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Investigating the Influence of Economic and Financial Factors on the Share Market

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ABSTRACT

This study investigates the interconnection and influence of factors including Financial and Macroeconomic on Share Market Returns. It aims to comprehend how a range of factors influence diverse economies due to varying market conditions and supply-demand dynamics. Employing a quantitative approach grounded in the Post Positivism Paradigm, this study employs Jonas & Mishkin (2004) monetary policy mechanisms as the conceptual framework. The PSX-100 index serves as a substitution for evaluating share market returns, utilizing data spanning a decade from June 2012 to July 2023. Correlation Analysis unveils a negative linkage between Inflation, Interest rates, and Exchange rates, while demonstrating a positive correlation between Industrial Production and share market returns. This investigation furnishes valuable insights for investors keen on comprehending the risk-return dynamics in share market investments, while also establishing a robust foundation for future investigations into related domains.

1 Introduction

The share market serves as a reflection of an economy's financial health and exerts a profound influence on both the economy and the lives of ordinary individuals. Shares represent ownership stakes in companies and hold great significance for consumers and businesses alike (Fromentin et al., 2022). They constitute an important portion of individual investment portfolios. Companies utilize the share market to raise capital for their tactical and working needs. Fluctuations in share prices have a direct impact on consumer and business confidence, thereby influencing both the economy and the share market. Financial experts contend that the share market provides insights into a nation's economic status, be it a developed or developing economy (Robert, Lyria & Mbgogo 2016). The PSX presently operates as a comprehensive entity, representing all exchanges, boasting 950 companies, and a marketplace capitalization of thirty-seven million Pakistani rupees.

Büyüksalvarci & Abdioglu (2010) led a study on the influence of macroeconomic factors on share market returns in Turkey. They used dependent variables including inflation, interest rates, oil and gold prices, money supply and exchange rates, with the Istanbul Share Exchange (ISE) 100 index as the dependent variable. Various regression models were employed, and the results indicated a negative association between industrial production, interest rates, exchange rates, and oil prices on the ISE 100 index, whereas Industrial Production had a constructive effect. Inflation and gold prices also played a role.

Pakistan's first share exchange, Karachi Stock Exchange (PSX), was established on September 18, 1947, with 5 listed companies and a capitalization of 37 million Pakistani rupees. Lahore Stock Exchange (LSE) was created in October 1970, followed by the formation of the Islamabad Stock Exchange (ISE) in 1989. Initially, these three share exchanges operated independently as profit-making entities. However, due to various struggles and fluctuations in rates, they merged on January 11, 2016, to form

a unified entity known as the Pakistan Stock Exchange (PSX). Today, the PSX boasts 577 listed corporations with a marketplace capitalization of 8079.598 billion PKR. These firms span numerous segments, including financial, energy, textiles, fast food, and others. Despite facing numerous challenges, the PSX was recognized as the 5th greatest execution market for the year 2016.

Research Problem

Analyzing the connection among the share market and macroeconomic factors poses a complex challenge, requiring a comprehensive examination of this relationship. The configuration of emerging share markets differs significantly from that of established and developed markets, leading to distinct responses of emerging share market returns to macroeconomic variables. Nevertheless, macroeconomic factors exert a notable influence on Share Market Returns, encompassing elements such as Exchange Rate, 6-month T-Bill Rates, Interest Rates, Industrial Production, Inflation, and more. We investigate the temporal association between macroeconomic variables and how they progressively influence returns in the Share Market, employing a decade's worth of consistent financial data sourced from the PSX.

Research Objective

- To examine the correlation and influence of Inflation on the share market performance.
- To assess the connection and repercussions of Interest rates on the share market performance.
- To scrutinize the association and effects of Exchange Rates on the share market performance.
- To investigate the consequences of Industrial Production on the share market performance.

Research Question

- How does Inflation affect Share Market Performance in terms of its relationship and impact?
- How does Share Market Performance relate to and get influenced by Interest rates?
- What effect does Exchange Rates have on Share Market Performance, and what is the relationship between them?
- How does Industrial Production Impact Share Market Performance, and what is the nature of their relationship?

2 Literature Review

Huy et al., (2021) noted that investors allocate their funds in capital markets with a degree of uncertainty about their future gains. However, by examining historical share market price data, shareholders can approximate their future revenues and assess investment risks. The Pakistan Share Market has made significant strides in contributing to financial growth over the years, maintaining its ranked as the premier exchange market of South Asia in 2016 (Robert, Lyria & Mbgogo 2016). While research on share market return volatility has been conducted in the United States and Malaysia, such analysis has been lacking in the context of the Pakistan Share Market. Consequently, researchers are undertaking similar investigations to forecast share market returns based on financial metrics. Analyzing share market return consistency in prominent markets remains an intricate and challenging endeavor. Predicting changes in share market returns can be achieved through financial ratios, providing insights into investment validity and risk assessment by evaluating profitability metrics.

Ghani et al., (2022) conducted an examination into the influence of macroeconomic factors on China's stock exchange using auto-regressive distributed lag (ARDL) analysis. They assessed various variables, including inflation, interest rates, industrial production, imports, and exports, in relation to the returns in China's stock market. Their results unveiled a positive association between inflation

and stock returns, with other factors such as interest rates, industrial production, exports, imports, and inflation being linked to China's stock market valuations.

Naik & Padhi (2012) investigated the influence of macroeconomic factors on the Indian share market. By analyzing data spanning from 1994 to 2010 using a vector error correction model, they concluded that money supply and industrial production positively affected the Indian Share Exchange. Conversely, the Indian Share Exchange was negatively impacted by exchange rates, inflation, and interest rates, among other factors.

Celebi & Hönig (2019) conducted a study revealing that share market returns were positively influenced by government reserves, industrial production, money supply, and exchange rates. Additionally, the research highlighted that share market returns were negatively influenced by interest rates and inflation.

Macroeconomic Factors and Share Market Returns

An investigation into the influence of economic factors on the Malaysian share market. This model indicated that the Malaysian share index was co-integrated with industrial production, interest rates, and exchange rates (Song et al., 2023).

Interest Rate

Ahmad, Rehman & Raoof (2010) discussed financial theory, which posits an association among these factors in both the short and long term. For instance, if the central bank raises the current interest rate, it serves as a signal to investors to explore the money market for their investments, assuming all other causes remain unchanged.

Researchers conducted an analysis to investigate the influence of interest rates on share market returns. The study's conclusion emphasized the interconnection of the inflation rate with real interest rates, affecting the share market's fluctuations in an upward or downward direction (Hashmi & Chang, 2023).

Moradi et al., (2021) also explored the impact of changes in interest rates on share returns while delving into the behavior and dynamics of the share market. The study specifically scrutinized share returns following federal fund rate announcements, ultimately determining that interest rates have a notable influence on share market returns.

H1: There is an influence of Interest Rates on Share Exchange Returns.

Inflation

The study gathered data from the US market and proposed that currency devaluation initially led to a failure in the share market. In the short term, a drop in the exchange rate suggested future inflation, which made investors uncertain about the company's upcoming performance. Consequently, share prices began to decrease (Idun et al., 2022).

Demir (2019) conducted a research on the relationship between macroeconomic variables and share returns. They examined share returns from six Asia-Pacific countries, using independent variables such as industrial production and inflation, with share market returns as the dependent variable. Monthly data spanning from January 1993 to December 2002 were used for all variables.

Chang et al., (2019) explored the impact of inflation rates on share market performance. An increase in the price level, leading to a decrease in purchasing power parity, can result from a rise in inflation. An anticipated increase in inflation negatively affects the real value of currency and other financial assets over time.

In financial theory, the rate of inflation is represented by the consumer price index (CPI), it reflects the extent of price increases for goods and services. Inflation occurs when prices rise, requiring more

money to purchase the same items. Researchers believe that inflation rates can impact share market volatility and risk. Analyzing historical data during periods of inflation fluctuations can provide valuable insights for investors.

H2: There is an influence of Inflation on Share Market Returns.

Exchange Rate

In their research, Krishnan & Dagar (2022) conducted an analysis to examine the influence of exchange rates on Malaysian share prices, specifically during times of financial crises. They applied a Granger non-causality test to their investigation. During this period, the Malaysian currency (Ringgit) experienced depreciation while the US dollar appreciated. As a result, the effect of exchange rates on the share prices of the Malaysian share exchange was found to be substantial.

Following Pakistan's transition into the 7th nuclear power in the world and its nuclear explosion on May 8, 1998, various economic sanctions were imposed on the country by its primary supporters. Consequently, Pakistan's foreign exchange reserves experienced a significant decline. In response, a two-tiered system, consisting of an official exchange rate and a floating interbank exchange rate, was adapted, effective from July 22, 1998.

Yadav, Khera & Mishra (2022) highlighted the inverse relationship between exchange rates and share prices. Exchange rates not only impact policymakers and economists but also influence investors in their investment decisions because share returns are contingent on the fluctuations in foreign exchange rates, which can move either upwards or downwards in relation to a country's exports and imports. An increase in exchange rates corresponds to an increase in share prices and a decrease in the value of the dollar.

H3: There is an influence of Exchange rates on Share Exchange Returns.

Industrial Production

The research on share market returns consistency has been conducted in the United States and Malaysia, there is a notable absence of such studies in the context of the Pakistan Share Market (Bhuiyan & Chowdhury, 2020). Consequently, researchers are endeavoring to conduct similar investigations, aiming to predict share market returns based on financial ratios. Examining share market return consistency in established markets presents a complex and challenging issue.

Forecasting changes in share market returns can be accomplished through financial ratios, providing a means to assess the validity and investment risk by evaluating profitability metrics. Prasad, Bakhshi & Seetharaman (2022) conducted research in this area, focusing on exchange rates as a key factor influencing financial share markets. Exchange rates are considered a risk factor for the share market due to the fluctuation percentages associated with them.

They delved into the influence of a macroeconomic variable, namely the exchange rate, on share returns. Data were collected daily from the State Bank of Pakistan, and various tests, including unit tests and co-integration tests, were employed to analyze the long-term relationship in the data (Khan et al., 2023).

Erdoğan (2021) conducted an analysis to review the relationship between macroeconomic variables and share returns. Their research suggested that exchange rates have a positive impact on share returns, contributing to higher profitability in share investments. They also indicated that interest rates and inflation rates have adverse effects on share returns.

Parab & Reddy (2020) conducted research into the relationship between share market returns and currency devaluation. They found that a country's currency devaluation has an influence on share returns, as it involves a deliberate reduction in the value of the national currency in comparison to other currency.

H4: There is an impact of Industrial Production and Share Exchange Returns.

3 Research Methodology

The study will be carried out within the framework of epistemology, which elucidates the acquisition and utilization of knowledge. Epistemology clarifies that social phenomena and theories can be employed to describe and comprehend various phenomena. This research will adopt a deductive approach, which delineates the relationships among variables based on theory. This research aims to elucidate the interrelationships among various variables within the context of share market returns. It will rely on secondary data, rendering it a quantitative study. Additionally, this research falls under the category of explanatory research, which is a subset of quantitative research. The focus of the research is to investigate the causal relationships between macroeconomic variables and share market returns. The research will be conducted using quantitative methods, leveraging secondary data collected over the past decade, specifically from 2012 to 2023. The dependent variable will be share market returns, obtained from the Pakistan Share Exchange (PSX), while the macroeconomic variables under consideration include exchange rates, interest rates, industrial production, and inflation.

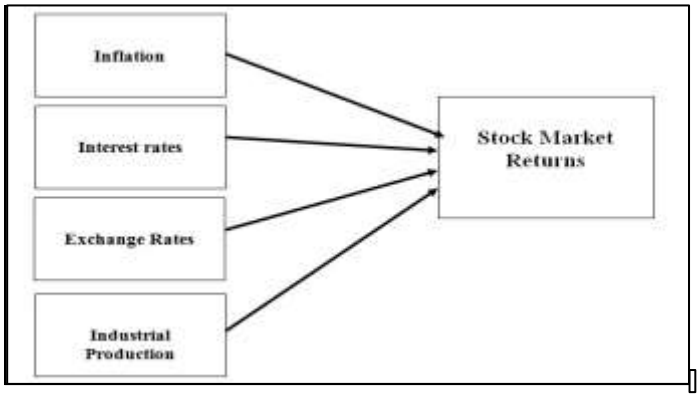

Figure 1

Conceptual Framework

Source: *Pervaiz, Masih & Jian-Zhou (2018)*

Econometric Model

The primary objective of this study was to evaluate the connections between Inflation, Interest rates, Industrial Production, and Exchange rates and their impact on the performance of the stock market. To accomplish this, the research utilized econometric analysis techniques, including Unit Root Tests and Correlation Analysis. The study also offers a comprehensive explanation of the goals of these tests and their resulting findings, with the Co-integration equation provided as follows:

$$\mathbf{PSX\ Y = B_o + B_1(CPI) + B_2(EXR) + B_3(TBR) + B_4(IP) + E}$$

Where,

Y = Pakistan Stock Exchange

B_1 = Consumer Price Index

B_2 = Exchange Rate

B_3 = Treasury Bills Rate

B_4 = Industrial Production

4 Results and Findings

Unit Root Test

The data employed in the unit root test was determined to possess non-stationary characteristics and was obtained from reliable and appropriate sources. Monthly data covering a twelve-year duration were gathered for all the variables, encompassing the PSX 100 index, Inflation rate, exchange rate, interest rate, and Industrial Production. Due to the inherent volatility observed in macroeconomic variables, the data displayed fluctuations and sudden changes. To examine the data, the unit root test was performed, with the Augmented Dickey Fuller test (ADF) serving as the foundational method for the analysis.

Table 1

Unit root test ADF

Variable	At Level	Critical value of t at 5%	Decision of Null Hypothesis	At 1st Difference	Decision of Hypothesis
EX Rates	-1.99	-2.88	Not Supported	-9.59	Supported
Inflation Rates	-1.05	-2.88	Not Supported	-6.47	Supported
TBR Rates	-0.318	-2.88	Not Supported	-10.55	Supported
Industrial Production	-0.59	-2.88	Not Supported	-6.95	Supported
PSX-100 index	-0.16	-2.88	Not Supported	-13.52	Supported

Null hypothesis, when subjected to a unit root test at a 5% confidence level, was not accepted. Consequently, a first difference transformation was applied to all variables, rendering them stationary and facilitating further analysis. The table indicates that the values at the original level were statistically significant. Therefore, it was crucial to convert the non-stationary time series data into a stationary format, as non-stationary data can pose challenges in empirical analysis.

Descriptive Analysis

Table 2

Descriptive Analysis

	EX Rates	Inflation Rates	TBR Rates	Industrial Production	PSX Index
Mean	89.91297	9.03917	9.54621	1121.024	20245.93
Median	94.52000	8.220000	9.450000	1134.700	15125.89
Maximum	108.3800	25.33000	14.01000	2072.970	39505.28
Minimum	60.3300	1.320000	5.75000	377.01000	5377.42
Std. Dev.	15.45007	5.412825	2.644637	453.4025	10402.71
Skewness	-0.734983	1.087255	-0.048418	0.091566	0.330912
Kurtosis	2.294841	4.013384	1.795015	1.897400	1.468029
Probability	0.000326	0.00000	0.012100	0.22964	0.000222
Sum	13037.38	1310.680	1384.200	162548.5	2935660
Sum Sq. Dev.	34373.47	4219.009	1007.151	29602627	0.00000

Table 2 displays the outcomes of central tendency measurements. This analysis is grounded in data pertaining to mean and variances. Over the last 12 years, the PSX 100 index demonstrates an average (mean) of 20245.93. Meanwhile, DLNINFL boasts a mean of 9.039172, DLNTBR has a mean of 9.546207, DM3's mean stands at 1121.024, and DEX exhibits a mean of 89.91297.

Figure 2

EX Rates Behavioral Trends

In this graph, the exchange rate in 2010 stood at 60, and it displayed an annual increase due to the favorable positioning of the country. This, in turn, exerted a lasting influence on the performance of the share market, as exchange rates are a crucial macroeconomic variable that impacts share market performance.

Through this graph, we can deduce that the exchange rate has a positive influence on share returns. Notably, in 2013, the exchange rate reached its peak, significantly affecting the Pakistani economy. Although there were minor fluctuations in 2013 and mid-2014 with a decrease in the exchange rate, the trend remained positive for share returns throughout the period up to 2018.

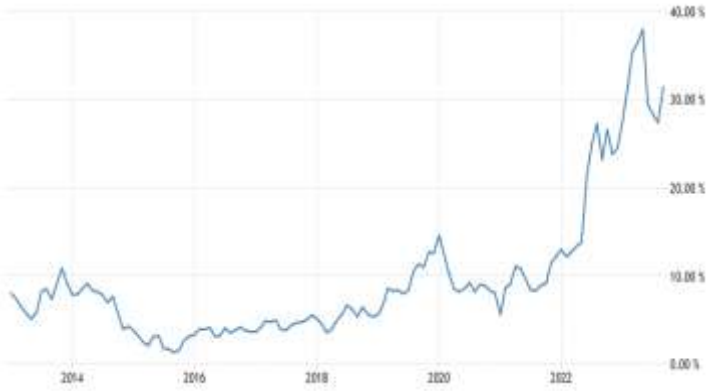

Figure 3

Inflation Rates

In this graph, the inflation rate in 2010 stood at 7, but it experienced a rapid increase in 2012. This swift rise in inflation had a detrimental effect on our share returns because higher inflation rates lead to changes in prices over time. A rapid surge in inflation is typically measured unfavorable for the overall economic situation. Notably, in 2013, the graph exhibited an upward trend, signaling negative news for stockholders and exerting a complete adverse influence on performance of share market.

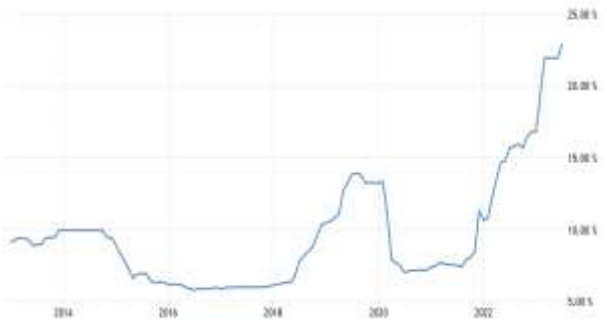

Figure 4

TBR Rates

In this graph, the interest rate in 2010 was recorded at 8.3%. As we move towards 2012, there was a significant increase in interest rates, which is often considered unfavorable for businesses. This graph serves as a valuable tool for making financial decisions. Interest rates are a fundamental component and a cornerstone of macroeconomic variables. Share Market Returns exhibit an indirect relationship with interest rates because as returns increase, interest rates tend to decrease.

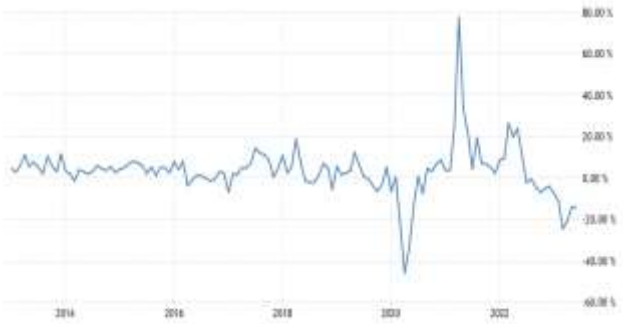

Figure 5

Industrial Production

In this graph, the Industrial Production in 2006 stood at 400. However, in 2007, it increased from 400 to 500. In 2011, there was a significant upward shift in the graph, reaching 1400. It's noteworthy that as the number of years increased, Industrial Production also experienced growth, which had a positive impact on share market performance.

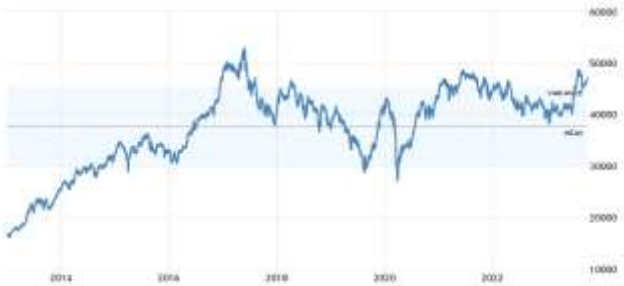

Figure 6

PSX-100 index

In the graph, the PSX index in 2010 was at 10,000. However, in 2013 and mid-2014, the PSX experienced a sharp decline, which is unfavorable for the overall economy. In 2016, we observe that the index increased to 40,000, which is a healthy indicator for the investor and economy.

Table 3

Correlation Matrix

		LNDINF	LNDTBR	DIP	DEX	DPSX
LNDINF	Pearson	1	.763**	.381**	.549**	-.715**
	Sig. (2-tailed)		.000	.000	.000	.000
LNDTBR Rates	Pearson	.763**	1	-.126	-.447**	-.745**
	Sig. (2-tailed)	.000		0.171	.000	.000
DIP	Pearson	-.381**	-.126	1	.727**	-.601**
	Sig. (2-tailed)	.000	.171		.000	.000
DEX Rates	Pearson	-.549**	-.447**	.727**	1	-.835**
	Sig. (2-tailed)	.000	.000	.000		.000
DPSX-100	Pearson	-.715**	-.745**	.601**	.835**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000

In the correlation analysis, we delve into the connection between the dependent variable, PSX-100, and a range of independent variables, which include the inflation rate (DLNINF), exchange rate (LEX), interest rate (DTBR), and Industrial Production (LM3). Notably, an inverse correlation exists between the inflation rate and interest rate with regard to share returns, whereas there is a positive correlation between the exchange rate and Industrial Production with share returns. To quantify these correlations, we employ the Pearson correlation coefficient to assess both the strength and direction of these relationships. Additionally, we evaluate the significance level (two-tailed) to determine the probability associated with the data and potential errors.

Hypothesis Testing – Correlation Hypothesis

Table 4

Alternative Hypothesis

Hypotheses	Accepted/Rejected	Significance Level
H1: There is an influence of Interest Rates on Share Exchange Returns.	Accepted	0.000
H2: There is an influence of Inflation on Share Market Returns.	Accepted	0.000
H3: There is an influence of Exchange rates on Share Exchange Returns.	Accepted	0.000
H4: There is an impact of Industrial Production and Share Exchange Returns.	Accepted	0.004

The inflation rate demonstrates a significant association with the PSX-100 index, as evidenced by a Pearson test result of less than 0.05, leading to the acceptance of H1. Similarly, the interest rate is also shown to possess a noteworthy connection with the PSX-100 index. Additionally, it's worth

highlighting that both the exchange rate and Industrial Production exhibit a positive correlation with the PSX-100 index, a deduction substantiated by both the analysis of data and existing literature.

Discussion and Conclusion

The study discovers the relation between the variables (macroeconomic and financial) with stock market returns. The share market returns can be influenced by multiple macroeconomic and financial factors. Within the literature reviewed, certain studies have proposed an inverse association between industrial production, interest rates, exchange rates, oil prices, and the PSX 100 index. Conversely, it was found that industrial production positively influences the PSX 100 index, while rising inflation rates typically coincide with declines in the stock market. The outcomes of this study are consistent with the findings of Patra & Poshakwale (2006), who conducted an investigation into the connection between these variables and the Athens Share Exchange Market and their conclusion was that inflation rates, industrial production, and trading volume notably influence returns on the Athens Share Exchange. In a similar vein, Gunsel & Cukur (2007) examined the association between macroeconomic variables and returns in the London stock market during the period from 1980 to 1993. They considered seven macroeconomic variables and established that all these variables had a substantial impact on returns in the London stock market. In this study, a quantitative methodology is employed, utilizing secondary data gathered over the previous 12 years from both the Pakistan Share Exchange and the State Bank of Pakistan. Quantitative methods, including correlation analysis, were utilized to examine the relationship between macroeconomic factors and stock market returns. To address the nonstationary nature of Pakistan's exchange rates at the outset, a differencing approach was applied, resulting in a more normalized distribution and the removal of exceptional data points.

This study extends its scope beyond solely uncovering the association between stock market returns and macroeconomic variables within the PSX. It illuminates the role of financial policies in influencing stock market returns. This study utilizes both correlation and co-integration approaches, with correlation shedding light on the connection between macroeconomic variables, while co-integration categorizes how these variables impact stock market returns.

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