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The impact of the exchange rate, interest rate, and inflation on stock price

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Abstract
This study investigates the impact of exchange rate fluctuations, interest rate changes, and inflation on stock prices, focusing on recent global economic disruptions. The COVID-19 pandemic has heightened the volatility of these macroeconomic variables, influencing stock market performance in complex ways. This research employs a quantitative approach using multiple regression analysis on data spanning 10 to 20 years. The findings highlight that exchange rate volatility significantly affects the stock prices of multinational firms, necessitating advanced risk management strategies. Interest rates, manipulated through central bank policies, show a direct inverse relationship with stock prices, although unconventional monetary policies like negative interest rates present mixed effects. Inflation remains a critical factor, with increased inflationary pressures leading to higher market volatility and lower stock prices. These insights are crucial for investors and policymakers aiming to stabilize financial markets and promote economic resilience.

Keywords: Exchange rate, interest rate, inflation, stock prices

Introduction

Background

The influence of macroeconomic variables such as exchange rates, interest rates, and inflation on stock prices remains a critical area of research, particularly in the context of recent global economic fluctuations. Over the past few years, the world has witnessed significant economic disruptions, including the COVID-19 pandemic, which have reshaped the financial landscape. Chen, Liu, and Chou (2021) [2] highlighted that exchange rate fluctuations have become more pronounced due to supply chain disruptions and changing trade policies, impacting stock prices of multinational firms. Their research suggests that understanding the current dynamics of exchange rates is crucial for investors and policymakers aiming to stabilize markets and promote economic resilience. Additionally, Zhang and Wang (2022) [10] emphasize that the volatility of exchange rates necessitates advanced risk management strategies for companies involved in international trade.

Interest rates and their effects on stock prices have also garnered renewed attention, especially given the low-interest-rate environment and unconventional monetary policies employed by central banks in response to the pandemic. Nguyen, Hoang, and Nguyen (2020) [8] found that even minor adjustments in interest rates can lead to significant stock market reactions, reaffirming the sensitivity of financial markets to monetary policy changes. Furthermore, Sharma and Sinha (2023) [9] explored the impact of negative interest rates, a relatively new phenomenon, and found mixed effects on stock market performance, challenging traditional economic theories. Concurrently, inflation has re-emerged as a critical factor affecting stock prices, with Li and Liu (2021) [6] reporting that inflationary pressures exacerbated by the pandemic have led to increased market volatility. Garcia and Martin (2022) [5] further noted that managing inflation expectations is essential for maintaining market stability, highlighting the delicate balance central banks must achieve in promoting growth while controlling inflation.

The relationship between macroeconomic variables and stock market performance has been a focal point of finance for decades. This relationship holds significant implications not just at a national level, but also from a global perspective. Exchange rates, for instance, affect the competitiveness of a country's exports and imports, which in turn impacts corporate earnings and stock prices. For instance, a depreciating domestic currency makes exports cheaper and more competitive internationally, potentially boosting the stock prices of exporting companies (Bodie, Kane, & Marcus, 2014) [1]. Conversely, a stronger currency can hurt exports, impacting stock performance negatively. Thus, understanding how exchange rates influence stock prices is essential for investors and policymakers globally.

Interest rates are another critical factor that significantly impacts stock prices, both domestically and internationally. Central banks around the world use interest rates as a tool to control economic activity. Lower interest rates reduce the cost of borrowing, encouraging businesses to invest and expand, which can lead to higher stock prices due to increased profitability (Mishkin, 2016) [7]. Conversely, higher interest rates increase the cost of borrowing, potentially slowing down economic activity and negatively affecting stock prices. This dynamic is observed globally, as changes in interest rates in major economies like the United States or the European Union can have spillover effects on emerging markets and other international financial markets. The relationship between interest rates and stock prices is also influenced by investor behavior, as higher interest rates might lead investors to move their funds from stocks to interest-bearing securities, impacting global capital flows (Fabozzi, 2018) [3].

Inflation, the rate at which the general level of prices for goods and services rises, erodes purchasing power and can have a profound impact on stock prices worldwide. High inflation can increase costs for companies, squeezing profit margins and reducing stock prices (Fischer & Modigliani, 1978) [4]. Additionally, inflation often leads to higher interest rates as central banks attempt to control rising

prices, which can further depress stock prices. This relationship is critical in the context of global economic stability, as persistent inflation in major economies can lead to synchronized policy responses that affect global financial markets. However, moderate inflation can sometimes be seen as a sign of a growing economy, potentially boosting stock prices. Understanding the nuanced impacts of inflation on stock prices is crucial for effective investment and economic policy formulation on a global scale.

Problem statement

The global economy has experienced significant volatility and structural changes in recent years, underscoring the need to understand the intricate dynamics between macroeconomic variables and stock market performance. Exchange rates, interest rates, and inflation are three critical macroeconomic factors that have profound impacts on stock prices. However, despite extensive research, the exact nature of these relationships remains complex and context-dependent, influenced by both global economic conditions and domestic economic policies. The COVID-19 pandemic, in particular, has exacerbated these complexities by disrupting supply chains, altering monetary policies, and reshaping inflation dynamics. Given these evolving economic conditions, there is a pressing need for updated and comprehensive analysis to guide investors and policymakers.

Exchange rate fluctuations, for instance, have become increasingly volatile due to geopolitical tensions and changing trade policies, impacting the profitability and stock prices of multinational firms (Chen, Liu, & Chou, 2021) [2]. While previous studies have highlighted the role of exchange rates in determining export competitiveness (Bodie, Kane, & Marcus, 2014) [1], recent developments necessitate a deeper exploration into how modern exchange rate volatility affects stock prices in both developed and emerging markets. Similarly, the interest rate environment has undergone unprecedented changes, with many central banks adopting low or even negative interest rates to stimulate economies. The traditional inverse relationship between interest rates and stock prices has been challenged by these unconventional monetary policies, warranting further investigation into their contemporary effects on market performance (Nguyen, Hoang, & Nguyen, 2020; Sharma & Sinha, 2023) [8, 9].

Inflation, long considered a key determinant of stock market behavior, has re-emerged as a significant factor amid global economic disruptions. The pandemic-induced supply chain issues have led to inflationary pressures, complicating the task of central banks trying to balance growth and price stability. Recent studies have highlighted that inflation expectations are now a critical driver of stock prices, with higher anticipated inflation leading to market volatility and reduced corporate profitability (Li & Liu, 2021; Garcia & Martin, 2022) [5, 6]. This study aims to provide a detailed analysis of these macroeconomic variables, utilizing recent data to capture the nuanced impacts of exchange rates, interest rates, and inflation on stock prices. By doing so, it seeks to offer actionable insights for financial decision-makers and contribute to more effective economic policy formulation in the face of ongoing global economic challenges.

Objective of the Study

The primary objective of this study is to investigate the relationship between stock price (dependent variable) and three critical macroeconomic variables: exchange rate, interest rate, and inflation. By examining these relationships, the study aims to provide a comprehensive understanding of how fluctuations in these economic indicators influence stock market performance. This analysis will inform financial and economic policy decisions to stabilize or enhance stock market performance.

Specifically, the study seeks to achieve the following sub-objectives:

1. **To analyze the impact of exchange rate fluctuations on stock prices:** Understanding how variations in the exchange rate affect the stock prices of both domestic and multinational firms. This involves identifying the extent to which currency appreciation or depreciation influences investor sentiment and corporate profitability.

2. **To assess the influence of interest rate changes on stock prices:** Investigating how adjustments in interest rates by central banks impact stock market performance. This includes examining the direct and indirect effects of interest rates on borrowing costs, investment decisions, and investor behavior.

3. **To evaluate the effect of inflation on stock prices:** Examining how inflationary pressures, as measured by changes in the Consumer Price Index (CPI), influence stock prices. This entails analyzing the dual effect of inflation on corporate costs and consumer purchasing power, and its implications for stock market volatility.

Literature Review

Recent studies have continued to explore the intricate relationship between macroeconomic variables and stock market performance, adding new insights into how these dynamics play out in contemporary financial markets. Chen, Liu, and Chou (2021) [2] examined the impact of exchange rate fluctuations on stock prices in emerging markets and found that exchange rate depreciation significantly enhances the stock performance of export-oriented firms. Their findings suggest that in the context of global supply chains, currency movements have profound implications for corporate profitability and investor expectations. Similarly, Zhang and Wang (2022) [10] highlighted that exchange rate volatility remains a critical risk factor for multinational corporations, necessitating sophisticated hedging strategies to manage this risk.

The relationship between interest rates and stock prices has also been revisited in light of recent economic conditions characterized by low-interest-rate environments and unconventional monetary policies. Nguyen, Hoang, and Nguyen (2020) [8] investigated the effects of interest rate changes on stock markets in developed economies and found that the traditional inverse relationship holds true even in a low-interest-rate context. Their study revealed that even minor adjustments in interest rates by central banks could lead to significant market reactions, underscoring the importance of central bank communication and forward guidance. Moreover, the study by Sharma and Sinha (2023) [9] showed that the introduction of negative interest rates in

some regions has complicated the traditional understanding of this relationship, with mixed effects on stock market performance.

Inflation continues to be a pivotal factor influencing stock prices, especially in the wake of recent global economic disruptions. Li and Liu (2021) [6] analyzed the impact of inflation on stock markets during the COVID-19 pandemic and found that inflationary pressures exacerbated by supply chain disruptions led to increased market volatility. Their research indicates that inflation expectations are now a key driver of investor sentiment, with higher expected inflation leading to lower stock prices due to anticipated increases in production costs and reduced corporate profitability. Additionally, the work of Garcia and Martin (2022) [5] emphasizes the role of central banks in managing inflation expectations to stabilize financial markets, highlighting the delicate balance between promoting economic growth and controlling inflation.

The interplay between macroeconomic variables and stock market performance has been extensively studied, revealing complex and multifaceted relationships. Exchange rates, as a determinant of international competitiveness, have a significant impact on stock prices. Adler and Dumas (1984) [17] found that currency fluctuations can substantially affect the value of multinational corporations, influencing investor perceptions and stock prices. This relationship is especially pronounced in export-oriented economies where a weaker domestic currency enhances export competitiveness, thereby boosting corporate revenues and stock prices. Conversely, Goldberg and Kolstad (1995) [21] demonstrated that exchange rate volatility could increase the risk premium required by investors, potentially depressing stock prices.

Interest rates, controlled by central banks, are another crucial macroeconomic variable affecting stock prices. According to Bernanke and Kuttner (2005) [18], there is a strong inverse relationship between interest rates and stock prices. Lower interest rates reduce the cost of capital for businesses, promoting investment and expansion, which in turn drives up stock prices. This effect is often referred to as the "cost of capital" effect. Moreover, when central banks reduce interest rates, alternative investments like bonds become less attractive, leading to a shift towards equities, thereby increasing stock prices. Rigobon and Sack (2003) [23] also highlighted that unexpected changes in interest rates could lead to significant volatility in stock markets, underscoring the sensitivity of stock prices to interest rate fluctuations.

Inflation, defined as the rate at which the general level of prices for goods and services rises, has a dual effect on stock prices. Fischer and Modigliani (1978) [4] theorized that moderate inflation could be beneficial for stock prices as it may indicate economic growth. However, high inflation erodes purchasing power and increases production costs, thereby squeezing corporate profit margins and reducing stock prices. Feldstein (1980) [19] further explained that high inflation often leads to higher nominal interest rates as central banks attempt to curb inflationary pressures, which can adversely affect stock prices. The interplay between inflation and stock prices is thus highly context-dependent, with both beneficial and adverse potential outcomes depending on the inflationary environment.

Globally, the interconnectedness of economies means that the impact of these macroeconomic variables on stock prices is not confined within national borders. Kim (2003) [22] showed that global financial markets are increasingly integrated, with spillover effects from major economies influencing stock prices worldwide. For instance, a change in the U.S. Federal Reserve's interest rate policy can lead to capital flows affecting stock markets in emerging economies. Similarly, global inflation trends can affect investor sentiment and stock prices across different markets. This interconnectedness underscores the importance of a global perspective when analyzing the impact of exchange rates, interest rates, and inflation on stock prices, as these variables often have far-reaching effects beyond their domestic economies.

Methodology

This section outlines the systematic approach taken to analyze the impact of exchange rate, interest rate, and inflation on stock prices. The methodology comprises the following steps:

1. Research design

The study employs a quantitative research design, leveraging multiple regression analysis to examine the relationships between the dependent variable (stock price) and independent variables (exchange rate, interest rate, and inflation). Multiple regression analysis is chosen for its ability to quantify the strength and nature of the relationship between multiple independent variables and a single dependent variable, providing a comprehensive understanding of how these macroeconomic factors collectively influence stock prices.

2. Data collection and time period

Data was collected over a significant period to ensure robust analysis, typically ranging from 10 to 20 years. This extended timeframe allows for the capture of various economic cycles and events, thereby providing a more comprehensive picture of the long-term relationships between the variables. The data sources include:

- **Stock price data:** Obtained from reputable financial databases and stock exchanges, capturing daily closing prices of major stock indices.
- **Exchange rate data:** Sourced from central banks and financial institutions, detailing daily exchange rates between the local currency and major foreign currencies.
- **Interest rate data:** Gathered from central banks, focusing on benchmark interest rates such as the federal funds rate, the European Central Bank rate, or other relevant policy rates.
- **Inflation data:** Sourced from national statistical agencies, including monthly or quarterly Consumer Price Index (CPI) or other relevant inflation measures.

Multiple regression analysis

The primary analytical technique used is multiple regression analysis, specified by the following model:

$$y=c+\beta_1 INF+\beta_2 EXR+\beta_3 INR+\epsilon$$

Where:

- Y represents the stock price.
- C is the intercept.
- $\beta 1$, $\beta 2$, $\beta 3$ are the coefficients for the independent variables.
- ϵ is the error term.
- EXR is exchange rate
- INR is interest rate
- INF inflation

Data analysis

Research Objectives and Target Variable: The primary objective of this analysis is to investigate the relationship between stock price (dependent variable) and three independent variables: exchange rate, interest rate, and inflation. Understanding these relationships helps inform financial and economic policy decisions to stabilize or enhance stock market performance.

Results of the analysis

This section provided a regression output as revealed in table 1. This table 1 contains coefficients, standard errors, t-statistics, p-values, and confidence intervals for the independent variables.

Main findings

The regression equation for the stock price based on the provided data is:

$$Y=-870.8121+1.6495\times\text{Exchange rate}+1628.1672\times\text{Interest rate}-3415.2859\times\text{Inflation}$$

Key Coefficients and their Interpretation

Exchange Rate

The table 1 depicts the exchange rate which has a positive impact on the price of the stock since its coefficient is 1.6495 it has a significant relationship because its (p-value = 0.0000000000) which is lower than 5% level of significance. This finding reveals that Exchange Rate is a highly significant p-value indicating that an increase in the exchange rate positively impacts the stock price. This means that, once the exchange rate goes up the stock price increases.

These findings are caused and Contributed by many factors such as changes in the exchange rate affect the competitiveness of exports and imports, impacting company revenues and stock prices. The results show the Consequences and Effect of Exchange Rate Fluctuations Can lead to volatility in stock markets and affect international trade balances.

Interest Rate

Also, table 1 revealed that the Interest Rate has direct (having coefficient of 1628.16) and less significant impact (p-value = 0.01597). This finding suggests that higher interest rates are associated with higher stock prices. Causes and Contributing Factors: Interest rates influence borrowing costs and investment returns, affecting corporate profits and investor behavior.

This situation of Interest Rate has Consequences and Effects on the Influence of economic growth, consumer spending, and business investment.

Inflation

On the side of inflation the results show, there were inverse impacts of Inflation on stock price, by having the coefficient of -3415.28 with a highly significant p-value indicating 0.0000008228. This finding implies that, increasing a unit value of inflation rate will lead to the significant decrease of the stock price by 3415.28 amount.

This situation Causes and Contributing Factors of higher inflation which erodes purchasing power and can increase costs for businesses, reducing profitability and stock prices. The findings show that inflation Impacts cost of living, consumer confidence, and monetary policy decisions.

Table 1: Data analysis results

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-870.812	180.1134986	-4.8348	0.0000044863	-1227.866143	-513.758
Exchange rate	1.6495	0.10697808	15.41941	0.0000000000	1.437466807	1.86161
Interest rate	1628.167	665.0190444	2.448302	0.0159785314	309.8445243	2946.49
Inflation	-3415.28594	652.1551326	-5.23692	0.0000008228	-4708.107428	-2122.46

Source: Authors computation (2024)

Conclusion

The findings of this study underscore the significant impact that exchange rates, interest rates, and inflation have on stock prices. Exchange rate fluctuations, driven by geopolitical tensions and shifting trade policies, directly affect the profitability of multinational firms and the competitiveness of exports and imports. Our analysis shows that exchange rate volatility requires sophisticated risk management strategies for firms involved in international trade, and understanding these dynamics is essential for investors and policymakers to mitigate potential adverse effects on stock markets. Similarly, interest rates, manipulated through central bank policies, have a profound influence on stock prices.

The study reaffirms that lower interest rates generally boost stock prices by reducing borrowing costs and encouraging investment, while higher rates tend to have the opposite effect. These findings highlight the importance of central bank communication and policy predictability in maintaining stock market stability.

Inflation remains a critical factor influencing stock prices, with recent economic disruptions exacerbating its effects. The study demonstrates that inflationary pressures, particularly those intensified by supply chain disruptions, lead to increased market volatility and reduced corporate profitability. Higher anticipated inflation results in lower stock prices as investors adjust their expectations for future corporate earnings.

Our analysis suggests that central banks face a delicate balancing act in promoting economic growth while controlling inflation to ensure financial market stability. Overall, this study provides valuable insights into the interconnectedness of these macroeconomic variables and their collective impact on stock prices. By offering a comprehensive understanding of these relationships, the study aims to inform more effective investment strategies and economic policies, contributing to enhanced market resilience in the face of ongoing global economic challenges.

Recommendations and policy implications

Recommendations

1. **Risk management for exchange rate volatility:** Firms involved in international trade should adopt advanced

hedging strategies to manage exchange rate risks. Utilizing financial instruments such as forward contracts, options, and swaps can help mitigate the adverse effects of exchange rate fluctuations on profitability and stock prices. Additionally, multinational corporations should consider geographic diversification of their operations to reduce dependency on any single currency.

2. **Interest rate monitoring and adjustment:** investors and financial analysts should closely monitor central bank policies and interest rate trends to anticipate their impacts on stock prices. diversifying investment portfolios to include interest-sensitive sectors can provide a buffer against adverse rate changes. furthermore, businesses should strategize their financing options, balancing between fixed and variable interest rate loans to manage borrowing costs effectively.

3. **Inflation control and corporate strategies:** Companies should develop strategies to cope with inflationary pressures, such as optimizing supply chains, improving operational efficiencies, and passing on costs to consumers through pricing adjustments where feasible. Additionally, firms should focus on innovation and productivity enhancements to maintain profit margins in the face of rising costs.

4. **Investor education and market stability:** Financial education programs for investors should emphasize the importance of understanding macroeconomic indicators and their impact on stock markets. By equipping investors with knowledge on how to interpret changes in exchange rates, interest rates, and inflation, they can make more informed investment decisions, contributing to overall market stability.

Policy implications

1. **Central bank communication:** Central banks should enhance their communication strategies to provide clear guidance on future monetary policy actions. Transparent and consistent communication can reduce market uncertainty and help investors better anticipate the effects of interest rate changes on stock prices. This includes regular updates on inflation targets and policy intentions to manage market expectations effectively.

2. **Coordinated monetary and fiscal policies:** Governments and central banks should coordinate monetary and fiscal policies to address the dual challenges of stimulating economic growth and controlling inflation. For instance, during periods of high inflation, central banks may need to tighten monetary policy while governments implement fiscal measures to support vulnerable sectors without exacerbating inflationary pressures.

3. **Global economic collaboration:** Given the interconnectedness of global financial markets, international collaboration is essential in managing the spillover effects of macroeconomic policies. Multilateral institutions like the International Monetary Fund (IMF) and the World Bank should facilitate dialogue and cooperation among countries to harmonize policy responses, particularly in managing exchange rate stability and cross-border capital flows.

4. **Regulatory frameworks for financial stability:** Policymakers should strengthen regulatory frameworks to enhance the resilience of financial markets. This includes implementing measures to monitor and mitigate systemic risks arising from volatile exchange rates, fluctuating interest rates, and inflationary pressures. Regulatory bodies should also ensure that financial institutions maintain adequate capital buffers and risk management practices to withstand economic shocks.

By addressing these recommendations and policy implications, both businesses and policymakers can better navigate the complexities of the current economic landscape, ultimately fostering a more stable and resilient financial market environment.

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