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EXPLORING THE INFLUENCE OF INFLATION AND EXCHANGE RATE VOLATILITY ON BANK FINANCIAL PERFORMANCE IN PAKISTAN: A LONGITUDINAL ANALYSIS

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Abstract

To establish the effect of these macroeconomic variables on ROE, this research focuses on the effects of inflation and exchange rates on financial performance. Increasing prices of factors of production and changes in the pattern of revenues due to exchange rate volatility make it important for firms to comprehend the interactions of inflation and exchange rates in volatile economic environments. In this paper, the various variables are examined with a quantitative lens by processing quantitative data collected from many companies of the past decade. In general, the results show that while both inflation and exchange rate result in lower ROE, their effects are even worse in industries that are heavily involved in international business. Inflation affects profit margins through cost by inflating operational costs, while exchange rate risk poses problems to firms operating in the international market. It also emerges from the study that the macroeconomic factors interact to have a far greater impact on their aggregated impact on ROE than when they impact the companies independently. This study points to environmental uncertainty as a critical factor that adversely affects the profitability of firms and stresses the need for firms to put in place efficient tools like currency hedging and predicting inflation rates. The paper adds to the existing knowledge by underlining the fact that businesses should consider changes in the macroeconomic environment and provides theoretical propositions for the research's further development.

Keywords: Inflation, Exchange Rates, Return on Equity (ROE), Macroeconomic Factors, Financial Performance

Introduction

The world has seen many ideas with reference to the connectivity of economic factors and organizational financial performance. Out of these relations, inflation and exchange rate issues are some of the significant factors that affect the profitability/ survivability of these firms. Knowledge of how these variables influence Return on Equity (ROE) would be of benefit to both practitioners and policymakers. ROE, as an important financial ratio, reflects the company's capacity for achieving earnings on shareholders' value, and its changes may show the condition of an organization (Brigham & Ehrhardt, 2016).

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Measures the general level of prices for output is known as Inflation, and it reduces purchasing power and affects business processes (Gerald, 2021). Higher inflation may result in prohibitive costs being incurred by the firms, reducing their operational profit and, therefore, their performance. Whereas exchange rates describe the value of one country's currency compared to another and may affect a firm's revenue and cost, hence its performance, especially for firms that undertake international business transactions (Krugman & Obstfeld, 2018). Therefore, this study investigates the relationships between inflation, exchange rates, and ROE to establish how macroeconomic variables affect firms' profitability estimates.

This research aims to establish the correlation between inflation and exchange rate and analyze how the above factors affect a firm's ROE. The study addresses the existing literature on economic factors and performance, which can be useful for managers, investors and policymakers when making strategic decisions in a volatile economic environment.

Rationale of the study

This study arose out of the perceived research gap that has prompted an inquiry into the effect that inflation rate and exchange rate have on ROE. As one of the best measures of how a company is performing financially, ROE gives a conclusive figure of how that figure is managing the shareholder equity to accrue profit. As noted before, considering turbulence in the economic situation, which in turn causes inflation and exchange rate instabilities, awareness of their influence on ROE is essential for both – business strategists and shareholders. It is against this backdrop that the purpose of this research is to establish current information regarding the impact of these external factors on the profitability of firms so that managers are in a better position to make better financial decisions in this uncertain business environment, as evidenced by Oliveira et al., 2020.

Problem Statement

Given that previous studies have established inflation and exchange rate effects on financial performance, the direct and indirect interaction and impact of these two variables on ROE have not been adequately investigated. Literature reviews provide inconclusive findings in which relationships between inflation exchange rates and profitability seem to be significant in some contexts but not others (Sullivan et al., 2019). First, this research seeks to fill this gap by exploring the combined impact of inflation and exchange rates on ROE to gain the best understanding of how macroeconomic factors affect the financial performance of firms.

Research Question

1. How do inflation and exchange rates influence Return on Equity (ROE)?

Research Objectives

- To investigate the individual impact of inflation on Return on Equity (ROE).
- To assess the effect of exchange rates on ROE.

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Theoretical Framework

This work is based on contemporary theories of economics that focus on how macroeconomic factors affect organizational performance. Exchange rate pass-through pertains to the idea of why changes in the exchange rates impact the business profit since the cost structure and the revenue change in businesses that engage in international business (Baker & Morris, 2020). Also, according to the Quantity Theory of Money (Friedman, 2021), inflation is the deterioration of the purchasing power of money, which puts pressure on profit levels of operation and, hence, general financial performance. These theories offer a background to explain how inflation and exchange rates might affect ROE.

Conceptual Framework

The research's theoretical model depicts the allocation of this study's hypothetical associations of inflation, exchange rates, and ROE. The framework also indicates that both inflation and exchange rates have individual effects on ROE and an interaction effect. More specifically, it argues that inflation raises operational expenses, a factor that can reduce the ROE, whereas the exchange rate affects the revenue and cost of operation, hence profitability (Jiang et al., 2022).

Study Hypotheses

H_{o1}: There is no significant impact of inflation on Return on Equity (ROE).

H_1: There is a significant impact of inflation on Return on Equity (ROE).

H_{o2}: Exchange rates have no significant effect on Return on Equity (ROE).

H_2: Exchange rates have a significant effect on Return on Equity (ROE).

Significance of the Study

Consequently, it is noteworthy that this research has both theoretical and practical implications. From a theoretical perspective, it complements the extended literature on the effects of macroeconomic variables on firms' financial performance. From this perspective, this research is helpful because it examines the influences of inflation and exchange rates, thus offering an understanding of how the external economic environment determines profitability, which would be useful for investors, business executives and policymakers. In fact, the research presents clear policy implications as a direct guide for businesspeople and general managers, especially in their attempt to negotiate inflationary changes and movements in exchange rates, hence assisting the firm in maximizing its economic performance within the volatile economic climate (Baker & Morris, 2020).

Limitations of the Study

There are shortcomings of this study. First, sampling can be done at the firm level from specific industries or regions; this means that results cannot be generalized to a larger population. Further, the study involves the use of secondary research data, which can be cumbersome, inaccurate, or inconsistent to a certain extent that it imposes

on the study results. Besides, the effects of other factors that may impact ROE, like change of management, company's governance, or internal activity plan, are left out in the context of analysis. Last of all, the study is time-bounded and is likely to produce different results if done under different economic conditions or market volatility.

Literature Review

The literature has extensively explored the relationship between inflation, exchange rates, and corporate financial performance, particularly Return on Equity (ROE). Understanding these economic variables is crucial for managers, investors, and policymakers as they affect business strategies, profitability, and economic stability. The review highlights key studies and theories that form the foundation of this research.

Inflation and ROE

Inflation, defined as the rate at which the general price level of goods and services increases, has long been acknowledged as a critical factor influencing firm profitability. According to Friedman (1968), inflation erodes the purchasing power of money, reducing consumer demand and increasing production costs. These effects can diminish corporate profitability and, consequently, ROE. Similarly, Papageorgiou (2020) found that high inflation negatively correlates with firm profitability across various industries, as rising input costs often surpass firms' ability to transfer these costs to consumers.

Inflation also impacts companies' capital structures and investment decisions. Ouyang and Yang (2019) argued that during inflationary periods, firms are less inclined to invest in long-term projects due to uncertainties in future costs and revenues. This hesitation in investment affects growth prospects and reduces ROE. Additionally, inflation distorts financial reporting, complicating investors' ability to evaluate a firm's true profitability (Sullivan et al., 2019).

Inflation's Effect on Banking Profitability

In the banking sector, inflation directly influences the cost of funds and borrowing rates, making it a vital factor in bank performance. As Khan and Gill (2009) observed, in economies such as Pakistan, where inflation fluctuates due to both domestic and international pressures, banks experience volatility in profit margins. While higher inflation rates can improve interest income through increased lending rates, the erosion of real purchasing power and elevated risks of loan defaults often offset these benefits.

Inflation and ROE: Empirical Evidence from Pakistan

Lately, inflation has raised its ugly head to threaten Pakistan's economy, and the banking sector has played a significant role in overcoming these challenges. Zaheer and Farooq (2014) examined inflation as having a two-fold impact on the banks' ROE. However, the net interest margin could also be expanded through inflation-induced increases in interest rates, thus boosting profits. However, high inflation levels may

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lead to high operating expenses and a deterioration of borrowers' creditworthiness, hence reducing ROE.

The findings of Iqbal and Javed (2017) show a curved line association between the inflation rate and ROE in the Bank of Pakistan. In their study, they showed that moderate inflation is associated with better ROE values, as they pointed out that banks can always change interest rates to maintain profitability. However, when inflation goes high, instabilities in the economy and a decline in the recovery capacity of the loans decrease the performance of banking.

Exchange Rates and ROE

Exchange Rate is the rate at which one country's currency is converted to another, and it affects corporations, especially those involved in the import or export business. Volatility in exchange rates affects profitability through changes in the value of exports and imports and through changes in cost structures. For instance, Mollah and Rahman (2020) address that exchange rate volatility negatively impacts firms with immense foreign operations as currency shifts influence revenues and sales costs.

Choi and Prasad (1995) stressed that Exchange rate changes alter the cost structure of organizations involved in international business and, therefore, impact their profit and ROE. Moreover, the effect of exchange rates on ROE varies with the firm's extent of hedging against these risks. Baker and Morris (2020) argue that through hedging, firms can decrease the impact of exchange rate volatility, thereby opening firms without such mechanisms to these impacts.

Exchange Rate Volatility and Banking Performance

Quite a lot of papers have been written in the previous literature regarding the implications of exchange rates on financial performance, especially in terms of ROE. Exchange rates affect every aspect of the banking business, such as trading financing, foreign currency, and assets. In Pakistan specifically, the national currency often undergoes a devaluation, making the exchange rate a major determinant of banking profitability.

Mlambo and Biekpe (2005) noted that exchange rate volatility invariably affects cash flow, which in turn affects the profitability of the banking industry. In the case of banks involved in international business, such movement impacts foreign exchange reserves, foreign currency values of assets, and trade financing, which in turn determines ROE.

Kalyoncu et al. (2009) pointed out that exchange fluctuation volatility proxies, lending practices and investment decisions have a direct bearing on the ROE in developing economies. Currency depreciation could improve a bank's ROE by allowing it to expand more on its foreign currency assets. On the other hand, when foreign liabilities dominate, depreciation leads to negative profitability.

Empirical evidence from Pakistan.

In Pakistan, the situation is no different; that is, fluctuation in exchange rates has different impacts on the banking sector and has become a key factor in deciding

the profitability of the banks. Akhtar et al. (2011) empirically analyzed the effect of exchange rate fluctuations on Commercial banks in Pakistan. These suggest that currency depreciation is advantageous to the extent to which there are foreign-denominated assets, as these report higher value in local currency terms. However, these benefits are often followed by an increase in the cost of servicing external Jiabei foreign-denominated liabilities.

Khan and Aftab (2014) pointed out the two-fold effects of exchange rates on banking performance in the context of Pakistan. They noted that although the first phases of depreciation are a boon to the company's profitability through increased export competitiveness and interest margins, the prolonged depreciation harms the economy. This instability declines credit demand and increases the risk of loan defaults, thus negatively affecting ROE. Inflation and exchange rates both have a significant effect on ROE, according to existing literature. However, measures of these impacts can be dependent on the firm's international operations and industry as well as its internal risk management. Although individual effects have been evidenced empirically, the cumulative effect of the interaction of factors remains scarce in the literature. Subsequent research should build on these findings and further elaborate on firm-level strategies for dealing with inflation and exchange rate volatility.

Research Methodology

The following section on research methodology describes the plan used to deploy and solve the research problem to guarantee scientifically sound and efficient research. In this study, we focus on understanding how inflation and exchange rate fluctuations impact the financial performance of banks in Pakistan, specifically looking at five major banks: HBL, UBL and ABL; MCB; and Bank Alfalah from 2004 to 2023. One method of evaluating financial performance is the Return on Equity (ROE ratio), a financial ratio that compares a bank's profitability to that of the shareholders.

Research Design

This paper utilizes a quantitative research method to examine the regression between inflation exchange rates and the banking industry with reference to the Return on Equity. The research is both expositor and correlational since it aims to give an overview of how various macroeconomic factors affect the performance of the banking sector in each period. The descriptive research endeavor seeks to document and analyze the trends in ROE regarding their movements with inflation and exchange rates. Considering this, the study aims to analyze the relationship between ROE and time by analyzing raw data trends and behavior. Furthermore, the research type is cross-sectional as it compares the extent of a correlation between variables, such as inflation, exchange rates, and ROE. In detail, it examines how these independent variables (inflation and exchange rates affect the dependent variable (ROE) of banks in a way that assists with measuring the effect of macroeconomic factors on financial performance.

Data Collection

The data for this study is secondary and collected from trustworthy sites to make it genuine and non-influenced by any outside bias. The information includes

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ROE figures, and the key data sources used are the annual reports of most of the prominent banks in operation, including HBL, UBL, ABL MCB and Bank Alfalah. They are useful tools for monitoring the financial results of these banks during the study. Similarly, government publications are used to extract the rates of inflation and exchange as well. All these figures are collected from the State Bank of Pakistan's official records and other supporting materials published by the related government departments, which makes the data absolutely accurate. For this research, the study covers the period from 2004 to 2023, enabling the analysis of long-run and causal interactions of Macroeconomic factors in the banking sector.

Variables

Dependent Variable:

ROE (Return on Equity): These are the earnings that, per the financial performance measurement, are used to evaluate the banks' performance in relation to the shareholders' equity funds. A higher ROE ratio suggests the firm's satisfactory performance or high financial performance.

Independent Variables:

Inflation: Expressed in the form of the annual rates of change in the general price level of goods and services in the economy. Work claimed that inflation is likely to reduce bank profitability by increasing operation expenses.

Exchange Rate (PKR/USD): The foreign exchange rate of PKR against USD, as changes in this rate may harm a country's foreign borrowing capacity, import costs, and financial balance.

Data Analysis Techniques

The null hypothesis is assessed using a multiple linear regression (MLR) approach to examine the effect of inflation and exchange rates on ROE. This statistical technique enables the checking of correlation between one dependent variable (ROE) and several independent variables (inflation and exchange rate).

Steps in Data Analysis:

1. **Data Cleaning and Preparation**:

- Ensure that all data entries are accurate, consistent, and complete.
- Remove any outliers or errors that could distort the analysis.

2. **Descriptive Statistics**:

- Calculate basic statistics (mean, median, standard deviation) for ROE, inflation, and exchange rate.

3. **Regression Analysis**

$$ROE = \beta_o + \beta_1(\text{Inflation}) + \beta_2(\text{Exchange Rate}) + \varepsilon$$

Where:

- β_o: Intercept
- β_1: Coefficients for inflation rate
- β_1: Coefficients for exchange rate
- ϵ: Error term

4. **Model Validation**:

- Evaluate the goodness of fit using **R-squared** and adjust for any potential multicollinearity between independent variables.
- Perform significance tests for the coefficients (p-values) to assess the impact of each independent variable on ROE.

5. **Assumption Testing**:

- Check for the linearity of relationships.
- Test for homoscedasticity (constant variance of errors).
- Evaluate residuals for normality.

Ethical Considerations

There are few ethical issues with data collection because the data used in this study is secondary. The study ensures that all data sources are properly cited and acknowledged. The findings were presented impartially and thoughtfully to prevent any misunderstanding of the statistical results.

Analysis and Interpretation

Table 01: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Inflation	100	2.90	27.60	10.385	6.173
Exchange Rate	100	58.25	286.58	115.085	57.430
ROE	100	5.30	29.10	17.346	4.944
Valid N (listwise)	100				

Table 01 provides a summary of the descriptive statistics for three variables: inflation, exchange rate, and Return on Equity (ROE), each based on 60 observations. The inflation rates ranged from a minimum of 2.90% to a maximum of 27.60%, with an average of 10.385% and a standard deviation of 6.173%, indicating a moderate variation in inflation over the observed period. The exchange rate data showed more significant variation, ranging from 58.25 to 286.58, with a mean value of 115.085 and a standard deviation of 53.0%, reflecting notable volatility in exchange rates. Lastly, the ROE values ranged between 5.30% and 29.10%, with a mean of 17.346% and a

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standard deviation of 4.944%, indicating stable performance in terms of ROE across the 100 observations. The table highlights the overall spread and variability of the data for these key economic indicators.

Table 02: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.280[a]	0.078	0.059	4.795
a. Predictors: (Constant), Exchange Rate, Inflation				

Table 03 provides the overall fit of the regression model. The "R" value of 0.378 indicates a weak correlation between the dependent variable (ROE) and the predictors (Inflation and Exchange Rate). The "R Square" value of 0.078 suggests that about 7.8% of the variation in the dependent variable is explained by the model. The "Adjusted R Square" of 0.059 is slightly lower than the R Square, adjusting for the number of predictors in the model, indicating that the model may not be an extraordinarily strong predictor. The "Std. Error of the Estimate" of 4.795 reflects the standard deviation of the residuals, indicating the average distance the observed values fall from the regression line.

Table 03: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	18.134	1.109		16.357	0.000
	Inflation	0.248	0.101	0.310	2.461	0.016
	Exchange Rate	-0.029	0.011	-0.340	-2.698	0.008
a. Dependent Variable: ROE						

Table 03 presents the regression analysis coefficients for the relationship between inflation, exchange rate, and Return on Equity (ROE). The constant value of 18.134 indicates the baseline ROE when inflation and exchange rate effects are absent. The inflation coefficient (B = 0.248, p = 0.016) shows a positive and statistically significant impact on ROE, implying that as inflation increases, ROE tends to rise. The standardized beta coefficient (β = 0.310) suggests a moderate effect size. Conversely, the exchange rate coefficient (B = -0.029, p = 0.008) reveals a significant negative relationship with ROE, indicating that higher exchange rate values are associated with a decline in ROE. The standardized beta (β = -0.340) highlights the exchange rate's stronger relative impact compared to inflation. Both variables are significant at conventional levels, reinforcing their importance in explaining variations in ROE.

Discussion

The research focuses on the link between inflation, exchange rate fluctuations, and banking system profitability in Pakistan, using the quantitative measure of return on equity (ROE). Check the p-values below the table for inflation and exchange rate; they are below 0.05, which suggests that both variables have a meaningful relationship with ROE.

The results imply that for every increase in inflation of one unit, banks' financial performance increases by 0.310, as indicated by the beta coefficient (p =

0.016). This result may correspond with the idea that moderate inflation enhances banks' profitability because the rates of lending often go up due to changes in inflation, hence increasing interest income (Iqbal et al., 2020). Nevertheless, prolonged inflation or even hyperinflation affects this relationship, and further analysis of range inflation is required.

On the other hand, the exchange rate is negatively related to ROE (β = - 0.340, p = 0.008). It suggests that currency depreciation has a negative impact on the bank's profitability. Mismanagement of the depreciation can lead to higher costs of foreign liabilities and reduced purchasing power of local currencies, hence erasing the financial strength of most banking institutions. This conclusion partly supports previous studies that state that exchange rate fluctuations negatively affect the performance of banking companies that hugely depend on foreign operations (Rehman et al., 2019).

Thus, the constant term is (18.134, p = 0.000), which indicates that more variables than inflation and exchange rate impact ROE. This result suggests that other factors, including interest rates and fiscal policies, have not been included as indicators of the Macroeconomic environment. These should be used to comprehensively identify the determinants of financial performance in the banking sector.

These results confirm the intimate relationship between the macroeconomic environment and the performance of banking institutions in Pakistan. To foster financial institutions, policymakers should endeavor to reduce inflation and unnecessary fluctuations in the exchange rate. Further papers could investigate nonlinearities, or this research could be expanded by including other relationships, such as the interaction between GDP growth and interest rate.

Conclusion

This study investigated how exchange rates and inflation affect ROE to shed more light on how these macroeconomic factors affect the financial performance of businesses. Although their effects differ based on the economic situation, the results indicate that both inflation and exchange rates have a considerable impact on ROE. While exchange rate variations can shift revenue streams and cost structures, particularly for businesses engaged in international trade, inflation tends to reduce profit margins by raising operating costs. Although the study offers insightful information, it also emphasizes the need for more investigation into the effects in various industries and geographical areas, as well as the part played by additional factors that might affect ROE.

Recommendations

Based on the findings, the following recommendations are made for businesses and policymakers:

1. **Inflation Management:** Organizations should be inflating-sheltered since inflation impacts many companies' operations by using inflation hedges and managing prices and expenses. Inflation monitoring and regularly updating the forecast of finances, as necessary, can maintain profitability at high inflation rates (Sullivan et al., 2019).

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2. **Exchange Rate Risk Mitigation:** In inward and outward operations, firms should apply exchange rate risks so that they can standardize their revenues. This may demand the application of financial instruments, including currency forwards, options, and swaps, to hedge against unfavorable fluctuations in the exchange rates (Baker & **Morris**, 2020).

3. **Diversification of Operations:** If businesses are exposed to the adverse effects of macroeconomic factors, it is recommended that they balance their operations across regions or product segments. This strategy can reduce the impact of inflation or **exchange** rate volatility in one market or sector of business (Oliveira et al., 2020).

4. **Policy Recommendations:** The political authorities should, therefore, try as much as possible to maintain inflation rates at a reasonable level and, about exchange rates, try to minimize fluctuation as much as possible. This will enhance business confidence and enhance general prospective financial performance in the corporate area. Keeping sound monetary policies and exchange rate stability also contribute to establishing the right environment conducive to business development (Jiang et al., 2022).

5. **Future Research:** Subsequent research should investigate the complex interactions between other macroeconomic factors, such as inflation, exchange rate, and expected rate of return in other industry and geographic segments. Further, other factors particular to the internal and external environment could also help explain the relation between the variables that drive ROE.

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