

# The Impact of Traditional Monetary Policy and the Moderating Role of Macroprudential Policy on Pakistan's Financial Stability

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## Abstract

*This study empirically investigates the impact of traditional monetary policy and the moderating role of macroprudential policy on Pakistan's financial stability. Panel data (2008–2023) of top 20 banks were examined with Hausman test, fixed, and random-effects models. The study assesses financial stability through bank performance (ROA, ROE, NIM) and risk indicators (z-score, LLP). The independent variables include discount rate and inter-bank offer rate. The findings indicate that tight monetary policy improves banks performance as it enhances ROE, however it has no impact on banks ROA and NIM. In addition, monetary policy doesn't have any impact on bank default risk i-e z-score, however, tight monetary policy reduce LLP hence enhances bank asset quality. Moderation analysis finds that macroprudential policy reduces NIM hence depress banks performance, although it has no moderating effect on bank risk. The monetary policy exerts a positive influence on banks' profitability and asset quality, whereas macroprudential policy tends to suppress bank performance. Hence, monetary policy instruments are more effective than macroprudential policy for financial stability.*

**Keywords:** Monetary policy; macroprudential policy; financial stability; moderation analysis.

**JEL Classification:** E52, E58, G21, E43

## 1. Introduction

The role of central banks and their monetary policy decisions has been widely debated since the Global Financial Crisis of 2007–2008 (GFC), with prolonged inappropriate monetary stances often being cited as a key contributing factor. In response, economists and policymakers have emphasized the prominence of macroprudential policy to manage financial uncertainty and to prevent future crises. Empirical evidence validates banks' risk-taking channel during periods of monetary easing, as it incentivizes financial institutions to

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extend a greater volume of riskier loans (Whited et al., 2021; Wang et al., 2022). Monetary tightening reduces asset net worth and firms' cash flows, thereby enhances external funding cost and subsequently suppressed investment and output (Boivin et al., 2010; Durante et al., 2022). A low-interest rate environment lowers banks' short-term funding costs and diminishes returns on financial assets, prompting banks to increase their risk exposure in pursuit of higher yields (Lojak, Makarewicz, & Proaño, 2023). It also alters banks' balance sheets, encourages greater reliance on short-term funding and increased lending to riskier borrowers (Adrian & Shin, 2010). Monetary policy easing raises the value of banks' assets, thereby reducing their probability of default, potential losses, and price volatility. Consequently, this impairs banks' ability to accurately assess expected risks, which increases their risk tolerance and results in larger riskier lending portfolios (Borio & Zhu, 2012).

It is empirically evident that the low-interest-rate regime enhance banks' expected default risk for corporate loans (Adão et al., 2022), it is when banks relax their lending conditions and actively engage in riskier lending activities (Shikimi, 2023). The bank risk taking also enhance due to negative economic prospects (Zhang et al., 2022) and increased banks competition (Ha & Quyen, 2018). The bank specific characteristics also alter bank risk behavior such as bank size, liquidity, and capitalization. The large, strong liquid, and capitalized banks exhibit lower risk-taking tendencies and vice versa (Li et al., 2024). The central bank regulations and monetary policy stance impact bank risk-taking conduct, and strong capital requirements increase bank risk-taking (Mujtaba et al., 2022; Dias, 2021), whereas easy monetary policy enhance and tight reduce bank risk appetite (Djatche, 2019).

In addition, the banking industry increases risk with a loose monetary policy, according to the Z-score, a risk metric; nevertheless, big banks in Vietnam have a low propensity for taking risks (Ha & Quyen, 2018). Similar to this, risk measures like Z-scores and non-performing loan ratios validate banks' willingness to take risks during a loose monetary policy (Qiao et al., 2018). In response to GFC, Basel III, a capital framework, was introduced in order to enhance quality and quantity of bank regulatory capital and limit excess leverage (Van Der Weide & Zhang, 2019). It has been empirically evident that macroprudential guidelines are efficient in managing the adverse impact of financial crises (Fernandez-Gallardo, 2023; Van der Ghote, 2021). In addition, optimal macroprudential policies can dramatically address financial crises during credit booms (Gertler et al., 2020). There are limited empirical studies that suggest that financial authorities should adopt an optimal policy in order to hedge financial crises, whereas recent research found standalone monetary policy ineffective for financial stability (Jordà et al., 2016). Similarly, contractionary monetary policy, a rise in the interest rate, was found to be ineffective in addressing the economic instability and financial crises (Wei & Han, 2021). The eight different types of macroprudential policy tools, including capital requirements, confirmed that strict macroprudential regulations enhance bank stability (González, 2022).

To what extent has monetary and macroprudential policy served as an effective transmission mechanism for promoting Pakistani financial stability? Did the moderating role of macroprudential policy has a key role in financial stability of Pakistan? In order to address these queries, this study has been conducted on the banking sector of Pakistan with the aim to empirically ascertain that did monetary policy stance induced banks to take more risk and effect banks performance and risk, and weather the bank capital regulations as a macroprudential policy tool strengthen the financial stability.

In this paper, we assess whether conventional monetary policy, and along with the moderating role of macroprudential policy implemented at the country level have a significant impact on banks' performance, default risk, asset quality and financial stability at large. In the first step we estimate the performance of the financial sector of Pakistan is measured by ROA, ROE and NIM (Eltweri et al., 2024; Yuan et al., 2022; Gul et al., 2011). In the second step, banks default risk is estimated through Z-Score, a higher score indicates bank stability and lower score indicate bank instability and insolvency (Bui & Bui, 2019) and asset quality as a credit risk estimate by using loan loss provision to total loans (Nhleko & Adelowotan, 2025). The proxies used for monetary policy are interbank offer rate and discount rate or policy rate, found significant impact on banking sector performance (Lojak et al., 2023; Guo et al., 2023, De Nicolò et al., 2010). The proxies used for macroprudential policy are capital requirements (Jiménez et al., 2014). This study analyzes a panel dataset that includes 20 large banks which cover the period from 2008 to 2023.

This paper aims to contribute to the existing literature on the role of monetary policy on bank performance, default risk and asset quality; and moderating role of macroprudential policy to strengthen the banking sector's resilience in times of crisis. Several studies suggest that excessive risk-taking can be curtailed through stricter prudential measures such as bank capital requirements (Begenau, 2020). The empirical evidence of the impact of monetary policy and in coordination with macroprudential policy on financial stability is limited, hence we investigate their impact on bank's performance, default risk and asset quality.

This study finds that traditional monetary policy improves banks performance as it influences ROE, with no observable impact on ROA and NIM. The tight traditional monetary policy reduces bank risk by enhancing asset quality which in turn reduce loan loss provisions. Bank size, liquidity, and capital position improve bank performance, whereas non-interest income negatively affects ROE. Moderation analysis reveals that when combined with monetary policy, macroprudential policy reduces NIM hence negatively affect bank performance, although it shows no moderating effect on default risk and asset quality. Additionally, higher capital levels correlate with increased loan loss provisions, indicating a risk-seeking approach in credit portfolios. The findings emphasize the impact of traditional monetary policy on profitability and asset quality and highlight the role of macroprudential policy which suppress bank performance.

The paper is planned as follows: section 2 review of related literature. Section 3 presents the methodology and econometric analysis. Section 4 summary and conclusion. Section 5 references.

### **1.1 Research Objectives**

The core objectives of the study are,

1. To examine the impact of variations in traditional monetary policy on the performance of banks and assess its implications for the financial stability of Pakistan's banking industry.
2. To analyze how different stances of traditional monetary policy influence banks' default risk and asset quality, and their subsequent effects on the financial stability of Pakistan's banking sector.
3. To investigate the moderating role of macroprudential policy measures in enhancing bank performance and promoting financial stability in Pakistan.
4. To evaluate the moderating role of macroprudential policy measures in managing bank default risk and asset quality, thereby contributing to the financial stability of Pakistan's banking sector.

### **1.2 Research Questions**

The research questions are as under;

1. To what extent do variations in traditional monetary policy influence bank performance and, by extension, the financial stability of the banking sector in Pakistan?
2. How do different stances of traditional monetary policy impact banks' default risk and asset quality, and what are the consequent implications for the financial stability of Pakistan's banking sector?
3. To what extent do macroprudential policy measures moderate the relationship between monetary policy and bank performance, and consequently, the financial stability of Pakistan's banking sector?
4. To what extent do macroprudential policy measures moderate the relationship between monetary policy and banks' default risk and asset quality, and thereby influence the financial stability of Pakistan's banking sector?

### **1.3 Scope of the Study**

This study empirically investigates the impact of traditional monetary policy and the moderating role of macroprudential policy on Pakistan's financial stability. The analysis covers the top 20 commercial banks of Pakistan over a sixteen-year period from 2008 to 2023. Financial performance is evaluated using Net Interest Margin (NIM), Return on Equity (ROE) and Return on Assets (ROA), while financial stability is assessed through the Z-score and Loan Loss Provisions (LLP). Control variables include bank liquidity, bank size, non-interest income, and bank capital, with data collected from the unconsolidated annual reports of banks. The independent variables, specifically the interbank offer rate and discount rate, are obtained from the State Bank of Pakistan (SBP) and the International Monetary Fund (IMF) database.

## **2. Literature Review**

### **2.1 Theoretical Literature**

The Expected Bankruptcy Hypothesis Theory states that undercapitalized financial institutions have higher bankruptcy costs; hence, a positive association among bank earnings and capital (Mehran & Thakor, 2011). As per "Bank Lending Channel Theory" the policy stance of a central banks can change loanable funds supply, as contracting policy decreases supply of loanable funds and vice versa (Merkl & Stolz, 2009). The theory of the interest rate channel explains monetary policy transmission; a fall in the real interest rate decreases borrowing costs, which enhance investment, aggregate demand and output / gross domestic product (Dieng & Sene, 2024).

### **2.2 Empirical-Based Literature**

#### **2.2.1 *Bank Risk Appetite, Performance and Monetary Stance***

Most literature on bank risk-taking channel emphasized its effects on financial institution earning, funding access, leverage, and lending portfolio (Drechsler et al., 2018). The empirical evidence validates bank risk taking channel, as monetary easing push financial institutions to grant more and riskier loans (Whited et al., 2021; Wang et al., 2022).

The economic models state that monetary policy transmission mechanism has three neoclassical channels: cost-of-capital effects, wealth effects and exchange-rate effects. In economic boom, the rise in interest rates increase borrowing cost, which discourage the firm's investments, houses purchase and consumers finances. Higher rates also reduce the present value of various assets, which suppress aggregate spending via wealth effect. Higher rates also appreciate domestic currency which depress net exports. However, as per modern

view, the monetary policy affects economic and financial activity via credit channels. The tight monetary policy reduces assets net worth as well as firm's cash flow, hence external financing become expensive which depress investment and then output (Boivin et al., 2010).

The monetary policy has the power to affect macroeconomic and financial conditions through risk-taking which has been named as risk-taking channel (Borio & Zhu, 2012). The risk-taking channel operates via banks, institutional investors and households 'conduct. The classic consumption-based asset pricing model states that investor risk appetite vary over time due to: economic condition and investors 'risk preferences (Cochrane, 2005). The bank risk appetite improves as if there is a favorable economic or financial outlook (de Zwart, 2021). The economic and financial outlook can affect asset values and balance sheets. The stronger lender and borrower balance sheets are associated with increased credit extension and more-rapid economic growth which raises risk appetite (Passos et al., 2024). The investors change "risk on, risk off" behavior, due to fluctuations in financial markets which include rapid shifts from inflows to outflows of capital from emerging-market economies (Chari et al., 2020; Forbes & Warnock, 2021) and the periodic "flights to safety," when investors change their holdings of safe assets (Baele et al., 2020).

The balance sheets of financial intermediaries play a critical role in determining their degree of risk aversion. When the aggregate level of capital declines and approaches regulatory or self-imposed risk limits, these institutions tend to reduce their risk exposure. This behavior is explained by "intermediary asset pricing" models, which highlight how such capital constraints influence intermediaries' risk appetite (Adrian & Shin, 2010; He & Krishnamurthy 2013). According to the "reach for yield" hypothesis, risk appetite varies over time. In periods of low interest rates, investors tend to assume greater risk and exhibit lower risk aversion in an effort to achieve their target returns, thereby increasing the potential for financial losses (Becker & Ivashina, 2015). The reach-for-yield behavior exhibited by financial institutions might be driven by regulatory requirements. For instance, pension schemes and insurance contracts often commit to delivering specified returns to their clients, which may compel these institutions to engage in riskier investments in search of profit. In contrast, individual investors may alter their behavior in low interest rate environments; rather than drawing down accumulated savings, they may prefer to consume the income generated from their wealth, thereby also engaging in reach-for-yield behavior, albeit through a different mechanism (Lian et al., 2019; Campbell & Sigalov, 2022). The study on Pakistani banks, with data set of 20 banks, endorsed that banks non-interest income have positive effect on ROA & ROE, but mixed on NIM. In addition, the higher policy or discount rate suppress NIM and lowers profitability (Ashraf & Nazir, 2023).

A low interest rate environment reduces banks' short-term funding costs while simultaneously diminishing returns on financial assets such as bonds. In response, banks tend to increase their risk exposure in the search of profit (Lojak et al., 2023). The

low-interest rate environment also alters banks' balance sheets, encourages them to rely on short-term funding and lend to riskier borrowers (Adrian & Shin, 2010). In addition, the loose monetary policy enhances banks' asset value which reduces their default probability, losses, and price volatility. This hampers their ability to assess expected risks; therefore, banks' risk tolerance increases and they enhance their leading portfolio. Similarly, effective central bank communication policies regarding future policy directions help in reduction of market uncertainty which encourages banks to take more risk (Borio & Zhu, 2012).

It is empirically evident that the low-interest-rate regime enhances banks' expected default risk for corporate loans (Adão et al., 2022) as banks relax their lending conditions and actively engage in riskier lending activities (Shikimi, 2023). The element of bank risk-taking is also enhanced due to the certain factors such as negative economic prospects (Zhang et al., 2022), increased banks competition (Ha & Quyen, 2018), and internet finance (Qiao et al., 2018). Bank-specific characteristics, including size, liquidity, and capitalization, influence risk-taking behavior. Larger, more liquid, and better-capitalized banks generally assume lower levels of risk. Central bank regulations and monetary policy stance also affect bank risk appetite. Stringent capital requirements enhance bank risk-taking (Mujtaba et al., 2022; Dias, 2021), while loose monetary policy enhances and tight stance reduces bank risk-taking (Djatche, 2019).

The Austrian banks' lending data confirmed that the expected default rate for corporate loans were increased during low interest rates regimes (Adão et al., 2022). Similarly, Spanish banks study confirmed that in low interest rate regime from 1984 to 2006, the default probability of existing loans decreases, however, in general banks normally compromise lending criteria and grant risky loans to poor credit record borrowers (Jiménez et al., 2014). The KMV credit risk model, analysis of individual bank default risk, also found that the persistent low interest rate endorsed the fact that such a monetary policy stance is not neutral when it comes to risk-taking behavior of bank in sector of EU and US (Altunbas et al., 2014). The cut in policy rate by the monetary authorities and the perceived negative economic outlook affect banks risk taking. The future expectation regarding interest rate cuts and a negative economic outlook induced Brazilian banks to enhance their provisions for bad debts (Montesa & Scarparia, 2015). The Vietnamese commercial banks risk, calculated via Z-scores, confirmed that banking sector enhances risk under loose monetary stance, however large banks have low risk-taking tendency, while market competition enhances risk in the banking industry (Ha & Quyen, 2018). Similarly, the Chinese financial risk, calculated via z-scores and non-performing loans, confirm bank risk-taking in loose monetary regime and internet finance (Qiao et al., 2018). The Turkish banking industry analysis confirmed that in the event when the policy rate is below the benchmark rate, banks take more risk; however, for large, more liquid and well-capitalized banks the risk-taking tendency is low (Özşuca & Akbostancı, 2016). The risk premium for risk corporate loan is lower in a loose monetary stance and vice versa. This endorses that the monetary stance influences the risk behavior of banking industry (Wang et al., 2022).

The literature regarding whether the increase in capital requirements reduces financial instability or not is controversial. Because of the advantages of insurance on deposit, banks pursue aggressive financial strategies. Hence, in order to protect the banks from such moral hazards it recommended to enhance capital requirement proportionally the magnitude of risk taken by banks (Swamy, 2021). When the too big to fail banks are backed by the government in adversity which encourage banks to take excessive risk. Therefore, enhanced capital requirement made bank resilient against unexpected adverse shocks, reduce vulnerability, meet customer cash withdrawal demands, and make wise investment decisions (Anginer & Demirgüç-Kunt, 2014). The study on Asian emerging markets from confirmed a positive association among bank risk-appetite and capital. The study calculated bank risk via loan loss provisions and non-performing assets (Mujtaba et al., 2022; Dias, 2021). The study based on over 1800 banks, more than 135 countries, from 2011 to 2015, and Callem and Rob (1999) models confirmed that Z-score has U-shaped relationship with increase capital regulation. The stricter regulation, such as increased capital and risk-based capital requirement, induce bank risk-taking (Dias, 2021). The loan loss provision reflects banks' balance sheet risk and loan quality, the volume of loan loss provision increases during economic downturns. Therefore, consideration of business cycle, bank size, and loan portfolio risk can limit provisioning (Zhang & McIntyre, 2021). The study on Pakistani banking sector, data set of 17 commercial banks, confirmed that discount rate increase suppress NIM and asset quality, measured by non-performing loan or loan loss provision and CAR positively linked with profitability (Sultan et al., 2020).

Djatche (2019) study confirmed that in the event of low interest rate bank engage in excessive riskier assets. However, contrarily other studies indicate that no change in bank risk as interest rate fall (Korinek & Simsek, 2016; Segev et al., 2024). Hence, Djatche (2019) calculated bank risk via Z-scores and confirmed that deviation of policy rate from Taylor rule rate differently impact bank risk based of different monetary policy regimes.

Figure 2 illustrates the historic trend of federal funds rate as a monetary policy stance of Fed from 2000 to 2008. The US economy was normal and experienced normal fluctuations from 2000 to 2008. The Fed implemented contractionary monetary policy in 2000 and 2006, wherein the federal fund rate was increased to 6.5 percent and 5.25 percent in order to avoid inflation and slow down the economic activity. However, in 2004, Fed implemented expansionary monetary, decreased federal fund rate to 1 percent, to address recession and stimulate employment. However, during 2008 financial crises, the Fed reduced the federal fund rate historically low to 0.25 percent. The inflation was below 2 percent, however fed took this policy stance to fight the recession and reduce high unemployment. The interest rate was kept close to zero for next eight years till 2016. In 2019, the federal fund rate gradually raised to 2.5 percent but due to outbreak of Covid the rate was decreased near to zero in order to fight high unemployment (Parkin, 2023).



Figure 1: Federal Fund Rate and Business Cycles

Under contractionary monetary policy stance, small and less liquid banks failed to raise external funds, their reserves and credit supply decline, and unable manage lending operations (Bui & Bui, 2019; Kashyap & Stein, 2000). The banks encounter low profitability due to low interest rates, hence may enhance return by taking higher risk on lending. The study employs the natural logarithm of the Z-score as a measure of bank stability, a higher score indicates greater stability and vice versa. It is found that cuts in policy rates, reflect in decline of z-score, which increased bank risk-taking. This effect is stronger for banks who search-for-yield incentives (Huynh, 2023). A decline in profitability, ROA and ROE can lead to lower capital buffers, increasing the risk of insolvency. Hence, monetary policy instruments can influence bank stability metrics, such as the Z-score, which is a measure of a bank’s default risk (Shahid, Muhammad, Shafqat, Khan, Iqbal, Safiullah, & Babar, 2024). The bank default risk is measured through Z-Score (Giordana & Schumacher, 2017).

$$Z\text{-Score} = (\text{ROA} + \text{CAR}) / \sigma \text{ROA} \quad (1)$$

The variation ‘σ’ depletes all bank equity, so a higher score indicates bank stability and lower score indicate bank instability and insolvency risk (Bui & Bui, 2019).The banks specific factors, such as size, liquidity, capital, internal rating systems, influence their risk-taking behavior (Khan et al., 2017; Bui & Bui, 2019). There is a relationship between a bank’s specific factors on its profitability, as measured by ROA, ROE, and NIM (Gul et al., 2011). The bank liquidity position measured by the ratio of liquid assets to total deposits (Nguyen, Boateng, & Newton, 2015). According to the “too big to fail” hypothesis, large-sized banks are more likely to take greater risks on their loan portfolios (Khan et al., 2017).

A study of the Pakistani banking sector, using a dataset of 37 banks, found that higher discount rates raise borrowing costs, negatively affecting banks' ROA, ROE, and NIM. In contrast, effective liquidity and credit risk management exert a positive and moderate influence on profitability, while bank size also contributes positively to overall sector performance (Haris et al., 2024).

### 2.2.2 *Monetary Policy and Financial Stability*

Following GFC, bank liquidity became a major topic of discussion. Asset purchases increase bank reserves, available funds, and loans to businesses and individuals, created more liquidity (Bai et al., 2018). During crises, banks accumulate liquid assets and curtail lending. (Cornett et al., 2011). The GFC affected South Asian economies by causing real output losses, external reserves reductions, and increased fiscal deficits. Consequently, several policies, including reductions in reserve requirements, were implemented to boost liquidity and stimulate economic activity (Ghosh et al., 2023).

After the GFC, Pakistan's economy was affected by fiscal and current account deficits, which were addressed through IMF economic stabilization programs. However, due to a liquidity crunch and depletion of foreign exchange reserves, Pakistan experienced slower output growth (State Bank of Pakistan, 2008). The SBP adopted a stringent monetary policy in 2009 to tackle inflation and manage the liquidity crunch. At the same time, it reduced reserve requirements and the policy rate to boost economic activity, as detailed Table I.

Table 1

*Fiscal and Monetary Policy Measures- Pakistan (2007-2010)*

<b>Policies</b>	<b>In addition, Pakistan signed an agreement with the IMF</b>
Fiscal Policy	- Enhanced development budget -3.8 to 4% of GDP- from 2009 to 2012
Monetary Policy	-Reduction 2%: CRR- Cash Reserve Ratio. -Reduction .5%: RR- Repo Rate. -Deduction 2%: RRR- Reverse Repo Rate.

Source: SBP Annual Report.

### 2.2.3 *Macroprudential Policy Tools and Bank Performance*

In recent years, new databases regarding macroprudential tools and policies has emerged which provide details information. Therefore, contemporary literature with respect to the association among macroprudential policies and financial stability has expanded significantly. The recent studies developed confirmed that the macroprudential policies have

positive role in restoring the financial stability irrespective of econometric techniques and regions considered for the study as it improves intermediate target variables, such as private credit growth. However, one specific variable cannot determine whether macroprudential policies are effective to prevent systemic financial crisis and financial instability, as there are several type of risks which are complex and difficult to measure. During good time financial intermediaries miscalculate potential risk exposure-related asset prices, ignore financial negative impact which effect their borrowing decisions ultimately hurt them during financial crisis.

It has been empirically evident that the macroprudential policies are effective and manage adverse impact of financial crises (Fernandez-Gallardo, 2023; Van der Ghote, 2021). In addition, the optimal macroprudential policies has the ability to dramatically address the financial crises during credit booms (Gertler et al., 2020). Past empirical evidences confirmed that the excessive surge in credit / loans during financial booms is the main indicator of financial crises (Jordà et al., 2015). The credit boom is not a sufficient indicator of financial crises; however, during global financial crises the mortgages-financed housing booms was termed as the main reason behind the financial crises. There are limited empirical studies which suggested financial authorities regarding the optimal policy in order to hedge financial crises, whereas recent research found standalone monetary policy ineffective for financial stability (Jorda et al., 2016). Similarly, contractionary monetary policy, a rise in interest rate, found ineffective to address the economic instability and financial crises (Wei & Han, 2021).

This empirical study covered almost last 150 years across 17 advanced economies, analyzed association among macroprudential policy and financial crises. This study confirmed that there is no association between capital ratios as macroprudential policy tool and systemic financial crisis. However, it has been argued that may be several macroprudential policy instruments found effective to manage financial crises (Jordà et al., 2021).

The GFC exposed the central bank guidelines specifically related to capital requirements, supervision, and structure. Large financial institutions capital buffers were failed to absorb the financial losses and end with bailout on public funds (Laeven & Valencia, 2017). Consequently, several economies adopted Basel Committee on Banking Supervision (BCBS) recommendations and strengthen the quality and quantity of regulatory capital requirements of banks.

The empirical analysis of twenty emerging economies confirmed that strict macroprudential policies enhance financial resilience (Anwar et al., 2023). Similarly, eight different types of macroprudential policy tools confirmed that strict macroprudential regulations enhance bank stability (González, 2022). The empirical study of 65 countries from 2000 to 2016 suggests that macroprudential policy effective transmission channel in manage banking crises is credit channel (Nakatani, 2020). Similarly, empirical study of 85

developing economies from 2000 to 2014 confirmed that macro-prudential policies tools promotes financial stability (Ali & Iness, 2020). The study on 231 China commercial banks confirmed that macroprudential policies significantly improve financial stability, reduce financial vulnerabilities, and induce banks to take less risk (Zhang et al., 2018). The study on China banking industry affirmed that coordinating macroprudential and monetary policies is effective to manage bank risk-taking appetite and recommended countercyclical regulation alongside monetary policy (Jiang et al., 2019).

Macroprudential policy was introduced following the GFC and has since confirmed that a well-capitalized banking sector can effectively manage financial instabilities (Carreras et al., 2018, Floreani et al., 2023). An analysis of Pakistani and Indian banks from 2009 to 2022 revealed that higher capital adequacy ratios are associated with increased risk-taking, suggesting that while capital requirement, as macroprudential tool, is intended to reduce risk, it unintentionally encourages banks to pursue riskier activities (Bashir et al., 2025).

### 2.3 Hypothesis

The hypotheses of the study are segregated as under;

***H1: Any variation in interbank offers and discount rates, as a traditional monetary stance, effects the performance of the banking sector.***

*H 1a:* Any variation in interbank offer rate, as a traditional monetary stance, effects the return on asset of the banking sector.

*H 1b:* Any variation in interbank offer rate, as a traditional monetary stance, effects the return on equity of the banking sector.

*H 1c:* Any variation in interbank offer rate, as a traditional monetary stance, effects the net interest margin of the banking sector.

*H 1d:* Any variation in discount rate, as a traditional monetary stance, effects the return on asset of the banking sector.

*H 1e:* Any variation in discount rate, as a traditional monetary stance, effects the return on equity of the banking sector.

*H 1f:* Any variation in discount rate, as a traditional monetary stance, effects the net interest margin of the banking sector.

***H2: Any variation in interbank offers and discount rates, as a traditional monetary stance, affects the default risk and asset quality of the banking sector.***

*H 2a:* Any variation in interbank offer rate, as a traditional monetary stance, affects the default risk of the banking sector.

*H 2b:* Any variation in discount rate, as a traditional monetary stance, affects the default risk of the banking sector.

*H 2c:* Any variation in interbank offer rate, as a traditional monetary stance, affects the asset quality of the banking sector.

*H 2d:* Any variation in discount rate, as a traditional monetary stance, affects the asset quality of the banking sector.

***H 3: The capital requirements, implemented as a macroprudential policy, moderate the relationship between monetary policy and bank performance.***

*H 3a:* The capital requirements, implemented as a macroprudential policy, moderate the relationship between interbank offer rate and return on asset.

*H 3b:* The capital requirements, implemented as a macroprudential policy, moderate the relationship between interbank offer rate and return on equity.

*H 3c:* The capital requirements, implemented as a macroprudential policy, moderate the relationship between interbank offer rate and net interest margin.

*H 3d:* The capital requirements, implemented as a macroprudential policy, moderate the relationship between discount rate and return on asset.

*H 3e:* The capital requirements, implemented as a macroprudential policy, moderate the relationship between discount rate and return on equity.

*H 3f:* The capital requirements, implemented as a macroprudential policy, moderate the relationship between discount rate and net interest margin.

***H 4: The capital requirements, implemented as a macroprudential policy, moderate the relationship between monetary policy and bank's default risk and asset quality.***

*H 4a:* The capital requirements, implemented as a macroprudential policy, moderate the relationship between interbank offer rate and bank default risk.

*H 4b:* The capital requirements, implemented as a macroprudential policy, moderate the relationship between discount rate and bank default risk

*H 4c:* The capital requirements, implemented as a macroprudential policy, moderate the relationship between interbank offer rate and bank asset quality.

*H 4d:* The capital requirements, implemented as a macroprudential policy, moderate the relationship between discount rate and bank asset quality.

## 2.4 Theoretical Framework

Figure 2 illustrates the theoretical framework developed for this study, which is grounded in relevant theoretical foundations and supported by empirical literature.

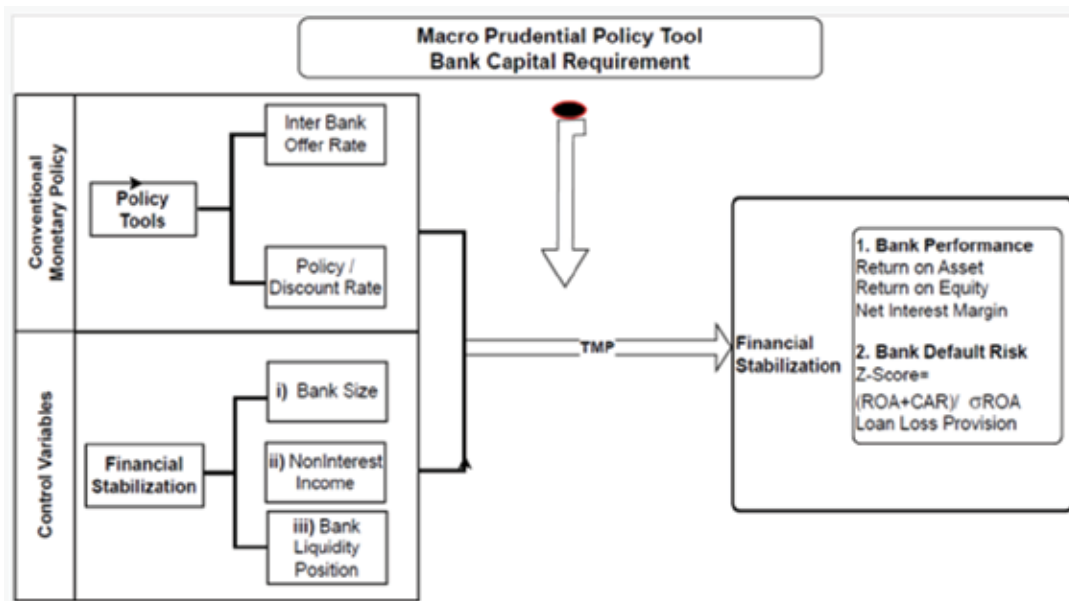


Figure 2: Theoretical Framework

### 3. Methodology

The study adopts a quantitative research design that utilizes a deductive approach to analyze data and test hypotheses. A panel dataset constructed comprising the top 20 banks of Pakistan, for a sixteen-year period from 2008 to 2023. The banks were selected on the basis of their asset size, collectively represents approximately 70% of the country's financial sector. The total number of observations considering 20 banks, 16 years, and 11 variables, are 3,520. To evaluate financial performance, the study employs Return on Assets (ROA), Return on Equity (ROE) and Net Interest Margin (NIM), while Z-score is used as a measure of default risk and Loan Loss Provision (LLP) measure banks asset quality. Several control variables are included, such as bank liquidity, bank size, non-interest income, and bank capital, and these variables are collected from the unconsolidated annual financial statements of the selected banks. The independent variables—specifically, the interbank offer and discount rates—are obtained from the official website of the State Bank of Pakistan (SBP) and the International Monetary Fund (IMF) database.

To investigate the relationships among the study variables, an appropriate econometric model was selected for the panel data regression analysis. Following the assessment of data stationarity and preliminary panel data diagnostics, both fixed and random-effects models were estimated. To identify the most suitable model, the Hausman test was conducted and decision was based on the test's p-value, indicating whether the fixed or random-effect model provided a more reliable estimation framework for the model. The operationalization of all variables is summarized in Table 2.

Table 2  
*Variable Operationalization*

Group	Label	Descriptions	Citations
<b>Independent Variables</b>			
Karachi Inter Bank's offer rate	KIBOR	3 Months of KIBOR	Guo et al., 2023
Policy rate / Discount rate	PR	Quarterly Discount Rate	De Nicol'o <i>et al.</i> , 2010
<b>Dependent Variables</b>			
<b>Financial Stability</b>			
Performance	ROA	Net Income/Average Total Assets	Yuan et al., 2022;-Eltweri et al., 2024; Gul et al., 2011
	ROE	Net income divided by average total equity	Yuan et al., 2022; Eltweri et al., 2024; Gul et al., 2011
	NIM	Net Interest Income-Net Interest Expense/Avg Interest Earning on Assets	Yuan et al., 2022; Gul et al., 2011
Bank Assets Quality	LLP	Loan Loss Provision/Total Assets	Nhleko & Adelowotan, 2025; Mujtaba et al., 2022; Dias, 2021
Default Risk	Z Score	Z-Score = ROA + CAR/ $\sigma$ ROA	Giordana & Schumacher, 2017, Ha & Quyen, 2018; Djatche, 2019.
<b>Control Factors</b>			
Bank Size	BS	Logarithm of Total Bank Assets	Kashyap & Stein, 2000; Bui & Bui, 2019; Li et al., 2024; Zhang & McIntyre, 2021
Non-Interest Income	NII	Non-Interest Income to Total Revenue (DIV).	Carreras et al., 2018; Ashraf & Nazir, 2023
Bank liquidity	BL	liquid assets divided by the total deposit	Nguyen et al., 2015; Li et al., 2024
<b>Moderator</b>			
Capital Adequacy/Requirement	CA	Equity / total assets	Jimenez et al., 2014; González, 2022

### 3.1 Econometric Modeling

Financial Performance:

$$ROA_{it} = \beta_0 + \beta_1 IBOR_{it} + \beta_2 BS_{it} + \beta_3 NII_{it} + \beta_4 BL_{it} + \mu \quad (2)$$

$$ROE_{it} = \beta_0 + \beta_1 IBOR_{it} + \beta_2 BS_{it} + \beta_3 NII_{it} + \beta_4 BL_{it} + \mu \quad (3)$$

$$NIM_{it} = \beta_0 + \beta_1 IBOR_{it} + \beta_2 BS_{it} + \beta_3 NII_{it} + \beta_4 BL_{it} + \mu \quad (4)$$

$$ROA_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 BS_{it} + \beta_3 NII_{it} + \beta_4 BL_{it} + \mu \quad (5)$$

$$ROE_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 BS_{it} + \beta_3 NII_{it} + \beta_4 BL_{it} + \mu \quad (6)$$

$$NIM_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 BS_{it} + \beta_3 NII_{it} + \beta_4 BL_{it} + \mu \quad (7)$$

Bank Assets Quality and Default Risk:

$$LLP_{it} = \beta_0 + \beta_1 IBOR_{it} + \beta_2 BS_{it} + \beta_3 NIM_{it} + \beta_4 BL_{it} + \mu \quad (8)$$

$$LLP_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 BS_{it} + \beta_3 NIM_{it} + \beta_4 BL_{it} + \mu \quad (9)$$

$$ZScore_{it} = \beta_0 + \beta_1 IBOR_{it} + \beta_2 BS_{it} + \beta_3 NIM_{it} + \beta_4 BL_{it} + \mu \quad (10)$$

$$ZScore_{it} = \beta_0 + \beta_1 DR_{it} + \beta_2 BS_{it} + \beta_3 NIM_{it} + \beta_4 BL_{it} + \mu \quad (11)$$

Financial Performance: Macroprudential Policy Intervention

$$ROA_{it} = \beta_0 + \beta_1 IBOR_{it} * CA + \beta_2 BS_{it} + \beta_3 NII_{it} + \beta_4 BL_{it} + \mu \quad (12)$$

$$ROE_{it} = \beta_0 + \beta_1 IBOR_{it} * CA + \beta_2 BS_{it} + \beta_3 NII_{it} + \beta_4 BL_{it} + \mu \quad (13)$$

$$NIM_{it} = \beta_0 + \beta_1 IBOR_{it} * CA + \beta_2 BS_{it} + \beta_3 NII_{it} + \beta_4 BL_{it} + \mu \quad (14)$$

$$ROA_{it} = \beta_0 + \beta_1 DR_{it} * CA + \beta_2 BS_{it} + \beta_3 NII_{it} + \beta_4 BL_{it} + \mu \quad (15)$$

$$ROE_{it} = \beta_0 + \beta_1 DR_{it} * CA + \beta_2 BS_{it} + \beta_3 NII_{it} + \beta_4 BL_{it} + \mu \quad (16)$$

$$NIM_{it} = \beta_0 + \beta_1 DR_{it} * CA + \beta_2 BS_{it} + \beta_3 NII_{it} + \beta_4 BL_{it} + \mu \quad (17)$$

Bank Assets Quality and Default Risk: Macroprudential Policy Intervention

$$LLP_{it} = \beta_0 + \beta_1 IBOR_{it} * CA + \beta_2 BS_{it} + \beta_3 NIM_{it} + \beta_4 BL_{it} + \mu \quad (18)$$

$$LLP_{it} = \beta_0 + \beta_1 DR_{it} * CA + \beta_2 BS_{it} + \beta_3 NIM_{it} + \beta_4 BL_{it} + \mu \quad (19)$$

$$ZScore_{it} = \beta_0 + \beta_1 IBOR_{it} * CA + \beta_2 BS_{it} + \beta_3 NIM_{it} + \beta_4 BL_{it} + \mu \quad (20)$$

$$ZScore_{it} = \beta_0 + \beta_1 DR_{it} * CA + \beta_2 BS_{it} + \beta_3 NIM_{it} + \beta_4 BL_{it} + \mu \quad (21)$$

### 3.2 Econometric Analysis

#### 3.2.1 Impact of Traditional Monetary Policy on Financial Stabilization

Financial stabilization is analyzed through banking sector performance measured by ROA, ROE, and NIM. However, bank default risk measured by the z-score and bank assets quality by LLP. This study analyzes whether a variation in traditional monetary policy tools

and control variables has a significant impact on banks performance, risk and asset quality or not. Similarly, this study analyzes whether macroprudential policy stance has a significant independent and moderating role in this respect or not.

Table 3 summarizes the descriptive statistics. Total possible number of observations for dependent, independent, and control variables is 3520.

Table 3  
*Descriptive Statistics*

Variable	Obs	Mean	Std. Dev.	Min	Max
<b>Dependent Variables</b>					
ROA	320	.009	.007	-.002	.025
ROE	320	.13	.077	.021	.351
NIM	320	.432	.194	-.834	.921
ZScore	320	29.654	19.779	-17.304	77.655
LLP	320	.003	.005	-.005	.013
<b>Independent Variables</b>					
IBOR	320	10.781	3.468	6.13	19.821
DRate	320	11.713	3.68	7.969	22
<b>Control Variables</b>					
BS	320	26.8	1.213	24.248	29.007
NII	320	1.095	.821	-.247	2.603
BLP	320	.091	.021	.034	.125
<b>Moderator</b>					
BCR	320	.081	.099	-.669	.762

*Note:* Std. Dev is the standard deviation; Min and Max show the minimum and maximum value of all variables, respectively; ROE shows return on equity score; NIM is net interest margin score, DRate is discount rate, IBOR is interbank offer rate, BS is bank size score, NII is non-interest income, BLP is bank liquidity position, and Z score.

Table 4 presents the results of the pairwise correlation analysis conducted to assess potential multicollinearity among the study variables. According to widely accepted econometric standards, correlation coefficients exceeding  $\pm 0.8$  may indicate multicollinearity concerns, which could compromise the reliability of regression estimates. The results indicate that all correlation values fall within the acceptable threshold, suggest that multicollinearity does not pose a significant issue for the subsequent regression analysis.

**Table 4**  
*Pairwise correlations*

<b>Variables</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>	<b>(7)</b>	<b>(8)</b>	<b>(9)</b>	<b>(10)</b>	<b>(11)</b>
(1) ROA	1.00										
(2) ROE	0.59	1.00									
(3) NIM	0.61	0.09	1.00								
(4) ZS	0.20	0.20	0.23	1.00							
(5) LLP	-0.09	-0.23	0.07	-0.07	1.00						
(6) IBR	0.07	0.15	-0.14	-0.00	0.19	1.00					
(7) DR	0.03	0.17	-0.14	-0.00	0.12	0.92	1.00				
(8) BS	0.46	0.41	0.32	0.39	-0.14	0.01	0.09	1.00			
(9) NII	-0.01	-0.24	0.08	0.15	0.03	-0.06	-0.08	0.07	1.00		
(10) BP	0.27	0.08	0.32	0.09	0.14	-0.04	-0.03	0.23	0.07	1.00	
(11) BR	0.27	-0.36	0.66	0.06	0.19	-0.05	-0.09	-0.02	0.02	0.13	1

Table 5 presents the results of unit root tests for each dependent and explanatory variable. The reported order of integration indicates the level at which each time series achieves stationarity—either at level (I-0) or first difference (I-1). The Levin-Lin-Chu test was employed, where null hypothesis: panels contain unit roots and alternative hypothesis: panels are stationary. A statistically significant p-value leads to the rejection of the null hypothesis. Based on the results, the variables under study are found to be stationary either at the level or after first difference.

In addition, multicollinearity between the independent variables was estimated via Variance Inflation Factor (VIF) test across all study models. The results indicated that all VIF values were close to 1, with a mean VIF of 1.037, below the threshold value of 5 or 10. These findings confirm that multicollinearity is not a problem in the estimated models, ensuring the reliability and stability of the regression results.

**Table 5**  
*Panel Unit Root Test Results*

	<b>Series</b>	<b>Levin-Lin-Chu Test</b>		
		Adjusted t*	Prob	Level
1	ROA	-3.2750	0.0005	I(0)
2	ROE	-3.2028	0.0007	I(1)
3	NIM	-1.9987	0.0228	I(0)
4	Score	-3.7710	0.0001	I(1)
5	LLP	-7.7774	0.0000	I(0)
6	IBOR	-3.3051	0.0005	I(1)
7	DRate	-1.6181	0.0528	I(1)
8	BS	-2.5903	0.0048	I(1)
9	NII	-6.4935	0.0000	I(0)
10	BLP	-4.8687	0.0000	I(0)
11	BCR	-4.5753	0.0000	I(1)

Table 6 presents regression results related to the impact of conventional monetary policy on banking sector financial performance. The monetary policy stance measured by inter-bank offer and discount rates, however bank performance measured by NIM, ROA and ROE. The control variables include bank size, non-interest income, bank liquidity position and bank capital position. The fixed and random-effects model with robust standard errors is used to test the complete set of hypotheses (Mergaliyev et al., 2021).

The models one till three represent the interbank offer rate as monetary stance however model four till six represent discount rate as monetary stance. The results of model 1 show that only bank size and bank capital position has a significant relationship with positive coefficient values of 0.0089 and 0.0175 which implies that one unit increase in bank size and bank capital position enhance bank's ROA by 0.1 percent and 1.7 percent respectively. The results of model 2 indicate that monetary policy stance has significant positive and non-interest income has a negative relationship with coefficient values of 0.0025 and -0.0077 which implies that one unit increase in discount rate enhance bank's ROE by 0.2 percent and one unit increase in non-interest income depress bank's ROE on equity by 0.7 percent respectively. The results of model 3 indicate that bank size and liquidity position have significant positive relationship with net interest margin with coefficient values of 0.1157 and 1.1125, which implies that one unit increase in bank size and bank liquidity position enhance bank's NIM by 11 percent and 111 percent respectively.

The results of model 4 indicate that bank size and capital position has significant positive relationship with ROA with coefficient values of 0.008 and 0.1739, which implies that one unit increase in bank size and bank capital position enhance bank's ROA by .8 percent and 17 percent respectively.

The results of model 5 indicate that monetary stance and bank size has significant positive relationship with ROE, with coefficient values of 0.0018 and 0.04689, which implies that one unit increase in discount rate and bank size enhance bank's ROE by 0.2 percent and 4.6 percent respectively. However, non-interest income has a significant negative relationship with ROE with coefficient values of -0.0077 which implies that one unit increase in non-interest income decrease bank's ROE by 0.7 percent.

The results of model 6 indicate that bank size and liquidity position have significant positive relationship with NIM, with coefficient values of 0.111 and 1.184, respectively, which implies that one unit increase in bank size and bank liquidity position increase bank's NIM margin by 11 percent and 118 percent respectively.

The interaction between a bank's capital adequacy with interbank offer rate and discount rate was generated to evaluate the moderating role of macroprudential policy instrument along with monetary stance on bank financial performance. The result stated that

macroprudential policy instrument don't have moderation role in model one till five, however it has negative significant relationship with model 6 with coefficient value of -0.0745, which implies that implementation of macroprudential policy tool along with monetary stance reduce bank net interest margin by 7 percent.

Table 6  
*Panel Data Analysis- Financial Sector Performance*

REM/FEM with Robust Standard Errors						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
VARIABLES	ROA(RE)	ROE (FE)	NIM (RE)	ROA(RE)	ROE(FE)	NIM (REV)
IBOR/DR	.000034 (0.00010)	0.0025*** (0.00090)	0.00665 (0.00510)	-0.00002 (0.00010)	0.0018** (0.00088)	-0.00532 (0.00436)
BS	0.0089*** (0.00193)	0.0454 (0.0280)	0.1157*** (0.04359)	0.0080*** (0.0019)	0.04689* (0.0282)	0.111*** (0.0427)
NII	0.000044 (0.00118)	-.00775* (0.00415)	0.00819 (0.02221)	0.00004 (0.001189)	-.00771* (0.00417)	0.00798 (0.02231)
BLP	0.01992 (0.02157)	-0.0398 (0.1630)	1.1125*** (0.42539)	0.0203 (0.02121)	-0.07141 (0.1626)	1.184*** (0.438)
BCR	0.0175*** (.00545)	.02333 (.05929)	.12428 (.13813)	.01739*** (.005395)	.03386 (.05929)	.0983 (.14722)
IBOR*BCR	0.0045 (0.0057)	0.0142 (0.02155)	0.0283 (0.0654)	0.00222 (0.0049)	0.03869 (0.0218)	-.0745** (0.0355)
PR*BCR						
Constant	0.00636* (0.0035)	.01212 (0.0163)	0.3054*** (0.0656)	0.00631 (0.00349)	0.0151 (0.0162)	.2989*** (.0692)
Observations	300	300	300	300	300	300
No of Banks	20	20	20	20	20	20
R-squared	0.23	0.014	0.40	0.23	0.012	0.40
No of Years	16	16	16	16	16	16

*Note:* The significant probability value explains that the models are correctly specified. The R-square represents the goodness of fit. Robust standard errors are shown in parentheses. \*\*\*, \*\*, \* represents coefficients significance at 1%, 5%, and 10% significance levels.

Table 7  
*Hausman Specification Test Results for Panel Data Model*

Model	Dependent Variable	Prob > $\chi^2$	Model Selection
1	ROA	0.7672	Random Effects
2	ROE	0.0000	Fixed Effects
3	NIM	0.8931	Random Effects
4	ROA	0.8482	Random Effects
5	ROE	0.0000	Fixed Effects
6	NIM	0.8563	Random Effects

*Note.* The Hausman specification test evaluates whether the difference in coefficients is systematic. A p-value > .05 indicates failure to reject the null hypothesis, suggesting that a random effect model (REM) is appropriate. A p-value < .05 indicates rejection of the null, suggesting a fixed effect model (FEM) is appropriate.

Table 8 presents results in relation to impact of conventional monetary policy on default risk and asset quality in the banking sector. The monetary policy stance measured by inter-bank offer and discount rates; however, bank default risk is by Z-score and bank asset quality by loan loss provision. The control variables include bank size, non-interest income, bank liquidity position and bank capital position. The fixed and random-effects models with robust standard errors was used to test the complete set of hypotheses (Mergaliyev et al., 2021).

The models seven and eight represent the interbank offer rate as monetary stance however model nine and ten six represent discount rate as monetary stance. The results of model 7 and model 8 show that conventional monetary policy stance didn't have any impact on bank default risk. However, results of model 9 confirmed that only bank capital position has a significant relationship with positive coefficient value of 0.0085, which implies that one unit increase in bank capital position enhance bank's loan loss provision by 0.8 percent. The results of model 10 indicate that monetary policy stance has significant negative and bank capital position has a significant positive relationship with coefficient values of -0.00031 and 0.0088, which implies that one unit increase in discount rate reduce bank's loan loss provision by 0.03 percent and one unit increase in bank capital position enhance loan loss position by 0.08 percent.

The interaction between bank's capital adequacy with interbank offer rate and discount rate was generated to evaluate the moderating role of macroprudential policy instrument along with monetary stance on bank default risk and asset quality. The result stated that macroprudential policy instrument don't play moderation role when implemented along with monetary stance.

Table 8  
*Panel Data Analysis- Default Risk and Asset Quality*

VARIABLES	Model 7	Model 8	Model 9	Model 10
	ZS(REv)	ZS (FEv)	LLP(REv)	LLP(FEv)
IBOR/DR	.07373 (0.1101)	-.19484 (0.1590)	-0.00011 (0.000094)	-0.00031*** (0.00008)
BS	2.7024 (3.3034)	2.1456 (3.9808)	-0.00615 (0.004110)	-0.00677 (0.00400)
NII	0.7254 (0.48813)	.60864 (0.42851)	-0.000182 (0.000708)	-.000293 (0.000674)
BLP	-17.0300 (19.1717)	-24.1141 (20.6945)	.025235 (0.15339)	0.20925 (0.01514)
BCR	6.3768 (6.9722)	7.5753 (12.2602)	0.0085*** (0.00201)	.00887*** (.00187)
IBOR*BCR	-.6589 (2.5211)	-2.626 (4.1222)		
PR*BCR			-0.00164 (0.00110)	0.00014 (0.00132)
Constant	0.7781 (1.9168)	1.7546 (1.5292)	0.00631 (0.00349)	0.002611* (0.00134)
Observations	300	300	300	300
No. of banks	20	20	20	20
R-squared	0.02	0.003	0.23	0.07
No. of years	16	16	16	16

*Note:* The significant probability value explains that the models are correctly specified. The R-square r represents the goodness of fit. Robust standard errors are shown in parentheses. \*\*\*, \*\*, \* represents coefficients significance at 1%, 5%, and 10% significance levels.

Table 9  
*Hausman Specification Test Results for Panel Data Model*

Model	Dependent Variable	Prob > $\chi^2$	Model Selection
7	Z-Score	0.4214	Random Effects
8	Z-Score	0.0000	Fixed Effects
9	LLP	0.7207	Random Effects
10	LLP	0.0217	Fixed Effects

*Note:* The Hausman specification test evaluates whether the difference in coefficients is systematic. A p-value > .05 indicates failure to reject the null hypothesis, suggesting that a random effect model (REM) is appropriate. A p-value < .05 indicates rejection of the null, suggesting a fixed effect model (FEM) is appropriate.

Table 10  
*Hypothesis Testing*

Hypotheses	Decision
<b>H 1</b> <i>Any variation in interbank offers and discount rates, as a traditional monetary stance, effects the performance of the banking sector.</i>	Accepted
<b>H 1a</b> Any variation in interbank offer rate, as a traditional monetary stance, effects the return on asset of the banking sector.	Rejected
<b>H 1b</b> Any variation in interbank offer rate, as a traditional monetary stance, effects the return on equity of the banking sector.	Accepted
<b>H 1c</b> Any variation in interbank offer rate, as a traditional monetary stance, effects the net interest margin of the banking sector.	Rejected
<b>H 1d</b> Any variation in discount rate, as a traditional monetary stance, effects the return on asset of the banking sector.	Rejected
<b>H 1e</b> Any variation in discount rate, as a traditional monetary stance, effects the return on equity of the banking sector.	Accepted
<b>H 1f</b> Any variation in discount rate, as a traditional monetary stance, effects the net interest margin of the banking sector.	Rejected
<b>H 2</b> <i>Any variation in interbank offers and discount rates, as a traditional monetary stance, affects the default risk and asset quality of the banking sector.</i>	Accepted
<b>H 2a</b> Any variation in interbank offer rate, as a traditional monetary stance, affects the default risk of the banking sector.	Rejected
<b>H 2b</b> Any variation in discount rate, as a traditional monetary stance, affects the default risk of the banking sector.	Rejected
<b>H 2c</b> Any variation in interbank offer rate, as a traditional monetary stance, affects the asset quality of the banking sector.	Rejected
<b>H 2d</b> Any variation in discount rate, as a traditional monetary stance, affects the asset quality of the banking sector.	Accepted
<b>H 3</b> <i>The capital requirements, implemented as a macroprudential policy, moderate the relationship between monetary policy and bank performance.</i>	Accepted
<b>H 3a</b> The capital requirements, implemented as a macroprudential policy, moderate the relationship between interbank offer rate and return on asset.	Rejected

*Table to be continued...*

<b>H 3b</b>	The capital requirements, implemented as a macroprudential policy, moderate the relationship between interbank offer rate and return on equity.	Rejected
<b>H 3c</b>	The capital requirements, implemented as a macroprudential policy, moderate the relationship between interbank offer rate and net interest margin.	Rejected
<b>H 3d</b>	The capital requirements, implemented as a macroprudential policy, moderate the relationship between discount rate and return on asset.	Rejected
<b>H 3e</b>	The capital requirements, implemented as a macroprudential policy, moderate the relationship between discount rate and return on equity.	Rejected
<b>H 3f</b>	The capital requirements, implemented as a macroprudential policy, moderate the relationship between discount rate and net interest margin.	Accepted
<b>H 4</b>	<b><i>The capital requirements, implemented as a macroprudential policy, moderate the relationship between monetary policy and bank's default risk and asset quality.</i></b>	Rejected
<b>H 4a</b>	The capital requirements, implemented as a macroprudential policy, moderate the relationship between interbank offer rate and bank default risk.	Rejected
<b>H 4b</b>	The capital requirements, implemented as a macroprudential policy, moderate the relationship between discount rate and bank default risk	Rejected
<b>H 4c</b>	The capital requirements, implemented as a macroprudential policy, moderate the relationship between interbank offer rate and bank asset quality.	Rejected
<b>H 4d</b>	The capital requirements, implemented as a macroprudential policy, moderate the relationship between discount rate and bank asset quality.	Rejected

A control variable related to the COVID-19 period (covering the years 2020 and 2021) included in all regression models to examine its potential impact on the study's results. The corresponding outcomes are presented in Table 11 and 12.

Table 11  
*Effect of COVID-19 on Bank Performance Indicators*

<b>Model</b>	<b>Dependent Variable</b>	<b>Coefficient (B)</b>	<b>SE</b>	<b>Z</b>	<b>P</b>
1	ROA	0.00013	0.00074	0.17	.863
2	ROE	0.00827	0.00845	0.98	.329
3	NIM	-0.09304	0.02414	-3.85	.000***
4	ROA	-0.00201	0.00082	-2.44	.014*
5	ROE	0.00382	0.00815	0.47	.640
6	NIM	-0.07631	0.02341	-3.26	.001**

Note. Standard Error (SE). †p < .10, \*p < .05, \*\*p < .01, \*\*\*p < .001.

In table 11, with respect to bank performance, it is found that in Models 3 and 4, COVID-19 exerted a strong negative effect on banks' NIM and RoA with coefficient value of -0.093, highly significant at p < .001 and coefficient value of -0.002, significant at p = .014, respectively for model 3 and 4. For model 6 the COVID had strong negative effect on bank's NIM with coefficient value of -0.076, significant p = .001.

Table 12  
*Effect of COVID-19 on Bank Default Risk and Asset Quality*

Model	Dependent Variable	Coefficient (B)	SE	Z	P
7	ZS	-1.14701	0.97598	-1.18	.240
8	ZS	-1.70015	0.94367	-1.80	.073†
9	LLP	-0.00026	0.00080	-0.33	.745
10	LLP	-0.00066	0.00075	-0.89	.376

Note: SE = Standard Error. †p < .10, \*p < .05, \*\*p < .01, \*\*\*p < .001.

In table 12, model number 8, the COVID had marginal negative effect on bank's default risk, with coefficient value of  $-1.70$  and significant at  $p = .073$ . Hence, weak evidence that COVID may have reduced financial stability. In summary, COVID mainly hurt banks' interest margins and partially reduced risk-adjusted returns, but its effect on overall profitability and stability was limited.

#### 4. Summary and Conclusion

The study empirically investigates the impact of traditional monetary and moderating role of macroprudential policy on Pakistan's financial stability. Using panel data from 2008 to 2023, fixed and random-effects models were estimated. The analysis is divided into two segments: the first assesses banking performance using ROA, ROE, and NIM; the second evaluates financial stability through bank default risk (z-score) and asset quality (loan loss provisions). Moderation analysis explores how macroprudential tools, when implemented along with monetary stance influence the financial stability i-e banks performance, default risk, and asset quality. This study applies a literature-based framework to assess the practical significance of both policy approaches.

The results for the first segment confirm that traditional monetary tools only significantly impact on component of bank performance i-e. ROE. However, for other performance measures, such as ROA and NIM, monetary policy stance remains ineffective. However, bank size has positive relationship with almost all components of the performance, while bank liquidity has positive relationship with NIM, and bank capital position has positive relationship with ROA.

The non-interest income has negative relationship with ROE. The result of moderation analysis confirmed that macroprudential policy has negative moderating role in financial stability as its implementation, along with monetary stance, reduce bank performance as it depress NIM. However, the macroprudential stance plays no moderating role in relation to ROA and ROE.

The results regarding second segment of analysis confirm that monetary stance only significantly impact bank LLP which conclude that a tight monetary stance marginally enhance bank asset quality and vice versa. However, bank capital position has no role in bank default risk but has positive relationship with LLP, which indicate that greater bank capital corresponds to higher LLP or bad loan portfolio. The moderation analysis confirmed that macroprudential policy plays no moderating role in addressing bank default risk and bank asset quality. However, COVID mainly hurt banks' NIM margins and partially reduced ROA, but its effect on overall profitability and stability found limited.

In brief, the first segment confirmed that monetary policy stance has positive impact on ROE and macroprudential policy moderation is effective but it depresses banks performance through NIM. The second segment confirmed that tight monetary policy improves bank asset quality, however, macroprudential policy moderation is ineffective with respect to bank default risk and asset quality. It is concluded that traditional monetary measures ensure financial stability and marginally mitigate bank risk. However, moderating role of macroprudential policy stance marginally suppress banks profitability, which in turn weaken the financial stability. These findings are consistent with the monetarist and neoclassical schools of thought (e.g., Friedman, 1968; Taylor, 1993), which emphasize the role of interest rate adjustments in enhancing financial sector efficiency. By contrast, the results challenge the macroprudential school of thought, as per Basel III framework (Belkhir, Ben Naceur, Candelon, Choi, & Mugrabi, 2023), that regulatory instruments, capital buffers, are effective in mitigating risk and safeguarding financial stability. Hence, the study supports the traditional monetary policy perspective, prefer it over macroprudential measures in sustaining bank performance and achieving financial stability.

The study suggests that bank managers and policymakers should recognize the role of conventional monetary policy in enhancing ROE and marginally improving asset quality. However, macroprudential measures, when applied alongside monetary policy, may reduce profitability through lower NIM without improving financial stability. Policymakers should consider implementing both policies in a coordinated but possibly separate manner to ensure financial stability and improved banks performance. The theoretical understanding on financial stability advances which confirms that conventional monetary policy influences certain aspects of bank performance, such as ROE and asset quality, supporting the theory that monetary policy can stabilize financial institutions. Contrary, the findings reveal that macroprudential policy, when implemented alongside monetary policy, suppress bank performance (NIM) with no effect on financial stability. This highlights the efficacy of macroprudential tools is context-dependent and may not always complement monetary policy. This study is subject to several limitations such as unavailability of entire banking sector data restricts the ability to capture the full exposure. Second, Pakistan's macroprudential framework is in early stage, hence instruments and data is not available. Third, advance methodologies and additional time may affect the precision of results. Future studies could

examine the moderating role of other macroprudential tools such as debt burden caps, loan to value caps, exposure limits or sectoral limits and liquidity requirements etc. In addition, the unconventional monetary policy instruments, such as central bank assets to GDP ratio and broad money, can be employed to find its impact on financial stability. This study contributes that monetary policy exerts a positive influence on banks' profitability and asset quality, whereas macroprudential policy tends to suppress bank performance and no role in risk mitigation. Hence, traditional monetary policy tools are more suitable as compare to macroprudential policy for financial stability.

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