Mapping the Causal Connections among Exchange Rate Indicators and Exchange Rate: New Evidence from NARDL Econometric Approach

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Abstract

The aim of the study is to find out the symmetric or asymmetric relationship between the macroeconomic fundamentals and exchange rate of Pakistani Rupee against the US Dollar which has never been analyzed briefly in previous literature. The NARDL approach has been applied with the selected macroeconomic fundamentals i.e., GDP, foreign reserves, inflation rate, interest rate, oil price, gold price, trade balance, and money supply for the data analysis. The data of exchange rate and selected macroeconomic fundamentals have been taken during the time period of 2011 to 2022 from the official IMF IFS database. The findings indicate that foreign reserves and inflation possess an asymmetric relationship with the exchange rate in long run. The increase in productive inflation only helps to stabilize the exchange rate whereas all other significant variables weakens the Pakistani currency either in short -run or long run i.e., decrease in money supply, GDP, inflation and increase in interest rate. The findings will be helpful for the policymakers and economists to implement their policies accordingly to prevent the further depreciation the of Pakistani Rupee against US Dollar.

Keywords: NARDL; bound test; exchange rate; US dollar; Pakistani rupee.

JEL Classification: E37, F27, F47

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1.   Introduction

A country's economy is significantly impacted by the exchange rate in a number of ways (Uddin et al., 2021; Asad Ullah, 2017). The price of a nation's exports and imports is influenced by its exchange rate, which in turn determines how competitive its trade is, claim Bahmani et al. (2009). If a nation's currency is much lower, its exports may be more competitive in foreign markets, which could lead to better export earnings and potential economic growth. In contrast, a rising exchange rate may make imports more affordable but may make exports less competitive. The cost of production, profitability, and the repatriation of profits are all impacted by the exchange rate, which has an impact on foreign direct investment, according to Borensztein et al. (1998). A stable and predictable exchange rate is generally preferred by investors, as it reduces the uncertainty associated with exchange rate fluctuations.

A depreciation in the domestic currency can lead to imported inflation by increasing the prices of imported goods and raw materials (Edwards,1988). This relationship is particularly relevant for countries with a high dependence on imports. In another study, Kaminsky and Reinhart (1999) state that Exchange rate movements can influence capital flows, including foreign portfolio investments and speculative flows. Rapid and large fluctuations in exchange rates can pose challenges for financial stability, as they may lead to instability in asset prices and disrupt the functioning of financial markets.

Pakistan was one of the fastest-growing emerging markets in 2006 during the tenure of the Pakistan Army General Pervez Musharraf (Late). At that time the exchange rate was stable against the United States Dollar from 2001 - 2007 which enabled the economy to boost and compete against other emerging markets. The exchange rate of PKR/USD remained almost constant in above-mentioned tenure i.e., between Rs. 59 to Rs. 61. The GDP of Pakistan touched all-time peak i.e., above 7% annual growth. Unfortunately, after the dismissed of the government in 2007, the Pakistani Rupee has been under pressure due to several reasons. In 16 years, the Pakistani Rupee has been depreciated by almost 400%. Currently, the interbank rate has crossed the benchmark of Rs. 300 per dollar. Due to the excessive depreciation of Pakistani Rupee, traders, individuals, and businessmen indulge in buying US Dollars by selling their domestic currency which also creates a panic in FOREX market and ultimately black market formed where the exchange rate has crossed Rs. 325.

The above-mentioned situation has an adverse impact on the Pakistani economy. In 2023, the policy rate has crossed 21% whereas the inflation is counted as more than 50%. The current economic situation leads towards stagflation rather than hyperinflation because according to most he economists, hyperinflation is phased out which is taken over by the "stagflation". Stagflation refers to the period where inflation increases more than the period of "Hyper Inflation" and simultaneously reduces the employment which create more damage to the economy because on one side, people loses the purchasing power but on the other side

it becomes more severe if they lose their income as well. The economy is also out of foreign reserves i.e., almost 9 Billion Dollars (accumulated from commercial bank and government reserves). Pakistan has to repay the 17 Bn US Dollar loan in next financial year therefore the situation is worst. At this time, this study supports the policymakers to find out the significant drivers of exchange rate because Pakistan has to maintain their exchange rate in emergency otherwise we may have seen the default of nuclear state in financial ground.

The NARDL approach has been applied in this study due to its unique characteristics because ARDL fails to find out the symmetric and asymmetric relationship between the dependent and independent variables. The relationship between macroeconomic fundamentals and exchange rates is a complex and multifaceted topic. With the help of the Bound testing approach, we can find out the three possibilities regarding the existence of co- integration in long run. The three possibilities will provide evidences of existence, non- existence and inconclusive results related to the co-integration. The NARDL was developed the Shin et al. (2014) as it was the extension of ARDL model. While they can provide you with a general overview of the factors that researchers have traditionally considered, it's important to note that opinions can vary among economists, and the specific context of Pakistan may introduce unique dynamics.

1. Interest Rates: Higher interest rates tend to attract foreign investors seeking higher returns, which increases the demand for domestic currency, leading to an appreciation in its value. Conversely, lower interest rates make the domestic currency less attractive and can lead to depreciation.
2. Inflation: High inflation erodes the purchasing power of a currency, making it less attractive to foreign investors. Central banks may respond by raising interest rates to curb inflation, which can strengthen the currency. Conversely, low inflation or deflation can lead to currency depreciation.
3. Current Account Balance: The current account balance, which represents the balance of trade in goods and services, plays a significant role. A trade deficit (imports exceeding exports) can put downward pressure on the currency.
4. Fiscal and Monetary Policies: Sound fiscal policies, such as maintaining a balanced budget or reducing government debt, can positively influence the exchange rate by instilling confidence in the economy. Similarly, prudent monetary policies that ensure stability and control inflation can support the value of the domestic currency.
5. Economic Performance: Political stability and the overall health of the economy can significantly impact exchange rates. Countries with stable political environments, strong institutions, and robust economic growth tend to attract foreign investment, which can strengthen their currency (Yuan, 2011).

Due to above-mentioned discussion related to the exchange rate fluctuation in Pakistan economy and its importance, it is important to find out the determinants' relationship

associated with the exchange rate. The novel approach of NARDL helps us in finding out the valuable results which enable the policy makers to stabilize the exchange rate in future. Rest of the study will be in following sections i.e. Literature review, Methodology, Empirical Results and Discussion with the policy implications.

2.   Literature Review

The predictability of exchange rates is the subject of a raging debate that is still going on. Various methodological approaches for forecasting exchange rates (for example, time series analysis, econometrics, or a combination of the two) have been proposed in the literature and are currently being tested in practice. Frankel et al. (1995) and Meese (1990) conducted a review of the empirical literature to determine whether theoretical and econometric models of exchange rate determination provide better descriptions of the exchange rate sequence than empirical models of exchange rate determination. Meese and Rogoff demonstrated in 1983, through ground breaking research, that the random-walk model outperformed all other models in exchange-rate forecasting when conducted outside of a sample of historical data. There is some evidence that exchange rate fluctuations can be predicted over longer time horizons by employing advanced econometric methods for time series, as well as fundamental and technological approaches, as well as fundamental and technological approaches (Osinska, 2010). Since the publication of Meese and Rogoff's seminal work in 1980, foreign economists and policymakers all over the world have taken a keen interest in comparing potential changes in exchange rates with current data to make informed decisions (Groen, 2000).

Canales and Habermeier (2004) provided a concise summary of previous work on evaluating the by focusing on three primary viewpoints on exchange rates and uncertainty. Random walk models perform better than macro-economic based models at least in the short- run where the leverage of macro-economic fundamentals is low (Meese, 1990; Meese & Rogoff, 1983). Second, macroeconomic fundamentals play a crucial role in describing the behaviour of currency rates. Some experts, however, claim that these basics are only relevant in the long run and do not explain short-term fluctuations. Others, on the other hand, feel that macroeconomic fundamentals may explain both long-run and short-run economic performance. The third issue is that the performance of both types of models doesn't perform equally well in all situation therefore the efficiency of them are doubtful therefore NARDL can play a vital role in the determination of the exchange rate by selecting significant macro fundamentals which can affect the exchange rate.

Researchers in the financial literature disagree on the factors that influence exchange rates (Canales-Kriljenko & Habermeier, 2004). Exchange rates, however, are impacted by a number of fundamental factors, including GDP, local investment, trade openness, government consumption, and money supply. According to Uddin (2006), interest rates, inflation

rates, and balances of payments are the most important economic factors in determining the exchange rate between the Bangladeshi taka and the US dollar.

The currency exchange rate reacts fast to any unexpected changes in monetary policy, claim Karim et al. (2007). Yuan (2011) evaluated the US Dollar's bilateral exchange rates against the Canadian Dollar, Australian Dollar, Japanese Yuan, and British Pound using five macroeconomic factors, including the GDP, interest rate, CPI index, money supply, and current account balance. If trade is more open, the exchange rate will drop, claim Carrera and Vuletin (2002). Kim and Mo (1995) used the money supply, interest rate, real GDP, trade balance, and real income to forecast the Dollar/DM exchange rate. Money supply, interest rate, and real income were the three macroeconomic factors used by Islam and Hasan (2006) to assess the USD/JPY monetary model. Hwang (2001) forecasted the exchange rate using the flexible-price model and the sticky-price model. The author looked at four macroeconomic variables as explanatory factors: GDP, inflation, interest rate, and money supply. Groen (2000) investigated the monetary exchange model by incorporating four explanatory variables: the money supply, the price level, real income, and interest rates. The impact of macroeconomic factors on currency exchange rates has also been established. For example, Khan and Qayyum (2007) investigate the long-run link between the Pakistani currency rate and the purchasing power parity (PPP) hypo study. The data show that in the long run, the exchange rate tends to trend towards PPP equilibrium.

The focus of Jaffri (2010) is on the Pakistani exchange rate's impact on consumer costs. It suggests that changes in the exchange rate have a significant impact on inflation and can shift the ranges of domestic prices. Time-series data from 1973 to 2019 are used by Hussain et al. (2019) to analyze the variables affecting the Pakistani exchange rate. The report claims that variables such as inflation, interest rate disparities, trade balance, and foreign direct investment have a substantial impact on the exchange rate.

Butt et al. (2018) examines the microeconomic factors influencing the Pakistani exchange rate. The study finds that variables such as inflation, interest rates, government borrowing, and international reserves significantly affect the exchange rate. Raza and Afshan (2017) re-evaluates the determinants of the Pakistani exchange rate using annual data from 1980 to 2014. The findings indicate that inflation, money supply, interest rates, and government borrowing have a significant impact on the exchange rate. Nazir & Qureshi (2016) applies the monetary model of exchange rate determination to Pakistan using quarterly data from 1990 to 2014. The study concludes that money supply, interest rate differentials, and foreign exchange reserves are important factors influencing the Pakistani exchange rate.

Nazir and Jawad (2017), Hussain and Bashir (2013) and Magee (1973) provide evidence in their studies that the association between the trade balance and the exchange rate of selected economies are asymmetric due to the existence of J-Curve in such economies.

Chin (1991) analysed the relationship between exchange rate and trade balance by using linear and non-linear techniques. The author included the monthly data to test their association via RMSE and MAE. The author concluded that most of the times the trade balances show a non-linear behaviour. Thus, the non-linear model provides better results than linear models in this case. In another study, the author concluded that the exchange rate affects by number of macro-economic fundamentals which include money supply, GDP, investments, and trade openness (Deka & Resatoglu, 2019).   Rasheed et al. (2020) analyze the factors or determinants of the PKR/USD by applying ARDL Co-integration model over the time period 2010-2020. Based upon the results, it was stated by the authors that trade surplus appreciates the Pakistani Rupee which means that decrease in imports are beneficial for the strength of local currency. It was also found that the increase in interest rate also leads to strengthen the domestic currency.

The higher interest rate policy by the Central Bank may attract the international investors which increases the inflow of US Dollars within an economy and shattered the demand of foreign currency enhance the value of local currency. Another surprising finding of the study is the higher inflation does not affect the domestic currency which means that the productive inflation is important for the economy. Chroufa and Chtourou (2023) concluded that there is an asymmetric relationship between inflation and exchange rate in the context of Tunisia. Exchange rate is also an important indicator for the price equilibrium of agriculture and food related items in various countries where they have been imported but sometimes the relationship is found asymmetric due to number of reasons (Layani & Mehrjou, 2023). Dukic et al. (2023) tested the asymmetric and symmetric relationship between the exchange rate and inflation in selected countries. They concluded that there are evidences of asymmetric relationship between the inflation and the exchange rate. Hence, the following hypothesis has been concluded from the above literature;

H1: Macroeconomic fundamentals have asymmetric relationship with the exchange rate.

3.   Methodology

3.1   *Data*

The monthly frequency data of exchange rate and explanatory variables i.e., i.e., GDP, foreign reserves, inflation rate, interest rate, oil price, gold price, trade balance, and money supply have been taken from the IFS IMF data base for the time period 2011 to 2022. The data has been extracted from the official database of IMF IFS.

3.2   Statistical Techniques

a) NARDL

Before delving into NARDL, it is crucial to review the history of ARDL, which enabled Shin et al. (2014) to develop the NARDL technique. ARDL is a time series analysis- based causal econometric approach. Prior scholars, however, did not place much emphasis on the Auto Regressive Distributed Model (ARDL) in projecting exchange rates. To analyse the relationship between the explanatory and dependent variables, econometric models can be used. Similarly, for exchange rates with their own determinants, an econometric model can help determine the elements influencing exchange rates.

Pesaran and Shin (1995) discussed their innovative idea of ARDL technique with the lags of included variables. Further, ARDL approach has several advantages as below:

- By suitable augmentation, it avoids problems of endogeneity and serial correlation.
- It avoids pre-testing of unit root tests.
- It also provides the information about short run relationship without losing long run data.

It has been noticed that very few researches have applied NARDL model for exchange rate forecasting and most of them were from advanced markets economies (Jamazzi et al., 2015; Asad Ullah et al., 2022; Shamsoddini et al., 2023). Hence this research study will make an added contribution to literature and fulfil the gap by analysing the factors influencing exchange rates of frontier, emerging and standalone markets too.

A simple ARDL model is defined as:

$$y_t = \mu + \varphi Y_{t-1} + \omega_0 X_t + \omega_1 x_{t-1} + e_t \dots\dots\dots\dots (1)$$

Where y_t and X_t are stationary variables.

Non-linear ARDL model developed by Shin et al. (2014) uses positive and negative partial sum decompositions that allow detecting asymmetric effects in long and short-term/run. NARDL model holds some competitive advantages over traditional ARDL therefore it gains more insight from the researchers, first of all, there is no need of large sample in order to find out the results, the small sample is also enough for the analysis.

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To check the asymmetries, separate series should be designed which indicates appreciation and devaluation behaviour of explanatory variables as proposed by Bahamani et al. (2015). In the previous literature the author expects non-linear relationship between exchange rate and trade balance IPI growth and current account balance therefore in this study, the author will analyse the non-linear relationship by using NARDL approach. The author uses the EViews version 9 to find out results of all models in this study.

The Control Variables to be used in the Co-Integration Analyses
Table 1 below discusses the control variables and their assessment criteria.

Table 1
Control Variables

Full Name	Valuation
Money Supply	Money Base
Interest Rate	Central Bank Policy Rate
Inflation	Consumer Price Index
Industrial Production Index	Economic Activity
Trade Balance	Exports – Imports
Foreign Reserves	Official Foreign Reserve's excluding Gold reserves
Oil Price	Crude Oil Price
Gold Price	Gold Price

In this study the author applies two new assessments for the explanatory variables. Firstly, the author employs Industrial production index as a proxy of Gross Domestic Product (GDP). As data for GDP is available on quarterly basis hence if interpolation techniques are integrated to produce univariate time series in monthly frequency then the reliability could be compromised. Due to above reason the author chooses a suitable proxy of GDP that represents Gross Domestic Product at its best. For this Industrial Production Index (IPI) is taken as its extensive application evidenced in previous studies. For example, Beik and Fatmawati (2014) examines the impact of macroeconomic fundamentals on Jakarta Islamic Index the proxy of economic growth was taken as Industrial Production Index (IPI) and considered to be the best representation of any economy growth on monthly basis because of unavailability of monthly frequency data of economic growth or IPI. Forson and Janrattanagul (2014) analyzed relationship between the macroeconomic fundamentals and SETI. For the purpose of investigation authors have taken the data for twenty years ranging from 1990-2009 on monthly basis.

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Despite above-mentioned studies there is a list of studies where researchers compliment IPI as a proxy of Gross Domestic Product. Number of researchers indicates that IPI can be taken as a proxy of GDP when the monthly output of IPI is required in any study for the analysis. (Civcir & Akçağlayan, 2010). Number of researchers has tested the relationship between IPI and Industrial Production Index (IPI), the findings concluded that there is significant positive relationship between these two variables as suggested by (Chen,1997).

Thus, in this study, it is decided to use IPI as a proxy of GDP due to two reasons. Firstly, it provides the data on monthly basis and secondly it represents certain portion of annual economic growth of every individual economy. Further justify IPI as a proxy of IPI by the findings of significant relationship between IPI and IPI from previous literature. As evidenced from existing literature ranging from 1986 to 2019 the use of IPI as a proxy of economic growth or Gross Domestic Product, the author decides to use IPI as a proxy of IPI in this study. It will be helpful to create a balanced panel data of the same frequency because all control variables are taken on monthly basis i.e. money stock, inflation rate, interest rate, trade balance, oil price, gold price and foreign reserves of each economy.

Similarly, the data for money supply in monthly frequency is hard to collect and further have observed new dynamics in the calculation of money supply that changed the school of thoughts regarding conventional proxy for certain variables. In a latest research by Funashima (2020) that have been published in Journal of IMF, the author states that money base plays a significant role in determination of exchange rate whereas money supply doesn't connect with exchange rate as money base growth. Considering above and availability of data in monthly frequency the author decides to take money base growth rate as the proxy for money supply in this study.

4.   Empirical Analysis

It is mentioned earlier that to avoid biasedness, two-unit root tests have been applied in this study to validate the results. The preliminary assumption of the NARDL technique is to ensure that the selected time series must be stationary at level and first difference. If any time series found stationary at second difference, the respective variable must be dropped from the model and now allowed to include in the analysis.

Table 2
Unit Root of Exchange Rate Time Series

ADF Test		PPP Test	
Level	**1st Diff.**	**Level**	**1st Diff.**
-1.1042	-8.8503**	-1.2111	-8.8503**

**significant at 5%

Table 2 depicts the unit root test results for the exchange rate time series of Pakistani Rupee against the US Dollar. In both cases, it is found that the exchange rate time series found stationary at first difference of ADF and PPP tests.

Table 3
Unit Root

Variable	ADF Test		PPP Test	
	Level	**1st Diff.**	**Level**	**1st Diff.**
Foreign Reserves	-1.3598	-5.7260**	-1.6088	-10.0556**
Money Supply	-3.0633	-12.4576**	-5.8793**	-
Inflation Rate	0.8252	-9.7683**	0.6505	-9.8490**
Interest Rate	-2.4428	-4.0171	-1.8666	-9.1857
Trade Balance	-1.6268	-11.2737**	-1.4721	-11.8513**
GDP	-4.852**	-	-3.6011**	-
Oil Price	-2.6640	-8.5447	-2.2433	-8.3373
Gold Price	-0.0626	-8.7842**	-0.3256	-8.7474**

**significant at 5%

Table 3 illustrates the unit root tests findings of selected independent variables. It is found that the GDP is stationary at level but all other independent variables are found stationary at the 1st difference. The results satisfy the pre-requisites of the NARDL analysis therefore all independent variables are included in NARDL analysis.

Table 4
Long Run Coefficients

Country	Long Run Coefficients
Pakistan	$FE = 83.954 + 0.002*FR\_POS - 0.002*FR\_NEG - 0.213*OP\_NEG - 0.8396* INF\_POS$ (-2.172) (-2.347) (-2.493) (-2.064) [0.045] [0.022] [0.015] [0.043] $+ 6.049*INF\_NEG + 4.623*IR\_POS - 0.001*TB\_NEG$ (3.915) (6.499) (-2.321) [0.000] [0.000] [0.023]

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Bound Test, F Statistic: 4.230
I(0) Bound: 3.77, I(1) Bound: 3.23 (10% significance)

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Table 4 describes the results of long run coefficients via NARDL technique. The Bound test F- statistics shows the F-Statistics value of 4.2302 which is higher than the lower and upper bound i.e., 3.77 and 3.23. It indicates that there is a co-integration between the exchange rate and selected significant macroeconomic fundamentals at 10% level of significance.

The foreign reserves have continuous adverse impact on the exchange rate irrespective of increase or decrease in one unit of foreign reserves. Surprisingly, the decrease in oil price also leads to devalue the Pakistani currency. The inflation is one of the significant indicators of the exchange rate in the context of Pakistani Rupee i.e., one unit increase and decrease result into devaluation of currency by 0.839 and 6.049 units respectively. The negative inflation destabilizes the Pakistani Rupee much higher if compare to the tenure of higher inflation. Furthermore, when interest rate increases by one unit, the Pakistani Rupee devalued by 4.623 units. Trade deficit also weakens the Pakistan Rupee against the United States Dollar. All in all, all above-mentioned long-run significant coefficients leads towards devaluation of domestic currency. The results are consistent with the findings of Nazir and Qureshi (2016), Raza and Afshan (2017), Butt et al. (2018), Ali et al. (2019) and Hussain et al. (2019) and inconsistent with the results of Qayyum et al. (2016).

Table 5
Short-Run Coefficients of Pakistan Market

Country	Short Run Coefficients
Pakistan	ΔFE= -0.71615 + 0.2321*Δ MS_NEG$_{t-2}$ -2.5151* Δ INF_NEG$_{t-2}$ +3.343* ΔIR_POS$_t$ –
	(2.591) (-3.1767) (2.769)
	[0.012] [0.002] [0.007]
	0.0987* Δ GDP_NEG$_{t-1}$
	(-2.173)
	[0.034]
	F= 443.732 [0.000]

Table 5 illustrates the short-run coefficients of Pakistan market. The results conclude that second month decrease in money base growth of one unit leads to strengthen the domestic currency by 0.2321 units. Inflation, like long-run coefficient, also play its part in the devaluation of Pakistani Rupee. The negative inflation difference of second month affects the Pakistani Rupee negatively by 2.5151 units.

The one month increase in interest rate shaken the Pakistani Rupee by 3.343 units as it also affects in a same way in long-run. The monthly cut of domestic product weakens the Pakistani Rupee significantly by 0.0987 units respectively. The decline in money supply is the only indicator which stabilize the Pakistani Rupee whereas all remaining variables devalued the domestic currency against US Dollar. The results are consistent with the findings of Dukic et al. (2023), Chroufa and Chtourou (2023), Nazir and Qureshi (2016), Raza and Afshan (2017), Butt and Rehman (2018), Ali et al. (2019) and Hussain et al. (2019) and inconsistent with the results of Qayyum et al. (2016) and Rasheed et al. (2020).

Table 6
Diagnostic Tests Results

Diagnostic Tests			
Normality	**Heteroskedasticity**	**Serial Correlation**	**RAMSEY Test**
0.2222	0.2297	0.1471	0.0730

It is important to remove any problem related to normality, heteroscedasticity, serial correlation and omission in the provided data set otherwise the results are not supposed to acceptable and declare us invalid or spurious. Table 6 shows the insignificant values of all diagnostic tests which reveals that there isn't any issue of normality, heteroscedasticity, serial correlation and omission. It means that the error terms are random and mean, variance and co variance are constant. The selected model is fit i.e., none of any significant independent

variable has been overlooked by author. In NARDL analysis, like ARDL, it is important to find out the stability of the model via CUSUM and CUSUM of Square as shown in below fig. 1.
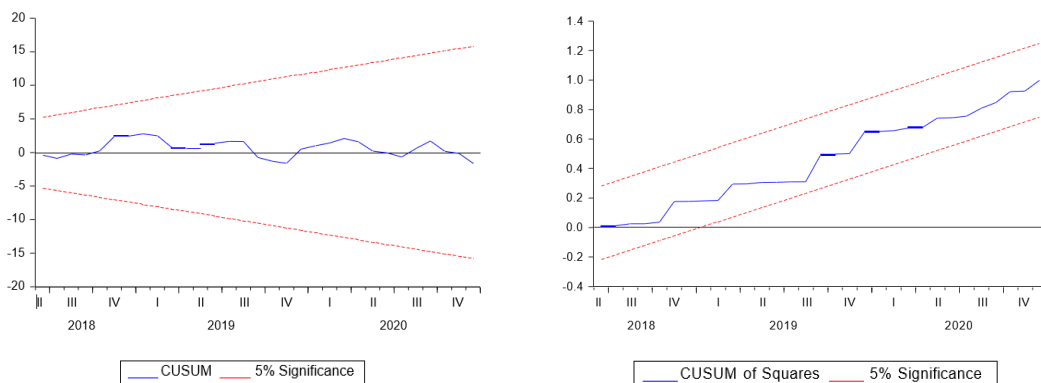

Figure 1: CUSUM and CUSUM of Square

The above figure indicates that the model is super fit for the analysis as the model lies between the upper and lower bound area and does not surpass at any stage therefore the stability of the model is up to the standard.

5.   Conclusion & Policy Implications

The aim of this study is to explore the relationship between the exchange rate and selected macroeconomic fundamentals i.e., money supply, GDP, gold price, oil price, foreign reserves, inflation rate, interest rate, and trade balance. It was mentioned earlier that we have included two new proxies i.e., money base growth for the money supply and IPI for the GDP. The motivation of this study is the current economic outlook of Pakistan economy which is near to collapse if preventive measurements have not been taken under consideration in emergency.

Due to characteristic of gauging the symmetric and asymmetric relationship by de-composing a single variable into positive and negative, the NARDL testing approach is applied in this study. The Bound testing approach reveals that the co-integration exists among the exchange rate and macroeconomic fundamentals due to higher F-statistics if compare to upper and lower bounds.

5.1   Policy Implications

The findings are important for the policymakers because the economic vital are somehow in unfavorable conditions and results into adverse conditions in moving any way.

If we look upon long run relationship, the foreign reserves do not play any role in stabilizing the exchange rate even in case of increase in reserves. There is a constant decline in the Pakistani Rupee value against the US Dollar in either case i.e., decline or increase in foreign reserves. It is also noticeable that the decrease in oil price does not strengthen the exchange rate but devalue the domestic currency. The reason may be the oil purchase in deferred payment contract with the KSA. Therefore, Pakistan may purchase oil in low prices from any other market which resulted into decline in Pakistan Rupee value against the Dollar. For the future researchers, it is recommended to validate the above finding related to the oil prices association with the exchange rate because in future, Pakistan will have to repay the debt of deferred payment of gasoline which the economy is enjoying right now. On the other hand, the future researchers will have to analyze the impact of current and future oil prices on the exchange rate because it is possibility that at the time payment of deferred liabilities from Pakistan related to the oil prices, the oil price will may be much higher than the previous agreed price.

It is essentially acceptable that the increase in policy rate by the Central bank attracts the foreign investments which eventually enhance the reserves and stabilize the exchange rate against the major currencies. The Pakistan' economy case is totally reverse i.e.; the higher interest rate does not attract the investors either local or international. It may be the distrust on Pakistan economy by the investors therefore the investors do not rely upon the economic situation of Pakistan and reluctant in getting higher return due to the fare of default. Right now, the Central bank policy rate is 22% point base but the exchange rate has been following an unfavorable trend continuously i.e., the Pakistani Rupee weakens against the US Dollar. Moreover, the interest rate is also used to manage the inflation rate of an economy therefore when interest rate increases, most of the time inflation also increases but the relationship is not straight forward.

In higher inflation, the Pakistan Rupee has lost its value fewer if compare to the depreciation during decrease in inflation. The reason may be the bulk purchases from abroad by the local citizens and businessmen. The trade deficit also depreciates the Pakistani Rupee and enhance the exchange rate against the US Dollar. Trade deficit has been one of the major problems of Pakistani economy because the dependency of local manufacturing heavily relies upon the import of raw material. Overall, none of any significant indicators tends to enhance the value of Pakistani Rupee which is strange for any researcher. It shows the current economic deterioration.

Stabilizing the exchange rate is a complex task that requires a comprehensive approach involving various policy measures. While I can provide some general suggestions, it's important to note that the specific actions needed to stabilize the exchange rate in Pakistan would depend on the country's unique economic circumstances. Here are a few measures that Pakistan could consider;

1. Monetary Policy: The central bank can play a crucial role in exchange rate stabilization through appropriate monetary policy. Adjusting interest rates to manage inflation and balance capital flows can help maintain stability in the currency. Additionally, the central bank can intervene in the foreign exchange market by buying or selling foreign currency to influence the exchange rate.
2. Fiscal Policy: Sound fiscal policies can contribute to exchange rate stability. Maintaining fiscal discipline, reducing budget deficits, and implementing structural reforms to enhance tax revenues can help reduce reliance on external borrowing and ease pressure on the exchange rate.
3. Managing Foreign Exchange Reserves: Having enough foreign exchange reserves provides protection against the volatility of exchange rates. Pakistan can focus on building and maintaining adequate reserves through activities including increasing exports, attracting foreign direct investment, and managing the current account balance.
4. Structural Reforms: The exchange rate may gain from structural reforms that increase the economy's overall competitiveness. A variety of measures, including as improving the business climate, supporting export-oriented businesses, diversifying the economy, and investing in infrastructure, can be taken to achieve long-term exchange rate stability.
5. Exchange Rate Flexibility: Allowing some exchange rate flexibility can help a country maintain its competitiveness by absorbing shocks from the outside market. Despite the fact that fixed exchange rate systems may provide stability in the medium term, they are vulnerable to speculative attacks. One could argue that by allowing the exchange rate to be managed by market forces with intermittent interventions, a managed floating exchange rate regime strikes a balance between stability and flexibility.
6. Efforts to increase confidence Enhancing investor confidence through transparent and consistent economic policies, institutional development, and enhanced governance may attract foreign investment, stabilize the exchange rate, and promote economic stability.

It's important to note that these suggestions are general in nature, and their implementation should be tailored to the specific economic context of Pakistan. Consultation with economists, policymakers, and experts with a deep understanding of Pakistan's economy would be crucial in formulating and implementing an effective exchange rate stabilization strategy.
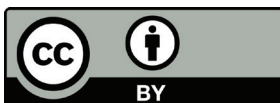
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