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CASUAL RELATIONSHIP BETWEEN EXCHANGE RATE VOLATILITY AND MACROECONOMIC INDICATORS IN EMERGING ECONOMY: A CASE STUDY OF PAKISTAN

Faiz Rasool[*1], Muhammad Mudassar Hussain[2], Iqra Shehzadi[3], Muhammad Faheem Ullah[4]

[*1,4]Research Scholar, Institute of Business Management Sciences, University of Agriculture Faisalabad, Pakistan;
[2,3]Research Scholar, Lyallpur Business School, Government College University, Faisalabad, Pakistan

Corresponding Author: [*1]faizrasool.uaf@gmaill.com

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ABSTRACT

The exchange rate dynamics play an imperative role in deciding the landscape of any economy, manipulating the critical indicators of emerging economies. The study investigates the association between exchange rate volatility and Pakistan's macroeconomic indicators. The current research delves into a specific case of Pakistan to determine the comprehensive and indepth analysis of exchange rate and macroeconomic factors. The study used secondary information only from 2000 to 2023, and data was collected from authentic sources such as the IMF, World Bank, and Pakistan Statistical Bureau. Exchange rate volatility is used as a dependent variable, while Exports, GDP, Government Expenditures, Imports, and Inflation rates are used as independent variables. Eviews statistical software is used to evaluate the outcomes of the study. Summary Statistics results show that exchange rate fluctuation positively affects Pakistan's exports and imports, while GDP, government expenditures, and inflation rate are negatively affected by exchange rate volatility. According to the Correlation Matrix, all variables are positively correlated. It was found that Government Expenditures Granger causes the exchange rate in Pakistan; however, Exports, GDP, Imports, and Inflation rate are not Granger caused by the exchange rate but directly affect these factors. It is recommended that a sound monetary policy be adopted and considered. Policymakers should develop sound policies to manage the money supply in the financial market that will decrease the inflation rate and create more opportunities for foreign investors to enhance economic growth and depreciate the exchange rate.

Keywords: Exchange Rate Volatility, Economic Indicators, Economic Growth, Granger Causality

INTRODUCTION

The fluctuation and movement in the currency are the main hurdles to the growth and development of any emerging economy. The association between the exchange rate, inflation rate, imports, exports, and GDP is critical (Olamide et al., 2022). There are several reasons for exchange rate volatility between emerging and advanced economies. Exchange rate volatility is increasing across the globe due to significant financial crises. The exchange rate changes may fall due to fiscal and administrative policies and strategies presumed by each country (Nor, 2015). Inflation enhances insecurity and decreases people's actual income.

Monetary policy is crucial to evaluating the country's money supply and inflation rate. The inflation rate has grown daily in Pakistan over the last decade (Stylianou et al.., 2024). Inflation is the continuous increase in the level of consumer price or a constant decrease in the purchasing power of people caused by the rise in the money supply in the money market. Inflation rates harmfully affect the overall financial sectors and even the economic growth of any country (Cecchetti, 2000).

Advanced economies' central banks uphold fixed exchange rates necessary to balance the supply and demand of money in the market. To improve trade and macroeconomic stability, any economy must

maintain a stable exchange rate, even if maintaining a fixed exchange rate is extremely difficult. As international transaction costs rise, investors' and agents' profits are negatively impacted. Experts in finance claim that a floating exchange rate is highly detrimental to the economy since it affects the purchasing power of goods and services abroad Morina F. et al., (2020).

Instability in the exchange rate directly affects the exports of any country. Uncertainty in the exchange rate damages traders' profits. There is a considerable risk for the investors in terms of trade gain and adverse association exchange rate and trade. Pakistani exports are based on the exchange rate volatility; Pakistan has access to the markets of the United States, Japan, the United Kingdom, and Germany. Financial advisers, agents, economists, traders, and investors constantly monitor the currency's stability in any country because a stable exchange rate pushes exports, enhancing economic growth.

Exchange rates are essential in developing and growing economies worldwide as they affect national trade, international trade, and macroeconomic stability (Vinh & Duong, 2019). The exchange rate is a vital parameter to determine the current position of any economy at the international level. The exchange rate is a functional macroeconomic factor that compares the global cost and prices of different goods and commodities (Krugman et al., 2018).

The exchange rate is a critical factor in macroeconomics that affects investors and agents when making investment decisions. For more than half a century, the relationship between Foreign direct investment and Exchange rate has increased fast and gained the interest of policymakers and researchers. Discussed by Jehan and Hamid (2017), Sharifi-Renani and Mirfatah (2012), and Moraghen et al. (2023).

The exchange rate movement is affected by several domestic and international factors. The exchange rate is the currency's price relative to other currencies' value. The Indian rupee was used in 1947 after the independence of Pakistan. In 1948, Pakistan introduced its official rupee and made its link with the British currency. The decimalization process was introduced in 1961, and the currency subunits annas were replaced with paisa. Currency was badly Disastrous before the general election 2008; a 23% depreciation in the country's currency was noted in December 2007 and August 2008. The rupee consistently decreased till 2018, and the highest currency devaluation against US currency was found. The devaluation crises worsened the situation in 2021, and more than 50% of the devaluation of Pakistan's currency was observed. Being a developing country, Pakistan fought a great battle against COVID-19 despite having a scarcity of resources. The sharp devaluation of currency largely depends on political instability, damage to natural resources, and the curse of increasing debt.

Objective of the Study

The main objective of this research is to check the in-depth analysis of Macroeconomic indicators on the exchange rate volatility and fluctuation in Pakistan. Several macroeconomic factors used in this research are Exchange rate, Exports, economic growth, Government Expenditures, Imports, and Inflation rate. The main objective of this study is to find the relationship of the Exchange rate with the rest of the variables. Lastly, the study focuses on strengthening the position of exchange rate fluctuation with other macroeconomic factors of Pakistan.

The rest of this paper will be organized as follows: Section two will cover the literature review of Pakistan's exchange rate volatility. In section three, there will be research methodology; chapter four will contribute the Results and Discussion; section five will discuss the Conclusion of the study; and last section elaborates the Refrenses of the current research.

Literature Review

Rahman, M. et al. (2020) conducted a study to explore the impact of exchange rate volatility on the trade of Bangladesh. Data was collected from 2013 to 2019. RCH, GARCH, and EGARCH models were used to estimate the study results. The GARCH model describes a negative impact of the exchange rate on Bangladesh's trade, but using EGARCH, there was no relationship between dependent and independent variables.

Morina et al. (2020) examined the effect of exchange rate volatility on the financial improvement of 14 countries in crucial and Japanese Europe using facts from 2002 to 2018. The Eviews software program uses numerous econometric exams, unit roots, correlation matrices, and descriptive data. The observer's conclusions confirmed that exchange rate volatility and economic growth correlate negatively.

Dagume, A. M. (2022). A study was conducted to determine the effect of exchange rate volatility and economic factors in South Africa. Data was compiled from 1979 to 2019. The study included six macroeconomic variables: GDP, FDI, growth rate, inflation rate, interest rate, and trade openness. OLS was used to determine the relationship between independent and dependent variables. The research outcome found a positive impact of the exchange rate on economic growth, inflation rate, and interest rate, whereas FDI, GDP, and Trade openness Hurt the exchange rate volatility of the selected country.

Jamil, M. N et al (2023). They checked out empirical studies to determine the effect of macroeconomic variables at the exchange charge volatility regimes, along with GDP, in step with capital income, inflation, foreign direct investment, imports, exports, and foreign debt. For the five economies, Australia, Hong Kong, Japan, New Zealand, and Singapore, information masking from 1970–2020 was utilized. The consequences have been assessed using the most state-of-the-art statistical method available. They looked at the alternate rate regime of the selected inventory markets and used a device to study (ML) binary logit. In step with the study's findings, foreign reserves, inflation, and foreign debt have all been terrible for growing countries.

Meraj J et al. (2024). Trade prices are crucial to each kingdom's improvement. The study aimed to determine if exchange price volatility and financial signs, including GDP, FDI, CPI, and exchange balance, are associated. ANOV, multi-regression evaluation, model summary, and correlation were applied to examine the supposed result. SPSS software was used for the testing. The Statistical Bureau and the State Bank of Pakistan provided the statistics using dependable commentary assets. The findings showed that FDI and alternate stability with alternate charge volatility had a terrible affiliation. The trade price of Pakistan turned into one of the high-quality variables during the same period.

Cakici, S. M. (2024) investigated a study to discover how governance traits and exchange rate volatility affected each other. The selected sample included developing nations from 1996 to 2022, including Argentina, Mexico, South Africa, and Turkey. The findings confirmed that low costs of forex volatility are related to international locations having some degree of suitable governance.

Yuorkuu (2024) researched the effect of fluctuating forex rates on Ghana's financial growth. The lookahead's basis became secondary statistics, and the records series changed from 1990 to 2019. GARCH (1,1) and the autoregressive allotted lagged (ARDL) version have been used to get the results. Alternate rate volatility turned out to have a terrible impact on Ghana's monetary increase. Furthermore, the rates of interest and inflation are the avenues through which the alternate charge impacts the development of the financial system.

Research Methodology

The observer's main objective is to examine how foreign exchange affects Pakistan's macroeconomic metrics. The sector financial institution, Pakistan Statistical Bureau, and the Country Bank of Pakistan provide annual facts. The secondary information used inside the observer was amassed between 2000 and 2023. Exports, GDP, imports, government expenditures, and inflation are the independent variables, even as the foreign exchange rate became the dependent variable. Through the use of the Eviews software program, several statistical techniques have been employed to assess the impact, which include descriptive information, unit roots, OLS, correlation, and VAR Granger causality.

Model Specification

Sims's vector autoregression (VAR) model from 1980 was employed in the study to assess the impact of macroeconomic variables on the trade fee. In line with the version, it says:

Exrate= f (EXP, GDP, GEXP. IMP, INF)

Model in Econometric Form.

$$EXRATE_{it} = \alpha + \beta_1 EXP_{it} + \beta_2 GDP_{it} + \beta_3 GEXP_{it} + \beta_4 IMP_{it} \ \beta_5 INF_{it} + \varepsilon_{it} \ \ldots\ldots (1)$$

EXRATE: Exchange Rate

GDP = Gross Domestic Products;

EXP = Exports

GEXP= Government Spending

IMP= Stands for imports.

INF= Stands for the inflation rate.

Where: β is the coefficient,

Ɛ_(it)= error term

Table No.1 Computation of Variables

Variables	Definition	Sources
EXRATE	Fluctuation and Volatility of Exchange Rate in Pakistan	World Bank
GDP	Gross Domestic Product	World Bank, IMF
EXP	Total Annual Exports of Pakistan	Pakistan Bureau of Statistics
GEXP	Total Govt Expenditures during the year	Pakistan Bureau of Statistics
IMP	Total imports of Pakistan	Pakistan Bureau of Statistics
INF	Inflation rate in Pakistan	World Bank, IMF

Trend Analysis

Figures 1 and 2 show the trend graph of how the exchange rate affects the macroeconomic indicators of Pakistan for the selected period from 2000 to 2023. The time series graphical analysis is shown below.

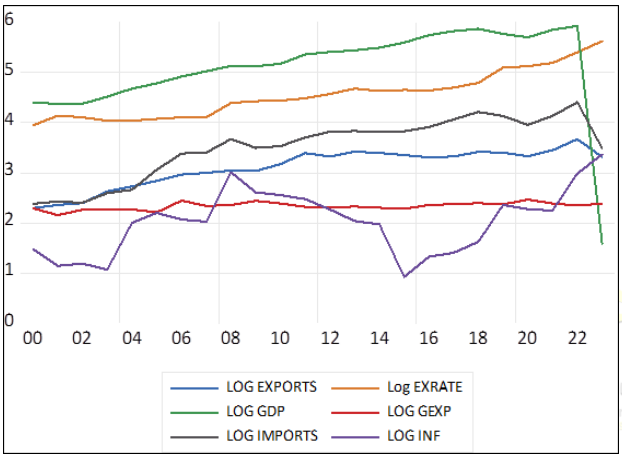

Figure 1. Graph of Variables

The trend graph above depicts how the elements connect to the studies. The regular increase as much as the chosen time body is described using the change charge trend. Even though the export graph suggests an upward push in exports, a regrettable decline was observed at some point in the COVID-19 duration. Although the gross domestic product is trending better, the COVID issue and political unrest triggered the economic system of the kingdom to say no. Government spending fluctuates through the years. The graph suggests a growth in imports in 2019, even though the government reduced imports at some point in the COVID-19 pandemic, imposed import regulations, and outlawed overseas trade. Following the outbreak, Pakistani imports accelerated all over again. As much as 2008, inflation expanded, but the rate fell in 2015 following that year. In addition, at that time, there had been a boom in the inflation rate, which brought about a rise in political unrest, a kingdom of lawlessness, and the COVID-19 pandemic.

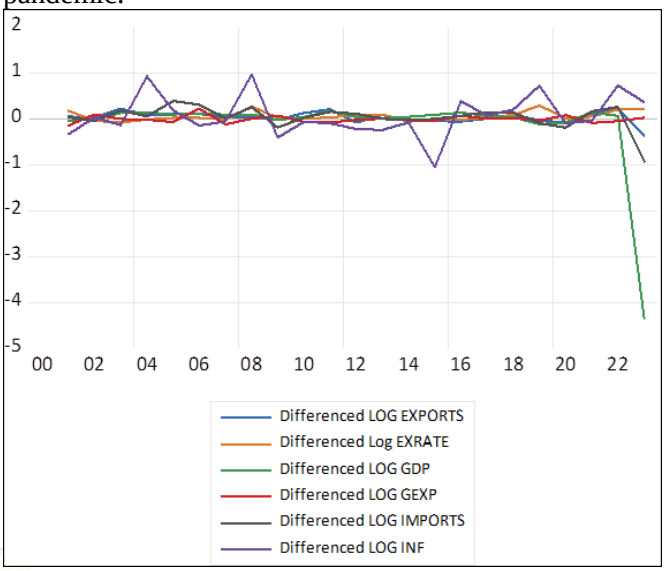

Figure 2. Graph of Differenced Series

The many collections of variables are depicted by fashion in the above image. Unrelated variables may have a low correlation coefficient on differencing yet a high correlation coefficient on employing the tiers, as confirmed by Stigler (1985). actual GDP, exports, imports, alternate rates, and inflation, but exhibit the same sample as shown in Figure 2.

Results and Discussions

Descriptive Statistic:

The table below indicates that the exchange rate has an average value of 4.56 and an undoubtedly skewed Standard Deviation of 0.36. The export information shows an average cost of 3.11, a negatively skewed export, and a wide Standard Deviation of 0.905. additionally, the GDP generates a negatively skewed implied cost of five.090 with a stranded deviation value of zero.905. moreover, the government's expenditures and imports have respective methods of 2.338 and three.156, and their Standard Deviations

are 0.074 and 0.614. eventually, the same deviation of the inflation fee is 0.652, and its implied value is 2.028.

Table 2: Descriptive Statistics Summary

	EXRATE	EXP	GDP	GEXP	IMP	INF
Mean	4.562	3.11	5.09	2.338	3.516	2.028
Median	4.532	3.313	5.271	2.347	3.689	2.055
Maximum	5.628	3.674	5.931	2.467	4.41	3.367
Minimum	3.951	2.297	1.589	2.158	2.385	0.928
Standard Deviation	0.465	0.384	0.905	0.074	0.614	0.652
Skewness	0.63	-0.85	-2.47	-0.40	-0.69	0.07
Kurtosis	2.57	2.62	10.38	3.03	2.30	2.30
Jarque-Bera Test	1.81	3.048	78.905	0.659	2.407	0.507
Sum of Squared Deviations	4.966	3.385	18.82	0.124	8.672	9.778

Summary Statistic:

Table 3: Summary Statistics

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.01	2.429	1.65	0.116
EXP	0.014	0.608	0.023	0.982
GDP	-0.302	0.091	-3.311	0.004
GEXP	-0.378	1.003	-0.376	0.711
IMP	0.848	0.441	1.921	0.071
INF	-0.026	0.108	-0.237	0.815
			R^2	0.778
			Adjusted R2	0.716
			Prob(F-statistic)	00

The results of the selected variable are displayed in the above table. The effects display that the exchange rate positively impacted exports. Furthermore, imports from Pakistan are also positively affected by the volatility of the exchange rate. Moreover, the effects show that the exchange rate negatively impacts the GDP, government spending, and national inflation. R^2 indicated that the exchange rate explains 77% of independent variables.

Correlation Matrix:

Table 4: Matrix of Correlation

	EXRATE	EXP	GDP	GEXP	IMP	INF
EXRATE	0.783	1				
EXP	0.041	0.441	1			
GDP	0.042	0.783	0.041			
GEXP	0.498	0.554	0.205	1		
IMP	0.751	0.964	0.561	0.615	1	
INF	0.504	0.451	-0.202	0.476	0.397	1

Note: Demonstrates significance at the 0.05 level,

The correlation matrix's effects show that all of the variables have a positive relationship with one another.

Table 5. Phipls- Perron Unit Root Test at Level

Method	t-Statistic	Prob.
Augmented Dickey-Fuller test statistic	1.44	0.99
Test critical values: 1%	-3.75	
5% level	-2.99	
10% level	-2.63	

One-sided p-values by MacKinnon (1996).

Table 5 observations show that the PP value exceeds the 5% level, which rejects the null hypothesis. The p-value is 0.99, which means that variables in the VAR model are not stationary.

Table 6. Phipls- Perron Unit Root Test at first difference

Method	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.93	0.007
Test critical values: 1%	-3.77	
5% level	-3.00	
10% level	-2.64	

Table 7:7 demonstrates that Each variable is examined at the first difference level, and the p-value is less than the significance level at 5%, indicating that the null hypothesis is accepted at 0.007. The p-value is 0.007, which elaborates the stationary of all the variables

Table 7. VAR Model optimal log lengths

Lag	LogL	LR	FPE	AIC	SC	HQ
0	46.037	NA*	0	-3.81	-3.5187*	-3.7454*
1	83.83	50.35	8.8e-10*	-3.98	-1.892	-3.52
2	121.66	28.83	0	-4.1607*	-0.281	-3.31

Table 8. Wald Tests for Granger Causality and Block Exogeneity in VAR

Dependent Variable ExRate

Excluded	Chi-sq	Df	Prob	Do Causality effect?
EXP	0.57	2	0.75	NO
GDP	0.68	2	0.19	NO
GEXP	8.84	2	0.02	YES
IMP	1.93	2	0.31	NO
INF	0.94	2	0.63	NO

To determine the effect of variables, the Granger causality model is used primarily based on the model. The effects imply that the Exchange suffers from GEXP; Pakistan's government expenditures Granger Cause Exchange rate is found. However, exports, GDP, imports, and inflation rates do not Granger Cause the exchange rate.

Table 9: D(ExRate) Variance Decomposition:

Period	S.E.	ExRate	Exp	GDP	GEXP	IMP	INF
1	0.104	100	0	0	0	0	0
2	0.58	11.36	39.55	48.31	0.32	0.44	0.003
3	1.61	19.06	14.99	65.26	0.54	0.12	0.006
4	4.29	7.07	55.65	36.82	0.38	0.08	0.016
5	19.02	15.54	24.07	60.22	0.11	0.02	0.012

Exports represent a sizeable contributor to exchange rate volatility, as visible via the variance decomposition, which accounts for 55.65 shocks over a longer time frame. At the same time as GDP swings at 65.26 percent, the inflation price, which considers exchange fee shocks, is 0.016 percent. Moreover, import shocks are numerous via 0.44, and last but no longer least, government spending, which accounts for 55.65, indicates exchange rate volatility.

Conclusion

The exchange rate is an important device that directly influences the significant components of the economy. This study aimed to investigate the exchange rate volatility and its impact on the macroeconomic indicators in Pakistan. The study focuses on the five macroeconomic indicators, namely, exports, GDP, government expenditures, imports, and inflation rate from 2000 to 2023.

The empirical outcomes of the study show that the volatility of exchange rate volatility has a negative impact on GDP, government expenditures, and inflation rates. However, the exchange rate positively affects the country's imports and exports. Furthermore, Granger Causality elaborates that Government Expenditures cause the exchange rate. Exports, GDP, Imports, and Inflation rates do not Granger Cause the exchange rate, but these macro variables are affected by the exchange rate.

The analysis found that Govt expenditures and inflation rate are the factors that harm the exchange rate volatility. In a period of inflation, the supply of money increases, and the cost of goods increases. Policymakers and govt officials should prepare a strategy to cut down their expenditures and make sound policies to control the supply of money in financial markets to control inflation. Moreover, foreign direct investment should be encouraged in the country, and taxes should be rebated for foreign investors to motivate them and attract their funds. Foreign direct investment should enhance the country's economic growth and help stabilize the country's exchange rate.

Further Research

In future studies, one may add quarterly or monthly data instead of annual data; it will definitely provide the desired and best results. The current study only focuses on Pakistan; further studies may be conducted using emerging economies like China, India, Sri Lanka, Bangladesh, etc. This study only used limited macroeconomic variables; more variables such as trade balance, Foreign direct investment, interest rate, and money supply may be taken.

References

Olamide, E., Ogujiuba, K., & Maredza, A. (2022). Exchange rate volatility, inflation and economic growth in developing countries: Panel data approach for SADC. Economies, 10(3), 67. doi:https://doi.org/10.3390/economies10030067

Morina, F., Hysa, E., Ergün, U., Panait, M., & Voica, M. C. (2020). The effect of exchange rate volatility on economic growth: Case of the CEE countries. *Journal of Risk and Financial Management*, *13*(8), 177.

Nor, M. I. (2015). The volatility of Somalia's unregulated exchange rates. Universiti Sains Malaysia.

Stylianou T, Nasir R, Waqas M. The relationship between money supply and inflation in Pakistan. PLoS One. (2024) Mar 29;19(3):e0301257. doi: 10.1371/journal.pone.0301257. PMID: 38551929; PMCID: PMC10980205.

Cecchetti, S. G. (2000) "Making Monetary Policy: Objectives and Rules" Oxford Review of Economic Policy, Vol. 16, No. 4, pp. 43–59

Jamil, M. N., Rasheed, A., Maqbool, A., & Mukhtar, Z. (2023). A cross-cultural study of the macro variables and their impact on exchange rate regimes. *Future Business Journal*, *9*(1), 9.

Meraj, J., Ahmed, P., & Abbas, M. G. (2024). Understanding the Dynamics: The Impact of Exchange Rate Fluctuations on Pakistan's Economic Landscape. *Journal of Development and Social Sciences*, *5*(1), 211-223.

Cakici, S. M. EXCHANGE RATE VOLATILITY, AND GOVERNANCE INDICATORS.

Yuorkuu, C. A., Kamasa, K., & Forson, P. (2024). Effect of Exchange Rate Volatility and its Transmission Pathways on Economic Growth in Post Exchange Rate Liberalization Ghana. *African Journal of Economic Review*, *12*(1), 55-69.

Jehan, Z., & Hamid, A. (2017). Exchange rate volatility and capital inflows: role of financial development. *Portuguese Economic Journal*, *16*, 189-203.

Sharifi-Renani, H., & Mirfatah, M. (2012). The impact of exchange rate volatility on foreign direct investment in Iran. *Procedia Economics and Finance*, *1*, 365-373.

Monaghan, W., Seetanah, B., & Sookia, N. U. H. (2023). The impact of exchange rate and exchange rate volatility on Mauritius foreign direct investment: A sector-wise analysis. *International Journal of Finance & Economics*, *28*(1), 208-224.

Dagume, A. M. (2022). Exchange rate volatility and macroeconomic variables in South Africa. *International Journal of Economics and Financial Issues*, *12*(6), 1-14.

Rahman, M. H., Majumder, S. C., & Hossain, M. N. (2020). The impact of exchange rate volatility on export and import in Bangladesh. *European Online Journal of Natural and Social Sciences*, *9*(2), pp-411.