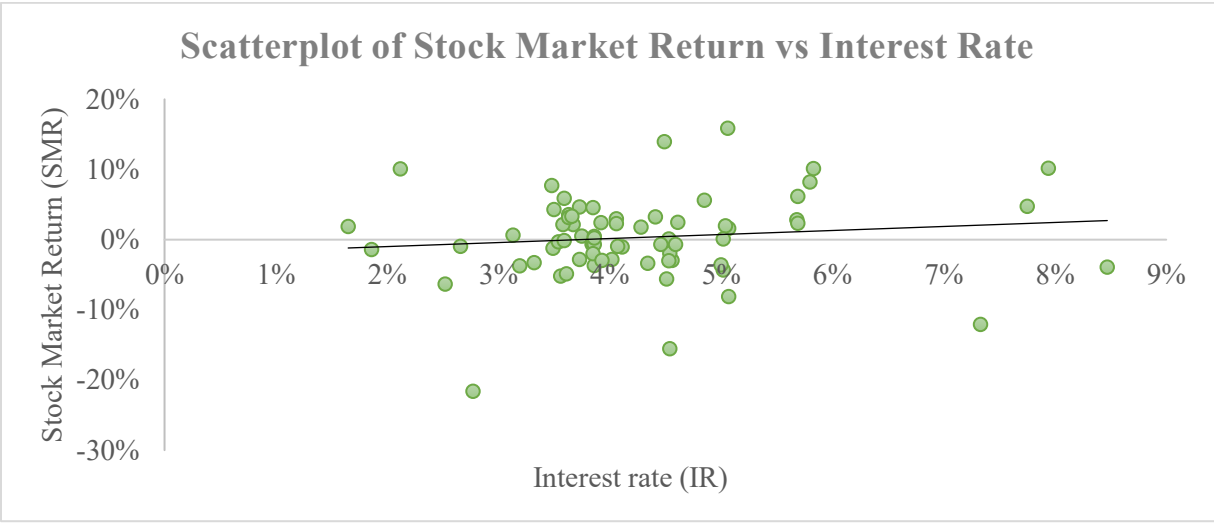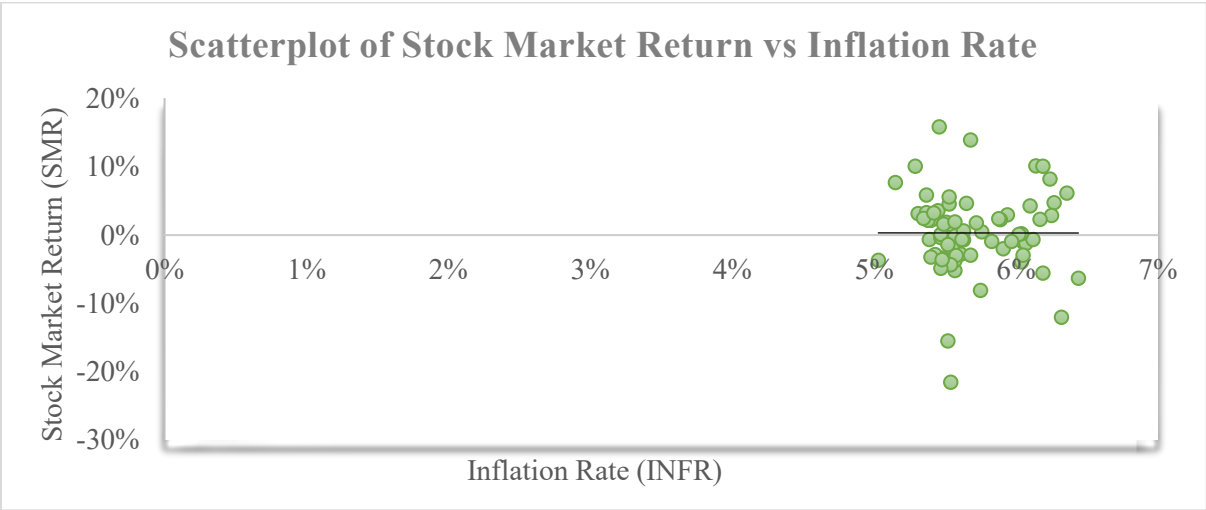

Figure 6 Scatterplot of Stock Market Return vs Inflation Rate

The graph's independent variable, inflation rate, is shown along the x-axis, and the dependent variable, stock market return, along the y-axis (dependent variable). The scatterplot lacks any

recognizable structure and the data points form no line of any kind. Thus, according to the visual evaluation, there is no linear relationship between the inflation rate and the stock market return.

Next, a correlation analysis of inflation rate (IR) and stock market return (SMR) was carried out to back up the preliminary thoughts gained from the scatterplot.

Correlations		Stock Market Return	Inflation Rate
Stock Market Return	Pearson Correlation	1	-.001
	Sig. (1-tailed)		.498
	N	70	70
Inflation Rate	Pearson Correlation	-.001	1
	Sig. (1-tailed)	.498	
	N	70	70

Table 10 Correlation Analysis between Stock Market Return and Inflation Rate

Correlation Coefficient (r) = -0.001 and Significance (p) = 0.498, as determined by the correlation analysis presented. This -0.1% correlation is not statistically significant. This indicates that neither a positive nor a negative association exists between the inflation rate and stock market return. The correlation analysis confirmed the scatterplot's initial interpretation.

A simple Linear Regression was performed to examine how much the inflation rate may explain changes in stock market return (dependent variable), despite the finding from the correlation analysis that inflation rates and stock market returns did not have a linear connection in the data set utilized for this research.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.001[a]	.000	-.015	.0590067
a. Predictors: (Constant), INFR				

ANOVAᵃ					
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.000	1	.000	.000	.995ᵇ
	Residual	.237	68	.003		
	Total	.237	69			
a. Dependent Variable: SMR						
b. Predictors: (Constant), INFR						

Table 11 Regression Analysis: Stock Market Return vs Inflation Rate

Decision: Coefficient of Determination (R^2) =.000. As the regression model is not even statistically significant, the exchange rate cannot be employed to describe any variance in stock market return. Thus, this is not a good regression model and must accept the null hypothesis.

4.6 Multiple Linear Regression Analysis

The research employed a Multiple Linear Regression to investigate the collective explanatory power of all the macroeconomic determinants, including money supply, exchange rate, industrial production, interest rate, and inflation rate, on the fluctuations in stock market return, which served as the dependent variable.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.371ᵃ	.137	.070	.0564879
a. Predictors: (Constant), INFR, IP, IR, EXR, MS				

ANOVAᵃ					
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.033	5	.007	2.040	.085ᵇ
	Residual	.204	64	.003		
	Total	.237	69			
a. Dependent Variable: SMR						
b. Predictors: (Constant), INFR, IP, IR, EXR, MS						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.452	.492		2.952	.004
	MS	1.703E-7	.000	.583	1.160	.250
	EXR	-1.910	.678	-.924	-2.816	.006
	IP	5.773E-5	.000	.241	.671	.505
	IR	1.001	.665	.212	1.504	.137
	INFR	-2.583	2.463	-.143	-1.049	.298
a. Dependent Variable: SMR						

Table 12 Multiple Linear Regression Analysis

Decision: The value of the coefficient of determination (R^2) is 0.137. The macroeconomic determinants exhibit a limited explanatory power of 13.7% concerning the variability observed in stock market returns. The model is also lacking statistical significance. Thus, it is essential to acknowledge the null hypothesis as the appropriate course of action since this regression model lacks reliability.

The equation presented below has been derived by utilizing Multiple Linear Regression Analysis. Given that the Regression model lacks validity, it would not be a suitable formula for forecasting stock market returns.

SMR =1.452 + (1.703E-7)MS - 1.910EXR + (5.773E-5)IP + 1.001IR - 2.583INFR

4.7 Discussion

This thesis hypothesized that macroeconomic determinants would significantly impact stock market returns. However, the statistical analysis conducted in this thesis revealed that the effects of these determinants (money supply, exchange rate, industrial production, interest rate, and inflation rate) on stock returns were inconclusive. There are multiple contributing factors to obtaining such outcomes.

Several affluent and politically influential individuals have control over the stock markets in Bangladesh. They accumulated a fortune through fraud and established a culture of extensive loan default in Bangladesh. The secondary market is artificially inflated through massive share trading to attract amateur investors. As inexperienced investors enter the market, they quickly liquidate their stocks at inflated prices. Such unethical behavior ultimately results in the collapse of the market. The recent history of Dhaka stock exchange of severe market crashes occurred in 1996 and 2010, respectively (Haque, 2023). The two crashes were defined by extreme stock price tampering and the enticement of inexperienced investors seeking to generate easy money. The concept of enduring investment, supported by a thorough evaluation of a firm's fundamental capacity, has never caught on in Bangladesh. The practices of speculation[4] and "share trading" persist.

Analysts have linked the confidence crisis among investors to the actions of the Bangladesh Securities and Exchange Commission (BSEC), which attempted to artificially maintain the market at a higher level despite the declining prices of most stocks. Establishing an artificial price floor

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[4] Buying or selling a share in hopes of a price increase or decrease is speculation. Speculators ignore a security's fundamental worth and focus only on price swings.

resulted in a significant disparity between the demand and supply of stocks, leading to a depletion of market liquidity. The imposition of a floor price has resulted in an artificial price mechanism for stocks, contrasting the global treatment of stock markets as free. The correlation between the stock market index of Bangladesh and the global market is incongruous due to the presence of market distortions. Structural issues have prevented the stock market in Bangladesh from experiencing a consistent period of bullish activity over the past ten years. In contrast, many global indices have demonstrated significant growth, doubling, or even tripling in value during the same time frame.

Finally, the thesis's inconsequential conclusion was further influenced by the fact that it included just six years of data, and it was restricted in its ability to incorporate other crucial macroeconomic parameters like GDP and the balance of trade because of time constraints and limited asses to crucial data.

Chapter 05 Conclusion

This research aimed to conduct an empirical investigation into the influence of macroeconomic determinants, i.e., money supply, exchange rate, industrial production, interest rate, and inflation rate, on the stock market returns of the Dhaka Stock Exchange's Pharmaceutical Industry. Scatterplots were utilized to visually examine the relationship between macroeconomic determinants (independent variable) and the stock market return (dependent variable). In addition, correlation analyses were performed to verify the initial observations made from the scatterplot. Linear regressions were also performed to determine the extent to which independent variables can account for fluctuations in the dependent variable.

The author hypothesized that macroeconomic factors would strongly affect stock market returns. However, the statistical research performed here showed that these factors had little to no influence on stock returns. Getting such results involves several contributing elements. At the outset, the stock markets in Bangladesh are controlled by a small group of extremely wealthy and politically powerful individuals. Through deceit, they acquired a fortune and laid the groundwork for widespread debt default across Bangladesh. Stocks have an artificial price mechanism thanks to establishing a floor price, which contradicts the generally held view that stock markets are free. Due to market inefficiencies, the relationship between the Bangladesh stock market index and the international market is inconsistent. Lastly, the thesis's lack of ability to combine other important macroeconomic metrics like GDP and the balance of trade contributed to its ultimately inconclusive outcomes.

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Appendix 1: Macroeconomic Determinants Monthly Data

Date	Broad Money (M2)	Exchange Rate (EXR)	Industrial Production (IP)	Interest Rate (IR)	Inflation Rate (INFR)
	(Tk. in crore)	Interbank Taka-USD Exchange Rate (Average)	Pharmaceuticals and Medicinal Chemical Production (Base: 2005-06=100)	Call Money (Weighted Average Rate)	(Base: 2005-06=100)
January, 2015	738526.50	77.87%	270.23	8.47%	6.04%
February, 2015	747086.60	77.80%	256.09	7.94%	6.14%
March, 2015	751386.50	77.80%	270.31	7.75%	6.27%
April, 2015	755192.40	77.80%	385.31	7.33%	6.32%
May, 2015	768349.80	77.80%	396.23	5.83%	6.19%
June, 2015	787614.10	77.80%	424.48	5.68%	6.25%
July, 2015	804681.60	77.80%	328.72	5.69%	6.36%
August, 2015	805378.00	77.80%	331.81	5.69%	6.17%
September, 2015	821473.10	77.80%	289.48	5.80%	6.24%
October, 2015	820257.10	77.81%	297.74	4.51%	6.19%
November, 2015	825182.00	78.51%	313.46	4.11%	6.05%
December, 2015	838114.20	78.77%	305.32	3.50%	6.10%
January, 2016	834501.10	78.50%	295.74	3.49%	6.07%
February, 2016	845036.00	78.55%	295.37	3.75%	5.62%
March, 2016	853184.80	78.41%	302.42	3.73%	5.65%
April, 2016	861414.50	78.40%	354.34	3.73%	5.61%
May, 2016	876093.60	78.40%	334.18	3.63%	5.45%
June, 2016	916377.90	78.40%	382.60	3.85%	5.53%
July, 2016	913304.70	78.40%	325.16	3.67%	5.40%
August, 2016	922883.10	78.40%	425.71	3.59%	5.37%
September, 2016	931523.20	78.40%	375.04	3.54%	5.53%
October, 2016	933226.60	78.40%	352.81	3.56%	5.57%
November, 2016	938721.40	78.55%	366.54	3.58%	5.38%
December, 2016	954053.80	78.80%	396.38	3.86%	5.03%
January, 2017	951582.90	78.85%	431.59	3.48%	5.15%
February, 2017	957886.50	79.24%	401.55	3.63%	5.31%
March, 2017	964823.10	79.54%	441.87	3.84%	5.39%
April, 2017	971263.70	79.83%	499.57	3.85%	5.47%
May, 2017	978479.90	80.49%	534.07	3.86%	5.76%
June, 2017	1016076.00	80.59%	541.33	4.06%	5.94%
July, 2017	1009591.90	80.63%	574.63	3.59%	5.57%
August, 2017	1031151.70	80.69%	645.12	4.06%	5.89%
September, 2017	1028700.60	80.74%	412.17	3.86%	6.12%

October, 2017	1033222.00	80.82%	484.51	3.86%	6.04%
November, 2017	1040365.20	81.28%	552.83	3.85%	5.91%
December, 2017	1056009.20	82.55%	455.61	4.07%	5.83%
January, 2018	1048062.10	82.82%	484.99	3.92%	5.88%
February, 2018	1051546.70	82.92%	490.86	4.28%	5.72%
March, 2018	1054113.20	82.96%	563.06	4.56%	5.68%
April, 2018	1059468.00	82.98%	601.39	3.13%	5.63%
May, 2018	1078297.90	83.41%	547.64	3.19%	5.57%
June, 2018	1109981.00	83.72%	525.52	2.77%	5.54%
July, 2018	1106160.70	83.75%	845.33	1.65%	5.51%
August, 2018	1123954.10	83.75%	967.75	4.34%	5.48%
September, 2018	1118894.30	83.75%	436.19	4.02%	5.43%
October, 2018	1125824.60	83.82%	459.89	3.32%	5.40%
November, 2018	1131502.90	83.87%	673.65	3.66%	5.37%
December, 2018	1155360.40	83.90%	606.80	4.61%	5.35%
January, 2019	1154557.50	83.94%	644.15	4.41%	5.42%
February, 2019	1160572.40	84.03%	646.80	4.53%	5.47%
March, 2019	1168579.40	84.21%	661.34	4.54%	5.55%
April, 2019	1170943.40	84.33%	683.40	4.53%	5.58%
May, 2019	1205157.60	84.49%	691.00	4.59%	5.63%
June, 2019	1219611.40	84.50%	728.57	4.54%	5.52%
July, 2019	1229572.40	84.50%	766.98	4.46%	5.62%
August, 2019	1246305.30	84.50%	879.83	5.07%	5.49%
September, 2019	1251880.70	84.50%	870.20	5.02%	5.54%
October, 2019	1261811.30	84.67%	892.50	3.61%	5.47%
November, 2019	1275477.00	84.78%	871.07	3.93%	6.05%
December, 2019	1294434.90	84.90%	884.77	5.07%	5.75%
January, 2020	1297549.90	84.90%	889.25	5.04%	5.57%
February, 2020	1306496.70	84.95%	884.60	5.06%	5.46%
March, 2020	1310668.50	84.95%	889.12	5.00%	5.48%
June, 2020	1373735.00	84.92%	953.89	5.02%	6.02%
July, 2020	1404878.20	84.81%	916.99	4.85%	5.53%
August, 2020	1415412.30	84.83%	1013.86	4.49%	5.68%
September, 2020	1426204.40	84.80%	1035.36	2.66%	5.97%
October, 2020	1439727.80	84.80%	1057.82	2.52%	6.44%
November, 2020	1453960.00	84.80%	1080.18	1.86%	5.52%
December, 2020	1478684.30	84.80%	1100.27	2.12%	5.29%

Appendix 2: Average Pharmaceutical Industry Stock Return

Date	Square	Beximco	Marico	ACI	Renata	Orion Infution	Kohinoor Chemicals	Orion Pharma	The IBN SINA	Ambee	Average Pharmaceutical Industry Stock Return
January, 2015	-2.22%	-9.17%	0.61%	-8.71%	0.92%	-7.06%	-1.10%	-5.86%	-6.44%	-0.12%	-3.91%
February, 2015	4.03%	4.18%	9.76%	22.18%	15.56%	3.22%	3.11%	2.31%	14.83%	22.50%	10.17%
March, 2015	-0.15%	-0.34%	19.47%	14.47%	1.76%	3.89%	7.59%	-3.24%	-1.60%	5.78%	4.76%
April, 2015	-7.19%	-20.52%	-19.25%	11.30%	-10.83%	-12.49%	-11.63%	-22.50%	-9.59%	-18.00%	-12.07%
May, 2015	3.71%	31.83%	7.00%	37.75%	-14.55%	17.08%	2.52%	26.94%	-5.28%	-5.77%	10.12%
June, 2015	7.24%	10.37%	1.30%	-5.27%	7.70%	2.57%	11.19%	-3.33%	-2.83%	-0.32%	2.86%
july, 2015	4.85%	12.78%	5.83%	-8.27%	25.98%	0.58%	4.21%	-2.01%	14.67%	2.98%	6.16%
August, 2015	-6.11%	-7.43%	-0.32%	-13.69%	-6.41%	17.72%	7.60%	-4.37%	32.56%	3.75%	2.33%
September, 2015	-1.37%	10.17%	20.09%	9.55%	3.76%	7.33%	-0.10%	3.22%	29.00%	0.63%	8.23%
October, 2015	-2.40%	-0.68%	-4.16%	-10.18%	-3.25%	-14.83%	-2.10%	-8.66%	-3.97%	-5.71%	-5.60%
November, 2015	4.19%	8.30%	-6.93%	1.68%	3.93%	8.59%	-5.82%	-0.61%	-21.67%	-1.88%	-1.02%
December, 2015	-1.62%	5.92%	-4.19%	8.48%	-1.29%	4.33%	4.30%	6.01%	12.72%	8.20%	4.29%
January, 2016	1.50%	0.13%	-5.52%	-6.67%	0.24%	9.45%	-2.28%	-5.58%	-4.06%	0.63%	-1.22%
February, 2016	0.81%	0.35%	0.92%	1.29%	-0.06%	-4.79%	-3.92%	10.65%	-2.46%	2.44%	0.52%
March, 2016	-4.01%	-1.63%	-3.09%	-2.36%	-1.84%	34.40%	7.63%	-8.30%	18.50%	7.28%	4.66%
April, 2016	-0.16%	-2.86%	-2.29%	-11.05%	0.05%	-24.49%	0.49%	-6.78%	18.46%	0.69%	-2.79%
May, 2016	2.32%	1.86%	3.16%	1.33%	-8.75%	17.96%	-1.97%	9.74%	9.93%	0.07%	3.56%
June, 2016	1.88%	0.98%	0.53%	1.20%	7.25%	14.87%	0.11%	-0.56%	23.78%	-4.42%	4.56%
July, 2016	0.94%	3.14%	-0.37%	3.27%	-4.02%	-4.50%	11.77%	0.75%	-3.41%	14.15%	2.17%
August, 2016	-2.01%	-3.90%	-2.22%	2.98%	-2.64%	-3.22%	5.91%	1.29%	7.97%	54.82%	5.90%
September, 2016	1.63%	2.14%	-0.09%	1.75%	0.46%	0.02%	-4.77%	2.36%	-0.80%	-5.69%	-0.30%
October, 2016	-0.30%	-5.46%	-0.70%	-8.01%	-1.81%	-4.09%	-5.17%	-6.66%	-7.70%	-12.07%	-5.20%
November, 2016	-8.57%	6.10%	-0.73%	4.34%	-0.15%	-12.41%	23.40%	16.46%	1.24%	-8.01%	2.17%
December, 2016	1.34%	-2.72%	-23.21%	-4.28%	-1.61%	-1.65%	-4.98%	2.12%	-6.11%	4.25%	-3.69%
January, 2017	4.84%	7.44%	5.35%	12.89%	1.81%	-6.05%	1.29%	13.99%	36.08%	-0.21%	7.74%
February, 2017	2.95%	5.05%	-2.45%	23.74%	0.37%	3.99%	1.31%	7.41%	-7.48%	-3.07%	3.18%
March, 2017	3.19%	19.27%	0.97%	-1.13%	-1.65%	-4.62%	-2.23%	-6.86%	-9.13%	-4.09%	-0.63%
April, 2017	1.32%	0.40%	0.88%	-4.01%	1.47%	2.56%	2.13%	-7.06%	-1.66%	0.24%	-0.37%
May, 2017	-2.11%	-0.06%	0.11%	-2.57%	-0.11%	3.05%	3.17%	-2.08%	-0.84%	6.08%	0.46%
June, 2017	2.22%	2.76%	0.62%	1.26%	5.36%	0.72%	6.71%	5.12%	3.19%	1.96%	2.99%
July, 2017	-1.27%	-0.62%	0.23%	0.76%	-1.00%	1.57%	-1.45%	-1.49%	-0.41%	2.50%	-0.12%
August, 2017	1.12%	-2.69%	0.82%	1.99%	0.07%	5.03%	1.77%	-1.31%	7.46%	8.48%	2.27%
September, 2017	5.68%	-1.29%	9.41%	-1.80%	1.88%	-7.35%	2.28%	-2.54%	-3.06%	-9.82%	-0.66%
October, 2017	-1.76%	-6.43%	8.11%	-11.85%	3.19%	4.93%	11.32%	3.28%	-6.55%	-2.00%	0.22%

November, 2017	2.15%	7.00%	-3.60%	0.13%	-8.92%	-8.94%	-11.13%	0.92%	3.71%	-1.15%	-1.98%
December, 2017	0.42%	0.10%	2.70%	-2.02%	1.20%	0.39%	-5.60%	1.14%	-0.58%	-7.17%	-0.94%
January, 2018	8.11%	2.41%	10.39%	3.81%	8.51%	-0.87%	-0.76%	-2.37%	-2.49%	-2.52%	2.42%
February, 2018	-4.14%	-1.40%	-3.11%	7.14%	2.22%	-1.63%	0.08%	1.16%	0.20%	17.53%	1.80%
March, 2018	-1.84%	-2.55%	4.32%	-7.13%	-2.48%	-2.18%	-4.08%	0.52%	-1.62%	-12.52%	-2.96%
April, 2018	-1.71%	0.00%	0.21%	-2.10%	1.59%	-6.67%	4.98%	-7.94%	11.13%	6.83%	0.63%
May, 2018	-7.17%	-8.21%	0.31%	-10.61%	-3.50%	-1.76%	-4.30%	-7.34%	-3.61%	8.94%	-3.72%
June, 2018	6.03%	-91.24%	0.11%	-82.27%	6.71%	-15.27%	9.57%	-59.63%	1.25%	8.87%	-21.59%
July, 2018	-5.91%	-3.91%	-2.40%	-1.59%	-1.28%	-7.41%	-1.85%	1.03%	19.06%	23.20%	1.89%
August, 2018	2.20%	0.23%	-0.05%	-0.32%	-1.37%	-6.77%	-4.63%	-2.41%	-1.26%	-19.36%	-3.37%
September, 2018	-2.12%	-7.64%	4.89%	-3.11%	0.61%	-8.46%	-0.41%	-3.72%	-3.66%	-4.71%	-2.83%
October, 2018	-2.06%	-6.51%	3.81%	-5.07%	4.16%	-6.17%	3.17%	-4.62%	-14.17%	-5.00%	-3.25%
November, 2018	-0.05%	5.20%	2.46%	2.30%	-9.80%	13.30%	-10.44%	0.05%	1.16%	29.09%	3.33%
December, 2018	-2.65%	-0.25%	2.01%	3.21%	1.06%	-5.85%	2.08%	2.27%	5.39%	17.28%	2.46%
January, 2019	3.89%	6.22%	3.96%	-2.02%	0.72%	17.14%	2.87%	2.49%	0.03%	-2.70%	3.26%
February, 2019	2.77%	4.36%	2.33%	2.03%	2.74%	-3.97%	-0.06%	-3.13%	0.22%	-6.31%	0.10%
March, 2019	-1.99%	-6.12%	9.62%	-4.06%	1.81%	-8.12%	-1.71%	-8.19%	-1.46%	0.89%	-1.93%
April, 2019	-2.59%	-3.80%	2.14%	-3.34%	0.43%	0.05%	0.61%	-5.56%	-1.43%	-16.47%	-3.00%
May, 2019	-1.89%	-4.63%	2.36%	-4.06%	-0.03%	0.93%	1.10%	2.15%	0.34%	-3.07%	-0.68%
June, 2019	4.21%	-92.45%	6.13%	-80.60%	2.74%	-1.88%	0.36%	-3.47%	2.12%	7.30%	-15.55%
July, 2019	-3.04%	-0.21%	12.72%	-4.96%	-2.13%	2.12%	-1.89%	-4.61%	-2.39%	-2.09%	-0.65%
August, 2019	0.13%	1.11%	6.59%	4.96%	0.80%	0.02%	5.03%	0.72%	1.58%	-4.76%	1.62%
September, 2019	-5.73%	0.27%	-5.65%	-8.46%	6.45%	-9.00%	0.39%	-9.84%	-2.43%	-9.33%	-4.33%
October, 2019	0.01%	-7.27%	0.18%	-17.27%	2.20%	-13.12%	3.48%	-4.30%	-6.18%	-6.23%	-4.85%
November, 2019	-12.19%	3.51%	-0.33%	-4.29%	-9.79%	10.41%	-17.15%	9.49%	1.20%	-10.32%	-2.95%
December, 2019	-9.63%	-12.22%	-1.09%	-16.45%	-4.91%	-3.72%	-3.89%	-6.78%	-6.46%	-16.06%	-8.12%
January, 2020	5.21%	10.02%	2.79%	-2.81%	0.38%	-2.69%	3.77%	1.22%	2.54%	-0.84%	1.96%
February, 2020	-1.66%	-0.78%	-4.47%	11.61%	0.55%	62.79%	18.13%	62.16%	3.69%	6.95%	15.90%
March, 2020	-10.64%	-16.79%	-3.75%	14.22%	-0.73%	-19.85%	17.64%	-2.87%	-5.52%	-7.73%	-3.60%
June, 2020	-1.64%	-1.39%	0.48%	-9.88%	-1.34%	0.16%	0.03%	-2.24%	2.95%	13.96%	0.11%
July, 2020	5.12%	21.17%	9.33%	14.04%	7.02%	0.16%	0.03%	3.89%	1.20%	-5.78%	5.62%
August, 2020	17.23%	34.92%	15.20%	-0.55%	7.99%	4.59%	0.05%	32.88%	19.41%	7.81%	13.95%
September, 2020	-5.67%	1.57%	9.38%	-8.36%	-2.47%	8.45%	0.03%	-4.48%	-8.70%	0.93%	-0.93%
October, 2020	-2.49%	-0.65%	-3.03%	-9.36%	2.00%	-12.47%	0.03%	-17.58%	-7.94%	-11.71%	-6.32%
November, 2020	-7.00%	13.19%	-0.47%	5.38%	-9.95%	-2.02%	0.03%	-11.18%	1.38%	-3.50%	-1.41%
December, 2020	19.02%	32.19%	1.32%	0.33%	5.32%	5.15%	0.03%	29.94%	5.51%	2.23%	10.10%