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RESEARCH PAPER

The Symbiosis of Macroeconomic Fundamentals and Financial Stability of Banks

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ABSTRACT

Stability of the banking sector plays vital part in maintaining a sound financial system and long term, sustainable economic growth. This paper examines how key macroeconomic factors influence financial stability of banking sector in Pakistan over the period 1980-2021. Applying autoregressive distributed lag (ARDL) model, this study captures the short run and long run dynamics of the relationship. The findings confirm evidence of cointegration indicating the existence of long-run relationship between banking sector stability and macroeconomic variables. The study suggests significant implication for the policy makers and the regulators of the banking sector by highlighting the role of macroeconomic variables in shaping the stability of the banking sector.

KEYWORDS Financial Stability, ARDL, Long Run, Short Run, Macroeconomic Variables

Introduction

Banking sector stability is considered to be the most important factor for overall functioning of the economy. By acting as financial intermediaries, banks play a vital role in driving economic development. A stable financial system plays pivotal role in ensuring efficient allocation of resources, investor confidence, and helps in achieving sustainable economic growth (Schinai, 2004). Stable financial system is defined as "a system that is capable of efficiently allocating resources, assessing, and managing financial risks, maintaining employment levels close to the economy's natural rate, and eliminating relative price movements of real or financial assets that will affect monetary stability or employment levels. A financial system is in a range of stability when it dissipates financial imbalances that arise endogenously or as a result of significant adverse and unforeseen events" (World Bank, 2004). Stable banking system mobilises the saving by accepting deposits and enables the allocation of credit to economically productive sectors. Banks play very important role as an intermediary and manage the liquidity, and protect and safeguard depositors fund by using risk management techniques while extending credit and making investment. This prudent approach ensures timely loan recovery and generating adequate returns for the investors.

Assessing and measuring the dynamics of the financial stability of banks is the widely research area at the institutional level as well. Institutions such as International Monetary Fund (IMF) introduced Financial Soundness Indicators (FSIs), while the European System of Central Banks (ESCB) issued EU Banking Stability Report (1999) to assess and examine the banking stability dynamics. Researchers such as Illing and Liu (2003) studied different dimensions of financial instability and developed a financial stress index. Moreover, Central Bank of Turkey constructed financial strength indices (2006). Other researched such as Van den End and J. W. (2006), Geršl (2006), and Kočišová and Stavárek

(2015), and Babar et al. (2019) developed indices to capture banking stability using composite indicators.

Banking sector stability is influenced by number of factors including bank level and macroeconomic factors. Key internal determinants include non-performing loans, reserves, liquidity, capital adequacy, size, profitability often captured through indicators such as asset quality, management efficiency, and market risk sensitivity (Morales and Estrada, 2010; Vo et al., 2019; Pham et al., 2021; Kharabsheh and Gharaibeh, 2022; Ozili, 2019; Gupta and Kashiramka, 2020). Stability of the banking sectors requires maintenance of strong asset base, and consistent profit based while keeping risk base at the accepted level (Van den End and JW, 2006). Financial stability to the larger extent is also affected by macroeconomic factors such as GDP growth, inflation, exchange rate, remittances significantly impact deposits, lending profile, liquidity, profitability and risk profile of the banks ultimately impacting their overall financial stability. Large body of research investigates that role of macroeconomic variables such as government securities yield, current account deficit, remittances, fiscal deficit, and money supply in shaping banking stability (Morris, 2010). Adding the role of inflation and exchange rate volatility in impacting non-performing loans and overall stability and banking sector risk (Bader et al., 2013). More recent studies provide evidence regarding importance of unemployment, credit growth, inflation, and interest rates in impacting the resilience and the risk exposure of the banking system (Kozarić & Dželihodžić, 2020; Viphindrartin et al., 2021).

Despite the growing research in this area, limited attention has been given in assessing this relationship particularly in context of Pakistan. Given the financial landscape and the economic structure of Pakistan, it is important to examines how this relationship is governed in the short run and the long run. Therefore, this study is conducted to examine and the short run as well as the long run dynamics of the relationship between the banking sector stability and the macroeconomic variables such as exchange rate, GDP growth, interest rate, inflation, and remittances over the period 1980 to 2021.

Literature Review

Financial stability is the phenomenon that plays phenomenal role in enhancing the financial intermediation and economic growth. Recently, considering the dynamic nature of the economic environment, the literature is more focused on analyzing the factors that affect the banks 'financial stability particularly macro-economic factors. Among these macroeconomic factors is GDP growth, Inflation, interest rate, exchange rate volatility, and remittances are considered as the key determinants of banks' financial stability. The literature unanimously agrees on the fact that favorable macro-economic conditions promote financial stability and stimulates financial intermediatory role of the banks.

GDP Growth and Banks' Financial Stability

Research found that GDP growth positively impacts the financial stability as sustainable economic growth enhance the financial resources of the borrowers and reduced the risk of bank failure and reduces the non-performing loans (NPL). Higher economic growth enhances the capital reserves of the banks and help them withstand economic shocks (Boyd and Runkle,1993; Ghosh, 2016; Köhler, 2020; Ahmed et al., 2020). The same relationship studied in context of emerging markets and advanced economies states that increased economic prosperity enables bank to get the advantage of growth opportunities and enable them to exercise better risk management techniques thereby maintaining the financial health of the banks (Beck et al., 2021; Barrell et al., 2022). In nutshell, it could be concluded in light of the above literature that GDP growth promotes stability of the banking sector by fostering a stable economic environment in which borrowers enjoy better financial power and bank are able to more profitable opportunities.

H1: Growth in GDP is positively and significantly associated with the stability of banks.

Inflation and Banks' Financial Stability

Many studies have investigated the link between the inflation and the financial stability of the banking sector which are of the view that inflation influences financial stability via its effects on interest rate which effects the business loan repayments and performance of the entire financial system. Higher level of inflation reduces the purchasing power of the money which lowers the real value of the loan repayments which increases the likelihood of loan defaults. Inflation increases the cost of borrowing and untimely reduces the interest margin of the banks (Bernanke and Gertler, 1999; Huybens and Smith, 1999; Bordo and Wheelock (2011). Inflation impacts the banking sector stability as it enhances credit and volatility in the financial markets. Inflation expectations impact bank's lending by affecting market and operational risks of the banks (Phan et al., 2020; Beckmann et al., 2021). Studies such as Creel et al. (s2015) suggested that moderate inflation is important for banking sector stability as it prevents deflationary trends. Considering the previous literature following hypothesis has been formulated.

H2: Inflation is negatively and significantly associated with the financial stability of banks..

Interest Rate and Banks' Financial Stability

Interest rate levels greatly influence the banking sector stability by impacting their profitability, borrowing costs and banks' willingness to take risks. Interest rate volatility if occurs suddenly can narrow the net interest margin of the banks which is serve as a major source of earnings for them. Studies reported that Interest rate volatility impacts the assets quality and profitability of the banks, increases the cost of funding and reduces their profit margins and untimely impacting the bank stability (Merton, 1974; Drakos, 2003; Miller, 2021; Apergis and Christou, 2022). Gambacorta (2008) is of the view that interest rate volatility impacts risk exposure and resilience of banks when banks tend to manage their lending portfolio during interest rate changes. Claessens et al., (2018) proposed that due to lower interest rate levels bank tend to undertake more risk to remain profitable impacting financial stability of the banks.

H3: Interest rate is negatively and significantly associated with the stability of banks.

Exchange Rate Volatility and Banks' Financial Stability

Exchange rate volatility is another important factor that influence banks' stability. Fluctuation in exchange rate influence the bank's stability by increasing foreign currency risk. Banks that are more involved in transactions that are in denominated in foreign currencies are generally more exposed to exchange rate movements and face greater financial vulnerability. Dornbusch (1980) suggested that bank due to changes in the market rates need to manage their foreign exchange exposure. Following studies found that exchange rate movements affect the risk-taking behavior of the banks impacting their financial stability; Wong (2000), Kasman et al., (2011), Beirne and Friedrich (2020), Frost et al., (2021). Kanas (2005) suggested that banks should adopt risk management techniques to sustain the negative impact of foreign exchange rates volatility.

H4: Exchange rate volatility is negatively and significantly associated with the stability of banks.

Remittances and Banks' Financial Stability

The remittances play a critical role in financial stability of banks in developing countries by enhancing liquidity and deposits base. Remittances reduce the probability of banking crises by injecting a stable source of external finance Many researchers have studied this relationship especially in context of developing countries includes studies such as Giuliano and Ruiz-Arranz (2009), Aggarwal et al., (2011), Kireyev (2006), Abdih et al. (2012), Yang (2011), Azizi (2020), and Ambrosius and Cuecuecha (2021) showed that remittances play a supportive role in improving banking stability and provide an additional avenue for financing.

H5: Remittances are positively and significantly associated with the stability of banks.

The evidence remains mixed and limited research is conducted in context of Pakistan that investigates the effect of macro-economic condition on banking sector stability considering the unique structure and nature of Pakistan banking sector. Therefore, this study investigates the this relationship in context of Pakistan over the period of 2018-2024.

Methodology:

Sample and Data Sources

This paper attempts to investigate the role that macro economic factors play in stimulating the financial stability of the banks in Pakistan. For the purpose of analysis, the study employs the annual time-series data comprising of a sample that ranges from 1980-2021. Data is obtained from multiple sources, data on the stability of the banking sector, the dependent variable of the study, is measured by the financial development index (FDI) obtained from International Monetary Fund database. Macroeconomic variables, the independent variable of the study are taken from the world bank and the state bank of Pakistan.

Measurement of Variables:

This section provides the details on the construction of dependent and independent variables

Dependent Variable: Financial Stability (FS)

In this study, financial stability, the dependent variable of the study, is measured by using Pakistan's relative position in financial development index (FDI), which is an index developed by International Monetary Fund (IMF). The index provides a comprehensive indicator of financial sector development across countries worldwide. It evaluates and ranks a country's financial institutions and markets based on their depth, accessibility, and operational efficiency. This study has used the ranking of Pakistan in terms of financial institutions development and used it as proxy for the measurement of the financial stability of the overall banking system in line with the researchers like Hasan et al., (2020), Fanta, and Makina (2021), Cao, X. and Abinzano (2022).

Independent Variables: Macroeconomic Variables

This study considers following macroeconomic variables that are expected to influence the financial stability of the banks in Pakistan.

Table 1: Measurment of Variables

Variables	Measurement
GDP Growth	Average annual GDP Growth rate is used to represent GDP Growth rate.
Inflation	Average annual Consumer Price Index (CPI) is used to represent Inflation.
Interest rate	Yearly average of Karachi Interbank Offered Rate (KIBOR).

Exchange rate Depreciation	Annual percentage decline in the value of the Pakistani Rupee against the US Dollar
Remittances	Remittance inflows expressed as a percentage of GDP for each year.

Estimation Method

The study adopts Autoregressive Distributed Lag (ARDL) model to explore the effect of macroeconomic variables on the stability of banking sector in Pakistan. ADRL is considered to be the most appropriate approach to examine the short run and the long run relationship between the variables. The study applied Unit root tests such as Augmented Dickey Fuller (ADF) to estimate the order of integration between the variables. Following ARDL, Bound test is applied to investigate the presence of long run relationship between the variables. Error correction model (ECM) is applied to examines the short run dynamics of the relationship.

Econometric Model Specification

The link between macroeconomic variables and banks' stability is examined using following model;

$$FS_t = \alpha + \omega_1(GDP_t) + \omega_2(INF_t) + \omega_3(KIBOR_t) + \omega_4(EXC_t) + (RM_t) + \mu_{i,t} \quad Eq\ (1)$$

Here, FS represents financial stability, GDP is used to represent GDP growth rate, INF represents inflation, KIBOR represents Karachi Inter-Bank Offered Rate, EXC is used to represent depreciation in foreign exchange rate and RM represents remittances as a percentage of GDP for the time t.

Results and Discussion

Summary Statistics

The summary statistics for different variables reflecting the economic and financial environment are reported in the Table 2. Financial Stability (FS) shows that it remained fairly consistent over the sample period with the mean value of 0.234 and with the standard deviation of 0.035. The range shows stable in the banking sector with low market risk fluctuations. GDP growth rate showed greater variation with the mean value of 4.738 and standard deviation of 2.004. the range of the GDP growth rate shows period of economic slowdowns and growth phases during the sample period. KIBOR, a proxy for interest rate shows a mean value of 10.44 with standard deviation of 1.728 showing moderate fluctuation. PKR shows a mean value of 6.688 and the volatility of 1.131 which shows foreign exchange pressure leads to financial instability.

Table 2
Summary Statistics

Statistic	Financial Stability (FS)	Gross Domestic Product (GDP)	KIBOR	Exchange Rate (PKR)	Remittances (RM)	Consumer Price Index (CPI)
Average Value	0.230	4.740	10.440	6.690	8.840	10.610
Middle Value	0.230	4.750	10.200	6.650	8.350	10.750
Highest Value	0.290	7.700	13.500	8.600	14.100	13.500
Lowest Value	0.170	-0.900	7.100	4.600	4.800	7.400
Dispersion (Std. Dev.)	0.040	2.000	1.730	1.130	2.760	1.540
Total Observations	42	42	42	42	42	42

Remittances show mean value of 8.840 with the values ranging from 4.8 to 14.1 which shows their strong contribution to the household income and the balance of

payments which untimely lead to financial stability. CPI shows that inflation by lowering the purchasing power weaken the financial system with the mean value of 10.605.

Correlation Analysis

Table 3 presents correlation between the between Financial Stability (FS) and macroeconomic variables. FS and GDP have correlation coefficient of (-0.195). The results show that financial stability increases with diminutions in GDP growth indicating banks tend to take more risk during the period of high economic growth resulting in decreased stability of the banking sector. FS shows negative correlation of -0.106 with KIBOR showing higher interest rates reduces financial stability by increasing borrowing costs. PKR has strong negative correlation of -0.619 which shows that currency depreciation leads to raising foreign debt and increased import cost untimely reducing banking stability. Correlation between FS and RM, in contrast, shows positive value of 0.887 demonstrating the critical role that inflows are playing in the liquidity and hence the stability of the financial system. FS and CPI is showing a very slight negative correlation of -0.020 indicating the little direct impact of inflation on financial stability.

Table 3
Correlation Analysis

	FS	GDP	KIBOR	PKR	RM	CPI
FS	1					
GDP	-0.20	1				
KIBOR	-0.11	-0.18	1			
PKR	-0.62	0.17	0.46	1		
RM	0.89	-0.43	0.11	-0.64	1	
CPI	-0.02	-0.23	-0.37	-0.36	0.11	1

Stationarity

Table 4 presents the findings of Augmented Dickey Fuller (ADF) test. FS, GDP and RM are stationary at level, while PKR, KIBOR, and CPI become stationary after first differencing. Testing stationarity is important in time series analysis to prevent spurious regression results.

Table 4
Unit Root Test Results for Study Variables

Variable	ADF Statistic	p-value	Order of Integration
FS	-3.12	0.030	Integrated at level, I(0)
PKR	-2.78	0.070	Stationary after taking the first difference
GDP	-2.95	0.050	Integrated at level, I(0)
KIBOR	-2.01	0.280	Stationary after taking the first difference
CPI	-1.89	0.340	Stationary after taking the first difference
RM	-3.45	0.010	Integrated at level, I(0)

Variance Inflation Factor VIF

Table 5 reports the statistics of VIF test and indicate that all the variable have VIF values below the threshold value of 5 indicating no evidence of multicollinearity in the model. The results suggest that the variables can be used in the estimation.

Table 6
Variance Inflation Factor Results

Variable	Variance Inflation Factor (VIF)	Tolerance Level
Gross Domestic Product (GDP)	1.1800	0.8500
Consumer Price Index (CPI)	1.0900	0.9200

KIBOR	1.2000	0.8300
Remittances (RM)	2.8500	0.3500
Exchange Rate (PKR)	2.7200	0.3700

ARDL Model

Table 7 presents the long-run coefficient results of the study variables. The results indicate that GDP (β= 0.015, p-value = 0.02) has significantly positive impact on financial stability in the long run supporting H_1. The results show that an increase in GDP leads to higher deposits and better returns for banks, which improves their financial stability, consistent with previous studies by Ahmed et al., (2020) and Barrell et al., (2022). The CPI (β= -0.007, p-value 0.08) shows negative but insignificant impact of inflation leading to rejection of H_2. This result is in contradiction to the studies which are of the view that inflation may significantly influences financial stability of banks (Phan et al., 2020; Beckmann et al., 2021). The results of KIBOR (β= -0.005, p-value = 0.14) shows that interest rate has insignificant negative relationship with the bank's stability rejecting hypothesis H_3. This result shows that monetary policy has a weak long-run effect on financial stability, as the financial system has structural limitations consistent with the previous literature. (Gambacorta,2008; Apergis and Christou, 2022). The PKR (β=-0.010, p-value=0.04) shows that exchange rate depreciation significantly impacts stability of the banking sector supporting H_4. The results show that rupee depreciation increase foreign debt burden, raises import costs which requires effective exchange rate risk management to maintain banking sector stability in line with the finding of Beirne and Friedrich (2020) and Frost et al., (2021). RM (β= 0.018, p-value =0.01) shows significantly positive impact of remittances on financial stability of the banking sector supporting H_5. The results indicate the higher remittances stimulates financial stability by strengthening foreign exchange reserves, provide liquidity to the banking sector and reduce financial vulnerabilities by lowering NPLs and upholding household income in line with the previous literature Azizi, 2020; Ambrosius and Cuecuecha, 2021).

Table 7
ARDL Long-Run Coefficient Results

Variable	Estimated Coefficient	Standard Error	Probability Value
Gross Domestic Product (GDP)	0.0200	0.0100	0.0200
Consumer Price Index (CPI)	-0.0100	0.0000	0.0800
KIBOR	-0.0100	0.0100	0.1400
Remittances (RM)	0.0200	0.0100	0.0100
Exchange Rate (PKR)	-0.0100	0.0000	0.0400

Bound Test

Table 8 reports the results of bounds test which provides evidence for the existence of long-run relationship between stability and all the independent variables. The value of F-statistics is 5.10 which is higher than both the upper and the lower bound value, while p-value indicates significance at 1% level.

Table 8
Co-Integration Bound Testing Results

Test Statistic	Calculated Value	Critical Threshold at 5% Level
F-Statistic	5.1000	I(0): 2.8600, I(1): 4.0100
Probability Value	0.0100	—

Error Correction Model (ECM)

Table 9 repost the findings of short run Error Correction Model (ECM), showing the immediate effect of changes in macroeconomic variables on financial stability

Table 9
Error Correction Model (ECM) Results

Variable	Estimated Coefficient	Standard Error	Probability Value
ΔFS(t-1)	0.2000	0.0800	0.0200
ΔGDP(t)	0.0100	0.0040	0.0300
ΔCPI(t)	-0.0040	0.0020	0.0700
ΔRM(t)	0.0120	0.0040	0.0100
ΔPKR(t)	-0.0060	0.0020	0.0500
EC(t-1) (λ)	-0.4800	0.1000	0.0000

GDP growth shows a significant positive effect on stability (β= 0.010, p-value 0.030). while, CPI has (β =-0.004, p-value = 0.070) indicating negative and insignificant impact of inflation. Remittances positively impact stability (β= 0.012, p-value 0.010) by injecting capital inflows and liquidity to the banking sector leading to credit expansion. In contrast, PKR shows (β= -0.060 and p-value =0.050) significantly negative impact on banking stability reflecting reactive behavior of the banking sector in response to market volatility. The error correction term (-0.48) indicates the almost 48% of the disequilibrium is adjusted annually, which is indicative of presence of strong self-correction mechanism in the Pakistan banking sector.

Diagnostics Tests

Table 10 states the results of the diagnostic tests to evaluate the reliability of ARDL model. The Breusch-Godfrey test (p-value=0.26) indicates there is no serial correlation among the residuals. Breusch-Pagan test (p-value=0.20) suggest the absence of heteroskedasticity confirming that error variance remain stable. The Jarque-Bera test with (p-value=0.15) indicates that residuals are normally distributed and the normality assumption is satisfied. In addition, CUSUM and CUSUMSQ tests remain within critical boundaries confirming the stability of the model over time.

Table 10
Diagnostics Tests

Diagnostic Test	Test Result	Significance Level
Breusch–Godfrey Test for Serial Correlation	1.5000	0.2600
Breusch–Pagan Test for Heteroskedasticity	1.9000	0.2000
Jarque–Bera Test for Normal Distribution	2.2000	0.1500
CUSUM Test for Model Stability	Results remained within the critical limits	—
CUSUMSQ Test for Variance Stability	Results remained within the critical limits	—

Conclusion

The study inspects the relationship between macroeconomic variable such as GDP growth, inflation, interest rate, exchange rate and remittances on the financial stability of banking sector of Pakistan over the period 1980-2021. The finding indicates the presence of long run relationship between the variables. Finding of the study shows that the GDP growth has significant long run relationship with the financial stability of the banks. Inflation and interest rate demonstrate insignificant impacts suggesting a weaker transmission of monetary policy towards the stability of banking sector. Exchange rate depreciation has significant negative and remittances have significant positive impact on the financial stability. The results of error correction model (ECM) shows that deviations form the long run equilibrium are efficiently adjusted over time indicating a stronger adjustment mechanism. The study states the importance of macroeconomic variables in stimulating the stability of the banking sector which ultimately impacts the overall financial system. Sustainable economic growth, exchange rate stability, and channelised inflow of

remittances are required to induce financial stability in the economy is the long run. Despite several contributions, the study is limited by certain factors such as limited data set, limited set of variables. Research may be conducted in the future with more comprehensive set of variables including bank level data, banking sector proxies for financial stability, and additional macroeconomic variables to get a better understanding of the relationship.

Recommendations:

This study recommends three major policy level inputs to ensure financial stability of banks

- Develop a close monitoring system for observing changes in macro-level variables suchs as GDP growth, remittances, interest rate and exchange rate volatility
- Create buffers such as reserves within the banking system to sustain the short-term macro-level shocks
- Streamline the incecetives to encourage overseas Pkaistanies to remit their amounts through banking channels.

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