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Basel III Effects on Bank Stability: Empirical Evidence from Emerging Countries

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Abstract

This article examines the influence of Basel III reforms, risk management, and banking sector efficiency on banks' financial stability in emerging countries. The data for this study is collected from various sources. Based on the GDP classification of IMF, the top 22 countries were selected as the sample. The sampling frame includes all six regions of the world including 482 banks and 3022 observations in total. The empirical analysis is carried out by estimating the random effects models. It is found that the effects of capital buffer, liquidity, and risk management practices are significant on financial stability. It is also noticed that the capital buffer has a constructive and significant influence on financial stability. However, liquidity management shows a mixed impact, as in some countries, its impact is positive and significant while, in other countries, it is insignificant. Risk management practices have an overall positive influence on financial stability in the case of large economies. However, results are insignificant in the case of small economies. Bank-specific variables, namely profitability, size, and efficiency have a positive whereas, loan quality has a negative impact on financial stability in the emerging countries. GDP has a positive impact on financial stability whereas inflation and unemployment both have a negative effect on financial stability.

Keywords: Capital Buffer, Liquidity, Risk Management, Efficiency, Financial Stability, Basel III

JEL Classification Code: C2, E32, G20, G32, L25

1. Introduction

Financial stability is a fundamental objective for policymakers. The financial stability and development of emerging countries strongly depend on the soundness of the financial institutions. The global financial crisis of 2008–2010 indicated the need to revise the Basel reforms to build a more stable financial system in the future. Financial stress has numerous harmful impacts as it disturbs the GDP growth, growth in investment, credit supply, the discount rate, level of employment, and purchasing power in emerging countries (Klemkosky, 2013). The annual probability of the banking crisis is in the range of 4–5 percent in advanced and emerging counties, and this can lead to economic imbalance globally. During the 2008–2010 financial crisis, the concept of "Too big to fall" also changed, as many well-established financial institutes also got bailout packages e.g., Citigroup and Royal Bank of Scotland (Guidara et al., 2013). The key factors of the international financial crisis include among several others liquidity risk, loan growth, and mispricing of credit.

During 2010, the capital and liquidity standards were presented to G20 countries through the Basel committee of banking supervision also known as Basel III. This model consists of an additional layer of leverage and liquidity ratios, capital buffer, public equity, liquidity coverage ratio, and net stable funding. The main goal of the implementation of the Basel III reforms in the world financial system is to attain financial stability. Capital buffer is used as a tool by financial institutions against financial shocks. The exiting empirical findings have indicated that well-capitalized banks normally can avoid the financial crisis as compared to under-capitalized banks. During a global financial crisis,

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Canadian banks used the capital buffer and all this helped to minimize the risks (Guidara et al., 2013). Financial institutions normally fail due to lesser capital buffer and discrepancy of structural funding. The capital buffer serves as a vital pillar for financial stability in both developed and emerging economies.

Basel III also introduced a novel, liquidity coverage ratio (LCR), net stable funding ratio (NSFR) over and above quantity-based standards. Liquidity risk may decrease the risk of default for financial intermediaries. Liquidity coverage ratio targets short-term solvency, for instance, thirty days period, where the NSFR reports the long-term solvency position which is usually one year. Both liquidity ratios proved to be useful to absorb short-term and long-standing financial shocks in the global financial structure. The liquidity ratio reduces the risk of default for financial institutions. Risk management is a unique factor that contributes to the financial stability of financial institutions. Ghenimi et al. (2017) stated that various risks such as credit, operational, and liquidity have a significant influence on the economic stability of the financial institutes. Several scholars have suggested that liquidity risk, operation risk, besides credit risk mishandling are the main causes of insolvency of financial institutions (Zou & Li, 2014).

The trade-off theory of capital structure describes the relationship between the cost and benefits of debts. Financial institutions act differently due to the key role of regulators as for protecting the shareholders' interest they might alter the regulations from time to time. Similarly, agency problem as explained by the moral hazard theory is present in different risk management methods. Several researchers have tested the moral hazard theory (Ngalawa et al., 2016) and stated that there is a positive and important connection between risk management and bank capital management. Another well-known, namely Capital buffer theory explains the relationship between capital buffer and financial stability. Banks having high capital buffers make efforts to maintain the higher buffer levels. On the other hand, banks with a lower capital buffer can regulate faster. In the financial system, capital buffer management is justified based on the capital buffer theory (Wong et al., 2005). Jiang et al. (2020) stated that banks have two core goals at the same time. One is to keep a higher capital buffer and the second is to earn maximum profit. Therefore, it would be interesting and useful to observe how banks achieve both of these goals.

This study focuses on emerging countries with a comprehensive dataset. The key objective of this study is to unfold the effect of the capital buffer, liquidity, and risk management on the financial stability of the financial institutes of the emerging countries. The random effects models are employed to analyze the unbalanced dataset. The findings of this study are valuable to understanding how financial institutions tradeoff between financial stability and financial growth.

2. Literature Review

2.1. Capital Buffer Impact on Financial Stability

Capital buffer shows an important leading role in the economy besides financial stability of the economic system (Chernykh & Cole, 2015). Basel III demands banks to increase their capital buffer by 2.5% in credit boom (Valencia & Bolanos, 2018). Bui et al. (2017) narrated that growth in bank capital buffer significantly contributes to the financial stability of banks. Maatoug et al. (2019) pointed out capital buffer proved countercyclical for conventional banks.

2.2. Liquidity Impact on Financial Stability

LCR established through Basel III has helped to raise the short-term stability of the economic system. High-quality liquidity assets (HQLA) of banks are also helpful to absorb short-term shocks by the banks for 30 days. Hong et al. (2014) observed a significant positive correlation between Basel III liquidity risk procedures and failure of a bank in the short term while the relationship is negative in the long run. Several researchers have found that both NSFR and LCR contribute positively towards financial stability (King, 2013; Imbierowiez & Rauch, 2014).

2.3. Risk Management Impact on Financial Stability

In the literature, it is suggested that market discipline is positively correlated with financial stability (Akram, 2014). Loan growth and credit cycle are proved to be positively associated with risk-based capital buffer (Hessou & Lai, 2018; Aggarwal & Jacques, 2001).

2.4. Basel III and the Financial Stability

Globally varying impacts of Basel III implementation on financial stability were observed. Several researchers have found that the implementation of Basel III may be costly in the beginning, but it can provide a positive impact on the long-term financial stability of the financial system.

3. Data and Methodology

The data for this study is collected from various sources. Based on the GDP classification of IMF top 22 countries were selected as the sample. The population consists of all the emerging countries. The sampling frame includes all six regions of the world including 482 banks and 3022 observations in total. The division of the total sample of emerging countries into six regions minimizes the chances of difference among the cross country in information and supervisions. The data is collected from the Banker database

for the period 2011–2018. The country-level data is collected from the World Bank database. The particulars about the report of the data are displayed in Appendix A.

The empirical analysis is carried out by estimating the random effects models. In particular, the following models are estimated.

$$Z_{ijt} = \alpha + X_{ijt}\beta + Y_{ijt}\lambda + M_{jt}\gamma + \sum_{k=1}^{6}\delta_k \text{REGION}_k + v_i + YD_t + \epsilon_{ijt}, \quad (1)$$

Where i (= 1, …, n) denotes bank, j implies country, t shows year, Z_{ijt} is Z score which is used a proxy for financial stability, X_{ijt} is the matrix of Basel III determinants, Y_{ijt} consists of bank-specific control variables.

To check the impact of Basel III upon Islamic banks, a dummy taking value one for the Islamic bank and zero elsewhere is used.

$$\begin{aligned} Z_{ijt} = {} & \alpha + \lambda D_i^{ISB} + X_{ijt}\beta + D_i^{ISB} \times X_{ijt}\beta \\ & + Y_{ijt}\lambda + D_i^{ISB} \times Y_{ijt}\lambda + M_{jt}\gamma \\ & + D_i^{ISB} \times M_{jt}\lambda + \sum_{k=1}^{6}\delta_k \text{REGION}_k \\ & + v_i + YD_t + \epsilon_{ijt} \end{aligned} \quad (2)$$

To find out the impact of ownership, the dummy variable (PUBLIC) is included to represent state ownership. This study interrelates PUBLIC dummy variables with other variables as follows.

$$\begin{aligned} Z_{ijt} = {} & \alpha + \lambda D_i^{PUB} + X_{ijt}\beta + D_i^{PUB} \times X_{ijt}\beta \\ & + Y_{ijt}\lambda + D_i^{PUB} \times Y_{ijt}\lambda^{PUB} + M_{jt}\gamma + D_i^{PUB} \\ & \times M_{jt}\gamma^{PUB} + \sum_{k=1}^{6}\delta_k \text{REGION}_k + v_i + YD_t + \epsilon_{ijt} \end{aligned} \quad (3)$$

4. Empirical Results

The empirical results are presented in this section. The section also includes detailed analysis, the correlation between various variables, and the empirical findings as presented below tables.

Table 1 reported the results regarding estimated Equation (1) for Africa and results displayed in Basel III capital buffer, NSFR shows a positive influence on the financial stability. Only two risk management indicators CRWA and MRWA have a positive influence on financial stability. Bank-specific variables efficiency measured through cost to income ratio shows a constructive influence on the financial stability. However, loan quality measured by the nonperforming loan shows a negative outcome on the financial stability. Macroeconomic variables, namely GDP show a positive

Table 1: Impact of Basel III on Financial Stability in Africa & Asia Pacific

	Variables	Africa		Asia Pacific	
		Coefficient	Std. Err.	Coefficient	Std. Err.
Basel III	BUF	15.10**	7.21	4.55**	3.01
	LCR	14.88	11.01	6.22*	3.65
	NSFR	7.36**	3.10	4.65	2.78
Risk Management	CRWA	7.68*	4.13	6.11*	3.13
	MRWA	3.43***	1.05	8.04**	4.01
	ORWA	19.70	13.87	8.56	6.87
Bank specific	Profitability	8.36	6.11	10.36*	5.82
	Size	24.04	18.55	11.04	8.55
	Efficiency	14.60**	6.40	12.68	8.40
	Loan Quality	–2.51***	1.22	–14.38**	9.34
Macroeconomic	GDP	3.01*	1.24	8.10*	5.20
	UR	–7.44*	6.23	–11.39	9.84
	I	2.32**	1.88	–3.29**	1.64
	Constant	0.82	1.40	1.40	1.60

Note: ***, **, and *, indicate that the results are significant at the 1%, 5 % and 10% level respectively.

impact whereas, unemployment and inflation show an undesirable influence on financial stability in the Africa region.

Table 1 also presents the results of equation (1) for the Asia Pacific and estimates showed that the capital buffer and liquidity coverage ratio show a constructive effect on the financial stability of the financial intermediaries. Standard and Poor global market intelligence in 2019 pointed out that 75 large banks are failed to implement the net stable funding ratio in this region. Risk management indicators show that CRWA and MRWA have a positive impact on financial stability. Regarding bank-specific variables only, profitability shows a positive impact whereas loan quality shows a negative influence on financial stability. Macroeconomic variables, namely gross domestic product shows a positive effect on the financial stability where inflation shows an undesirable impact on the financial stability.

Table 2 presents the results of equation (1) for central Asia and results reported a positive impact of capital buffer and LCR upon the financial stability of the financial institutions. MRWA shows a positive impact on financial stability. Regarding bank-specific variables, viz. profitability, size and efficiency have a positive whereas, loan quality has a negative impact on financial stability. The results also show that GDP has a constructive impact on financial stability. Table 2 also elaborates the results regarding Basel III effects in Europe are reported. The capital buffer coefficient is constructive and significant showing a positive effect on financial stability. Similarly, LCR and NSFR are also constructive and significant signaling a positive impact on financial stability. The risk management variables i.e., MRWA and ORWA and bank-related variables also have a positive impact on financial stability. The macroeconomic variable GDP has a positive impact on financial stability whereas inflation, as well as unemployment, have a negative effect on economic stability.

Table 3 presents the results of the impact of Basel III on financial stability in the Middle East. The coefficients capital buffer, NSFR, and LCR indicate that these variables have a significant impact on financial stability. Coefficients for risk management such as MRWA, CRWA, and ORWA are positive and very much significant. Bank-specific variables such as size, profitability, and efficiency have a positive impact on financial stability GDP has a positive impact on financial stability whereas inflation and unemployment have a negative effect on financial stability. Table 3 also presents findings regarding the impact of Basel III on financial stability in South America. The results for buffer are positive and significant. Similarly, findings for LCR and NSFR coefficients are significant. The risk management coefficients i.e., CRWA, MRWA, and ORWA are constructive and significant. The results regarding bank-specific variable show that only size and efficiency have a positive effect

Table 2: Impact of Basel III on Financial Stability in Central Asia & Europe

	Variables	Central Asia		Europe	
		Coefficient	Std. Err.	Coefficient	Std. Err.
Basel III	BUF	3.65***	1.21	6.42**	3.12
	LCR	2.88**	1.55	1.85*	1.10
	NSFR	2.53	2.37	3.71*	2.65
Risk Management	CRWA	2.60	2.09	4.32	4.24
	MRWA	2.89*	1.81	4.43***	1.27
	ORWA	3.39**	1.33	8.84*	6.30
Bank specific	Profitability	2.22**	1.11	6.23	4.17
	Size	2.26***	0.86	5.04***	1.55
	Efficiency	4.80**	2.40	6.21***	2.35
	Loan Quality	–5.66*	3.26	–3.69	3.10
Macroeconomic	GDP	635*	4.11	4.23**	2.21
	UR	–1.59	1.21	–5.80*	4.64
	I	–1.29	1.61	–4.10**	2.01
	Constant	2.69	2.44	1.93	2.14

Note: ***, **, and *, indicate that the results are significant at the 1%, 5 % and 10% level respectively.

Table 3: Impact of Basel III on Financial Stability in the Middle East & South America

	Variables	Middle East		South America	
		Coefficient	Std. Err.	Coefficient	Std. Err.
Basel III	BUF	2.25**	1.19	8.22*	5.26
	LCR	3.49***	1.28	5.34**	3.15
	NSFR	7.31**	3.36	12.55**	4.32
Risk Management	CRWA	5.26***	1.65	7.49*	3.52
	MRWA	7.24***	3.54	7.73**	3.45
	ORWA	7.10**	3.63	8.65***	3.65
Bank specific	Profitability	8.23**	3.11	8.44	6.90
	Size	4.04**	1.73	5.72**	2.65
	Efficiency	6.50**	2.75	9.66***	3.30
	Loan Quality	–7.35**	3.67	8.57	6.21
Macroeconomic	GDP	4.25*	2.11	5.89***	2.01
	UR	–11.31**	4.25	8.57**	3.64
	I	5.52	3.51	8.29	6.64
	Constant	2.03	1.86	2.73	2.65

Note: ***, **, and *, indicate that the results are significant at the 1%, 5 % and 10% level respectively.

on the financial stability. GDP shows positive whereas unemployment indicates a negative effect on financial stability.

Table 4 reported the results of estimated equation (2). To find out the impact of state ownership, a dummy variable public interacts in the regression equation. The buffer, LCR, NSFR coefficients are positive and highly significant. The results for CRWA, MRWA, and ORWA are positive and significant. Results for the Profitability and size coefficients are constructive and non-significant. The outcomes for GDP are beneficial for public sector banks (Pak, 2019). The coefficients both of unemployment and inflation are negative in the case of the public sector. The results indicate that state-owned banks have significant different responses to Basel III, risk management, bank-specific variables, and macroeconomic indicators. These findings have significant implications for investors and policymakers.

The estimates of a regression equation (3) are presented in Table 5. The interaction of the Islamic bank dummy is included as an instruction to find the effect of Basel III in the regression equation for Islamic banks. The coefficients LCR besides NSFR are positive as well as significant. However, the results are nonsignificant in the rest of the cases. The efficiency coefficient is non-significant. Coefficient unemployment along with inflation is negative and nonsignificant in the situation of Islamic banks, while negative and significant around the conventional financial system. The estimated value of the coefficient of the interaction terms provide strong evidence that the effects of Basel III measures, risk management instruments, bank-specific factors, macroeconomic indicators on financial stability are quite different for Islamic and conventional banks. These findings help understand how both types of banks behave differently when they face any shocks.

5. Conclusion

It is concluded in this study that the impact of Basel reforms is different in different regions of the world. A major contributing factor to the financial stability in Africa is profitability, risk management, and operational efficiency while Nonperforming loan has a negative impact on financial stability. Vital determinants of the financial stability in the Asia Pacific are the capital buffer, risk management, and operational efficiency while non-performing loan has an undesirable influence on financial stability. Essential determinants of the financial stability in Central Asia are the capital buffer, risk management, and operational efficiency while non-performing loans and inflation have an undesirable influence on financial stability. The main determinants of financial stability in Europe are the capital buffer,

Table 4: Impact of Ownership on the Financial Stability

	Variables	Coefficient	S. E
Basel III	BUF	8.10***	2.65
	LCR	7.88**	3.87
	NSFR	8.65*	4.65
	BUF × Pub	7.50**	3.65
	LCR × Pub	9.84	6.87
	NSFR × Pub	6.35**	3.11
Risk Management	CRWA	7.68*	3.13
	MRWA	3.43***	1.05
	ORWA	8.50***	3.20
	CRWA × Pub	5.69	3.13
	MRWA × Pub	10.43*	6.24
	ORWA × Pub	9.72	6.39
Bank specific	Profitability	13.36	8.11
	Size	14.04**	5.55
	Efficiency	18.65*	10.20
	Loan Quality	–20.20**	9.87
	Profitability × Pub	8.38	7.21
	Size × Pub	15.04*	8.23
	Efficiency × Pub	21.34	17.43
	Loan Quality × Pub	–16.20*	8.25
Macroeconomic	GDP	17.95***	6.36.
	UR	–16.80*	9.64
	I	–24.21*	11.98
	GDP × Pub	13.97***	5.42
	UR × Pub	–11.83	10.64
	I × Pub	–14.66*	8.23
	Constant	1.45	1.32

Note: ***, **, and *, indicate that the results are significant at the 1%, 5 % and 10% level respectively.

risk management, and operational efficiency while non-performing loans and inflation have an adverse influence on financial stability. Crucial determinants of financial stability in the Middle East are the capital buffer, risk management, and operational efficiency while unemployment and Inflation have a harmful effect on financial stability. Important determinants of the financial stability in South America are the return on assets, bank size, total risk-weighted assets, capital asset ratio, and debt to equity ratio have a constructive influence on financial stability, and unemployment and inflation have an undesirable influence on economic stability. The overall effect of Basel III reforms on the emerging countries is positive toward the financial stability in the global financial system. The results also indicate that the response of the financial stability of state-owned banks and Islamic banks is different to the examined empirical determinants than that of the stability of conventional and private including foreign banks. The findings of the paper are very useful to understand how Basel III measures, risk management instruments, bank-specific, and macroeconomic indicators are related to financial stability across different regions and different types of banks.

Table 5: Islamic Bank and Financial Stability

	Variables	Coefficient	Std. Err.
Basel III	BUF	6.65*	4.22
	LCR	10.15	7.01
	NSFR	6.81*	3.35
	BUF × Isl	7.75***	2.22
	LCR × Isl	8.15**	3.95
	NSFR × Isl	8.81*	4.95
	CRWA	8.32*	4.85
	MRWA	13.43*	7.81
	ORWA	8.84	7.95
Risk Management	CRWA × Isl	10.88*	4.82
	MRWA × Isl	8.43**	4.71
	ORWA × Isl	9.66	6.95
	Profitability	7.23*	3.82
	Size	6.04*	3.23
	Efficiency	7.01	6.40
	Loan Quality	–4.69*	2.26
Bank Specific	Profitability × Isl	5.44**	2.22
	Size × Isl	6.55*	3.23
	Efficiency × Isl	7.01*	4.07
	Loan Quality × Isl	–5.25	3.58
	GDP	6.23**	2.53
	UR	–4.80**	2.33
	I	–6.10*	3.22
Macroeconomic	GDP × Isl	8.55**	4.12
	UR × Isl	–2.50	1.21
	I × Isl	–8.33	7.61
	Constant	2.43	2.59

Note: ***, **, and *, indicate that the results are significant at the 1%, 5 % and 10% level respectively.

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Appendix A: Country Wise Description of Data Covering Various Regions

World Region	Name of countries	Total number of Banks	Total number of Observations
Africa	Nigeria	07	45
	South Africa	09	59
Asia-Pacific	Bangladesh	27	86
	China	82	647
	India	30	198
	Indonesia	20	127
	Malaysia	26	173
	Pakistan	14	67
	Philippines	09	53
	Thailand	16	112
Central Asia	Kazakhstan	14	82
Central and Eastern Europe	Russia	74	389
Middle East	Iran	07	32
	Qatar	05	28
	Saudi Arabia	08	55
South America	Argentina	27	177
	Brazil	50	306
	Chile	16	110
	Colombia	15	108
Europe	Turkey	26	168
Total	20	482	3022