

THE IMPACT OF CENTRAL BANK INTERVENTIONS ON FOREX MARKET DYNAMICS IN MALAYSIA

Muhammad Amir Shazri

Asia Pacific University of Technology and Innovation, Kuala Lumpur, Malaysia.
shazriamir17@gmail.com

Hafinaz Hasniyanti Hassan

Senior Lecturer Asia Pacific University of Technology and Innovation, Malaysia
hafinaz.hasniyanti@apu.edu.my

ABSTRACT

Central bank interventions are acts made by the central bank to influence exchange rate fluctuations through various ways, such as verbal communication or direct market operations. To evaluate the success of monetary policy measures and their effects on the Forex market, policymakers and market participants must have a clear understanding of the impact of these actions. This study investigates the effect of central bank interventions on the dynamics of the Malaysian Forex market, with a particular focus on the exchange rate between the US dollar (USD) and the Malaysian ringgit (MYR). This study used secondary data such as historical exchange rate data, central bank communications/statements, and market reports to uncover patterns, trends, and causal links between central bank operations and Forex market dynamics. The study's findings contribute to a better understanding of how central bank policies impact the behavior of Malaysia's USD/MYR exchange rate. The findings indicate that central bank intervention through interest rate adjustments is a significant instrument for influencing the Malaysian foreign exchange market, whereas central bank interventions in buying and selling currency and communications interventions are not significant. Policymakers can make more informed judgments on monetary policy measures by examining the effectiveness and implications of these interventions, while market participants can obtain insights into potential opportunities and hazards in the Forex market. Overall, this study is to shed light on the complex interplay between central bank policies and Forex market dynamics, providing significant insights into the impact of these interventions on the USD/MYR exchange rate in Malaysia.

Keywords: Forex Market; Central Bank Intervention; Interest Rate; Currency

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Biographical Notes:

Muhammad Amir Shazri is a Research Scholar at Asia Pacific University of Technology and Innovation, Malaysia.

Hafinaz Hasniyanti Hassan is a Senior Lecturer at Asia Pacific University of Technology and Innovation, Malaysia. Her areas of teaching and research interests are corporate finance, Time series Finance and econometrics.

1. INTRODUCTION

The largest financial market in the world is the foreign exchange (FX) market, with a daily transaction of around \$6.6 trillion in 2019. Due to their responsibility for overseeing the monetary policies of their various nations, central banks play a significant role in the FX market. To affect the dynamics of the foreign exchange market and further their monetary policy goals, central banks employ a variety of instruments and actions (Triennial Central Bank, 2019). Both academics and practitioners have been interested in the effect that central bank actions have on the dynamics of the currency market. This study aims to investigate the effects of central bank interventions on the dynamics of the forex market and to pinpoint the variables that affect these effects. The objective of the study is to further the body of knowledge by offering a thorough examination of how central bank operations affect the dynamics of the currency market (International Monetary Fund, 2021). Open market operations, interventions in the foreign exchange market, changes to interest rates, and forward guidance are just a few examples of the different ways central banks might intervene. The exchange rate, or the cost of one currency relative to another, is the subject of these interventions. These interventions are used by central banks to accomplish goals including price stability, economic growth, and full employment (Singh, 2023). Direct and indirect effects of central bank operations on the dynamics of the foreign exchange market are possible. Changes in the currency rate, volatility, and trading volumes are examples of direct consequences. Investor sentiment, market expectations, and risk appetite are examples of indirect effects. The success of central bank interventions is influenced by a number of variables, including the scope and timing of the intervention, the central bank's standing and reputation, and the nation's political and economic climate.

The foreign exchange (FX) market is a complicated process that is influenced in many ways, most notably by central bank operations. The impact of central bank interventions on foreign exchange market dynamics is a key area

of study because of its potential effects on exchange rate stability, trade flows, and economic growth. However, there is disagreement on the efficacy of these interventions and potential unexpected consequences including market distortions and moral hazard (Brychka et al., 2019). With trillions of dollars changing hands every day, the foreign currency (FX) market is an essential part of the world financial system. International trade, investment, and economic growth are significantly influenced by the dynamics of the forex market. Yet volatility and instability in the FX market can have a negative impact on the growth and stability of the economy (McCauley et al., 2015). Global central banks have been interfering in the currency market to foster exchange rate stability, maintain adequate levels of foreign reserves, and encourage economic growth. Yet, the efficacy of these therapies has been called into question in the literature. While some research implies that central bank interventions might help to stabilize the currency market and reduce volatility, others contend that they can also cause market distortions and inefficiencies (Hutchison & Sushko, 2012). In Malaysia, the government and central bank, Bank Negara Malaysia, have been active participants in the forex market to control exchange rate risks, maintain enough foreign reserves, and encourage economic growth. The decision to impose capital controls on September 1 was the greatest intervention Bank Negara Malaysia (BNM) made to respond to the Asian financial crisis in 1997. The BNM implemented this intervention, sometimes referred to as "Malaysian capital controls," as a substantial and divisive policy response to the acute financial crisis that had swept the region (Sharma, 2003). The Malaysian ringgit (MYR) was locked at a fixed exchange rate of 3.8 MYR to the US dollar under capital controls, and BNM placed stringent limits on capital movements, including bans on foreign currency transactions and the repatriation of cash. These steps were taken with the intention of stabilizing the ringgit, regaining investor confidence, and defending the Malaysian economy from the speculative attacks and instability that were at the time plaguing other Asian countries (Reuters, 2022). The implementation of the Malaysian capital controls by BNM was met with a mix of reactions and outcomes. The steps appeared to stabilize the Malaysian economy in the short run. A sense of security and stability was created by the fixed exchange rate and capital controls, which also stopped the ringgit's value from further declining. In turn, this assisted in regaining investor confidence and curbed the country's capital flight. The regulations also made it easier for Malaysia's banking system to be restructured and gave local firms and sectors some breathing room to adapt to the difficult economic circumstances (Bank Negara Malaysia, 1998). The Malaysian capital controls, however, also came under intense scrutiny and skepticism. The measures, according to critics, inhibited market processes, limited financial independence, and eventually discouraged foreign investment. Some analysts questioned the fixed exchange rate's sustainability and emphasized the risks of excessive government interference in the economy. The capital controls, which departed from the ideals of free capital mobility and spurred

discussions on the function of capital controls in times of crisis, also aroused worries about their implications for international trade and cooperation (Jongwanich et al., 2011). The Malaysian capital controls continue to be a fascinating case study for economists and policymakers regardless of the controversies surrounding them. The incident serves as a reminder that unorthodox policy measures can have both favorable and unfavorable effects, and their efficacy may differ depending on situations and circumstances. Discussions on the proper responses to financial meltdowns and the promotion of economic stability in the contemporary globalized world continue to be shaped by the lessons learned from BNM's involvement during the 1997 Asian economic disaster (Kaplan & Rodrik, 2002). Policymakers, market participants, and investors must all comprehend how central bank operations affect the dynamics of the currency market. Successful intervention strategies can encourage economic growth, facilitate international commerce and investment, and improve exchange rate stability. Conversely, poor interventions can result in market distortions, increased volatility, and decreased market efficiency, all of which have a negative impact on the economy (Chen, 2021). Furthermore, the Malaysian setting is particularly fascinating to research because it is a tiny open economy that depends heavily on foreign investment and commerce. Thus, it is critical to evaluate how well government actions manage exchange rate risks and foster economic growth. There have been a variety of findings from earlier studies on central bank operations in the FX market. In certain research, interventions are shown to be able to stabilize exchange rates and lower volatility, whereas in other studies, interventions are shown to be able to skew the market and lead to inefficiencies (Sandri, 2023). Unfortunately, most of these studies are centered on established economies, and there is no concrete data on how interventions in emerging markets affect those markets (Lafarguette & Veyrune, 2021). The efficiency of interventions in managing exchange rate risks and maintaining foreign reserves has been the focus of previous research, but their effects on the dynamics of the forex market have not been adequately explored. By presenting actual data on the influence of central bank actions on the dynamics of the forex market in the Malaysian context, this paper seeks to close this research gap.

The overall goal of this research is to analyze and comprehend the impact of central bank interventions on the dynamics of the Malaysian Forex market, with a particular focus on the USD/MYR exchange rate, from 2019 to 2021. The study tries to identify the extent to which central bank operations contribute to the stability and volatility of the USD/MYR exchange rate by evaluating important Forex market parameters such as exchange rate volatility, trading volumes, and market liquidity. Furthermore, the study intends to investigate the reactions and behaviors of various market participants, such as commercial banks, institutional investors, and retail traders, considering central bank interventions and their impact on exchange rate dynamics. Finally, this study aims to provide useful insights into the relationship between central bank actions and Malaysian Forex market dynamics, shedding light on the factors influencing exchange rate movements throughout the selected time frame.

2. LITERATURE REVIEW

The conceptual basis of this study is the idea that central bank operations can have a big impact on the dynamics of the currency market. It is based on the idea that central banks use a variety of instruments and tactics, including changing interest rates, buying, and selling currency, and communication interventions, to shape market expectations, affect exchange rates, and preserve market stability. The approach also considers how market participants' actions, investor sentiment, and the legitimacy of central bank policy all affect how interventions affect the dynamics of the currency market.

2.1. Interest Rate Adjustments

The alteration of interest rates is one of the main instruments used by central banks. Changes in interest rates are a tool used by central banks to control inflation, economic activity, and eventually exchange rates. The theoretical viewpoints on how changes in interest rates may affect the dynamics of the forex market are first examined in the conceptual framework. The method for how monetary policy is transmitted sheds light on the pathways via which changes in interest rates have an impact on currency rates. This concept suggests that many channels, such as the portfolio balance, signaling, and expectations channels, via which changes in interest rates can affect exchange rates (Reserve Bank of Australia, n.d.). By changing the relative attractiveness of local and foreign assets, the portfolio balance channel hypothesizes that changes in interest rates have an impact on exchange rates. When a central bank boosts interest rates, the return on domestic investments rises, luring in more foreign capital. The domestic currency appreciates because of the increasing demand for domestic assets.

According to the signaling channel, changes in interest rates reveal vital information about a central bank's view on monetary policy and its plans. Interest rate fluctuations are interpreted by market participants as signs of the central bank's stance on the state of the economy and upcoming policy initiatives. Exchange rates are impacted by these signals because they have an impact on market expectations. The expectations channel places a strong emphasis on how market expectations affect exchange rates. The expectations for future interest rate differentials, inflation, and economic growth can all change because of changes in interest rates. These shifts in expectations influence the dynamics of currency supply and demand, which influences exchange rates. Through models like the uncovered interest rate parity (UIP) and the monetary model of exchange rates, the efficiency of interest rate changes in influencing forex market dynamics can be further investigated. The UIP model investigates the connection between changes in exchange rates and interest rate differentials. It implies that to preserve interest rate parity, changes in interest rate differentials should also result in changes in exchange rates.

The monetary model of exchange rates emphasizes the importance of monetary considerations in setting exchange rates by focusing on the long-term link between exchange rates, interest rates, and other macroeconomic variables. The effects of central bank interest rate changes on exchange rates and forex market activity have been the subject of several empirical research. For instance, Zettelmeyer (2022) studied the impact of Malaysia's Central Bank changing interest rates. They discovered that increases in interest rates resulted in short-term currency appreciation and less volatility in exchange rates. However, it was shown that the effects were comparatively fleeting, indicating that market participants swiftly modified their expectations to consider the fresh information. Similar to this, Vawda (2023) looked into how the Reserve Bank of Australia's interest rate changes affected the value of the Australian dollar. They discovered that sudden changes in interest rates had a big, immediate impact on the value of the currency. Additionally, they found evidence to support the newly discovered interest rate parity theory by finding that interest rate differences between nations were significant in explaining changes in exchange rates. The nonlinear relationship between changes in interest rates and exchange rates has been investigated in several studies. For instance, Mehl & Cappiello (2007) examined the effects of significant currency pair movements on Federal Reserve interest rate fluctuations. They discovered indications of asymmetry in the way exchange rates reacted to changes in interest rates. Exchange rates specifically responded more favorably to rate increases than decreases, suggesting that market players may respond differentially to tightening and loosening monetary policies.

2.2. Buying and Selling Adjustments

Central banks frequently participate in currency buying and selling operations to directly influence exchange rates. These interventions entail the purchase or selling of domestic or foreign currencies in the forex market, thereby influencing currency supply and demand dynamics. The conceptual framework investigates theoretical viewpoints on how currency purchases and sales can influence forex market dynamics. Portfolio balance approach sheds light on how currency purchases and sales affect exchange rates. Central bank operations, according to this viewpoint, influence the relative supply and demand for currencies, hence influencing their exchange values. When a central bank buys domestic currency and sells foreign money, the demand for local currency rises, causing the currency to appreciate. In contrast, when a central bank purchases foreign currency and sells local currency, the supply of domestic currency rises, which causes a devaluation. According to the signaling hypothesis, currency purchases and sales can act as signs of a central bank's commitment to preserving exchange rate stability. Central banks actively intervene in the currency market to affect market expectations and discourage speculative actions that could disrupt exchange rate dynamics. These operations can boost the credibility of central bank policies and signal the bank's willingness to sustain the currency at specific exchange rate levels.

Furthermore, market liquidity may be directly impacted by central bank operations. The large-scale influx or outflow of liquidity from the market caused by central banks' purchases or sales of currencies can have an impact on market dynamics and trading conditions. The bid-ask spread, transaction costs, and general market efficiency can all be impacted by changes in liquidity. Empirical research that involves event studies, regression analysis, or market microstructure models can be used to investigate the effectiveness of buying and selling currency transactions in impacting forex market dynamics. By evaluating abnormal returns or volatility around intervention events, event studies examine the influence of central bank actions on exchange rates and other market variables. Regression analyses, which consider other relevant factors, estimate the link between intervention variables and exchange rate fluctuations. The influence of interventions on bid-ask spreads, trading volume, and other market liquidity metrics is the focus of market microstructure models. The effects of currency purchases and sales by central banks on the FX market have been well investigated. Increasing or decreasing the supply of domestic currency is the goal of these activities, which are intended to affect exchange rates. According to empirical data, these treatments' success in accomplishing their goals can vary. For instance, Mohanty (2013) used data from 12 important currencies to investigate the effect of central bank operations on exchange rates. They discovered scant evidence of major and ongoing consequences of exchange rate adjustments. However, they noted that interventions might have immediate results and affect market sentiment, particularly if several central banks work together to coordinate them. Shaari (2008) looked at the effects of Bank Negara Malaysia's (BNM) foreign exchange market interventions on the Malaysian ringgit in the context of Malaysia. They discovered that the interventions made by BNM significantly and right away affected the value of the ringgit. Additionally, they saw that BNM's actions reduced exchange rate volatility effectively, demonstrating a role for intervention in currency stabilization. The existence of other market actors can also affect how effective interventions are distinguished between sterilized and non-sterilized interventions when analyzing the effect of central bank interventions on exchange rates (Gemberg, 1981). He discovered that non-sterilized interventions had a greater impact on exchange rates than sterilized interventions, which had more modest effects. This shows that the degree of sterilization may have an impact on the transmission mechanism through which interventions affect exchange rates.

2.3. Communications Interventions

In addition to changing interest rates and buying and selling currencies, central banks frequently use verbal interventions to affect the dynamics of the forex market. The communication of central bank officials' opinions, statements, or future direction in relation to exchange rates and monetary policy is known as communications intervention. The theoretical viewpoints on how communications interventions can affect the dynamics of the currency market are explored in the conceptual framework. By offering direction on potential central bank actions or expressing worries about exchange rate fluctuations,

communications interventions can affect market expectations and mood. Central bank officials' remarks can affect market players' expectations for the direction of monetary policy and exchange rates, which in turn can affect investment choices and the dynamics of currency demand and supply. Communications interventions can also be used to signal the central bank's position on currency rates. Central bank officials can demonstrate their commitment to upholding exchange rate stability and their readiness to act, if necessary, by making public declarations. Verbal interventions can affect market dynamics by affecting market players' expectations about how the central bank will react to exchange rate movements. Studies of the effects of central bank communication on exchange rates, volatility, and market sentiment can be used to empirically test the efficacy of communications interventions in affecting forex market dynamics. While sentiment research approaches can capture the tone and content of central bank communication and its impact on market sentiment indices, event studies can evaluate the market response to specific communications actions.

The dynamics of the currency market can be affected by communications interventions made by central bank officials in the form of announcements, speeches, and interviews. According to the research, these actions may affect the mood of the market, investor expectations, and changes in currency rates. For instance, FRB (2004) examined how words made by Federal Reserve Chairman Alan Greenspan affected the value of the dollar. They discovered that his comments significantly influenced exchange rates, especially when they contained information about upcoming monetary policy activities. The study emphasized the significance of central bank communication in affecting currency prices and market expectations. Similar to this, Fratzscher (2006) investigated how central bank officials' speech comments affected currency rates in developed nations. They discovered that communication from the central bank significantly influenced exchange rates, with remarks expressing a steadfast commitment to exchange rate stability causing a decline in the value of the domestic currency. The study focused on how communications interventions might affect market sentiment and indicate the central bank's position. Umezaki (2019) investigated how communications interventions by Bank Negara Malaysia (BNM) affected the Malaysian ringgit in the context of Malaysia. They discovered that the value of the ringgit was significantly and immediately impacted by BNM's communications interventions. They also noticed that the effect of communication interventions varied according to the volume and nature of the utterances. The ringgit strengthened in response to statements indicating a commitment to stability, whereas statements to the contrary had the reverse impact.

3. DATA AND METHODOLOGY

The study will look at the impact of central bank interventions on Malaysian forex market dynamics, with a particular focus on the USD/MYR exchange rate.

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The three (3) regressors that will be analyzed are interest rate adjustments, currency purchases and sales, and central bank communications. This is a quantitative study that will be carried out to empirically examine the impact of the three (3) variables indicated above on forex market returns. In this section, only secondary data sources were used in the data collection process. Accessing and compiling reliable secondary data from Bank Negara Malaysia, the World Bank, the International Monetary Fund, and other reputable sources will be used to gather secondary data for the data collection procedure. These information sources give a thorough overview of the dynamics of the foreign exchange market and central bank actions. To make sure that the study is up-to-date and relevant, the data will be gathered throughout a three-year period, from January 2019 to December 2021. The procedure of gathering data makes sure that there will be correct and trustworthy data available for the analysis. Table 1 shows the measurement of the variables and source of data in this study.

Table 1: Source of Data and Measurements

Data/Variables	Measurement	Source
Exchange Rate (USD/MYR)	Computed by Excel on an average daily basis throughout the month: <i>The sum of the daily Exchange rate/number of days</i>	The data extracted from the Bank Negara Malaysia website
Interest Rate Adjustments (OPR)	Measured as a decimal on an average daily basis throughout the month: <i>The sum of daily OPR / number of days</i>	The data extracted from the Bank Negara Malaysia website
Buying & Selling Currency (VOLUME)	Measured as a decimal on an average daily basis throughout the month: <i>The sum of daily Volume/number of days</i>	The data extracted from the Investing.com website
Central Banks Communications (COMMS)	Using a binary numbering system, if there are Forex Market-related occurrences, they are represented as 1, if there are none, it is 0.	The data extracted from the Bank Negara Malaysia website

Using statistical techniques including regression analysis, correlation analysis, and descriptive statistics, the gathered data will be examined. The relationship between central bank interventions and currency market dynamics will be examined using regression analysis, and the strength of the relationship will be evaluated using correlation analysis. The EViews12 software will be used to compute data for analytical purposes.

This is due to the software's easy-to-use, object-oriented, and novel interface, which gives students access to strong forecasting, statistical, and modeling features.

3.1. Descriptive Statistics

Table 2 provides an in-depth look at the descriptive statistics produced from the annual data collected from 2019 to 2021. The absence of missing values in the dataset ensures the robustness and trustworthiness of our study. Each variable under examination has 36 observations, ensuring a consistent and adequate sample size for our statistical investigation. The descriptive statistics will be useful in creating hypotheses, testing assumptions, and drawing valid inferences as we progress with our investigation. Furthermore, these statistics will be critical in communicating our findings to stakeholders and providing a clear grasp of the dataset's properties and consequences. Finally, the lack of missing data and the consistent sample size of 36 observations for each variable strengthen the dependability of our dataset. Descriptive statistics and graphical representations can be employed to gain an understanding of data, extract valuable insights, and facilitate informed decision-making. These tools enable us to analyze data sets and draw insightful conclusions to guide our actions.

Table 2: Descriptive Statistics

	EXCH_RATE	OPR	VOLUME	COMMS
Mean	4.156977	1224.322	39.68538	0.361111
Median	4.154645	1.928387	38.15735	0.000000
Maximum	4.352345	43997.50	118.0952	1.000000
Minimum	4.037342	1.162333	20.45455	0.000000
Std. Dev.	0.068740	7332.545	16.74626	0.487136
Skewness	0.694567	5.747049	2.858760	0.578315
Kurtosis	3.712620	34.02857	14.41288	1.334448
Jarque-Bera	3.656285	1642.330	244.4159	6.167783
Probability	0.160712	0.000000	0.000000	0.045781
Sum	149.6512	44075.57	1428.674	13.00000
Sum Sq. Dev.	0.165384	1.88E+09	9815.308	8.305556
Observations	36	36	36	36

3.2. Correlation Matrix

The correlation matrix is a test of a linear relationship between the variables (Shahid, 2019; Shahid & Sattar, 2017). Correlation analysis can anticipate the movement of one variable based on changes in another one. When two variables move in the same direction, they are said to be positively correlated, but when they move in opposite ways, they are said to be negatively linked. The degree of correlation runs from -1 (perfect negative correlation) to +1 (perfect positive correlation), where the closer the findings are to either of these numbers, the stronger the correlation between the variables and the more closely their movements will sync. Hence, Table 3 illustrates the correlation between factors.

The correlation strength is reorganized as $OPR > VOLUME > COMMS$, in descending order from strongest to weakest. Overall interest rate adjustments (OPR) have a positive relationship with the exchange rate (ER), with $r = 0.29$, however buying and selling currencies (VOLUME) and central bank communications (COMMS) show a negative correlation with the exchange rate (ER), with $r = -0.014$ and -0.036 , respectively.

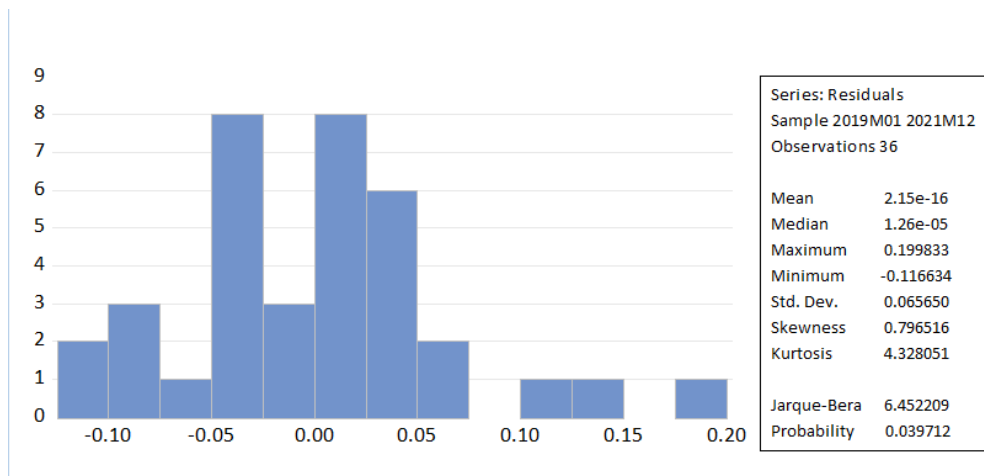
Table 3: Correlation Matrix

	EXCH_RATE	OPR	VOLUME	COMMS
EXCH_RATE	1.000000	0.295988	-0.014451	-0.036744
OPR	0.295988	1.000000	-0.103835	-0.127087
VOLUME	-0.014451	-0.103835	1.000000	0.286899
COMMS	-0.036744	-0.127087	0.286899	1.000000

The degree and direction of the linear link between two variables are measured by the correlation coefficient (R). It is utilized in this instance to describe the relationship that exists between the independent variables (OPR, volume, and communications) and the dependent variable (Malaysian forex market). $r = 0.29$ for OPR: This positive correlation coefficient indicates that there is a weak positive linear link between OPR (probably a variable) and the Malaysian forex market. As OPR rises, the FX market tends to rise slightly as well. $r = -0.014$ for VOLUME: This correlation coefficient is extremely close to zero, showing a very weak or non-existent linear link between volume (probably another variable) and the Malaysian forex market. Based on this correlation value, the change in volume does not appear to have a significant impact on the forex market. $r = -0.036$ for COMMS: This correlation value is also close to zero, indicating a very weak or negligible linear link between COMMS (probably a variable related to communication) and the Malaysian forex market. Based on this correlation value, the communication aspect does not appear to have a significant linear effect on the forex market.

3.3. Normality Test

The normality test, which assesses whether a given dataset has a normal distribution, is an important step in statistical analysis since it establishes a crucial presumption for many statistical methods (Shahid, 2022; Shahid 2024). Using the Jarque-Bera test, this study conducted a normality test on the dataset in this research to see how far it deviated from normality. The Jarque-Bera test is a well-liked technique for determining whether a sample is normal. It evaluates the data for skewness and kurtosis, which are measurements of the distribution's asymmetry and peakiness, respectively. Skewness and kurtosis for a distribution that is completely normal should be quite low.

Figure 1 : Summary of Normality Test with Test of Jarque-Bera

The Jarque-Bera test statistic obtained after running it on our dataset is 6.452209 as per Figure 1 above. The corresponding p-value is 0.039712. The resulting p-value is compared to a predefined significance level (e.g., = 0.05) to determine the data's normality. If the p-value exceeds the significance level ($p > \alpha$), we fail to reject the null hypothesis, indicating that the data is approximately regularly distributed. If the p-value is less than or equal to the significance level ($p \leq \alpha$), we reject the null hypothesis, suggesting that the data deviates considerably from a normal distribution. Based on the data normality test results in the image above, the probability value obtained is 0.039712 or less than 0.05 ($0.039712 < 0.05$) and obtains a Jarque-Bera (JB) value of 6.452209 or less than the Chi-Square value of 9.48773 ($6.452209 < 9.48773$), implying that the data in this study were normally distributed.

3.4. Multicollinearity Test

This study tested multicollinearity among the predictor variables in our regression model to see if it was present. When two or more independent variables have a high degree of correlation, multicollinearity occurs, which can make it difficult to assess the individual impacts of predictors and provide unstable coefficient estimates.

Table 4: Summary of Multicollinearity Test

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.000912	6.965612	NA
OPR	2.65E-12	1.050846	1.021552
VOLUME	5.26E-07	7.421548	1.095200
COMMS	0.000625	1.723581	1.101177

A Centered Variance Inflation Factor (VIF) is a frequently used statistic, to assess multicollinearity. VIF assesses the degree to which each predictor variable's variance rises because of collinearity with other predictors. VIF levels above a predetermined threshold (typically 5 or 10) are suggestive of serious

collinearity, while values close to 1 indicate minimal multicollinearity. Table 4 shows that for all VIF values, there is no significant multicollinearity among the predictor variables in our regression model. All VIF values are close to 1, showing that collinearity does not significantly increase the variance of the coefficient estimations. Therefore, it can be concluded that the predictive factors are mostly unrelated and that their individual effects are explicable.

3.5. Serial Correlation LM Test

To investigate the presence of serial correlation in the residuals of two different regression models, two serial correlation LM tests were performed. The p-value obtained in the first regression with lag 2 was 0.0023.

Table 5: Summary of Serial Correlation LM Test with 2 lag

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.026724	0.024854	-1.075254	0.2908
OPR	3.98E-06	1.76E-06	2.264724	0.309
VOLUME	0.000399	0.000576	0.691671	0.4945
COMMS	0.016529	0.019566	0.844801	0.4049
RESID (-1)	0.945567	0.194250	4.867789	0.0000
RESID (-2)	-0.679835	0.235197	-2.890489	0.0071
R-squared	0.447085	Mean dependent var		2.15E-16
Adjusted R-squared	0.354933	S.D. dependent var		0.065650
S.E. of regression	0.052728	Akaike info criterion		-2.896344
Sum squared resid	0.083406	Schwarz criterion		-2.632424
Log likelihood	58.13419	Hannan-Quinn criter.		-2.804229
F-statistic	4.851584	Durbin-Watson stat		1.930922
Prob(F-statistic)	0.002276			

Table 5 shows strong evidence to reject the null hypothesis of no serial correlation because this p-value is less than the significance level of 0.05. As a result, when lag 2 is used, the findings show the presence of serial correlation in the residuals of the first regression. To rectify the presence of serial correlation, this study computed the p-value for the second regression with lag 1 (using the dependent variable at lag 1) and the result was 0.693 as shown in Table 6. Thus, when lag 1 is used, there is no substantial hint of serial correlation in the residuals of the second regression because the p-value was bigger than the significance level of 0.05. The presence of serial correlation in the residuals can have an effect on the dependability of the regression results. When serial correlation is discovered, it is critical to manage it effectively, for as by incorporating more lagged variables or employing autoregressive models. When there is no substantial serial correlation, one can be more confident in the regression estimates' accuracy (Fiorentini & Sentana, 2016).

Table 6 : Summary of Serial Correlation LM Test with 1 lag

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.332658	0.949900	1.402945	0.1712
OPR	1.81E-06	1.63E-06	1.104339	0.2785
VOLUME	0.000122	0.000583	0.208857	0.8360
COMMS	0.003121	0.019953	0.156413	0.8768
EXCH_RATE (-1)	-0.322519	0.229124	-1.407616	0.1699
RESID (-1)	0.606553	0.347442	1.745768	0.0914
R-squared	0.095099	Mean dependent var		-7.98E-16
Adjusted R-squared	-0.060918	S.D. dependent var		0.052468
S.E. of regression	0.054042	Akaike info criterion		-2.843300
Sum squared resid	0.084696	Schwarz criterion		-2.576669
Log likelihood	55.75774	Hannan-Quinn criter.		-2.751259

3.6. Heteroscedasticity Test

According to the heteroscedasticity test results in the table above, overall probability values for all of the independent variables used in the study, which include interest rate adjustments (OPR), buying and selling currency (VOLUME), and central bank communications (COMMS), have a probability value greater than 0.05 with $p = 0.6193$, 0.4180 and 0.3839 respectively. As a result, the data in this study did not suffer heteroscedasticity issues.

Table 7: Summary of Heteroscedasticity Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.006112	0.003490	1.751390	0.0895
OPR	-9.27E-08	1.85E-07	-0.501729	0.6193
VOLUME	-6.8E-05	8.38E-05	-0.820525	0.4180
COMMS	0.002550	0.002889	0.882817	0.3839
R-squared	0.042640	Mean dependent var		0.004190
S.E. of regression	0.007933	Akaike info criterion		-6.731095
Sum squared resid	0.002014	Schwarz criterion		-6.555148
Log likelihood	125.1597	Hannan-Quinn criter.		-6.669685
F-statistic	0.475086	Durbin-Watson stat		1.403963
Prob(F-statistic)	0.701822			

3.7. Multiple Linear Regression

Berry (2005) used multiple linear regression analysis to examine the effect of many independent variables on the dependent variable.

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The purpose of this study's multiple linear regression analysis is to identify the impact of interest rate adjustments (OPR), buying and selling currency (VOLUME), and central bank communications (COMMS) on Malaysian forex market dynamics.

Table 8: Summary of Multiple Linear Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.685418	0.584293	2.884543	0.0072
OPR	3.23E-06	1.31E-06	2.468188	0.0195
VOLUME	7.52E-05	0.000598	0.125711	0.9008
COMMS	0.008095	0.020540	0.394108	0.6963
EXCH_RATE (-1)	0.592626	0.140077	4.230711	0.0002
R-squared	0.428173	Mean dependent var		4.158139
S.E. of regression	0.055856	Akaike info criterion		-2.800513
Sum squared resid	0.093597	Schwarz criterion		-2.578320
Log likelihood	54.00897	Hannan-Quinn criter.		-2.723812
F-statistic	5.615844	Durbin-Watson stat		1.636893
Prob(F-statistic)	0.001696			

3.8. Coefficient of Determination (R²) and Correlation (R)

The coefficient of determination (R²) is used to determine how much the independent variable can explain the dependent variable. The R² value ranges from 0 to 1 ($0 < R^2 < 1$), and the bigger the R² value, the greater the variance in the dependent variable (Fernando, 2023). According to the findings of the test for the coefficient of determination R² using multiple linear regression in Table 8 above, the Adjusted R Square is 0.3519 or 35.19%. This means that approximately 35.19% of the variance in the Malaysian forex market can be explained by the combined impact of the independent variables (OPR, volume, and communications factors) included in the multiple linear regression model. The remaining 64.81% of the variance may be attributed to the other factors not considered in the model or to random variability.

4. RESULTS AND DISCUSSION

The study of how central banks intervene in interest rate adjustments influences Malaysian Forex market activity shows substantial linkages and implications. The relationship between interest rate adjustments (particularly, the Overnight Policy Rate - OPR) and exchange rate variations was analyzed statistically over a long period. The study found that when the central bank hiked the OPR, it had a significant impact on the Malaysian forex market. An increase in the OPR caused the native currency to appreciate. Higher interest rates drew overseas investors looking for higher yields in the Malaysian market. As a result, there was less demand for foreign cash, which caused exchange rates to rise

(Xavier, 2014). In contrast, when the central bank reduced the OPR, the domestic currency depreciated. Interest rate cuts attracted investors to seek higher profits in international markets, resulting in increased demand for foreign currency and a drop in exchange rates (Twin, 2023). The central bank can directly influence investor behavior and currency demand by using the OPR to manage borrowing and lending costs. As a result, currency rates stabilize, and general economic stability improves. However, policymakers must exercise prudence and strike a delicate balance to ensure that interest rate modifications are consistent with economic objectives and do not have a negative impact on inflation or investment decisions.

The study aimed to analyze the impact of central bank intervention in the Malaysian forex market by examining the relationship between currency purchases and sales and exchange rate fluctuations. The statistical analysis revealed that there is no significant relationship between these factors. Additionally, the investigation included an analysis of the correlation between central bank statements and market behavior. However, the findings showed that there is no significant relationship between communications and the Malaysian forex market.

5. CONCLUSION

The primary goal of this research project was to investigate the impact of central bank actions on the dynamics of the Malaysian forex market. Interest rate adjustments (OPR), currency buying and selling, and central bank announcements were all incorporated as major independent variables. The links between these variables and the forex market activity were investigated quantitatively, giving light to the critical role performed by central banks in affecting exchange rates and trading volumes. The significant findings that emerged from the research are interest rate modifications by central banks have a considerable impact on currency rates and trade volumes in the Malaysian Forex market. Currency appreciation results from positive interest rate changes, while currency depreciation results from negative interest rate changes. In the context of the Malaysian forex market, it has been observed that the activities of buying and selling currency as well as effective central bank communication have shown relatively minimal impact. Despite these factors being important considerations in other forex markets, their influence on the Malaysian forex market seems to be comparatively less significant. Future studies in this area could focus on market participants' behavioral responses to central bank initiatives. Surveys, studies, and data analysis on trading can provide useful insights into how investors, traders, and financial institutions interpret and respond to central bank actions and communications. Understanding the psychology of market reactions to interventions can give light on how market expectations are formed, herd behavior, and potential biases that influence market dynamics. Behavioral analysis can also assist policymakers in identifying any gaps between logical economic decision-making and real market behavior, resulting in more effective intervention tactics.

Comparative studies that examine different central banks' efforts to manage currency markets can provide useful insights into best practices and

effective intervention strategies. Investigating different countries' experiences during times of economic volatility or financial crises might aid in identifying successful strategies and avoiding potential pitfalls. Examining how central banks adjust to different economic situations and regulatory regimes can also provide a broader view of currency market dynamics. A more comprehensive knowledge of alternative intervention tactics and their implications for economic stability and growth can be gained through comparative analysis. Extending studies to examine the macroeconomic impact of central bank actions will be critical in comprehending the larger ramifications of these policies. This could entail investigating the link between interventions and key macroeconomic variables including inflation, interest rates, employment, and economic growth. Examining how central bank activities affect overall economic performance might provide useful insights into the efficacy of measures in achieving economic stability and growth. Furthermore, investigating potential trade-offs and unexpected repercussions of interventions might assist policymakers in developing well-balanced and comprehensive monetary policies. Future studies also should focus on examining the durability of interventions' effects on exchange rates and economic stability to better understand the long-term implications of central bank interventions. Longitudinal studies that monitor the effects of actions over time can uncover any enduring patterns or trends in currency market dynamics. Furthermore, examining how previous interventions may have altered market expectations and behavior might provide useful insights for structuring future policy initiatives. Understanding whether short-term actions have long-term consequences on exchange rates and economic conditions can help to establish more consistent and strong currency market management policies.

REFERENCES

- Bank Negara Malaysia. (1998). Measures to regain monetary independence. *Kuala Lumpur, September*.
- Berry. (2005). *Multiple Regression - an overview* | ScienceDirect Topics. Multiple Regression - an Overview | ScienceDirect Topics. <https://doi.org/10.1016/B978-012369378-5/50017-X>
- Brychka, Klynovskyi, Krukovets, & Oharkov. (2019). Meta-analysis: effect of fx interventions on the exchange rate. *Modern economic studies*, 2(1), 24–44.
- Chen. (2021). *Foreign Exchange Intervention Definition, Strategies, Goals*. Investopedia. Retrieved March 1, 2023, from <https://www.investopedia.com/terms/f/foreign-exchange-intervention.asp>
- Fernando, J. (2023). R-squared: Definition, calculation formula, uses, and limitations. *Investopedia*. Retrieved September, 8, 2023.
- Fiorentini, G., & Sentana, E. (2016). Neglected serial correlation tests in UCARIMA models. *SERIEs*, 7, 121-178.

- Fratzscher, M. (2006). On the long-term effectiveness of exchange rate communication and interventions. *Journal of International Money and Finance*, 25(1), 146-167.
- FRB. (2004). *Remarks by Chairman Alan Greenspan*. The Federal Reserve Board. Retrieved July 3, 2023, from <https://www.federalreserve.gov/boarddocs/speeches/2004/20040302/default.htm>
- Genberg, H. (1981). Effects of Central Bank Intervention in the Foreign Exchange Market (Effets de l'intervention de la banque centrale dans les marchés des changes)(Efectos de la intervención de los bancos centrales en los mercados de divisas). *Staff Papers-International Monetary Fund*, 451-476.
- Hutchison, M., & Sushko, V. (2013). Impact of macro-economic surprises on carry trade activity. *Journal of Banking & Finance*, 37(4), 1133-1147.
- International Monetary Fund. (2021). Central Bank Support for Spot and Derivative. Retrieved June 9, 2023, from <https://www.imf.org/-/media/Files/Publications/covid19-special-notes/en-special-series-on-covid-19-central-bank-support-for-foreign-exchange-markets.ashx>
- Jongwanich, J., Gochoco-Bautista, M. S., & Lee, J. W. (2011). When are capital controls effective? Evidence from Malaysia and Thailand. *International Economic Journal*, 25(4), 619-651.
- Kaplan, E., & Rodrik, D. (2002). Did the Malaysian capital controls work?. In *Preventing currency crises in emerging markets* (pp. 393-440). University of Chicago Press.
- Lafarguette, R., & Veyrune, M. R. M. (2021). *Foreign Exchange Intervention Rules for Central Banks: A Risk-based Framework*. International Monetary Fund.
- McCauley, R. N., McGuire, P., & Sushko, V. (2015). Global dollar credit: links to US monetary policy and leverage. *Economic Policy*, 30(82), 187-229.
- Mehl, A., & Cappiello, L. (2007). Uncovered interest parity at distant horizons: evidence on emerging economies & nonlinearities.
- Mohanty, M. S. (2013). Market volatility and foreign exchange intervention in EMEs: What has changed?-an overview. *An Overview (October 2013)*. BIS Paper, (73a).
- Reuters. (2022). Malaysia rules out capital controls, currency peg as ringgit trades near 24-year low. Reuters. <https://www.reuters.com/markets/asia/malaysia-cbank-says-no-plans-capital-controls-ringgit-re-pegging-2022-09-23/>
- Sandri, D. (2023). FX intervention to stabilize or manipulate the exchange rate? Inference from profitability. *Journal of International Money and Finance*, 131, 102786.
- Shaari, M. H. (2008). Analyzing Bank Negara Malaysia's behaviour in formulating monetary policy: An empirical approach.

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- Shahid, M. N., & Sattar, A. (2017). Behavior of calendar anomalies, market conditions and adaptive market hypothesis: evidence from Pakistan stock exchange. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, 11(2), 471-504.
- Shahid, M. N. (2019). *Behavior of stock return, calendar effects and adaptive market hypothesis (AHM): evidence from Pakistan by using historic data with special focus on Gregorian and Islamic calendar* (Doctoral dissertation, PhD Thesis).
- Shahid, M. N. (2022). COVID-19 and adaptive behavior of returns: evidence from commodity markets. *Humanities and Social Sciences Communications*, 9(1), 1-15.
- Shahid, M. N. (2024). Connectedness of global energy markets with global agricultural, natural resources, and socially responsible investments using extended GFI. *Journal of Financial Economic Policy*, 16(5), 601-625.
- Sharma, S. D. (2003). The Malaysian capital control regime of 1998: implementation, effectiveness, and lessons. *Asian Perspective*, 27(1), 77-108.
- The Case for Intervention. (2023). IMF. Retrieved June 9, 2023, from <https://www.imf.org/en/Publications/fandd/issues/2023/03/POV-malaysia-the-case-for-intervention-sukudhew-singh>
- Triennial Central Bank. (2019). Foreign exchange turnover in April 2019. BIS. Retrieved June 6, 2023, from https://www.bis.org/statistics/rpfx19_fx.htm
- Twin. (2023). *6 Factors That Influence Exchange Rates*. Investopedia. Retrieved July 19, 2023, from <https://www.investopedia.com/trading/factors-influence-exchange-rates/>
- Umezaki, S. (2019). The Malaysian economy after the global financial crisis: International capital flows, exchange rates, and policy responses. *Public Policy Review*, 15(1), 69-98.
- Vawda, Z. (2023). *The Reserve Bank of Australia: A Trader's Guide*. DailyFX. <https://www.dailyfx.com/education/forex-fundamental-analysis/the-reserve-bank-of-australia-a-trader-s-guide.html>
- Xavier. (2014). *Should the OPR be revised?* New Straits Times. Retrieved July 15, 2023, from <https://www.nst.com.my/news/2015/09/should-opr-be-revised>
- Zettelmeyer. (2022). The Impact of Monetary Policy on the Exchange Rate. *International Journal of Intelligent Engineering and Systems*, 15(4). <https://doi.org/10.22266/ijies2022.0831.31>