

The fluctuation of exchange rate and its effect on commercial bank performance



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ABSTRACT

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The present study examines the effect of exchange rate fluctuation and bank size on the financial performance of top commercial banks of Afghanistan (Azizi Bank, Afghan United Bank, Afghanistan International Bank, Islamic Bank of Afghanistan) for the period from the first quarter of 2016 to the fourth quarter of 2020, where Return on Equity (ROE) is the most important indicator of measuring performance. Using panel data regression estimates spanning across four banking institutions, the evidence reveals that bank size, in the form of the natural logarithm of total assets, exerts a significant and statistically positive impact on ROE, whereas exchange rate fluctuation exhibits a statistically insignificant but positive relationship with profitability. Sufficient diagnostic checks validate the integrity and consistency of the model. These results indicate that bank size is a more fundamental determinant than exchange rate fluctuation with respect to profitability in the banking sector of Afghanistan. The study emphasizes the importance of diversification and expansion strategies in financial institutions in the process of building them into robust and resilient institutions against the influence of a poor economic environment. The conclusions here carry high policy relevance for policymakers and bank chief executives who seek to promote financial stability and sustainable development within Afghanistan's nascent financial sector.

Contribution/ Originality: This study is one of the first to investigate the impact of exchange rate fluctuations on Afghan commercial bank performance empirically. Since there has been no study on this issue in Afghanistan, the findings provide new implications for bank strategies and policies while contributing to the limited financial sector literature.

1. INTRODUCTION

Exchange rate variations have been a major source of concern for politicians, regulators, investors, and financial experts since the Bordo (1993) fixed exchange rate regime was abolished in 1971. This system has been replaced by several forms of floating exchange rate systems, in which the price of a currency is primarily determined by supply and demand (Elhussein & Osman, 2019). According to Article 69 of the Da Afghanistan Bank statute, one of the primary responsibilities of the bank is to develop, adopt, and implement exchange rate policies. Da Afghanistan Bank has chosen a Managed Floating Exchange Rate system, where the market's supply and demand variables decide the exchange rate, and the bank endeavors to control significant fluctuations (Da Afghanistan Bank, 2004). Changes in the currency rate can impact banks' performance, making it crucial to understand how foreign exchange fluctuations influence the banking sector's performance, given its importance to the economy. Banking operations such as maintaining internal reserves, intermediation in the domestic sector, and providing credit are significantly affected by exchange rate movements, which in turn influence economic growth.

Banks are key participants in the foreign currency market, engaging in import and export transactions requiring foreign currency payments. They also serve as intermediaries for multinational corporations involved in foreign exchange markets. Consequently, exchange rate fluctuations can lead to substantial profits or losses, skewing financial outcomes and potentially misrepresenting a bank's financial health. Without proper management or hedging, future fluctuations in foreign currency rates pose significant risks (Elhussein & Osman, 2019). Changes in foreign exchange rates affect the values of assets, liabilities, and off-balance sheet activities denominated in foreign currencies. Variations in exchange rates can produce gains or losses when assets and liabilities in a currency are mismatched, impacting the market value of a bank's stockholders' equity. This risk extends to off-balance sheet commitments and guarantees denominated in foreign currencies, known as foreign currency translation risk. Banks typically measure foreign exchange risk by calculating net exposure for each currency, which is the difference between assets and liabilities in that currency. The potential gain or loss from this exposure is related to the expected change in the exchange rate versus the domestic currency (Koch & MacDonald, 2014). Therefore, assessing the impact of foreign exchange fluctuations on the financial performance of commercial banks has been a primary concern for academics, professionals, bankers, and policymakers due to its implications for banking stability (Elhussein & Osman, 2019). Bank performance is often summarized using metrics such as return on equity (ROE) and return on assets (ROA). Banks with higher ratios are considered high-performance institutions, which may take on more risk or optimize asset and liability management to achieve superior returns (Koch & MacDonald, 2014).. ROE measures how effectively a bank utilizes shareholders' equity to generate profits, calculated as net income divided by shareholders' equity. A higher ROE indicates strong profitability and efficient capital deployment, making the bank more attractive to investors (VIS Banking, 2025). This study investigates how foreign exchange rate fluctuations and bank size influence the performance of four Afghan commercial banks Aziz Bank, Islamic Bank of Afghanistan, Afghan United Bank, and Afghanistan International Bank from Q1 2016 to Q4 2020, and explores the nature and direction of this relationship. Based on this literature review, the research aims to answer: How do exchange rate fluctuations affect the financial performance of Afghan banks? What is the nature of this impact positive or negative? Is there a causal relationship between exchange rate fluctuations and bank performance? To address these questions, the study tests specific hypotheses.

H₁: The performance of commercial banks in Afghanistan is significantly impacted by fluctuations in the exchange rate.

2. THEORETICAL LITERATURE REVIEW

The exchange rate is the price of purchasing foreign currencies. In other words, it is the cost of purchasing one unit of foreign currency in terms of one unit of local currency (Case & Fair, 2017). Exchange rates also enable individuals to calculate the relative prices of goods and services whose monetary prices are expressed in different currencies (Krugman, Obstfeld, & Melitz, 2015). Changes in the exchange rate are variations in the value of one currency in relation to the home currency (Case & Fair, 2017). Volatility represents the degree to which a variable changes over time. Changes in exchange rates are described as depreciations or appreciations. A depreciation of the Afghani against the dollar is a fall in the dollar price of the Afghani, for example, a change in the exchange rate from \$1 per 70 Afghani to \$1 per 75 Afghani. The preceding example shows that, all else equal, a depreciation of a country's currency makes its goods cheaper for foreigners. A rise in the Afghani's price in terms of dollars, for example, from \$1 per 70 Afghani to \$1 per 65 Afghani, is an appreciation of the Afghani against the dollar (Krugman et al., 2015), these fluctuations take place in the exchange rate market, where most of the exchange rate is determined by the interaction of households, firms, and financial institutions that buy and sell foreign currencies. The major participants in the foreign exchange market are commercial banks, corporations engaged in international trade, nonbank financial institutions such as asset management firms and insurance companies, and central banks. Individuals may also participate in the foreign exchange market (Krugman et al., 2015). Commercial banks are central to the foreign exchange market because nearly every significant international transaction involves the

debiting and crediting of accounts at commercial banks in various financial centers. Consequently, the vast majority of foreign exchange transactions involve the exchange of bank deposits denominated in different currencies. Banks routinely participate in the foreign exchange market to meet the needs of their customers primarily corporations. Additionally, banks quote exchange rates to other banks at which they are willing to buy currencies from and sell currencies to them. Foreign currency trading among banks (Krugman et al., 2015). There are several theories of exchange rates, each offering a different perspective to understand and predict their behavior. These include the three generally recognized theories that help explain the long-run equilibrium exchange rate: the Asset Market Approach, the Balance of Payments Approach, and the Purchasing Power Parity (PPP) Approach. While the BOP method asserts that supply and demand for currencies influence exchange rates, the PPP approach states that the ratio of domestic to international price levels determines exchange rates. The Asset Market method, also known as the relative pricing of bonds or the portfolio balance method, emphasizes how financial assets influence exchange rates and how shifts in fiscal and monetary policy impact perceived risks and projected returns. This study adopts the Asset Market Theory of Exchange Rate Determination as its theoretical framework. Developed in the 1970s, this theory explains exchange rate movements through the international demand and supply for financial assets, particularly national bonds, under the assumption of perfect capital mobility meaning no transaction costs, capital controls, or barriers to capital flows. A key assumption is the perfect substitutability of domestic and foreign bonds, where investors are indifferent between assets if expected returns are equal. This gives rise to two main conditions: Covered Interest Parity (CIP), which eliminates arbitrage through forward exchange rates, and Uncovered Interest Parity (UIP), where interest rate differentials reflect expected changes in future spot exchange rates. These conditions highlight how exchange rates respond to changes in investor expectations and interest rate differentials. The theory is operationalized through the Interest Rate Parity (IRP) model, which compares expected returns based on current interest rates and projected exchange rate movements, thereby allowing empirical analysis of exchange rate behavior in response to macroeconomic and financial variables (Kallianiotis, 2013; Suranovic, 2010).

2.1. Banking Business in Afghanistan

The Afghan banking system currently comprises 12 banks: 3 public banks, 7 private banks, and a branch each of 2 foreign banks. The primary distinction between public and private banks is that private banks have private shareholders, whereas public banks are owned by the Afghan government. The majority of assets in the banking sector are held by private banks, accounting for 67.36%, compared to 26.87% in public banks and 5.77% in foreign banks as of December 2020. Over the past decade, the sector has faced numerous challenges, evidenced by the reduction in the number of banks from 17 to 12. For instance, the withdrawal of US troops in 2014 led to economic uncertainty, prompting many individuals to transfer their savings abroad or relocate outside the country. This economic instability has resulted in a reluctance among people and businesses to invest locally. Consequently, banks adopted risk-averse strategies, often refraining from providing unsecured loans. Typically, loans required collateral valued at 150-200% of the loan amount, with the property duly registered. It is important to note that approximately 70% of land in Afghanistan remains unregistered. These circumstances contribute to the limited penetration of banking services among the population. As of 2019, banks served 3.8 million depositors, representing only 10% of the population, with the remaining 90% unbanked. Additionally, there were 410 bank branches and 356 ATMs across the country, predominantly located in city centers (Sahak & Choudhury, 2021).

2.2. Empirical Literature Review

Several studies have examined how exchange rate fluctuations affect banks' performance. The findings indicate that banks may experience both favorable and unfavorable effects from fluctuations in exchange rates. On the one hand, growing exchange rate volatility puts banks at higher risk of foreign exchange losses, which might reduce their liquidity and profitability. Exchange rate volatility, however, can also offer opportunities for higher earnings

under certain conditions. [Hossin and Mondol \(2020\)](#) analyzed how exchange rate volatility affected the financial performance of Bangladeshi public banks. Regression analysis using secondary data showed that while inflation had a positive influence on performance, exchange rates were mildly negatively related to ROA. They also suggested that the Central Bank should peg the currency and showed that a larger interest rate spread enhanced profitability.

[Zamani, Janati, and Ghorbani \(2018\)](#) find that exchange rate changes significantly affect the financial performance of Iranian banks during the years 1388–1393 (2009–2014), reducing ROA, liquidity, and stability. Utilizing the ARCH model, they demonstrate that volatility increases non-performing loans and reduces profitability. Notably, bank size (SIZE) is found to have a positive effect, indicating that larger banks are more capable of coping with exchange rate risks. The results highlight the need for efficient risk management and monetary policy. [Merko and Habili \(2023\)](#) examined the impact of interest rates, exchange rates, and inflation on the performance of Albanian commercial banks. They found that interest rate fluctuations have a positive impact on profitability, while exchange rate fluctuations and inflation negatively affect profitability. The study shows that there are other variables that have an impact on bank performance. [Njagi and Nzai \(2022\)](#) examined the impact of exchange rate volatility on the financial performance of commercial banks in the East African Community during the period 2000–2020. The study employed panel data analysis to conclude that exchange rate volatility is a threat to bank profitability and that the association between volatility and Return on Assets (ROA) is weakly negative. The findings highlight that Uganda was less unstable than Kenya and Tanzania, with currency fluctuations being higher. [Hossin and Mondol \(2020\)](#) analyzed the impact of exchange rate volatility on Sudanese bank performance between 2002 and 2017. Employing the methods of OLS, GLS, and ARDL on a sample of 37 banks, the study established the weak negative impact of exchange rate volatility on bank performance. This limited effect is the result of Sudan's economic isolation under embargoes, reducing international currency risks and cross-border activities exposure. Consequently, the banking sector remains well insulated from exchange rate movements. [Ademola and Moses \(2016\)](#) examined effects of exchange rate volatility on the performance of Nigerian banks from 2005 to 2014. Using ROA and Loan-to-Deposit Ratio (LDR) as measures of performance, they found that exchange rate volatility had no significant effect on profitability (ROA) but a significant adverse effect on liquidity (LDR). The study reveals that banks need foreign exchange risk management and advises Nigerian monetary authorities to impose policies that stabilize the banking industry and stabilize the naira. A study of Iranian banks from 2009 to 2014 concluded that there was a significant negative correlation between exchange rate volatility and banks' financial performance, which requires effective foreign exchange risk management. Furthermore, macroeconomic policies and exchange rate policies play a crucial role in determining the magnitude of these effects. [Lu, Lu, and Lv \(2021\)](#) explores how the post-Brexit movement of the British Pound exchange rate affected the profitability and performance of UK banks. Using a dataset of 34 banks between 2009 and 2018, the article reviews key performance indicators such as return on equity, return on assets, and capital-to-deposit ratio, and macroeconomic factors such as government expenditure, GDP, inflation, and a Brexit dummy variable. The results confirm a connection between exchange rate fluctuations and bank performance during Brexit, but inferences are limited by data constraints and need to be advanced in future studies ([Moyo & Tursoy, 2020](#)). The evidence from the study of South African commercial banks was that inflation has a strong negative impact on their performance measured in terms of return on equity because higher inflation causes higher costs and reduced real profitability. However, exchange rate movements are only weakly related to bank profitability, and while exchange rate movements affect banks, their net contribution to financial performance is relatively unimportant compared with the very substantial negative effects of inflation ([Taiwo & Adesola, 2013](#)). The study examines the impact of exchange rate volatility on Nigerian bank performance using two performance measures: loan loss to total advances ratio and capital deposit ratio. The independent variables for data analysis include exchange rate, government expenditure, interest rate, and real GDP. It is discovered that exchange rate movement adversely affects bank performance, as indicated by the loan loss to total advances ratio, which signifies increased loan management problems and bad loans. However, no

significant relationship was found between exchange rate volatility and the capital deposit ratio. It is recommended that exchange rate stability be maintained to enhance the banking sector's ability to allocate credit efficiently in the economy. Nyandema and Lagat (2016) revealed a strong positive correlation between exchange rate volatility and the performance of commercial banks in Kenya from 2006 to 2013, which showed currency volatility enhanced bank profitability. It recommends government intervention to boost exports to support this growth. Ayano and Ponnala (2016) analyzed determinants of the financial performance of commercial banks in Ethiopia using seven banks' panel data from 2000 to 2014. The analysis considers both internal factors capital adequacy, asset quality, earning capability, liquidity management, and bank size and a sole external determinant, the foreign exchange rate. Financial performance was measured by return on assets (ROA), return on equity (ROE), and net interest margin (NIM). Results, using a random effects model, indicated that earning capacity, asset quality, and bank size have significant effects on the financial performance of Ethiopian commercial banks. The management of the bank is advised to focus on these areas for improved financial outcomes. Najafzadeh, Monjaze, and Mamipour (2016) analyzed the impact of exchange rate volatility on stock returns of D8 nations. Using a Panel-GARCH model, they confirmed that exchange rate volatility had a positive effect on stock returns in Iran, Pakistan, Indonesia, and Bangladesh, while real exchange rate and inflation had a negative effect on them. Peprah-Odoom (2016) examined the effect of exchange rate volatility on HFC Bank performance in Ghana. Using quarterly data for the period 2008-2015 and a censored VAR model, the study concluded that movements in exchange rates have long-run positive effects on return on equity, net interest margin, and international trade commissions but a negative effect on return on assets. Kassa (2018) concluded that bank size was statistically significant and had a positive influence on the financial performance of Ethiopian commercial banks. This implies that larger banks are more profitable, perhaps owing to economies of scale, better access to resources, and wider customer bases. Tenoy (2021) found that commercial banks in South Sudan are favorably influenced by floating exchange rates, while fixed exchange rates only affect foreign banks. The study suggests that developing countries adopt more flexible exchange rate regimes to improve bank performance. Getachew (2016) examined the impact of exchange rate fluctuations on commercial bank profitability (ROE) in Ethiopia between 2000 and 2014. The study found that exchange rate fluctuations have a considerable negative effect on bank profitability but a positive effect on the growth of loans. Growth of loans and GDP growth also positively influence profitability, while loan loss expenses negatively influence profitability. The research suggests that bank management should devise strategies to mitigate the adverse effects of exchange rate volatility on profitability.

3. METHODOLOGY

This study empirically examines the effect of fluctuations in the exchange rate on the performance of four commercial banks in Afghanistan: Azizi Bank, Islamic Banks of Afghanistan, Afghan United Bank, and Afghanistan International Bank. It covers the period from Q1-2016 to Q4-2020. The data used in this study were acquired from secondary sources; however, the International Monetary Fund provided the data on the dollar exchange rate to AFN. The official financial reports and individual financial statements of each bank are the sources of banking statistics, such as ROE. When comparing businesses, return on equity is a crucial financial metric to consider. It is also frequently used as a goal for executive pay. For instance, a CEO may need to achieve a 15% ROE for the year to qualify for a bonus. Goals like these aim to provide management with an incentive to improve performance for the benefit of shareholders. Return on equity is calculated as net income divided by shareholder equity (Sridhar & Felton, 2007). This study builds on Merko and Habili (2023) methodology, which analyzes how interest rates, exchange rates, and inflation impact bank performance (measured by ROA) using OLS regression on monthly data from Albania. The panel least squares method will be used to test the hypothesis, validity, and accuracy of the data and model. The data are tested for serial correlation, heteroscedasticity, and normality using Durbin-Watson test, White's test, and Jarque-Bera test. EViews 13 software is used to perform the analysis to examine the relationship

between fluctuations in exchange rates and commercial banks' financial performance. The following equation represents the econometric model for this functional relationship between variables.

$$ROE_{it} = \beta_0 + \beta_1 EXCH_{it} + \beta_2 \log(BS_{it}) + e_{it} \quad (1)$$

Where;

ROE_{it} = The return on equity of bank i at time t .

β_0 = Is the model intercept.

β_1 and β_2 = Are the coefficients measuring the effect of each independent variable.

$EXCH$ = Represents the quarterly fluctuation in the AFN/USD exchange rate.

BS_{it} = Banks size (the natural logarithm of total asset of bank i at time t).

e_{it} = Is the stochastic error term capturing unobserved factors.

The coefficients β_1 and β_2 are calculated to evaluate the intensity and statistical relevance of the association among exchange rate variability, the scale of banking institutions, and their operational efficacy. Employing a multivariate regression methodology facilitates the delineation of the unique impact of each explanatory variable, thus yielding a more comprehensive insight into the factors influencing bank performance amid an unstable exchange rate landscape.

Table 1. Measurement of study variables.

Type of variable	Variables	Measurement
Dependent	ROE	Net income after tax divided by total equity capital
Independent	Fluctuation of exchange rate	$x_2 - x_1 / x_1$
Independent	Ending asset of quarter	Total assets at time t in natural logarithm form

Table 1 shows measurement of study variables. The dependent variable is Return on Equity (ROE), which is measured in terms of net income after tax over total equity capital. The independent variables are exchange rate fluctuation, which is the proportional change over two periods $(x_2 - x_1) / x_1$, and bank size, which is the natural logarithm of total assets at time t .

4. RESULTS

4.1. Descriptive Statistics

Descriptive statistics of the study for explanatory and dependent variables are presented in this section. As already mentioned, the model developed to determine the effect of changes in exchange rates and ending assets on the profitability of commercial banks in Afghanistan uses return on equity (ROE) as the dependent variable to estimate bank profitability.

4.1.1. Exchange Rate Fluctuation

The average quarterly change in the AFN/USD exchange rate was 0.0059, suggesting a gradual depreciation of the Afghani over time. While most changes were small, some quarters experienced sharper movements, ranging from -0.0219 to 0.0426 . The standard deviation of 0.0172 indicates moderate volatility. The distribution is moderately right-skewed (0.5583) and approximately normal (kurtosis = 2.849), supported by a Jarque-Bera p -value of 0.120 , justifying the use of parametric tests.

4.1.2. Total Assets (Bank Size)

Banks' total assets varied widely, with an average of AFN 35.54 million, a maximum of AFN 75.45 million, and a minimum of AFN 9.81 million. The standard deviation of AFN 19.99 million highlights high variability. The distribution was positively skewed (0.6029) and flatter than normal (kurtosis = 1.8359). A Jarque-Bera p -value of 0.0093 indicates the asset data deviate significantly from normality, reflecting major size disparities among banks.

4.1.3. Return on Equity (ROE)

Table 2 provides the descriptive statistics of the study variables. Afghan banks had a mean ROE of 2.8%, well below the generally accepted 15–20% benchmark (Alam, 2018). ROE ranged from –35.6% to 20.3%, with a standard deviation of 7.96%, indicating moderate but notable variation. The data are left-skewed (–1.524) and leptokurtic (kurtosis = 8.752), showing many underperforming banks and a few outliers. A Jarque-Bera p-value of 0.000 confirms a significant departure from normality. In conclusion, Afghan banks experienced a consistent currency depreciation, significant size disparities, and wide variation in profitability during the period.

Table 2. Descriptive statistics for ROE, exchange rate fluctuation, and total assets (Q1 2016–Q4 2020).

<i>Statistic</i>	Return on equity (ROE)	Exchange rate fluctuation	Total assets (million AFN)
Mean	0.028	0.0059	35.54
Median	0.031	0.0039	29.18
Maximum	0.203	0.0426	75.45
Minimum	–0.356	–0.0219	9.81
Standard Deviation	0.080	0.0172	19.99
Skewness	–1.524	0.5583	0.6029
Kurtosis	8.752	2.8490	1.8359
Jarque-Bera	141.253	4.2326	9.3637
Probability (p-value)	0.000	0.1205	0.0093
Sum	2.239	—	—
Sum of Squared Dev.	0.501	—	—
Observations	80	80	80

4.2. Correlation Analysis

Table 3 illustrates the correlation matrix of ROE, Exchange Rate Fluctuation, and Bank Size, with bank size measured by total assets. The results show a moderate positive correlation between Bank Size and ROE ($r = 0.50$), suggesting that banks with larger assets tend to be more profitable. On the other hand, Exchange Rate Fluctuation has a very weak positive correlation with ROE ($r = 0.05$), indicating that currency volatility had little effect on bank profitability during the study period. Additionally, a slight negative correlation ($r = -0.0487$) between Exchange Rate Fluctuation and Bank Size suggests a negligible relationship. Overall, these findings support the idea that Bank Size, when measured by total assets, is a more important predictor of ROE than exchange rate fluctuations, aligning with conventional views on economies of scale in banking.

Table 3. Correlation matrix of ROE, exchange rate fluctuation, and total assets.

Variable	1	2	3
1. Return on equity (ROE)	1.00		
2. Exchange rate fluctuation	0.05	1.00	
3. Asset	0.50	–0.049	1.00

4.3. Stationary Test

Table 4 presents the panel unit root test results for Return on Equity (ROE), the logarithm of Total Assets, and Exchange Rate Fluctuation are variables analyzed using various statistical tests. All test statistics, including Levin-Lin-Chu, IPS, ADF-Fisher, and PP-Fisher, demonstrate a high level of statistical significance, with p-values well below the conventional threshold of 0.05, predominantly registering at 0.0000. These results indicate strong evidence against the null hypothesis of a unit root, supporting the stationarity of these variables in their level forms ($I(0)$). Specifically, the Levin-Lin-Chu test yields markedly negative statistics, such as –6.662 for ROE, –9.825 for the logarithm of Total Assets, and –5.219 for Exchange Rate Fluctuation. The associated p-values further corroborate the rejection of the null hypothesis, confirming the absence of a unit root. Similarly, the IPS, ADF-Fisher, and PP-Fisher tests collectively affirm stationarity at level, with significant p-values ranging from 0.0000 to

0.0010. This evidence suggests that none of these variables require differencing prior to their inclusion in panel regression analysis, as they inherently satisfy the stationarity condition. Consequently, all variables can be reliably incorporated in their original forms, minimizing the risk of spurious regression results.

Table 4. Panel unit root test results for ROE, log of total assets, and exchange rate fluctuation.

Variable	Test method	Test statistic	p-value	Stationarity decision
ROE	Levin, Lin & Chu t^*	-6.662	0.0000	Stationary at level
	Im, Pesaran & Shin W-stat	-6.047	0.0000	Stationary at level
	ADF – Fisher Chi-square	48.870	0.0000	Stationary at level
	PP – Fisher Chi-square	53.450	0.0000	Stationary at level
Log of total assets	Levin, Lin & Chu t^*	-9.825	0.0000	Stationary at level
	Im, Pesaran & Shin W-stat	-5.651	0.0000	Stationary at level
	ADF – Fisher Chi-square	241.716	0.0000	Stationary at level
	PP – Fisher Chi-square	103.662	0.0000	Stationary at level
Exchange rate fluctuation	Levin, Lin & Chu t^*	-5.219	0.0000	Stationary at level
	Im, Pesaran & Shin W-stat	-3.569	0.0002	Stationary at level
	ADF – Fisher Chi-square	26.291	0.0009	Stationary at level
	PP – Fisher Chi-square	26.052	0.0010	Stationary at level

Note: * indicates that the Levin, Lin & Chu (LLC) test was considered as the main panel unit root test

4.4. Model Diagnosis

4.4.1. Test For Heteroscedasticity

Table 5 provides the outcomes of the White heteroscedasticity test, which examines whether the variance of the regression residuals is constant (homoscedastic) or varies across observations (heteroscedastic). This investigation employed White's general test for heteroscedasticity, which is favored due to its straightforwardness and detachment from the normality presumption (Gujarati, 2004). The findings delineated in Table 5 reveal that the p-values associated with both the F-statistic ($p = 0.0901$) and the Chi-square statistic ($p = 0.0914$) surpass the 0.05 significance level, thereby suggesting that the null hypothesis of homoscedasticity remains unrefuted. This infers that the model does not exhibit heteroscedasticity. Notably, while the Scaled Explained Sum of Squares produces a highly significant p-value ($p = 0.0000$), the alignment of the F-statistic and Chi-square outcomes furnishes adequate evidence to assert that heteroscedasticity is not an issue within this model. This further substantiates the dependability of the regression's standard errors and the soundness of ensuing statistical inferences.

Table 5. White heteroscedasticity test results.

Test Statistic	Value	df	p-value
F-statistic	1.989	(5, 74)	0.090
Chi-square ($\text{Obs} \cdot R^2$)	9.478	5	0.091
Scaled Explained SS	37.554	5	0.000

4.4.2. Test for Autocorrelation

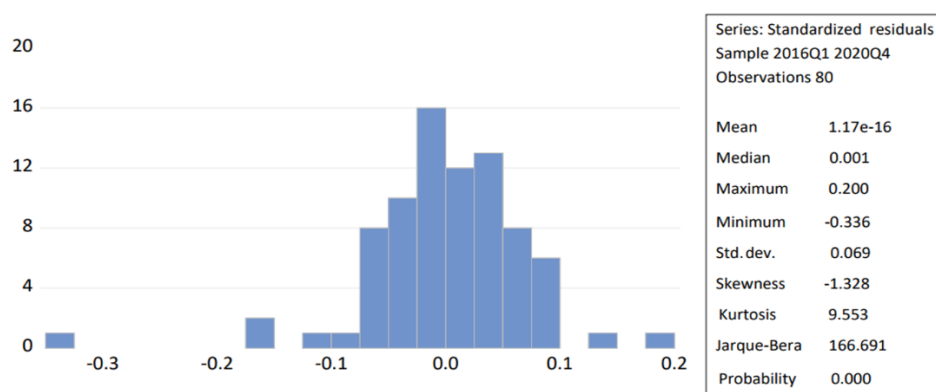
Table 6 presents the Durbin-Watson test statistic, alongside the key model variables, serves as an additional check to ensure the accuracy of the regression output. This research conducted a test for serial correlation in the error terms using the Durbin-Watson (DW) test, as (Brooks, 2008) recommends. The initial DW measure was less than 1, indicating the presence of first-order autocorrelation among the residuals. To address this issue, the model was specified with an autoregressive AR(1) term. After re-estimating the model, the DW statistic increased to 1.692, suggesting that autocorrelation was largely eliminated. With 80 observations and two explanatory variables, the critical values for the test are: lower bound = 1.42, upper bound = 1.67, and 4 minus the upper bound = 2.33. Since the DW statistic of 1.692 falls between the upper critical value (1.67) and 2.33, the results indicate there is no evidence of first-order autocorrelation in the model. Consequently, this confirms that the regression estimates are reliable and accurate.

Table 6. Durbin-Watson test statistic and model variables.

Test name	Statistic
Durbin-Watson	1.6928

4.4.3. Normality Test

Figure 1 demonstrates the normality test for the residuals. To verify normality, the residuals for the pooled least squares model were checked. The Jarque-Bera (JB) test was applied, as suggested by (Brooks, 2008). The test output showed a JB statistic of 166.6917 with a p-value of 0.0000, indicating strong non-normality. Therefore, the null hypothesis that the residuals follow a normal distribution is rejected. However, since the sample size is sufficiently large (80 observations), the Central Limit Theorem (CLT) applies. This implies that the sampling distribution of the estimators tends toward normality. Consequently, despite the non-normal residuals, the use of ordinary least squares (OLS) methods remains valid. Standard procedures for inference, such as t-tests and F-tests, are still appropriate and reliable in this context (Brooks, 2008).

**Figure 1.** Normality test for residual- Banks.

4.4.4. Test for Multicollinearity

Table 7 demonstrates the results for the multicollinearity test. Multicollinearity occurs when two or more explanatory variables in a regression model are highly linearly correlated, and as such, it is hard to distinguish the unique impact of each variable (Gujarati, 2004). It has the effect of inflating standard errors and decreasing the reliability of coefficient estimates. To check for this, the present study evaluated the pairwise correlation between the independent variables: Bank Size (measured as the log of total assets) and Exchange Rate Fluctuation. Gujarati (2004) indicates that a correlation coefficient greater than 0.8 suggests a high probability of multicollinearity. The calculated correlation was, however, only -0.048678 , which is well below the cut-off and indicates that the variables are not highly correlated. This implies the model is free of multicollinearity, increasing both the statistical validity and interpretability of the regression output.

Table 7. Correlation matrix of explanatory variables.

Variable	FLACTUATION	log Asset
FLACTUATION	1	-0.049
log Asset	-0.049	1

4.5. Redundant Fixed Effect Test

Table 8 describes the results for the redundant fixed effects test, as this study uses a panel regression specification to account for heterogeneity across Afghan commercial banks. A pooled OLS specification with a common intercept for the entire set of banks is used initially. To validate this assumption, a redundant fixed effects test is performed. The results ($F = 2.517$, $p = 0.0647$; Chi-square = 7.774, $p = 0.0509$) reveal that fixed effects are

not statistically significant at the 5% level. Given this and the data structure ($T = 20$, $N = 4$), the pooled OLS model is sufficient based on both practical and statistical grounds (Gujarati, 2004).

Table 8. Redundant fixed effects test results (Cross-section effects).

Test Statistic	Value	df	p-value
Cross-section F	2.517	(3, 74)	0.0647
Cross-section Chi-square	7.774	3	0.0509

4.6. Random Effect Model Test

Table 9 presents the Lagrange Multiplier (LM) test results used to evaluate whether a random effects model is more appropriate. The conventional Breusch-Pagan test indicated no significant random effects ($p = 0.2701$), supporting the use of Pooled OLS. Although two sensitive versions of the test (Standardized Honda and King-Wu) suggested possible random effects ($p = 0.0086$), these tests can sometimes detect negligible effects. Since the standard test did not confirm this at the 5% significance level and considering the small number of firms, the study opts for the simpler Pooled OLS model, which aligns with theoretical recommendations.

Table 9. Lagrange multiplier (LM) test results for random effects.

Test	Cross-section Statistic	Time Statistic	Both Statistic	p-value (Cross-section)
Breusch-Pagan	1.216	0.156	1.372	0.270
Honda	1.103	-0.395	0.501	0.135
King-Wu	1.103	-0.395	0.879	0.135
Standardized Honda	2.380	-0.151	-2.980	0.009
Standardized King-Wu	2.380	-0.151	-1.506	0.009
Gourieroux et al. (LM)	—	—	1.216	0.271

4.7. Regression Results

Table 10 presents the results of the regression analysis. The test shows that the log of total assets is statistically significant and positively related to Return on Equity (ROE) at the 5% level. The coefficient for $\log(\text{TOTAL ASSET})$ is 0.0703, and the p-value is 0.0000, indicating a strong and significant relationship larger asset size is associated with higher profitability. However, exchange rate fluctuation has a positive but statistically insignificant effect on ROE (coefficient = 0.3588, $p = 0.4319$), suggesting that exchange rate movements are not meaningfully influential on profitability according to this model. The intercept is negative (-1.1852) and significant ($p = 0.0000$), indicating a baseline decline in ROE when explanatory variables are zero or missing.

Table 10. Panel Least Squares Regression Results – Dependent Variable: ROE.

Predictor	B	SE	t	p
Fluctuation of exchange rates	0.356	0.454	0.790	0.432
$\log(\text{TOTAL ASSET})$	0.070	0.014	5.133	0.000
Constant (C)	-1.185	0.236	-5.016	0.000

Table 11. Regression Statistics

Model summary			
Statistic	Value	Statistic	Value
R-squared	0.257	Adjusted R-squared	0.238
F-statistic	13.320	Prob (F-statistic)	0.000
Durbin-Watson stat	1.693	S.E. of Regression	0.070
No. of Observations	80		

Table 11 reports the statistical results for the regression analysis. The model explains 25.7% of the variation in return on equity (ROE) ($R^2=0.2570$; Adj. $R^2=0.237$). The F-statistic (13.3198, $p=0.000011$) supports that the model

is suitably fitted as a whole and is statistically significant. The Durbin-Watson statistic (1.6928) implies that no significant autocorrelation exists, and the standard error of the regression (0.0695) reflects small prediction inaccuracies over 80 observations.

5. DISCUSSION

The study finds bank size to be statistically significant and positively related to performance for Afghan commercial banks. The coefficient value of the log of total assets being 0.0703 indicates that larger banks are more profitable due to potentially scale efficiencies, diversification of risk, and better access to funds. These findings are in line with earlier research, e.g., Blatter and Fuster (2022), Dietrich and Wanzenried (2011), and Athanasoglou, Brissimis, and Delis (2008), which reported similar size-performance effects in developed and emerging economies. However, there is also contradictory evidence. Rayamajhi and Bhandari (2024), for example, found a statistically non-significant, negative relation between size measured as total assets and ROA in Nepali banks, whereas Supiyadi and Novita (2023) did not find a significant impact of size on profitability for state-owned Indonesian banks. This kind of diversity is widely accounted for by institutional and structural differences in the banking systems. With respect to exchange rate volatility, this study establishes a positive, though statistically insignificant, coefficient ($\beta = 0.3588$, $p = 0.4319$) on ROE. This is consistent with evidence from low foreign-exposure economies, e.g., Sudan (Elhussein & Osman, 2019), Bangladesh (Hossin & Mondol, 2020), and Kenya (Njagi & Nzai, 2022). A mainly domestic banking industry and managed currency regime in Afghanistan would most likely reduce the impact of currency volatility. In contrast, evidence in more financially integrated economies, such as Iran (Zamani et al., 2018) and Nigeria (Taiwo & Adesola, 2013), reports significant effects of exchange rate volatility on loan performance and quality. The findings indicate the macro-financial environment as a factor behind bank responsiveness to external shocks. By and large, bank size emerges as the main driver of performance in Afghanistan, and exchange rate volatility does not play a significant role. Institutional capacity building and scale expansion continue to be critical in order to strengthen banking sector resilience and profitability.

6. CONCLUSION

This study was conducted to examine the effect of exchange rate fluctuation and bank size on the financial performance of Afghan commercial banks for the period from Q1-2016 to Q4-2020, where the most significant predictor of profitability was considered Return on Equity (ROE). The research focused on four banks Azizi Bank, Islamic Bank of Afghanistan, Afghan United Bank, and Afghanistan International Bank with the assistance of a panel data approach to analyze the bank and macroeconomic variable nexus more deeply in a dollarized, post-conflict economy. The main hypothesis taken into consideration was the alternative hypothesis (H_1): The financial performance of Afghan commercial banks is significantly affected by exchange rate fluctuation. Regression using the Pooled Ordinary Least Squares (Pooled OLS) showed that, even while the coefficient of exchange rate fluctuation was positive (0.3588), it was statistically insignificant ($p = 0.4319$). This may be interpreted to imply that, during the observation period, exchange rate volatility had no discernible effect on banks' ROE. Conversely, though, bank size as proxied by the natural log of total assets exerted an extremely significant positive influence on ROE, with a 0.0703 coefficient and p-value of less than 0.0000, indicative of a strong and stable relationship between larger bank size and improved profitability. The model itself was significant, indicated by an F-statistic of 13.3198 and a corresponding p-value of 0.000011. The R-squared of 0.2570, although moderate, indicates that approximately 25.7% of the variability in ROE is explained by the predictors in the model. The Durbin-Watson statistic of 1.6928 does not indicate any serious issues with autocorrelation in the residuals, and diagnostic tests including the Jarque-Bera normality test and correlation matrix confirm the results of the regression. From the findings above, it is concluded that the volatility of the exchange rate has no significant statistical impact on the financial performance of Afghan commercial banks during the study period. The alternative hypothesis (H_1) is

rejected, as the results do not provide sufficient evidence to support that exchange rate fluctuation significantly affects the financial performance of Afghan commercial banks. Alternatively, the research finds bank size to be a more consistent determinant of financial performance, perhaps due to the economies of scale, broader capital base, and superior shock absorption capacity that larger banks generally enjoy. These results have the implication that institutional expansion and scale enlargement can be a strategic necessity for the Afghan commercial banks. Regulatory intervention should be aimed at encouraging capital accumulation, triggering bank mergers, and encouraging institutional growth through good corporate governance and improved risk management systems. These can render the banking sector more profitable and stable, and one that can underlie broader economic development. In addition, Afghan banks must actively pursue diversification strategies—not only geographic but also across sectors, income streams, and client bases—to reduce exposure to exchange-rate-sensitive activities. Diversification of financial products and services can reduce risk exposure and enhance long-term profitability, particularly in a volatile macroeconomic climate. Future research can extend these findings by sampling a larger and more representative group of banks, a longer time frame after 2020, or by adding other macroeconomic variables such as inflation, interest rates, and political stability. Comparative studies involving other dollarized or weak economies with Afghanistan can also provide additional insights into how different economic structures moderate external shock impacts on bank performance. Moreover, application of non-linear or dynamic modeling methods can bring to light more complicated relationships which will be missed by linear methods. Briefly, though exchange rate volatility has been widely regarded as one of the main sources of financial risk, it has been identified in this study as a statistically insignificant determinant of bank profitability in the Afghan context. By contrast, bank size is a significant and strong determinant. Policymakers and bank managers are thus urged to consider structural diversification and growth as necessities to Afghanistan's financial sector empowerment, even as scholarly research sustains its exploration of this less-studied but strategically vital discipline.

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