Determinants of Profitability and Risk-taking in Pakistani Commercial Banks: Dynamic GMM Approach

Changjun Zheng* Shumaila Meer** Atif Nadeem*** Samina Parveen****

Abstract

The study used interest rate, exchange rate and banks size as variables of study. The panel data of 22 Pakistan commercial banks about 2009 to 2020, STATA Panel Ordinary Least Square (OLS) and general methods of moments (GMM) estimator is used, and results indicate that in Pakistani banks management efficiency is has high power over shareholder to make profits and involve in risk taking projects. Bank size increase highlights better performance but and a disadvantage to use funds in investments for future growth. Diversification in bank is not helpful factor to bring change in risk portfolio during financial crisis. The liquidity inverse relation cause less availability of resource to boost financial performance and default lending result in credit risk. High proportion of assets utilized for personnel expense raise risk-taking ratio for operation in Pakistan. Banks should avoid the adverse selection of risks with proper performance policy, as to safeguard from hostile economic situations.

Keywords: Commercial banks; GMM, Pakistan; profitability; risk-taking.

JEL Classification: G32

1.   Introduction

According to a study by Akin et al. (2016), risk-taking behavior may be influenced by agency issues in the banking industry. They suggest that macroprudential regulations and Basel III are two examples of policy tools that could be useful in preventing banks from taking on too much risk. In contrast, Boamah et al. (2021) argue that high levels of risk-taking combined with fierce competition could reduce bank profitability and raise the chance of

*Professor, School of Management, Huazhong University of Science and Technology, Wuhan 430074, China. Email: zhchjun@hust.edu.cn

** Assistant Professor, Management Science DHA Suffa University, Karachi, Pakistan. Email: shumailameer08@gmail.com

***Visiting lecturer IBS department KUST, Kohat, Pakistan Email:atifnadeem398@gmail.com

**** Lecturer, Management Science DHA Suffa University, Karachi, Pakistan. Email:samina.parveen@dsu.edu.pk

collapse, used bank size as one of the determinants of bank's profitability in Ethiopia by using GMM approach. A positive and significant effect have been identified by this research on Bank's profitibility.The significance / scope of this research is associated with different stakeholders as banking institutions, policy makers, researcher sin their respective domains to study about the banking sector of Pakistan. However, underd eveloped countries like Pakistan lacks in the aspect. The present study aims to know how financially efficient and profitable Pakistani banking system is by including internal and external macroeconomic variables by risk-taking practices for a period of 2009 from 2009 to 2018. The study is first to research the bank risk-taking and financial performance as well as, firm-specific, regularity and macroeconomic factors in Pakistan. Another scope of this research is associated with different stakeholders including banking institutions, policy makers, researchers in their respective domains to study about the banking sector of Pakistan whether profitability and risk-taking have effect on the stability of financial sector of Pakistan. The main objective of the current study shown below.

1.1   Research objectives

1. To determine the impact of banks' financial performance from Return on Equity (ROE).
2. To identify the effect of ZScore a proxy for risk taking.

What is the issue statement or research question? What are the objectives? What is the motivation?"

2.   Literature Review

2.1   The concept of financial performance/ profitability

Economic growth and the capacity to withstand external financial shocks have been associated with the profitability of the banking industry (Rolle et al., 2020; Rolle et al., 2020). In addition to fostering economic expansion, profitability plays a critical role in maintaining the stability of the financial system by mitigating adverse financial effects (Rolle et al., 2020; Rolle et al., 2020). Furthermore, promoting economic growth requires a healthy and prosperous banking industry (Kumar & Bird, 2020). It has been demonstrated that financial intermediation, made possible by the banking industry, stimulates economic growth in a considerable number of nations, highlighting its significance in conjunction with capital accumulation and exports (Próchniak & Wasiak, 2016). All of these results point to the importance of having a successful and expanding financial industry.

2.2   The concept of risk-taking behavior

Because it may be used for both public and unregistered banks, the Z-Score is widely used as a gauge of financial stability, according to research by Kabir and Worthington (2017). According to Al-Khouri and Arouri (2019), the Z-Score provides a thorough understanding of a bank's stability by incorporating capital-to-asset ratio and bank asset risk. According to Fosu et al. (2017), the Z-Score is sensitive to risk factors and rises with profitability and capitalization levels but falls with profit volatility.

In emerging countries, the Z-Score is a measure of commitment of capital with high explicit deposit and decides the market discipline (Haq & Heaney, 2012).

2.3   Firm-specific, regularity and macro-economic factors

The assets of a bank grow with time and management efficacy is required to keep the issue in control (Havrylchyk, 2006).The strategies of a bank decide the management efficiency regarding the profitability, especially of the diversified bank. Managers can increase the risk of operations when capacity is high, and diversification is beneficial when a manager has the skill to manage the mixture of business activities. Size is an important variable a proxy for total assets. To determine the performance of the bank as the economies of scale are obtained with increase in size reduce and efficiency to collect information to start a business (Stiglitz , 2010). The logarithm of assets of bank is proxy of bank size.(Lassoued et al., 2016). Bank's financial stability plays a crucial role in stabilizing the economy of BRICS (Brazil, Russia, India, China and South Africa) and banks' profitability is the main ingredients (Sain & Kashiramka, 2023). Banks are exposed to high risk-taking when the burden of leverage and regulatory requirements increase (Le et al., 2022). A big bank diversifies risk with the opportunity to take vast kinds of loans.

The diversification strategy of a bank is beneficial in the form of different financial services. The activities that carry no interest are harmful to banks, result in volatile nature but less profit from lending practice. The noninterest business decreases the risk-adjusted profits and shows the dark version of diversification. The investment opportunity increase with the increase in diversified products, the risk-adjusted return can increase. The two facets of diversification is the direct interaction of the diversification effect and increase in noninterest income and the inverse relation between the diversification effect the income earned (Stiroh &Rumble, 2006). The return of a bank decreases as the industry and sector loan diversifies. The banks that indulge in low risk earn an inefficient return of risk or produce just marginal environment. The assets that are formed in to banks, are diversified may not result in good management performance. For managerial efficiency decreases new sector is introduced in the loan portfolio and raise bank risk (Acharya et al., 2006) identified that diversification plays crucial role for banks of emerging and developing to reduce its risk that leads to the overall improvement of financial strength.

The central bank serves as a lender of last resort to stabilize the financial system and is essential in managing bank default risk and liquidity during times of crisis. The central bank intervenes to supply liquidity when depositors take their money out, averting a liquidity crisis that would affect the banking industry and have wider ramifications for the economy (McGuire & Peter, 2012; Gertler et al., 2012). According to McGuire and Peter (2012), the central bank's ability to add liquidity to the system aids in preventing funding shortages and preserving stability. Boyd et al. (2009) highlight how the Z-Score approach can be a useful tool for evaluating bank default risk and liquidity difficulties. Central banks can assess a bank's financial health and decide how much liquidity to provide during a crisis by using indicators such as the Z-Score (Acharya & Naqvi, 2012). Furthermore, Acharya and Mora (2015) research emphasizes how crucial it is for banks to efficiently manage their liquidity levels, particularly during times of crisis, in order to preserve stability and deal with funding issues (Acharya & Mora, 2015).

A research was conducted to explore whether profitability of Indian commercial banking sector is affected by risk taking measure or it. The study identified that higher credit has significant impact on the profitability of the banking industry. As stated in the instruction of central bank of Pakistan, CAR was regulated as proxy of risk to banks. The banks have to follow the instructions as separate entity and on consolidation stand. The CAR value can be increased or decreased based on deposit insurance scheme to cartel risk. CAR is a measure of capital at bank, a backup as secure deposit and bank consistency. The expected risk on risk weighted assets is lower for banks with less capital. As CAR is lowered ex-ante the investment on asset as collateral reduces.

Exchange rate is an important price value at a macroeconomic front for international transaction and a determinant to measure return on investment and risk-taking behavior. The exchange rate volatility in an economy is troublesome for international business. The ideal recommendation is to government for upholding restrictions on appreciation of currency against foreign exchange rate. Changes in exchange rates have a big effect on macroeconomic indicators, such the real interest rate. Exchange rate fluctuations can impact the real interest rate, which in turn can impact borrowing costs, investment choices, and the state of the economy as a whole (Andersen et al., 2003; Clarida & Galí, 1994). Furthermore, by encouraging trade and investment opportunities, exchange rate changes contribute to economic growth by making international business and services easier to do (Andersen et al., 2003; Hatmanu et al., 2020).

3.   Materials and Methods

In this study dependent variable profitability and bank risk-taking behavior credit risk, diversification, liquidity, and personal expense to total loan ratio. Furthermore, macro-economic variables include real interest rate exchange rate. The quantitative data was gathered

from Bureau Van Dijk's Bank focus. Further, real interest rate and exchange rate data was gathered from WDI database. The dominance of macroeconomic instability in the creation of loan loss provision is confirmed and supported by a small number of important bank-specific variables found in the data of commercial banks in Pakistan Zheng et al. (2019).

Using a sample of 28 banks, the study looks at the factors that affect banks' profitability in Pakistan between 2007 and 2016. Explanatory variables are divided into three categories: bank-specific, industry-specific, and macroeconomic (Yao et al., 2018).The study (Shair et al., 2019) looks into the internal factors that affect Pakistani banks' profitability.The study examines the variables affecting Pakistani commercial banks' profitability, emphasizing the importance of deposits and equity in this regard (Shah & Khan, 2021).

The deductive technique and positivist perspective are employed in the study of bank risk and profitability in Pakistani commercial banks. Using panel data from 2010 to 2017, a time frame selected after the 2008 global financial crisis (GFC), the study focuses on examining the relationship between profitability and bank risk (Dahir et al., 2018; Hakimi & Zaghdoudi, 2017). According to the theory put forth in the study, a high return on assets is a sign of a company's efficiency, and a large amount of proxy bank liquidity is used to evaluate a bank's capacity to promptly comply with monetary policy requirements in the event of solvency, default, or payment obligations (Dahir et al., 2018; Hakimi & Zaghdoudi, 2017).

The study uses the fixed effect (FE) model and Ordinary Least Square (OLS) estimation to remove time-variant individuals, yielding unique values for individual effects in the data set (Dahir et al., 2018). The study also includes Z-Score analysis, which is a technique that combines financial ratios to determine the degree of risk connected with default and profitability in order to evaluate bankruptcy or financial hardship (Hakimi & Zaghdoudi, 2017). As a risk indicator, the Z-Score draws attention to possible default scenarios and issues with financial stability (Hakimi & Zaghdoudi, 2017).

3.1 *Model specification*

The following econometric models are established based on the variable above explanation and review of the literature;

$ROE_{i,t}=\alpha_i+\beta_1(Management efficiency)_{i,t}+\beta_2(Banksize)_{i,t}+\beta_3(Diversification)_{i,t}+\beta_4((Liquidity)_{i,t}+\beta_5(Personal\ expenses)_{i,t}+\beta_6 Real\ interest\ rate)_{i,t}+\beta_7(Capital\ adequacy\ ratio)_{i,t}+\beta_8(Exchange\ rate)_{i,t}+\varepsilon_{i,t}$…………………………………………………………(I)

$Risk_{i,t}=\alpha_i+\beta_1(Management\ efficiency)_{i,t}+\beta_2(Banksize)_{,t}+\beta_3(Diversification)_{,t}+\beta_4((Liquidity)_{i,t}+\beta_5(Personal\ expenses)_{i,t}+\beta_6(Realinterestrate)_{,t}+\beta_7(Capitaladequacyratio)_{i,t}+\beta_8(Exchange\ rate)_{i,t}+\varepsilon_{i,t}$ …………………………….(II)

ROE is dependent variable in the Eq. (I) to account as a performance measure similarly in the Z-Score the dependent variable Z-Score is a proxy for risk. Iis a subscript of commercial banks there are i=1, 2….22 for Pakistani active commercial banks and t=2009...2020. α, β are estimation parameter and εi,t is error term.

Table1
Indicator of Measurement

Variables Dependent Variables	Measures of Variables Indicators (Measurement)	Source/ Explanation
Profitability (ROE)	Risk std ROE	(Zheng et al., 2019). Data gathered from Bank focus.
Bank Default Probability/ Financial Soundness: Z-SCORE	Z-Score=(ROE+CAR)/σ(ROE)	The ratio is calculating by the author to know the number of standard deviation from the mean value as a substitute for risk-taking the behavior of a bank (Laeven & Levine, 2009)
Independent Variables		
Management Efficiency (MAN)	A ratio of earning assets to total assets.	(Lassoued et al., 2016)The author calculated the ratio.
Bank size (Size)	Log oftotal assets of a bank	(Lassoued et al., 2016)Log calculated by the author
Liquidity (LIQ)	Loan to deposit ratio.	The ratio calculated by the author.
Diversification (DIV)	1-(Net Interest Income-Other Income/ Total Income) ratio.	(Lassoued et al., 2016) The rati calculated by the author.
Capital Adequacy Ratio (CAR)	Tier 1 capital to total risk weighted asset ratio.	The ratio calculated by the author
Personnel expenses (PER)	Staff expenses to total loan ratio	The ratio calculated by the author Table to be continued
Exchange Rate (EXR)	The conversion of value of a currency to another.	Data collected from WDI
Real Interest Rate (RIR)	Yearly real interest rate of sample country.	(Ramlall, 2009), (Uhde &Heimeshoff, 2009)Data collected from WDI

4.   Results and discussion

Table 2 represent the descriptive statistics of variables, based on the central tendency and variability of the data to help demonstrate the complete sample of the study. Also, standard deviation, and minimum and explains the variability or flexibility and range of the data.

Table 2
Descriptive Statistics

Variable	Observations	Mean	Standard. Deviation.	Minimum values	Maximum values
ROE	176	8.585	15.923	-42.33	30.7
Z-Score	160	.556	.48	-.525	1.579
MAN	176	.86	.041	.729	.933
SIZE	176	6.354	.65	4.756	7.386
DIV	145	-.9	4.048	-37.407	9.068
LIQ	176	.093	.068	.014	.365
PER	145	.043	.035	.02	.28
RIR	176	3.146	1.626	-1.054	3.89
CAR	113	.124	.042	-.005	.263
EXR	176	97.582	7.659	85.194	105.455

The table ostensibly yields a total dataset comprising 264 data points, detailing descriptive statistics, and reports a minimum and maximum observation count of 113 and 176o observations, due to some missing data for some banks and years.

Table 3
Pearson Matrix Return on Equity

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) ROE	1.000								
(2) MAN	0.359	1.000							
(3) SIZE	0.247	0.009	1.000						
(4) DIV	-0.090	0.064	-0.077	1.000					
(5) LIQ	0.031	-0.052	-0.255	0.117	1.000				
(6) PER	0.136	-0.099	-0.366	0.045	0.073	1.000			
(7) RIR	0.052	0.235	0.076	0.015	-0.024	0.036	1.000		
(8) CAR	-0.010	-0.124	0.168	0.156	0.002	-0.153	-0.110	1.000	
(9) EXR	0.052	0.336	0.102	0.047	-0.030	0.064	0.722	-0.119	1.000

Table 4
Pearson Matrix Z-SCORE

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Z-SCORE	1.000								
(2) MAN	0.138	1.000							
(3) SIZE	0.464	0.009	1.000						
(4) DIV	-0.041	0.064	-0.056	1.000					
(5) LIQ	0.062	-0.053	-0.313	0.125	1.000				
(6) PER	0.132	-0.246	-0.114	-0.051	0.423	1.000			
(7) RIR	0.018	0.235	0.095	0.012	-0.021	0.006	1.000		
(8) CAR	0.295	-0.130	0.075	0.184	-0.029	0.289	-0.103	1.000	
(9) EXR	0.041	0.338	0.142	0.042	-0.022	-0.037	0.723	-0.099	1.000

Table 3 & 4 present the Pearson's correlation coefficient for Pakistan. The tables show the multicollinearity does not cause any problem in the model as the dependent and independent variables in two separate models (Gujarati & Porter, 2009).

4.1 *Results of ordinary least square (OLS)*

The first section showcases the influence of bank performance and risk-taking for the 22 active commercial banks of Pakistan (Zheng et al., 2019).The second section shows the effect of bankruptcy of commercial banking.

The determinants impact on financial performance by ROE

Table 5
Results of ROE OLS Models

ROE	Coef.	[95% Conf	Interval]	Sig
ROE_L1	.476	.302	.651	***
MAN	81.813	31.509	132.116	***
SIZE	4.016	-.648	8.68	*
DIV	-.481	-1.125	.164	
LIQ	1.769	-22.323	25.861	
PER	197.993	129.065	266.922	***
RIR	-.122	-2.023	1.779	

Table to be continued

CAR	.339	-37.851	38.528
EXR	.32	-.61	1.25
Year	-1.683	-3.851	.486
Constant	3259.657	-1019.193	7538.507
Mean dependent var		11.061	
Overall r-squared		113.000	
Chi-square		0.000	
R-squared within		0.888	

*** *p<.01, ** p<.05, * p<.1*

Management efficiency is positively and significantly correlated to ROE (Havrylchyk, 2006). Size has a significant and positive correlation with ROE (Stiglitz, 2010). Diversification is insignificantly positively correlated to ROE and has a significant positive impact of diversification on earnings (Stiroh & Rumble, 2006) Also, an inversely significant correlation is seen between diversification and ROE for Pakistani banks (Acharya et al., 2006) Liquidity is positive and significantly correlated to ROE .Personnel are positive and significantly correlated to ROE for banks (Ramlall, 2009).

Table 6
Results of ROEGMM Model

ROE	Coef.	[95% Conf	Interval]	Sig
ROE_L1	-.161	-.299	-.023	**
MAN	208.792	-8.795	426.378	*
SIZE	65.678	-169.95	38.595	*
DIV	-2.974	-5.896	-.051	**
LIQ	48.022	-100.134	4.089	*
PER	391.123	-753.503	1535.749	***
RIR	2.927	.402	5.451	**
CAR	147.251	-3.79	298.292	*
EXR	-1.754	-3.636	.129	*
Year	5.474	-2.759	13.707	
Mean dependent var	15.306	SD dependent var	8.430	
Number of obs	67.000	F-test	.	

Arellano-Bond test for AR (1) in first differences: z = -0.81 Pr> z = 0.418 Arellano-Bond test for AR (2) in first differences: z = -0.77 Pr> z = 0.440 Sargan test of overidentification. Restrictions: chi2 (7) = 16.45 Prob> chi2 = 0.021 (Not robust, but not weakened by many instruments.

Results shows that management efficiency has positive and significant relationship on return on average asset that means that absence of efficiency by managers will strongly affect ROE. Size of banks is positively significant correlated to ROE (Havrylchyk, 2006). Size of banks has a significant and positive correlation with ROE (Stiglitz , 2010). Diversification is significantly negatively correlated to ROE Also; an inversely significant correlation is seen between diversification and ROE for Pakistani banks (Acharya et al., 2006) Liquidity is positive and significantly correlated to ROE .Personnel are positive and significantly correlated to ROE for banks (Ramlall, 2009). Real interest rate has a positive and significant relationship on ROE. Capital adequacy ratio of banks is positively significantly correlated to ROE (Havrylchyk, 2006). Exchange rate is significantly negatively correlated to ROA for Pakistani banks (Acharya et al., 2006)..

Risk-taking behavior impacts insolvency or bank default

Table 7
Results of Z-Score OLS Models

Z-SCORE	Coef.	[95% Conf	Interval]	Sig
Z-SCORE_L1	.819	.685	.953	***
MAN	.993	-.424	2.411	
SIZE	.09	-.059	.238	
DIV	-.018	-.038	.002	*
LIQ	-0.366	-.461	1.192	
PER	0.401	-6.098	5.297	
RIR	.003	-.055	.061	
CAR	.922	-.405	2.25	
EXR	.006	-.022	.034	
Year	-.035	-.1	.03	
Constant	68.258	-60.668	197.184	

Mean dependent var	0.634	SD dependent var	0.475
Overall r-squared	0.746	Number of obs	112.000
Chi-square	295.905	Prob> chi2	0.000
R-squared within	0.089	R-squared between	0.937

*** p<.01, ** p<.05, * p<.1*

Table 7 shows the OLS results of bank risk-taking in the case of the diversification variable an inversely significant correlation is seen between diversification.

Table 8
Results of Z-Score GMM Models

Z-SCORE	Coef.		[95% Conf	Interval]	Sig
Z-SCORE_L1	.648		-.062	1.358	*
MAN	26.459		5.967	46.952	**
SIZE	3.226		-6.369	-.082	**
DIV	-.009		-.086	.068	*
LIQ	-4.455		-6.356	-2.554	***
PER	27.055		-2.077	56.187	*
RIR	.072		-.034	.178	
CAR	.16		-8.476	8.795	
EXR	-.086		-.165	-.007	**
Year	.209	.095	2.19 .047 .003	.416	**

Mean dependent var	0.721	SD dependent var	0.414
Number of obs	73.000	F-test	.

*** *p<.01, ** p<.05, * p<.1*

*** *p<.01, ** p<.05, * p<.1*

Arellano-Bond test for AR (1) in first differences: z = -1.79 Pr> z = 0.073
Arellano-Bond test for AR (2) in first differences: z = 0.54 Pr> z = 0.591
Sargan test of overidentification. Restrictions: chi2 (7) = 7.46 Prob> chi2 = 0.382
Hansen test of overid. Restrictions: chi2 (7) = 1.98 Prob> chi2 = 0.961

Management is positively significant to Z-Score, and size is significant and positively correlated with Z-Score (Konishi & Yasuda, 2004). (Laeven & Levine, 2009). There is an inversely significant relationship visible between diversity and Z-Score. Liquidity is an important factor which needs to be considered as it can inversely affect the Z-Score. The regression result tells that the relationship between personnel expense and Z-Score is positively significant which says presence of PER will adversely affect the dependent variable. RIR of is positive in the relationship(Uhde &Heimeshoff, 2009). CAR of banks positively insignificant to risk and exchange rate is negative but it's significant.

5.   Conclusion and Policy Implications

The basic aim of the study is to determination of insolvency/ default risk and bank performance in Pakistan under monetary policy of interest rate. The ordinary Least Square approach is used to know the effect on bank risk-taking behavior, The administration and managers have more power than shareholders to influence the use of funds to run

government-based banks or spend money on social or public activities for the interest of political concerns.

The size as to keep the fact in control that large banks have opportunities to diversify and tendency when needed to face risk in times of financial crisis. The banks of Pakistan have less total asset size to change the portfolio of risk and have risk aversion strategy. Pakistan being a developing country has a low level of GDP, and the factor hinders the bank to indulge in bank risk taking the practice of making investments at the time of growth of economy with the fear of the adverse impact of facing default risk and getting bankrupt.

The real interest rate at the high rate offered by bank makes a borrower invest with risk in order to reimburse loan payment at a high value. Domestic banks maintain a risky portfolio with more assets in the form of a loan and earn a higher return on assets. The diversification strategy with respect to portfolio mentions the risk a bank takes decreases when income is generated from various less volatile sources, by the achievement of economies of scale to measures banks' performance. The diversified loans offered to industry and different sectors lower the return of bank and make risky loans, for Pakistani bank that adopt risk behavior. The banks of Pakistan get leverage out of hand the bank go for rebalancing by recapitalization policy, the bank that earns profit pay off debt, as firm lose money in result the debt increase.

Pakistan is an emerging economy with GDP growth in a positive direction and boosts credit demand ultimately to bank performance. The real interest rate is positive and significantly correlated to ROE for banks. As the lending rate increase the bank performance improves , as the lending rate increase make a customer deposit to bank as the money is demand for business to overcome the expense, banks in response raise the rate of interest to increase income ultimately the customer in order to cover the extra cost.

In conclusion banks provide purposeful and Powerful board people, betterment in timings, correctness and extent of reporting in bank reports and   to be attentive to interests of minor shareholders. The accounting mode of standards with security in proper methods, laws of corporation, balanced judicial scheme and systematic adjustments in all to ensure the process of well performing banking governance and management of risk for healthy banking sector. Independence of the risk management assembly can perform an important role and also can accelerate role in the deduction of default risk.

References

Acharya, V. V., Hasan, I., & Saunders, A. (2006). Should banks be diversified? Evidence from individual bank loan portfolios. *The Journal of Business, 79*(3), 1355-1412 https://doi.org/10.1086/500679

Acharya, V. V. & Naqvi, H. (2012). The seeds of a crisis: a theory of bank liquidity and risk taking over the business cycle. *Journal of Financial Economics, 106*(2), 349-366. https://doi.org/10.1016/j.jfineco.2012.05.014

Acharya, V. V. & Mora, N. (2015). A crisis of banks as liquidity providers. *The Journal of Finance, 70*(1), 1-43. https://doi.org/10.1111/jofi.12182

Akin, O., Marín, J. M. G., & Peydró, J. (2016). Anticipating the financial crisis: evidence from insider trading in banks. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn. 2779048

Al-Khouri, R., & Arouri, H. (2019). Market power and the role of banks as liquidity providers in GCC markets. *Cogent Economics & Finance, 7*(1), 1639878.

Andersen, T. G., Bollerslev, T., Diebold, F. X., & Vega, C. (2003). Micro effects of macro announcements: real-time price discovery in foreign exchange. *American Economic Review, 93*(1), 38-62. https://doi.org/10.1257/000282803321455151

Boamah, N. A., Boakye-Dankwa, A., & Opoku, E. (2021). Risk-taking behavior, competition, diversification and performance of frontier and emerging economy banks. *Asian Journal of Economics and Banking, 6*(1), 50-68. https://doi.org/10.1108/ajeb-04-2021-0047

Boyd, D. J., Grossman, P. L., Lankford, H., Loeb, S., & Wyckoff, J. (2009). Teacher preparation and student achievement. *Educational evaluation and policy analysis, 31*(4), 416-440.

Clarida, R. H. & Galí, J. (1994). Sources of real exchange-rate fluctuations: how important are nominal shocks?. *Carnegie-Rochester Conference Series on Public Policy, 41*, 1-56. https://doi.org/10.1016/0167-2231(94)00012-3

Dahir, A. M., Mahat, F., & Ali, N. A. (2018). Funding liquidity risk and bank risk-taking in brics countries. *International Journal of Emerging Markets, 13*(1), 231-248. https://doi.org/10.1108/ijoem-03-2017-0086

Fosu, S., Ntim, C. G., Coffie, W., & Murinde, V. (2017). Bank opacity and risk-taking: evidence from analysts' forecasts. *Journal of Financial Stability, 33*, 81-95. https://doi.org/10.1016/j.jfs.2017.10.009

Gertler, M., Kiyotaki, N., & Queraltó, A. (2012). Financial crises, bank risk exposure and government financial policy. *Journal of Monetary Economics, 59*, S17-S34. https://doi.org/10.1016/j.jmoneco.2012.11.007

Gujarati, D. N., & Porter, D. C. (2009). Basic econometrics. McGraw-hill.

Haq, M., & Heaney, R. (2012). Factors determining European bank risk. *Journal of International Financial Markets, Institutions and Money, 22*(4), 696-718.

Hakimi, A. & Zaghdoudi, K. (2017). Liquidity risk and bank performance: an empirical test for tunisian banks. *Business and Economic Research, 7*(1), 46. https://doi.org/10.5296/ber.v7i1.10524

Hatmanu, M., Căutișanu, C., & Ifrim, M. (2020). The impact of interest rate, exchange rate and european business climate on economic growth in romania: an ardl approach with structural breaks. *Sustainability, 12*(7), 2798. https://doi.org/10.3390/su12072798

Havrylchyk, O. (2006). Efficiency of the Polish banking industry: Foreign versus domestic banks. *Journal of banking & finance, 30*(7), 1975-1996.

Kabir, M. J. & Worthington, A. C. (2017). The 'competition–stability/fragility' nexus: a comparative analysis of islamic and conventional banks. *International Review of Financial Analysis, 50*, 111-128. https://doi.org/10.1016/j.irfa.2017.02.006

Konishi, M., & Yasuda, Y. (2004). Factors affecting bank risk taking: Evidence from Japan. *Journal of Banking & Finance, 28*(1), 215-232.

Kumar, V. & Bird, R. (2020). Do profitable banks make a positive contribution to the economy?. *Journal of Risk and Financial Management, 13*(8), 159. https://doi.org/10.3390/jrfm13080159

Laeven, L., & Levine, R. (2009). Bank governance, regulation and risk taking. *Journal of financial economics, 93*(2), 259-275.

Lassoued, N., Sassi, H., & Attia, M. B. R. (2016). The impact of state and foreign ownership on banking risk: Evidence from the MENA countries. *Research in International Business and Finance, 36*, 167-178.

Le, H. N. Q., Nguyen, T. V. H., & Schinckus, C. (2022). The role of strategic interactions in risk-taking behavior: A study from asset growth perspective. *International Review of Financial Analysis, 82*, 102127. https://doi.org/10.1016/j.irfa.2022.102127

McGuire, P. & Peter, G. v. (2012). The dollar shortage in global banking and the international policy response. *International Finance, 15*(2), 155-178. https://doi.org/10.1111/j.1468-2362.2012.01300.x

Próchniak, M. & Wasiak, K. (2016). The impact of the financial system on economic growth in the context of the global crisis: empirical evidence for the eu and oecd countries. *Empirica, 44*(2), 295-337. https://doi.org/10.1007/s10663-016-9323-9

Ramlall, I. (2009). Bank-specific, industry-specific and macroeconomic determinants of profitability in Taiwanese banking system: under panel data estimation. *International Research Journal of Finance and Economics, 34*(2), 1450-2887.

Rolle, J., Javed, B., & Herani, G. M. (2020). Micro and macroeconomic determinants of profitability of conventional banks and stock performance using tobin's q ratio: evidence from the banking sector of Pakistan. *International Journal of Business &Amp; Economic Development, 08*(02). https://doi.org/10.24052/ijbed/v08n02/art-05

Sain, A., & Kashiramka, S. (2023). Profitability–Stability Nexus in Commercial Banks: Evidence from BRICS. *Global Business Review*, 09721509231184765.

Shair, F., Sun, N., Sun, S., Atta, F., & Hussain, M. M. (2019). Impacts of risk and competition on the profitability of banks: empirical evidence from pakistan. *Plos One, 14*(11), e0224378. https://doi.org/10.1371/journal.pone.0224378

Shah, D. M. H. & Khan, S. (2021). Factors affecting commercial banks profitability in Pakistan. *Journal of Business &Amp; Tourism, 3*(1), 1-22. https://doi.org/10.34260/jbt.v3i1.55

Stiroh, K. J., & Rumble, A. (2006). The dark side of diversification: The case of US financial holding companies. *Journal of banking & finance, 30*(8), 2131-2161.

Stiglitz, J. E. (2010). Risk and global economic architecture: Why full financial integration may be undesirable. *American Economic Review, 100*(2), 388-392.

Uhde, A., & Heimeshoff, U. (2009). Consolidation in banking and financial stability in Europe: Empirical evidence. *Journal of Banking & Finance, 33*(7), 1299-1311.

Yao, H., Haris, M., & Tariq, G. (2018). Profitability determinants of financial institutions: evidence from banks in Pakistan. *International Journal of Financial Studies, 6*(2), 53. https://doi.org/10.3390/ijfs6020053

Zheng, C., Perhiar, S. M., Gilal, N. G., & Gilal, F. G. (2019). Loan loss provision and risk-taking behavior of commercial banks in pakistan: a dynamic gmm approach. *Sustainability, 11*(19), 5209. https://doi.org/10.3390/su11195209