

IMPACT OF INFLATION RATE AND EXCHANGE RATE ON THE PROFITABILITY OF FINANCIAL INSTITUTIONS: A PANEL DATA ANALYSIS FROM PAKISTAN

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ABSTRACT

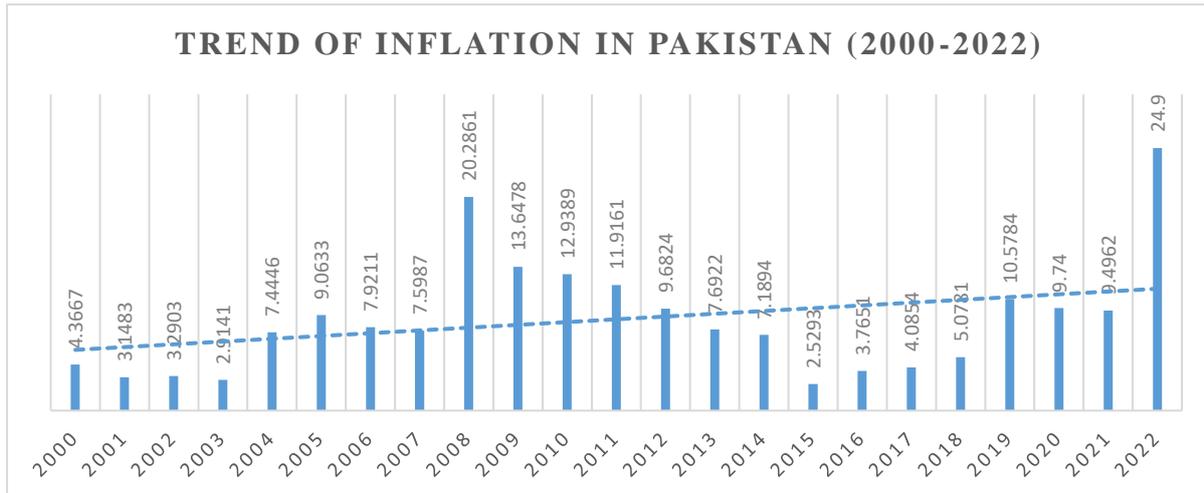
This paper explores the effects of instabilities of inflation and exchange rates on the profitability of financial institutions. The panel data was comprised of four commercial banks. The research period covers 22 years from 2000 to 2022. The annual balance sheets, statements and reports of respective banks, State Bank of Pakistan and IMF were the data source. ARDL model was applied as an estimation technique. The return on assets was used as a proxy for profitability while real GDP and interest rate were used as control variables. The results of this study showed that inflation has a negative and significant influence on return on assets (ROA). Theoretically it revealed that due to inflation, when purchasing power of general public declines they can save less money and it effect the saving amounts in banks deposits and hence disbursed less loans to individuals for investment. Exchange rate influence the profitability positively and significantly. The economic growth impact on profitability is positive and significant on 1% level. ECM coefficient measures the speed of adjustment in disequilibrium and its value was -0.632 indicating that any change in inflation and exchange rate is corrected by 62.36% per year. The study suggested that government should maintain more flexible exchange rate for price stability. The role of financial institutions in economic growth and should strengthen by lower interest rate for prospective entrepreneurial activities.

Keywords: inflation, exchange rate, profitability, financial institutions, return on assets.

INTRODUCTION

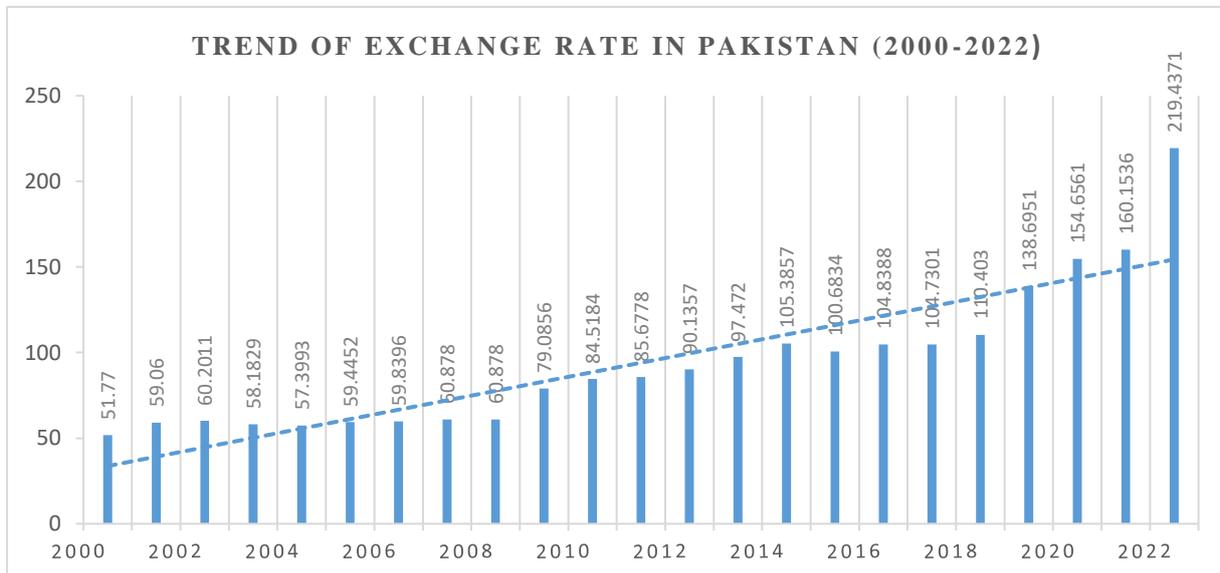
Inflation refers to a state where the general price level of goods and services increases over a period of time. Inflation in simple meaning is too much money chasing few goods and it declines the purchasing power of money. The units of currency will buy fewer goods when prices increases. Most of the central banks strive to maintain a low inflation rate. Economic growth is drastically affected by very inflation in long run. Champ's (2006) studied the theoretical insights about inflation and impact on real return on assets. The study suggested to discourage the savings and encourage borrowing with nominal interest rate. The high interest rate lead to discourage investment and decline the economic growth of a country. The major cause of inflation in any country may be too much money supplied. High inflation can reduce the purchasing power of businesses and consumers. Measurement of inflation is usually made through the estimation of general price index related to fixed basket of goods & services over a time period.

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Source: Pakistan Bureau of Statistic (2000-2022).

Exchange rate refer to the price of a currency in relation to another nation’s currency. The demand and supply of respective currencies in international money market determine the foreign exchange rate (Stephen et al. 1998). The International Monetary Fund (IMF) has classified the exchange rate in three broader categories: (1) the market rate which is largely determined by market forces (in which the rate ‘floats’); (2) the official rate or fixed rate which a monetary authority used to describe the exchange rate in a country and (3) arrangements falling between the two, in which the rate holds a stable value against another currency or a composite of currencies. Exchange rates affect the trade and the flow of currency between countries. In international transactions, foreign exchange rate facilitates in calculating the value of assets in foreign currencies and deferred payments. The performance of international trade and foreign exchange markets has been improved due to the emergence of electronic payment systems.



Source: State Bank of Pakistan (2000-2022)

The banking sector as a whole played an important role in the development of economy. Banking sector is important to the economies of world because it safeguard the wealth and provide credit to individuals and businesses. The contribution of this service industry in GDP of Pakistan is more than 20 percent. This sector arrange prompt solution for undercapitalization and non-performing loans. This sector is crucial to modern economy and it hold the financial assets. The government of every country try to regulate and prevent banking industry from engaging in excessively risky behavior or getting into financial trouble and dragging down the entire economy. There are different types of

banks: central bank, state owned banks, private banks, commercial banks, investment banks and microfinance banks etc.

Financial performance can have strong effects on the economic performance of a country. For policy makers it is very important to examine the relationship among inflation, exchange rate and financial performance of their organizations. The financial profitability describe the condition in a certain period where projected return is more than all of the costs. The financial performance in banking is carried out by measuring outcomes achieved by the bank by following the standard set by the central bank. Profitability of banking sector can be declined due to many reasons like a lower volume of non-traditional activity, a lower taxation, stock market, higher inflation, and weak institutional structure. Assessment of exchange rate and inflation rate is of prime concern for the investors, managers, lenders and shareholders in planning their programs efficiently. There exist uncertainty about future inflation rates due to numerous factors. Many studies has been studied extensively but the empirical results and policy recommendations sometimes vary and are in conflict. In context of financial structure of Pakistan, the exact relationship is not well defined in view of banking sector.

Research Objectives

Based on the introduction about the problems in financial performance, the specific objectives of this study are formulated as follows:

1. To estimate the effect of inflation on financial performance of banking sector in Pakistan.
2. To estimate the effect of exchange rate on financial performance of banking sector in Pakistan.
3. To suggest recommendations on the basis of results of this study.

REVIEW OF LITERATURE

Many theoretical and applied studies had been carried out to explore the relationship of financial sectors and economic development. These studies had used a variety of macroeconomic variables but inflation and exchange rate received a lot of attention among policy makers. Boyd et al. (2001) studied the mechanism how inflation interfere the performance of banking sector on basis of equity market size, rates of return and equity market liquidity. Panel data related to the 100 countries was used in this study. There found a significant negative impact of inflation on equity market of banking sector. The results also showed that financial performance decreases in those economies where inflation rate is higher than 15% and there exist a non-linear relationship.

Hahm (2004) empirically investigated the impact of exchange rate and interest rate exposure on banking institutions in Korea. The sensitivity of stock returns was used a measure of exposure. The study showed that Korean commercial and merchant banks to the risks associated with exchange and interest rates. These factors subsequently hit the profitability of commercial banks. The evidence highlighted the importance of risk management and financial supervision as precondition to a successful financial development.

Kim and Lin (2010) studied the relationship between inflation and financial development. The Pooled Mean Group estimator of Pesaran, Shin and Smith (1995) was applied to examine the panel data over a period of 1960-2005 for 87 countries. The data was split into different inflation and income groups. Results of this study illustrated that in long-run inflation affect financial development negatively and in short-run influence positively. These results were only valid in low-inflation and low-income.

Alimi (2014) conducted a study in Nigeria. The relationship between inflation and financial performance was explored in both time periods. The proxies used for measuring financial development were broad money as ratio of GDP, credit to private sector as share to GDP and quasi money share of GDP. The data period was from 1970 to 2012. The results showed that high inflation deteriorated the financial development in country. Inflation negatively impact the financial development and in return there is poor economic growth and income inequality. The study suggested that to achieve the goal of more active financial sector, a low and stable price mechanism should be implemented. This will help to enhance the economic growth.

Reaz et al., (2017) conducted a study about agriculture firm in Malaysia and estimate the impact of exchange rate volatility on their financial performance. Financial indicators for period of 2001 and 2015 were processed through the use of system GMM dynamic panel techniques and GARCH model. Findings showed that exchange rate volatility has negatively influenced the financial performance of agriculture firms in Malaysia. Both models ARME and AVA confirmed a positive and significant impact on financial development at 1% significance level. The study also revealed through the Wavelet

coherence that interest rate, exchange rate, consumer price index and financial performance move together.

Tang (2021) studied the relationship of Chinese commercial banks and stock market performance with inflation rate. The study compared the average annual CPI and Shanghai Composite Index. The data range was 2000 to 2020. It was observed that rise in inflation was relatively low and stable so annual earnings from stock market increased in lockstep. The impact of inflation on commercial banks evidenced that the costs and revenue both in commercial banks decreases. The liquidity risk also caused due to mismatch of deposits and loan maturity.

Iqbal et al., (2021) examined the financial performance of banking sector in Pakistan by using the multiple variables of inflation, corporate governance and financial ratios. The data was collected from secondary sources like World Bank, IMF and Pakistan Bureau of Statistics and data of 17 years from 2000 to 20216 from the financial sector. For diagnostic testing, correlation matrix and descriptive summary was presented and to examine the cause and effects relationship linear regression method was applied. Regression results analyze that inflation and corporate governance have significant relationship with profitability of firms. In financial ratios i.e. total loan ratio, cost income ratio and loan loss reserve ratio have significant relationship with profitability of commercial banks.

RESEARCH METHODOLOGY

Data Source

The specific objective of this research was to estimate impact of fluctuations occurring in inflation and exchange rate on the profitability of banking sector. The dependent variable is profitability measured through Return on Assets (ROA) while the independent variables are inflation rate and exchange rate. The macroeconomic series consist of panel data obtained from the annual statements of four big commercial banks in Pakistan; Habib Bank Ltd (HBL), Muslim Commercial Bank (MCB), United Bank Ltd(UBL) and Allied Bank Ltd (ABL). The yearly observations about the independent variables i.e. inflation and exchange rates have been retrieved from the official websites of the State Bank of Pakistan (SBP) and International Monetary Fund (IMF). The research period is from 2000 to June 2022 and this period was selected on the basis of data availability.

Analytical Models

Auto-Regressive Distributive Lag Models (ARDL) are considered as more advanced econometric techniques to estimate the distributive impact of independent variables (exchange rate and inflation rate) on dependent variable i.e. profitability metric (ROA). Another advantageous feature of this model is that its output is in both dynamics i.e. short-run and long run, also it provides more better results where sample size is small (Haug, 2002).

The equation form of standard ARDL model can be as:

$$\gamma_t = \beta_0 + \beta_1\gamma_{t-1} + \dots + \beta_p\gamma_{t-p} - m + \alpha_0x_t + \alpha_1x_{t-1} + \dots + \alpha_qx_{t-q} - n + \varepsilon_t \quad (1)$$

All series of data used in this research were transformed into natural logarithms. This transformation is required to resolve the issues of heteroscedasticity. Therefore long-linear model can be written as:

$$\ln ROA_t = \alpha_1 + \alpha_2 \ln ROA_{t-1} + \alpha_3 \ln INF_t + \alpha_4 \ln EXC_t + \alpha_5 \ln RGDP_t + \alpha_6 \ln INT_t + \varepsilon_{it} \quad (2)$$

Whereas the abbreviations used in above equation denotes the following variables:

ROA= Return on Assets (a proxy of profitability ratio)

INF= annual inflation rate

EXC= annual exchange rate

RGDP= annual real GDP

INT= annual interest rate

The ARDL model can be written as follows:

$$\Delta \ln ROA_t = \alpha_1 + \alpha_2 \ln ROA_{t-1} + \alpha_3 \ln INF_{t-1} + \alpha_4 \ln EXC_{t-1} + \alpha_5 \ln RGDP_{t-1} + \alpha_6 \ln INT_{t-1} + \sum_{i=1}^n \beta \Delta \ln ROA_{t-1} + \sum_{i=1}^n \gamma \Delta \ln INF_{t-1} + \sum_{i=1}^n \delta \Delta \ln EXC_{t-1} + \sum_{i=1}^n \rho \Delta \ln RGDP_{t-1} + \sum_{i=1}^n \tau \Delta \ln INT_{t-1} + \varepsilon_{it} \quad (3)$$

RESULTS AND DISCUSSION

Descriptive Statistics

The descriptive statistics summary about variables included in this study are reported in Table 1.

Table No. 1: Descriptive Summary of Data

Variable	Mean	Minimum	Maximum	St. Dev.
lnROA	0.0148	-0.9476	0.3715	0.20384
lnINF	0.0815	4.258	24.958	6.3340
lnEXC	0.1387	51.5702	239.252	48.1940
lnRGDP	0.9234	1.5024	7.7412	3.3635
lnINT	0.9753	6.00	15.00	3.0421

Source: authors' data analysis results, 2022.

The maximum and minimum value of return on assets range between -0.9476 and 0.3715. The mean value is 0.0148 with standard deviation of 20.38%. This indicate that value of variable in data is widely spread. The values of mean, maximum and minimum inflation from 2000 to 2022 are 8.15%, 4.258% and 24.95% respectively. The values of mean, maximum and minimum exchange rate from 2000 to 2022 are 0.1387, 51.570 and 239.252 respectively. The interest rate minimum and maximum value are 6% and 15% from 2000 to 2022.

Results of Unit Root Test

To test the stationarity among indented variables the Augmented-Dickey Fuller (ADF) and Phillips-Perron (PP) tests were applied. These tests provide certainty that whether all variables are capable to perform the ARDL analysis. The hypothesis of unit root is as follow:

H₀: Variable has a unit root (non-stationary)

H₁: Variable has no unit root (stationary)

The results of both tests are presented in Table 2. The values revealed that all variables were non-stationary at levels. However at first difference, series converted into stationary and this confirmed that all variables were integrated of order I (1). ARDL integration test was applied to test the long-run relationship among variables.

Table No. 2: Results of Unit Root Tests

Variables	Augmented Dickey–Fuller (ADF)		Phillips–Perron test (PP)		Level of integration
	At Level				
	Intercept	Trend	Intercept	Trend	
lnROA	-0.73	-2.373	-654	-1.715	I(1)
lnINF	-0.25	-1.624	-1.324	-0.834	I(1)
lnEXC	1.267	1.356	0.324	1.247	I(1)
lnRGDP	1.157	2.523	0.369	-1.367	I(1)
lnINT	-1.235	-0.669	-1.397	-1.437	I(1)
	At First Difference				
	Intercept	Trend	Intercept	Trend	
lnROA	-3.412**	-3.146**	-3.784**	-3.243**	-
lnINF	-4.367***	-4.134***	-4.173***	-4.634***	-
lnEXC	-3.957**	-3.247**	-3.164**	-3.117**	-
lnRGDP	-2.351*	-2.643**	-2.943**	-3.154**	-
lnINT	-3.602**	-4.143***	-4.149***	-4.645***	-

Note: *, **, and *** indicate the significance level at 10%, 5%, and 1% respectively.

Results of Cointegration Test

Cointegration revealed the existence of long relationship. Bounds test is an appropriate technique to evaluate it. The results in Table 3 confirmed the existence of cointegration among variables. F-statistics value was greater the upper bound value 6.924.

Table No. 3. Results of Bounds Test

F-Bound Test	1% Critical Value		5% Critical Value		10% Critical Value	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
F-Statistics= 7.314	4.657	6.924	3.621	5.147	3.117	4.945

Source: authors' data analysis results, 2022.

ARDL Long-Run Model

In Table 4, long-run coefficients obtained from the ARDL analysis provide information about the effects of inflation and exchange rate on profitability. The estimated coefficients indicated that return on assets (ROA) is negatively influenced by the inflation volatilities. The results showed that in long-run, when inflation is raised by 1%, it decreased the return on assets (ROA) by 3.646% and t-statistics is also significant at 5% significance level. Exchange rate influence the profitability positively and significantly. The coefficient value in Table 4 revealed that if exchange rate increased by 1%, it increased the ROA by 0.164. The economic growth impact on profitability is positive and significant on 1% level. This implied that if economic growth is increased by 1%, it leads to improve the financial performance by 1.56%. Likewise the outcomes of interest rate showed that it has negative relationship with profitability although the result is statistically insignificant. It may be due to that high interest rate lead to the high funding costs and low attraction from business community. As overall prices increases, the purchasing power of general public declines which means that they save less money. This relationship will decrease the saving amounts in banks and bank reduces loans to individuals for investment. The results of Asab and Al-Tarawneh (2018) were also similar to above findings.

Table No. 4. ARDL Long-Run Model

Variables	Coefficients	Std. Error	t-ratio	Prob.*
lnINF	-3.646	1.512	-2.411***	0.003
lnEXC	0.164	0.0193	3.849***	0.002
lnRGDP	1.562	0.192	4.105***	0.000
lnINT	-0.376	0.001	-2.225	0.825
Intercept	-6.801	0.215	-8.601***	0.000

Note: *, **, and *** indicate the significance level at 10%, 5%, and 1% respectively.

ARDL Short-Run Model

The results of inflation and exchange rates on profitability of financial institutions are reported in Table 5. Inflation has a negative impact on profitability indicating that 1% increase inflation decline the profitability by 0.61%. This result is significant at 5% level and in line with findings of Almalki & Batanyeh, 2015; Naceur & Ghazouani, 2005; Wahid et al., 2011.

Table No. 5. ARDL Short-Run Model

Variables	Coefficients	Std. Error	t-ratio	Prob.*
D(lnROA(-1))	0.114766	0.155174	0.739597	0.4662
D(lnROA(-2))	0.245577	0.363203	0.676142	0.2464
D(lnINF)	-0.610721	0.263631	-2.31658	0.0043
D(lnINF(-1))	-0.836479	0.547462	-1.527921	0.7904
D(lnINF(-2))	-0.138754	0.581473	-0.238625	0.9419
D(lnEXC)	0.254789	0.312254	0.815967	0.8174
D(lnEXC(-1))	0.044796	0.302764	0.417956	0.6865
D(lnEXC(-2))	0.031479	0.047812	0.658391	0.7917
DlnRGDP	0.419		2.491	0.024
D(lnRGDP(-1))	0.3245		1.248	0.487
D(lnRGDP(-2))	0.957		.04754	0.7842
D(lnINT	0.063704	0.231162	0.233186	0.5174
D(lnINT(-1))	0.093091	0.208463	2.10820*	0.04731

D(lnINT(-2))	0.43256	0.363203	0.676142	0.6147
ECM (-1)	-0.632	0.221	-2.965	0.0064
Model Summary				
R-squared	0.265478	Mean dependent var		0.011256
Adjusted R-squared	0.245786	S.D. dependent var		0.203992
S.E. of regression	0.187654	Sum squared resid		2.178569
Long-run variance	0.024578			
Diagnostic Tests for the estimated Model				
Serial Correlation of Residuals-LM	0.80027			p-value [.469]
Normality J-B Value	2.24878			p-value [.266]
Heteroscedasticity Test of Residuals	1.314			p-value [0.267]

Source: authors' data analysis results, 2022.

The results of exchange rate showed that if it is increased by 1% the ROA will increase by 0.05. In the next period exchange rate can raised the ROA by 0.08%, see Table 5. The outcomes were statistically insignificant. The effect of economic growth (RGDP) on profitability in short-run is positive and significant at 5% level showing that if RGDP increases by 1% it will improve the profitability by 0.41%. Almalki and Batayneh (2015) also reported similar results in their study. For short-run impact of interest rate on profitability, the results showed a positive effect but statistically insignificant. The results in Table 5 showed that 1 lag of profitability has a significant impact on current year performance. This revealed a relationship that last year policies can improve the profitability in a current year.

The Error Correction Term (ECM-1) measures the speed of adjustment in disequilibrium caused due to changes in the values of independent variables. Hence, ECM provide a probability how quickly the profitability of banks (dependent variable) will returns to long-run equilibrium when there are fluctuations in inflation and exchange rates. The value of ECM-1 is 0.632 indicating that any change in values of independent variable in short-run will correct the equilibrium by 62.36% per year statistically significant at 1% level. The results of diagnostics tests showed that model performed was very well and stable, the values of these tests are reported at the bottom of Table 5.

CONCLUSION AND RECOMMENDATION

The purpose of this research was to assess the influence of inflation and exchange rate on profitability of financial institutions. Panel data was comprised of four major commercial banks in Pakistan and time period range from 2000 to 2022. The official reports of State Bank of Pakistan and IMF were the data source. ARDL model was applied as estimation technique in short and long run.

The results obtained from ARDL analysis confirmed that profitability metric (ROA) and inflation were negatively associated both in short-run and long-run. Theoretical and empirical literature also proposed such kind of relationship. The results showed that 1 percent increase in inflation leads to decline profitability (ROA) by 0.61 percent (short-run) and 3.646 percent (long-run). The results of this study also confirmed that profitability and exchange rate was positive and significant in long run. The short run and long run coefficients of ARDL model obtained from this study revealed that increase or decrease in exchange rate transform the profitability ratio (ROA) of commercial banks in the same direction. The results showed that economic growth contribute positively towards the profitability ratios both in short and long-run terms. Therefore public policies aimed to keep lower inflation rate and stable exchange rate assist to achieve economic growth and better performance of financial sector. Therefore this study recommend that arrangement for flexible exchange rates should be made to maintain price stability.

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