5. COUNTRY RISK AND BANK STABILITY

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Abstract

This paper examines the impact of country risk on bank stability using data for more than 500 banks from 21 developed and 18 emerging countries over the period 2009-2018. As country risk is a multi-faceted concept, we employ three one-dimensional factors from 22 indicators of the ICRG country risk rating system: political risk, economic risk and financial risk. Likewise, we apply the dynamic factor analysis on 25 CAMEL indicators of banking risk to come up with our preferred measures of bank stability. And then, we construct a multilevel quantile regression model to estimate the effect of country risk on bank stability. Our main findings are as follows. First, political risk, economic risk and financial risk as well as country risk have a negative and significant effect on bank stability. Moreover, the effect seems to be stronger among high-instability banks. Second, the financial liberalization, bank concentration, size of bank, and dispersed ownership do not have a uniform impact on bank stability across quantiles although they are the factors significantly decreasing the stability of banks which are highly unstable. Third, the impact of country risk on bank stability is more pronounced in the emerging countries as compared to the developed countries. Overall, country risk will remain crucially important for explaining the variation in bank stability, especially in the emerging countries.

Keywords: political risk, economic risk, financial risk, bank stability, quantile regression

JEL Classification: G18, G21, G28

1. Introduction

Since the global financial crisis of 2007-2008 and the subsequent European sovereign debt crisis of 2009 highlighted the importance of adequate bank regulation and supervision, numerous studies have examined the impact of bank regulation and supervision on bank stability (Demirgüc-Kunt and Detragiache, 2011; Hakenes and Schnabel, 2011; Klomp and De Haan, 2012; Barakt and Hussainey, 2013; Delis, 2015; Mohsni and Otchere, 2018; Danisman and Demirel, 2019; Shaddady and Moore, 2019). For example, Barakat and Hussainey (2013) and Delis (2015) emphasize the need to strengthen financial supervision to promote financial stability and the importance of establishing a stable buffer to deal with

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any financial distress. Shaddady and Moore (2019) find that strengthening capital supervision is positively correlated with bank stability. On the other hand, some researchers believe that stricter regulation and supervision may cause the instability of the financial system, such as Hakenes and Schnabel (2011) state that heavy supervision may hinder the ability of banks to provide financial resources to the economic sector, and Danisman and Demirel (2019) show that higher regulatory powers and greater restrictions on activities increase bank risks. Additionally, Klomp and De Haan (2012) report that bank regulation and supervision have only an effect on higher risk banks. Demirgüc-Kunt and Detragiache (2011) find that there is not even any significant positive impact of regulation and supervision on bank soundness. As these results indicate, the effect of financial regulation and supervision on bank stability remains ambiguous although both the global financial crisis and the sovereign debt crisis have emphasized the need to properly assess the measures of bank soundness (Chiaramonte *et al*., 2015). Therefore, what other factors should be measured for bank stability besides financial regulation and supervision? Which elements are most important to ensure the soundness of bank? The study of the critical determinants of bank stability triggers the interest of scholars and significantly contributes to the banking literature.

A number of recent studies examine the impact of political, economic or financial conditions on banks' performance (Boussemart *et al*., 2019), profitability (Athari, 2021), credit (Demir and Danisman, 2021), risk (Wu *et al*., 2020; Wu *et al*., 2021), and stability (Al-Shboul *et al*., 2020). Among these existing studies, in particular, Al-Shboul *et al*. (2020) show that political risk is negatively correlated with bank stability, which generally supports the financial vulnerability hypothesis. Wu *et al*. (2020) find that there is a negative and significant effect of economic uncertainty on bank stability. Wu *et al*. (2021) also find that higher economic uncertainty is associated with a higher level of risk-taking by banks; however, higher financial uncertainty is associated with a lower level of risk-taking by banks.Consequently, the political, economic or financial factors play a significant role in explaining bank stability. Nevertheless, studies that simultaneously consider political, economic and financial risk factors as well as country risk to examine the direct link between country risk and bank stability, are limited.

However, does country risk affect bank stability? The answer to this question is unclear as well. Banks are well recognized as key economic agents, and the banking sector as a financial intermediary is a critical sector for the activities of each economy (Athari, 2021). Further, countries' economic dependence on the banking sector varies drastically (Singh *et al*., 2015). There is a relationship of mutual erosion and infection between banking sector risk and sovereign debt risk (Fatma and Suzan, 2010). More specifically, sovereign debt risk may exacerbate the banking sector systemic risk, and banking risks will expand sovereign debt risk, creating a vicious cycle of risk transfer between banks and their governments. Based on these economic backgrounds, the existing literature focuses on one or two measures as related to country risk, such as economic uncertainty (Wu *et al*., 2020), economic uncertainty or financial uncertainty (Caldara *et al*., 2016; Popp and Zhang, 2016; Wu *et al*., 2021), or political risk (Al-Shboul *et al*., 2020) to examine the determinants of bank stability; however, the relationship between country risk and bank stability remains unexplored. Therefore, this study aims to fill the gap and attempts to provide some insights into the related literature by exploring whether country risk has a significant impact on bank stability typically considering three widely used measures, namely political risk, economic risk, and financial risk that they can take account of disparate country risk and are jointly investigated in the banking literature.

This paper examines the impact of country risk on bank stability using quantile regressions (QR). To construct the variables of the QR analysis, this study employs factor analysis on 25 CAMEL indicators of bank stability to identify factors that are more useful in explaining the variance, and produces three one-dimensional factors from 22 indicators of the ICRG country risk rating system, because bank stability and country risk are multi-faceted concepts. Prominently, this paper contributes to the literature in several ways. First, as far as we know, this paper is the first attempt to use the QR models to test the impact of country risk on bank stability. Significantly, it is a proper and plausible approach, as different results are found at different levels of bank stability. Second, the existing literature focuses on one or two measures as related to country risk, such as economic uncertainty, economic uncertainty or financial uncertainty to examine the factors of bank stability; however, this paper considers three jointly used measures, namely: political risk, economic risk, and financial risk as well as country risk to widely test the effect of country risk on bank stability. Finally, we investigate whether the impact of country risk on bank stability shows a difference between the developed countries and the emerging countries. It contributes to the debate about whether or not bank stability in the emerging economies is relatively sensitive to the impact of country risk.

Our empirical results can be summarized as follows. First, we find that country risk is negatively associated with bank stability, implying that increased country risk tends to reduce the stability of banks. This effect is more significant among banks at a higher level of instability. Second, our findings show that financial liberalization, bank concentration, size of bank, and dispersed ownership are the factors that significantly increase the bank instability (risk), but they do not have a uniform impact on all banks with various levels of stability. Third, by separating banks into two subsamples based on the degree of country development, our results show that the effect of country risk on bank stability is more pronounced in the emerging countries. Conclusively, our results verify a strong link between country risk and bank stability, suggesting that country risk can be one of the critical determinants explaining the variation in bank soundness.

2. Literature Review

What is country risk and what should it include? According to various scholars (Simpson, 2002) country risk is the inability (economic and financial conditions) or unwillingness (human behavior) of a country to service its external debt. These arguments are consistent with the description of country risk of Simpson (2007). He argues that when viewed as a total risk concept, country risk has an economic and financial component based on historical balance of payment data, as well as a human component that is also affected by social and cultural factors. Erb *et al.* (1996) explore the information of five different measures of country risk including political risk, economic risk, financial risk, composite risk indices, and country credit ratings.[3] Their results show that the measures of country risk are associated with future stock returns. However, financial risk measures are more informative. In addition, Harvey (2004) investigates the importance of political risk, economic risk and financial risk in investment portfolio and decision-making, suggesting that country risk measures are related to future equity in the emerging markets only. In sum, studies that construct

[3] *The first four measures are from Political Risk Services' International Country Risk Guide (ICRG) while the last measure comes from the S&P and Moody's credit rating agencies.*

measures of country risk at minimum must consider the political risk, economic risk, and financial risk.

Accessing political risk, economic risk, or financial risk is difficult, although the variations of events are easily to identify (Shaddady and Moore, 2019). In the financial literature, some terminologies are used for referring to political risk, economic risk, or financial risk. For example, economic instability, economic uncertainty, economic condition, are among the terminologies used (*i.e*., same as the terminologies of political risk and financial risk used). Following the existing literature (Erb *et al.*, 1996; Harvey, 2004; Bekaert *et al*.; 2016; Belkhir *et al*., 2019), we rely on the International Country Risk Guide (ICRG) political risk, economic risk, and financial risk indexes, which offers a multi-dimensional country risk rating framework to conduct subjective assessments of the economic, political, and financial stability of countries (Belkhir *et al*., 2019).

The empirical literature has been extended to consider a wider range of factors that may affect bank stability. These factors include: regulations and supervision (Demirgüc-Kunt and Detragiache, 2011; Klomp and De Haan, 2012; Singh *et al*., 2015; Mohsni and Otchere, 2018; Shaddady and Moore, 2019); competition (Berger *et al*., 2009); legal rights (Clark *et al*., 2018); political institutions (Wang and Sui, 2019); and monetary and fiscal policies (Borio and Zhu, 2012). However, more recent studies examine the impact of political, economic and financial conditions on the banking stability. For example, Al-Shboul *et al.* (2020) find that political risk is negatively correlated with bank stability, and generally supports the assumption of financial fragility. Belkhir *et al.* (2019) examine the relationship between political risks and the volatility of Islamic and traditional banks' assets, suggesting that traditional banks are more exposed to political risks than Islamic banks. Thus, empirical evidence on the effect of political risk on bank stability in the context of the developed and emerging countries, as well as elsewhere, is still an open research issue.

Moreover, several previous empirical studies document significant evidence of the effect of economic uncertainty or financial uncertainty on the bank risk. For example, Wu *et al.* (2020) find that there is a negative and significant relationship between economic uncertainty and bank risk. Additionally, Wu *et al.* (2021) show that higher economic uncertainty is associated with higher risk-taking by banks; however, higher financial uncertainty is associated with lower risk-taking by banks. There are different effects on bank risk-taking between economic uncertainty and financial uncertainty (Wu *et al*., 2021). Caldara *et al.* (2016) and Popp and Zhang (2016) report that higher financial uncertainty leads to tighter credit conditions and less bank lending, implying that financial uncertainty is significantly negative to bank risk-taking. However, Danielsson *et al.* (2018) argue that banks may have an incentive to increase risk-taking in good time that therefore leads to a banking crisis, such as the presence of lower levels of risk volatility may encourage banks to take higher risk-taking and credit booms sequentially. Given the above lines of evidence and argument, *ceteris paribus*, economic uncertainty is positively associated with bank risk, while empirical evidence on the effect of financial uncertainty on bank risk remains ambiguous. According to the relevant literature, we therefore hypothesize that country risk including political risk, economic risk, and financial risk is negatively associated with the stability of banks.

Besides examining the impact of political risk, economic risk, and financial risk on bank stability, this paper also employs various combinations of these country, banking industry and bank-specific variables in alternative specifications as control variables that are suggested by previous studies. First, we control for country-specific variables: economic development and financial liberalization. Jokipii and Monnin (2013) and Chen *et al.* (2017) find that the stability of banks is affected by economic development. GDP per capita growth

is used to control for differences in economic development. Improper implementation of financial liberalization may trigger a banking crisis, because financial institutions have more opportunities to take risks in open financial markets (Abiad *et al.,* 2008). We also include a measure to capture financial liberalization. Second, we control for industry-specific variables: banking supervision and bank concentration. Higher banking supervision can increase stability by improving market discipline and reducing risk-taking motivation and moral hazard (Anginer *et al.*, 2014). Competitive vulnerability hypothesis suggests that higher bank competition (lower concentration of the banking system) will lead to higher risk of banking system (Allen *et al.*, 2011). Finally, we control for bank-specific variables: size of bank, dispersed ownership and government ownership. Larger banks have more opportunities to diversify their income sources and tend to be more stable (Boyd and Runkle,1993). Moreover, Shehzad *et al.* (2010) argue that loan quality and bank capitalization is significantly affected by ownership concentration. We control for bank's ownership status by employing two dummy variables, dispersed ownership and government ownership, to capture whether ownership status affects the stability of banks.

3. Data and Methodology

3.1 Data and Sample Selection

For several existing reasons, we apply factor analysis to the CAMEL indicators of banking risk to propose our preferred measures of bank stability, while most of previous studies focused on one risk indicator (*e.g.*, Chiaramonte *et al.*, 2015; Shaddady and Moore, 2019; Wang and Sui, 2019; Al-Shboul *et al.*, 2020; Wu *et al.*, 2020; Wu *et al.*, 2021). Firstly, previous studies usually employed a one-dimensional risk indicator to examine bank behavior, such as the Z-score, non-performing loans, credit ratings or capital ratios (Chiaramonte *et al.*, 2015; Shaddady and Moore, 2019). However, it is questionable whether these indicators fully reflect the risk of the banking sector (Klomp and De Haan, 2012) because most indicators based on balance sheet data have certain measurement errors, for example, different calculation methods for no- and off-balance problems (Zhao *et al.*, 2009). Therefore, researchers suspect about the ability of these indicators to capture banking risk (Shaddady and Moore, 2019). Secondly, although Chiaramonte *et al.* (2015) find that the Z-score is a valuable and concise measure for predicting bank distress, it is generally believed in the empirical literature that the CAMEL indicator is a multi-dimensional risk indicator, which can be used to assess the financial fragility of banks and predict their distress (Klomp and De Haan, 2012; Shaddady and Moore, 2019). Thirdly, there is no clear consensus in the literature on how to accurately combine various CAMEL indicators. Generally, bank supervisors and managers often use combinations of these indicators to assess the soundness of banks (Al-Shboul *et al.*, 2020). For these reasons, we finally adopt proxies of bank stability: capital adequacy, asset quality, earnings and profitability, and liquidity, retrieving 25 CAMEL indicators from the Bankscope database.

Only commercial banks are selected in our sample, in order to avoid the potential problems of sample selection bias (Bhattacharya, 2003)[4] and to minimize possible bias because of differences in the nature and business scope among banks (Wu *et al.*, 2020). We collect the data used to measure the stability and characteristic of banks from the Bankscope database,

[4] *Bhattacharya (2003) examines the quality of the Bankscope database and strong evidence of selectivity bias is found in Bankscope data for India, showing that the Bankscope database almost completely excludes regional rural banks and foreign banks in India.*

and then construct the need variables with our own calculations. Because some banks lack the necessary data in Bankscope, and because there is a trade-off between as many variables and banks as possible, on the one hand, and the availability of all data, on the other, the banks in our sample are selected based on data availability. Specifically, we follow Klomp and De Haan (2012) and only include commercial banks for which we have more than 75% of stability indicator data, which are considered sufficient to measure bank stability.[5] After excluding the banks for which we cannot calculate the CAMEL indicators in the sample, the final sample includes 594 commercial banks from 21 developed countries and 18 emerging countries over the period 2009 to 2018. Table A1 in Appendix A reports the distribution of banks across countries. There are 195 developed country banks and 399 emerging market country banks in the subsamples of developed countries and emerging countries, for a total of 594 banks.

We split the 25 CAMEL indicators into several categories according to IMF (2000). There are five categories that consist of bank stability variables related to capital adequacy, asset quality, managerial qualities, profitability of a bank, and liquidity and leverage. More specifically, we follow Klomp and De Haan (2012) to apply Dynamic Factor Analysis (DFA)[6] on these 25 indicators. By the DFA, the observed variables are modeled as a linear combination of factors plus an error term. Then, the eigenvalue of a given factor measures the variance in all variables that is explained by that particular factor. If the eigenvalue of a factor is very low, it may be ignored because other factors are more important in explaining variance. We therefore only use factors with eigenvalues above unit in the QR model to estimate the effect of country risk on bank stability.

Furthermore, in this paper we consider country risk as the main determinant of bank stability. There are many services for measuring country risk, which includes Moody's, Standard and Poors, Fitch, Euromoney, Institutional Investor and Political Risk Services's ICRG. We choose the ICRG political risk, economic risk, and financial risk as our primary variables for country risk not only because they are widely adopted in the literature (*e.g.*, Erb *et al.*, 1996; Bekaert *et al.*, 2016; Belkhir *et al.*, 2019; Al-Shboul *et al.*, 2020; Athari, 2021). Harvey (2004) and Al-Shboul *et al.* (2020) show that the ICRG is the only one that prepares the monthly indexes of political, economic and financial risk for 140 countries in the world for which we can simply average the annual scores for our empirical analysis. Specifically, a total of 22 risk indicators, including 12 political, five economic and five financial factors are used. The first index measures political risk based on twelve risk components covering political and social attributes. Political risk ranges from 0 to 100, where a higher value indicates a lower level of political risk or higher political stability, and vice versa. The second index measures the economic risk based on five risk components that indicate the degree of soundness or weakness of an economy. The third index measures a country's financial stability based on five risk components that reflect a country's debt financing capacity. The specified allowable range of economic risk and financial risk is from 0 to 50, where a higher value indicates lower risk or higher stability, and vice versa. Therefore, we extract historical information on the political risk, economic risk and financial risk of each country in our sample from the ICRG

[5] *Similarly, for some banks in our sample, some indicators are not available in all years. We therefore follow Klomp and De Haan (2012) to use the 75% cut-off point as a reasonable compromise, and delete banks for which we cannot calculate the CAMEL indicator from the sample.*

[6] *For a detailed description of the dynamic factor analysis method, please refer to Stock and Watson (2002).*

database as proxies of country risk. The specific factors considered for each risk index are detailed in Appendix A, Table A2.

3.2 Empirical Model

The study employs the CAMEL indicators for constructing a dependent variable, *i.e.*, bank stability. The constructed bank stability is then regressed on country risk and other determinants to investigate the multi-faceted effects on financial stability. A multilevel QR model is applied for estimation.

Since our sample includes a large number of banks from different countries, it is not clear whether the relationship between country risk and bank stability is homogeneous among banks. To solve this problem, we used the QR introduced by Koenker and Bassett (1978), which allows us to model the quantile of the dependent variable conditioned on the linear function of the independent variable; the quantiles are decided based on the stability of banks. The general univariate linear QR model can be written as:

$$y_i = x_i' \beta_\theta + u_{\theta i}, \quad i = 1,..., n \tag{1}$$

where: n is the sample size, β_θ is an unknown k x 1 vector of regression parameters associated with the θth percentile, x_i is the vector of independent variables (country risk and control variables), y_i is the dependent variable of bank stability and $u_{\theta i}$ is a random error term. The θth conditional quantile function of y_i given x_i can be formally expressed as:

$$Q_\theta(y_i \mid x_i') = x_i' \beta_\theta \tag{2}$$

following the necessary assumption of the error term, $u_{\theta i}$, $Q_\theta(u_{\theta i} \mid x_i) = 0$, *i.e.*, the conditional θth quantile of the error term is equal to zero. By estimating the partial derivatives of the conditional quantile function with respect to the set of independent variables, the QR method allows marginal effects to vary at different points in the conditional distribution,

$$\frac{\partial Q_\theta(y_i|x_i)}{\partial x} = \beta_\theta \tag{3}$$

using different θ values, this approach allows parameter heterogeneity. For a sample of size n and a given θ in the interval (0, 1), the parameter vector β_θ can be estimated by minimizing the weighted absolute deviations between y and x:

$$\hat{\beta}_\theta \arg\min_\beta \frac{1}{n} \sum_{i=1}^n \rho_\theta (y_i - x_i'\beta) \hat{\beta}_\theta \tag{4}$$

where the check function ρ_θ (.) is defined as,

$$\rho_\theta(u_{\theta i}) = \begin{cases} \theta u_{\theta i}, & u_{\theta i} \geq 0 \\ (\theta - 1) u_{\theta i}, & u_{\theta i} < 0 \end{cases} \tag{5}$$

Then, given the θth quantile ($0 < \theta < 1$), the parameter estimates of the QR model are obtained by solving the following minimization problem.

$$\begin{aligned} &\min_{\beta \in R^k} \sum_{i: y_i \geq x_i'\beta} \theta |y_i - x_i'\beta_\theta| + \sum_{i: y_i < x_i'\beta} (1-\theta) |y_i - x_i'\beta_\theta| \\ &= \min_{\beta \in R^k} \sum_{i=1}^n \rho_\theta (y_i - x_i'\beta_\theta) = \min_{\beta \in R^k} \sum_{i=1}^n \rho_\theta(\lambda) \end{aligned} \tag{6}$$

where: $\rho_\theta(\lambda)$ is the *check function*. It is defined as, when $\lambda \geqq 0$, the weight is θ, $\rho_\theta(\lambda) = \theta\lambda$; when $\lambda < 0$, the weight is $(\theta\text{-}1)$, $\rho_\theta(\lambda) = (\theta\text{-}1)\lambda$. The regression result, which is estimated by different values of θ (*i.e.*, the θ*th* quantile), means that the effect of each independent variable on y is obtained from the distribution of the dependent variable at the different value of θ.

Estimating a whole set of quantile functions can provide more description of the heterogeneous relation between country risk and bank stability. Undoubtedly, the QR methods are valuable tools for capturing heterogeneity under weak distributional assumptions (Koenker and Basset, 1978). By considering the heterogeneity of parameters, the QR method is suitable for exploring how country risk is related to our proxies for bank stability at different locations of the bank stability distribution. Therefore, by referring to Eq. (2) - (6), the baseline QR model is presented as below:

$$Q_{\theta ijt}\left(BS_{kijt}\middle|CR_{jt}\right) = \alpha_{\theta ijt} + \beta_\theta CR_{jt-1} + \gamma_{\theta p} CTRL_{pijt-1} + \eta_t + \varepsilon_{i,t} + \varepsilon_{j,t} \quad (7)$$

where: the dependent variable, BS_{kijt}, is the bank stability indicator of type k (picked up from the CAMEL) for bank i in country j at time t. CR_{jt} is a vector containing the measures of lagged country risk (including political, economic, and financial risk), where $CTRL_{pijt}$ is a vector of lagged control variables containing p elements. In order to alleviate the endogenous problem, we used one-year lagged observations for our country risk and control variables. The parameter η_t is used to capture time fixed effects. There are two error terms measured on bank level i and country level j, respectively. α, β and γ are the coefficients to be estimated. The regression is estimated for θ-quantiles, where θ is the 0.05th, 0.10th, 0.25th, 0.50th, 0.75th, 0.90th and 0.95th quantile. In addition, the bootstrap method, introduced by Efron (1979), is the most common method of estimating the covariance matrix of the QR parameter vector. The bootstrap is a resampling process designed to emulate repeated random sampling from the basic population, which allows to simulate the probability distribution of the needed statistics without making unreasonable assumptions (Hahn, 1995). Thus, we apply 1000 bootstrap replications to constitute a valid estimator of the covariance matrix of the original estimator in this paper.

To summarize, the dependent variable is the bank stability as measured by 25 CAMEL indicators. In addition, there are two types of independent variables, including the country risk and control variables. As country risk is a multi-faceted concept, we derive annual scores from the monthly index of the ICRG database, which produces three one-dimensional factors from 22 indicators of country risk: political risk, economic risk and financial risk indexes. The control variables include economic development, financial liberalization, banking supervision, bank concentration, average bank size, dispersed ownership, and government ownership. We provide an overview of all variables, their definition and descriptive statistics in Table A3 of Appendix A. The descriptive statistics in Table A3 show that the three measures of bank stability vary across banks, and highlight the importance of timely estimating the potential impact of country risk on bank stability.

4. Empirical Results

4.1 Factor Analysis: Bank Stability

The CAMEL indicators are multi-dimensional risk indicators that can be used to assess the financial fragility of banks (Klomp and De Haan, 2012). We employ DFA on 25 CAMEL indicators to propose our preferred variables of bank stability. An important step is to

determine the number of factors that apply to represent bank stability.Following Klomp and De Haan (2012), the Kaiser criterion suggests that all factors with eigenvalues below unit should be dropped. In addition, the Cattell scree test that is a graphical method is used to plot the eigenvalues on the vertical axis and the factors on the horizontal axis. According to the scree plot banking risk factors (see Figure 1), banking risk can be represented as a four dimensional construct with eigenvalues above unit. We therefore decide to adopt the four factors of banking risk to propose the proxies of bank stability.

Figure 1

Scree Plot Banking Risk Factors

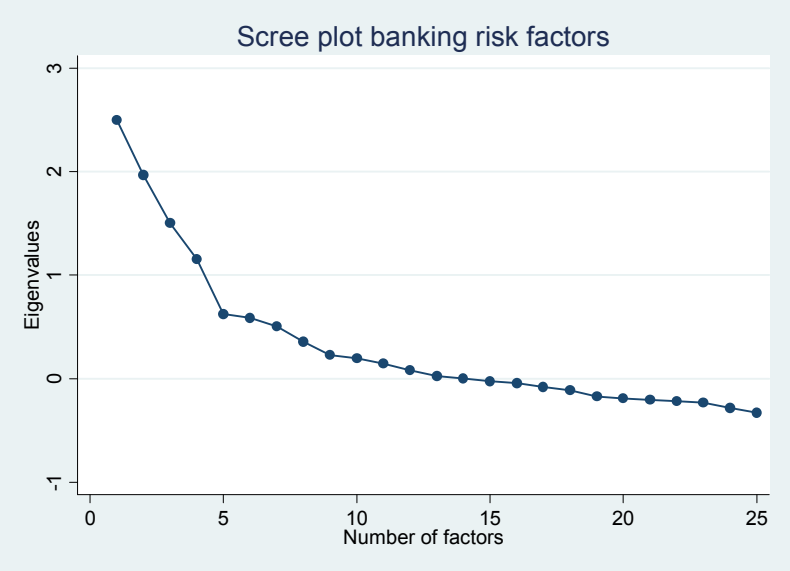


Table 1 shows the banking risk determined by dynamic factor analysis. The selected lag lengths are shown in column (1). Columns (2), (3), (4) and (5) show the factor loadings on factor 1, factor 2, factor 3 and factor 4, respectively. About 75% of the variance is explained by the three factor (column 6), while about 25% of the total variance is unique, *i.e.*, unexplained. Since all factor loadings of variables on capital adequacy, asset quality, and earnings and profitability are above 0.4,[7] we call these two factors "capital and asset risk" and "earnings and profitability risk". In addition, the variables on liquidity are only the factor loadings of the fixed asset ratio below 0.4 (*i.e.,* 0.336), while the factor loadings of the other variables are higher than 0.4. We thus term this factor "liquidity risk". Variables related to managerial qualities and market risk management have only a handful of factor loadings that are higher than 0.4. Therefore, the factor analysis suggests that three factors capture

[7] *It is generally believed that factor loadings above 0.4 have already complied with the moderate requirements.*

most of the variance of the various indicators of banking risk, which we label "capital and asset risk", "earnings and profitability risk" and "liquidity risk", respectively.

Table 1

Banking Risk: Dynamic Factor Analysis

Factor loadings / Banking risk	(1) Lags	(2) Factor 1 Capital and asset risk	(3) Factor 2 Earnings and profitability risk	(4) Factor 3 Liquidity risk	(5) Factor 4 Market risk management	(6) Variance explained
Capital adequacy						
Total equity/total assets	1	-**0.521**	-**0.548**	-0.162	-0.146	0.62
Total capital ratio	1	-**0.503**	-**0.469**	-0.142	-0.050	0.73
Asset quality						
Loan loss provision/total loans	-1	-**0.589**	-0.312	-0.291	-0.098	0.67
Nonperforming loans/total loans	-1	**0.803**	0.125	0.037	0.014	0.41
Unreserved impaired loans/equity	-1	**0.494**	0.010	0.141	0.140	0.73
Impaired loans/equity	0	-**0.518**	-**0.453**	-**0.632**	-0.046	0.59
Managerial qualities						
Total cost/total income	-1	-**0.417**	-0.366	-0.172	-0.024	0.64
Overhead cost/total assets	-1	0.239	0.087	0.257	0.036	0.24
Non-interest income/total assets	-1	0.356	0.173	0.209	0.158	0.57
Profit/number of employees	0	0.363	**0.533**	0.173	0.209	0.63
Earnings and profitability						
Return on equity	0	-0.398	-**0.792**	-0.090	-0.096	0.38
Return on assets	0	-0.156	-**0.624**	-0.205	-0.003	0.68
Log (Bank Z-score)	0	-0.033	-**0.482**	-0.168	-0.042	0.75
Liquidity						
Liquid assets/total assets	0	-0.129	-0.184	-**0.501**	-0.102	0.68
Total loans/deposits	0	0.035	0.079	**0.709**	**0.447**	0.75
Fixed assets/total assets	0	0.046	0.235	0.336	0.179	0.68
Subordinated debt/equity	0	0.037	0.127	**0.468**	0.194	0.49
Liquid assets/customers and short-term funds	0	0.148	0.264	**0.467**	**0.487**	0.74
Due to central bank/total equity	1	0.008	0.006	**0.463**	0.010	0.47
Due to commercial banks/total equity	1	0.384	0.373	**0.749**	0.093	0.77
Market risk management						
Total interest expenses/total deposits	0	0.162	0.303	0.128	**0.497**	0.15
Off balance items/total assets	0	0.047	0.106	0.017	0.203	0.14
Government deposits/total deposits	0	-0.142	-0.354	-0.104	-**0.486**	0.81
Government securities/total assets	0	-0.039	-0.163	-0.133	-0.205	0.48
Stock return variability	-1	0.080	0.049	0.025	0.136	0.35

4.2 Main Results

The baseline empirical results of the impact of country risk on bank stability are presented in Table 2 using QR. In this study we consider regression estimates across seven different θ-quantiles of bank stability (capital and asset risk, earnings and profitability risk and liquidity risk), where θ is the 0.05th, 0.10th, 0.25th, 0.5th, 0.75th, 0.9th and 0.95th quantile. In Panel A of Table 2, we first examine the impact of country risk on capital and asset risk. We find that the estimated coefficients on political risk and economic risk in all regressions are negative and statistically significant, suggesting that a negative association between political risk (economic risk) and our indicators of bank stability. As a lower value indicates a higher degree of political risk (economic risk) or lower political stability (economic stability) and also a higher value of capital and asset risk implies a higher level of bank risk or a lower level of bank stability, the negative coefficient estimates are interpreted as a decrease in bank stability, or alternatively speaking, an increase in bank risk with the elevation of political risk (economic risk). Moreover, the effects on bank stability that is proxied by capital and asset risk, are much larger at higher quantiles. For example, a 1% increase in political risk (a lower value of political risk index) is associated with 0.014% decreases in bank stability (a higher value of capital and asset risk) in the 0.05th quantile. However, an increase of 1% in political risk reduces the bank stability by 0.061% in the 0.95th quantile, which is about 4.36 times more than the 0.05th quantile. Particularly, the financial risk only significantly reduces bank stability among banks at a higher level of instability, since the coefficients are insignificant for the 0.05th, 0.10th and 0.25th quantiles, respectively. In addition, Figure 2 shows the distribution of country risk. The distribution of impact in Figure 2 shows a downward movement and indicates a sharp decrease at the 0.95th quantile.

Nevertheless, in Panels B and C, the results show that the estimated coefficients on political risk and economic risk in all regressions are still negative and statistically significant; however, the financial risk does not have a uniform impact on bank stability. The financial risk only significantly increases earnings and profitability risk, and liquidity risk among banks at a higher level of instability, it does not have much effect on high-stability banks. Specifically, in terms of the concept of risk decomposition, political and economic risks have a greater impact on bank stability than that of financial risk. In sum, the results of Table 2 indicate that country risks including political risk, economic risk, and financial risk are adversely associated with bank stability, implying that country risk may increase the riskiness of banks, thus impeding their stability. Moreover, the effect of country risk on bank stability seems to be stronger among high-instability banks, as we find that the largest coefficient is found at the 0.95th quantile.

Consequently, our findings are consistent with the evidence of previous studies. For example, Al-Shboul *et al.* (2020) show that an increase in the level of political risk tends to reduce bank stability in the MENA region, explaining that in the context of the banking sector, political risk affects bank stability via government uncertainties and higher information asymmetries (Al-Shboul *et al*., 2020), government corruption (Chen *et al*., 2015) and political connections (Cheng *et al*., 2021). In addition, Wu *et al*. (2020) find that bank stability reduces as the level of economic uncertainty increases, and Wu *et al.* (2021) show that the risk-taking of bank tends to vary heterogeneously with increased economic uncertainty and financial uncertainty, suggesting that the impact of financial uncertainty on bank stability could be different from that of economic uncertainty.

To summarize, we find consistent evidence for a negative association between country risk and our indicators of bank stability, which implies that bank stability tends to decrease with

elevated country risk. More specifically, political risk, economic risk and financial risk as well as country risk exert their impacts mainly by affecting banks' capital adequacy and asset quality, earnings and profitability, and liquidity, and then the effect shifts to affect bank stability. Therefore, our results shed some light on the necessity to distinguish the components of country risk when predicting the variation of bank stability, and on how country risk is translated into bank risk as well as affecting bank stability.

Table 2

The Impact of Country Risk on Bank Stability—Quantile Regression

Panel A: Capital adequacy and asset quality

Variables	Capital and asset risk						
	0.05	0.10	0.25	0.50	0.75	0.90	0.95
Intercept	0.482*** (0.110)	0.941*** (0.136)	2.463*** (0.136)	4.578*** (0.161)	6.901*** (0.266)	9.360*** (0.345)	11.791*** (0.650)
Political risk	-0.014*** (0.001)	-0.016*** (0.001)	-0.022*** (0.001)	-0.028*** (0.002)	-0.038*** (0.002)	-0.046*** (0.003)	-0.061*** (0.006)
Economic risk	-0.008*** (0.003)	-0.016*** (0.003)	-0.034*** (0.004)	-0.063*** (0.004)	-0.084*** (0.007)	-0.085*** (0.009)	-0.096*** (0.017)
Financial risk	-0.001 (0.002)	-0.003 (0.003)	-0.005 (0.003)	-0.008** (0.003)	-0.012** (0.005)	-0.042*** (0.007)	-0.053*** (0.013)
Number of banks	594	594	594	594	594	594	594
No. of observations	6576	6576	6576	6576	6576	6576	6576
Pseudo R^2	0.095	0.115	0.138	0.149	0.160	0.177	0.182

Panel B: Earnings and profitability

Variables	Earnings and profitability risk						
	0.05	0.10	0.25	0.50	0.75	0.90	0.95
Intercept	0.365*** (0.125)	0.419*** (0.136)	2.037*** (0.158)	3.573*** (0.157)	4.936*** (0.195)	6.345*** (0.327)	7.428*** (0.465)
Political risk	-0.003** (0.001)	-0.009*** (0.001)	-0.021*** (0.001)	-0.028*** (0.001)	-0.030*** (0.002)	-0.032*** (0.003)	-0.032*** (0.04)
Economic risk	-0.008** (0.003)	-0.012*** (0.004)	-0.016*** (0.004)	-0.017*** (0.004)	-0.024*** (0.005)	-0.026*** (0.008)	-0.034*** (0.011)
Financial risk	-0.001 (0.002)	-0.002 (0.003)	-0.009*** (0.003)	-0.024*** (0.003)	-0.039*** (0.004)	-0.056*** (0.006)	-0.066*** (0.009)
Number of banks	594	594	594	594	594	594	594
No. of observations	6576	6576	6576	6576	6576	6576	6576
Pseudo R^2	0.037	0.068	0.123	0.128	0.152	0.168	0.179

Panel C: Liquidity

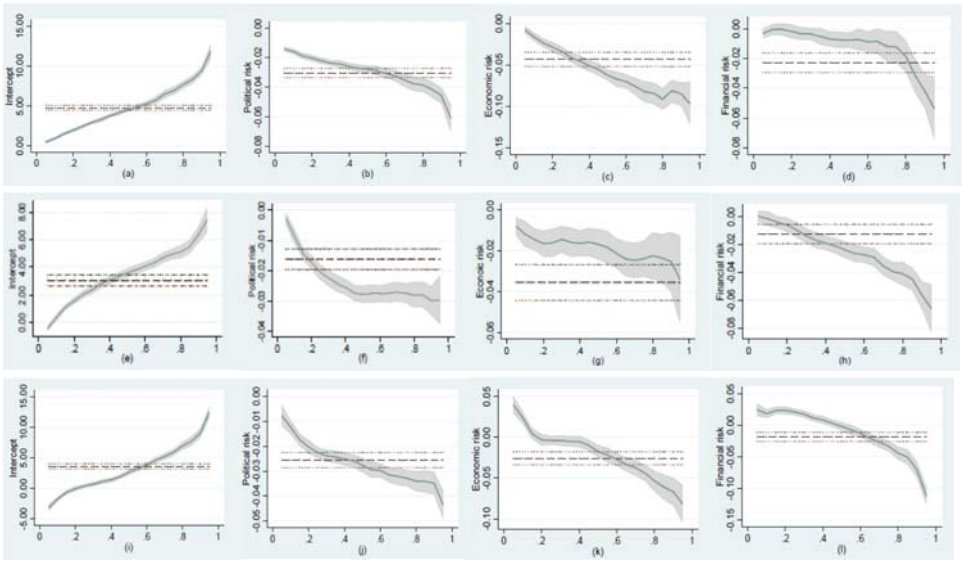
Variables	Liquidity risk						
	0.05	0.10	0.25	0.50	0.75	0.90	0.95
Intercept	0.151*** (0.115)	0.733*** (0.171)	1.377*** (0.191)	2.635*** (0.251)	5.906*** (0.309)	9.045*** (0.451)	12.416*** (0.738)
Political risk	-0.008*** (0.002)	-0.012*** (0.002)	-0.023*** (0.002)	-0.028*** (0.002)	-0.033*** (0.002)	-0.035*** (0.003)	-0.043*** (0.005)
Economic risk	-0.006*** (0.002)	-0.011*** (0.003)	-0.014*** (0.004)	-0.027*** (0.004)	-0.044*** (0.006)	-0.067*** (0.008)	-0.081*** (0.013)
Financial risk	0.024 (0.020)	0.021 (0.019)	0.018 (0.017)	-0.004 (0.003)	-0.033*** (0.004)	-0.070*** (0.007)	-0.112*** (0.012)

Variables	Liquidity risk						
	0.05	0.10	0.25	0.50	0.75	0.90	0.95
Number of banks	594	594	594	594	594	594	594
No. of observations	6576	6576	6576	6576	6576	6576	6576
Pseudo R^2	0.031	0.073	0.107	0.118	0.133	0.148	0.168

Numbers in the parentheses are standard errors.
** Significant at the 10% level, **Significant at the 5% level, ***Significant at the 1% level*

Figure 2

The Distribution of Explanatory Variables



Note: The distribution of explanatory variables (political, economic and financial risk). The horizontal line represents the quantile at the 0 scale and the grey area represents a confidence band at 95% for QR. The OLS estimator is represents by the broken line. Fig. (a)-(d) for the distribution of intercept, political risk, economic risk and financial risk on capital and asset risk. Fig. (e)-(h) for the distribution of intercept, political risk, economic risk and financial risk on earnings and profitability risk. Fig. (i)-(l) for the distribution of intercept, political risk, economic risk and financial risk on liquidity risk.

Our empirical results also provide significant evidence of the relation between control variables and bank stability using QR. In Panels A, B and C of Table 3, we find that financial liberalization, bank concentration, size of bank, and dispersed ownership are the factors significantly increasing the instability among banks at the high level of risk; however, they do not exert any impact on already stable banks as the coefficients are insignificant across lower quantiles. Thus, the results indicate that the financial development and individual bank characteristics do not have a uniformly significant impact on bank stability, unless banks exhibit in higher instability.

The significantly positive effect of financial liberalization on bank instability implies that a higher degree of financial deregulation, banks are largely independent from government control and intervention, which will encourage banks to take more risk (Al-Shboul *et al.*,

2020). Bank concentration has a positive significant influence on banking risk (instability) at least for the 10% of significant level across quantiles from the 0.75th to 0.95th. De Nicolo *et al.* (2004) argue that highly concentrated banking systems display higher levels of system risk. Regarding bank-specific factors, the empirical results show that the bank size across quantiles from 0.75 to 0.95 has a positive and significant impact on bank instability. In general, large banks have a lower level of risk because they can better diversify assets, take advantage of economic scale, and have greater ability to manage risk (Al-Shboul *et al.*, 2020); however, our results seem to have no such effect. Likewise, dispersed ownership contributes to bank instability among high-risk banks. For this result, Klomp and De Haan (2012) explain that it may be caused by the free-riders for minority shareholders because no single shareholder has an incentive to supervise bank management because his personal cost outweighs the benefits.

Table 3

Control Variables and Bank Stability—Quantile Regression

Panel A: Capital adequacy and asset quality

Variables	Capital and asset risk						
	0.05	0.10	0.25	0.50	0.75	0.90	0.95
Intercept	0.015 (0.017)	0.115* (0.070)	0.196** (0.085)	0.243** (0.112)	0.274** (0.116)	0.301** (0.121)	0.348** (0.150)
Economic development	-0.008 (0.019)	-0.012 (0.011)	-0.036 (0.025)	-0.083 (0.074)	-0.139 (0.101)	-0.193 (0.129)	-0.254 (0.169)
Banking supervision	-0.018 (0.029)	-0.043 (0.069)	-0.113 (0.094)	-0.176 (0.147)	-0.207 (0.159)	0.272 (0.194)	0.327 (0.233)
Financial liberalization	0.016 (0.012)	0.058 (0.046)	0.066 (0.050)	0.095 (0.064)	0.169** (0.071)	0.285** (0.125)	0.394** (0.181)
Bank concentration	0.013 (0.046)	0.086 (0.078)	0.193 ((0.176)	0.286 (0.195)	0.343* (0.202)	0.405* (0.224)	0.462* (0.231)
Average bank size	0.006 (0.007)	0.008 (0.005)	0.014 (0.009)	0.027 (0.018)	0.035* (0.023)	0.048* (0.026)	0.056* (0.031)
Dispersed ownership	0.002 (0.001)	0.029 (0.019)	0.057 (0.038)	0.105 (0.070)	0.212* (0.103)	0.243** (0.121)	0.268** (0.125)
Government ownership	0.002 (0.006)	0.007 (0.008)	0.013 (0.011)	0.023 (0.016)	0.031 (0.020)	0.036 (0.023)	0.052 (0.033)
Number of banks	594	594	594	594	594	594	594
No. of observations	5576	5576	5576	5576	5576	5576	5576
Pseudo R^2	0.069	0.081	0.103	0.115	0.162	0.183	0.196

Panel B: Earnings and profitability

Variables	Earnings and profitability risk						
	0.05	0.10	0.25	0.50	0.75	0.90	0.95
Intercept	0.067* (0.041)	0.097* (0.052)	0.142** (0.065)	0.162** (0.071)	0.196** (0.085)	0.245*** (0.092)	0.281*** (0.101)
Economic development	-0.037 (0.046)	-0.052 (0.057)	-0.087 (0.072)	-0.165 (0.137)	-0.386 (0.242)	-0.553 (0.345)	-0.651 (0.407)
Banking supervision	-0.011 (0.021)	-0.034 (0.039)	-0.053 (0.044)	-0.076 (0.047)	-0.106 (0.079)	0.172 (0.094)	0.207 (0.133)
Financial liberalization	0.021 (0.022)	0.042 (0.046)	0.065 (0.050)	0.092 (0.066)	0.139* (0.076)	0.258* (0.132)	0.295** (0.172)

Variables	Earnings and profitability risk						
	0.05	0.10	0.25	0.50	0.75	0.90	0.95
Bank concentration	0.006 (0.016)	0.026 (0.022)	0.083 ((0.056)	0.128 (0.095)	0.186* (0.102)	0.240* (0.124)	0.283** (0.131)
Average bank size	0.011 (0.008)	0.016 (0.015)	0.038 (0.025)	0.057 (0.045)	0.086* (0.051)	0.104* (0.061)	0.156* (0.080)
Dispersed ownership	0.008 (0.007)	0.021 (0.018)	0.043 (0.0383	0.085 (0.075)	0.176* (0.102)	0.241** (0.125)	0.306** (0.152)
Government ownership	0.005 (0.004)	0.007 (0.006)	0.012 (0.010)	0.026 (0.017)	0.035 (0.026)	0.041 (0.037)	0.052 (0.041)
Number of banks	594	594	594	594	594	594	594
No. of observations	5576	5576	5576	5576	5576	5576	5576
Pseudo R^2	0.101	0.112	0.123	0.134	0.165	0.185	0.198

Panel C: Liquidity

Variables	Liquidity risk						
	0.05	0.10	0.25	0.50	0.75	0.90	0.95
Intercept	0.512** (0.217)	0.654** (0.273)	0.696* (0.385)	0.834** (0.412)	0.874*** (0.416)	0.913** (0.412)	0.983** (0.452)
Economic development	-0.028 (0.029)	-0.032 (0.031)	-0.067 (0.052)	-0.098 (0.081)	-0.192 (0.113)	-0.293 (0.190)	-0.304 (0.203)
Banking supervision	-0.011 (0.012)	-0.037 (0.026)	-0.045 (0.051)	-0.093 (0.080)	-0.196 (0.151)	0.213 (0.198)	0.279 (0.201)
Financial liberalization	0.061 (0.042)	0.083 (0.061)	0.097 (0.085)	0.184* (0.104)	0.198* (0.117)	0.258** (0.122)	0.343** (0.162)
Bank concentration	0.013 (0.046)	0.086 (0.078)	0.193 ((0.176)	0.286 (0.195)	0.343* (0.202)	0.405* (0.224)	0.462* (0.231)
Average bank size	0.086 (0.070)	0.091 (0.082)	0.102 (0.103)	0.172* (0.109)	0.203* (0.123)	0.281** (0.136)	0.325** (0.156)
Dispersed ownership	0.052 (0.041)	0.074 (0.060)	0.087 (0.081)	0.116 (0.097)	0.162* (0.103)	0.213* (0.112)	0.252* (0.152)
Government ownership	0.021 (0.019)	0.053 (0.046)	0.076 (0.061)	0.106 (0.084)	0.152 (0.104)	0.178 (0.123)	0.223 (0.143)
Number of banks	594	594	594	594	594	594	594
No. of observations	5576	5576	5576	5576	5576	5576	5576
Pseudo R^2	0.068	0.096	0.103	0.116	0.134	0.182	0.192

*Note: Numbers in the parentheses are standard errors. * Significant at the 10% level, **Significant at the 5% level, ***Significant at the 1% level.*

Bermpei *et al.* (2018) argue that the financial systems in emerging countries exhibit comparative fragility which makes the banking sector relatively unstable compared with the developed countries. Further, although national economic dependence on the banking sector varies drastically, the structure of the banking sector varies considerably across countries (Singh *et al.*, 2015). A comparison of the impact of country risk on bank stability between developed countries and emerging countries, however, is limited. We therefore divide our sample into two subsamples based on the degree of country development to examine whether the impact of country risk on bank stability shows a difference between developed countries and emerging countries. Table 4 reports the estimation results for median effect quantiles, where θ is the 0.50th quantile. Prominently, the results in Table 4 show that compared with the developed countries, the political, economic and financial risks have a greater impact on capital and asset risk, earnings and profitability risk, and liquidity

risk in the emerging countries. Specifically, the effect is more pronounced in the emerging countries, suggesting that in these countries the financial policymakers must pay more attention to the impact of country risk on bank stability.

Table 4

The Impact of Country Risk on Bank Stability Split by the Degree of Country Development

Median effect / Variable	Capital and asset risk		Earnings and profitability risk		Liquidity risk	
	Developed country	Emerging country	Developed country	Emerging country	Developed country	Emerging country
Intercept	2.401*** (0.306)	1.022*** (0.065)	3.509*** (0.547)	3.724*** (0.235)	2.401*** (0.306)	2.648*** (0.293)
Political risk	-0.025*** (0.002)	-0.037*** (0.003)	-0.020*** (0.004)	-0.033*** (0.005)	-0.028*** (0.003)	-0.037*** (0.004)
Economic risk	-0.055*** (0.006)	-0.080*** (0.012)	-0.013** (0.005)	-0.040*** (0.006)	-0.019* (0.009)	-0.055*** (0.006)
Financial risk	-0.006 (0.004)	-0.018*** (0.005)	-0.015*** (0.002)	-0.048*** (0.006)	-0.008 (0.006)	-0.010** (0.005)
Number of banks	399	195	399	195	399	195
No. of observations	3792	1784	3792	1784	3792	1784
Pseudo R^2	0.163	0.184	0.118	0.158	0.111	0.161

*Note: Numbers in the parentheses are standard errors. * Significant at the 10% level, **Significant at the 5% level, ***Significant at the 1% level.*

4.3 Robustness Checks

In order to further check the robustness of the main results, we use the fixed-effect logit model by changing our dependent variable to a binary variable. If the value of our bank stability factor is in its lowest quartile (most stable zone), the value is equal to 1 and otherwise it is 0. A lower value of the dependent variable implies a higher degree of bank stability or a lower level of bank risk. The negative and significant coefficients of country risk presented in Table 5 indicate that country risk (including political risk, economic risk and financial risk) significantly increases the instability of banks. Alternatively, because our sample is an extensive hierarchical dataset, we utilize the mixed effects model, which is a special regression technique designed to consider the hierarchical structure of the data.[8] The mixed effects model is a mixed version of the fixed and random-effects model. The regression coefficient of the mixed-effects model is applicable to each individual, but not necessarily to the population (Laird and Ware, 1982). Table 6 shows that across all regressions, the three measures of country risk negatively influence bank stability, implying that country risk actually decreases the stability of banks. Overall, the results of robustness checks are consistent with the main results in Table 2.

[8] *We thank an anonymous referee for this appropriate suggestion.*

Table 5

The Impact of Country Risk on Bank Stability- Fixed Effects Logit Regression

Variable	Capital and asset risk	Earnings and profitability risk	Liquidity risk
Intercept	8.295*** (0.496)	9.011*** (0.514)	8.037*** (0.562)
Political risk	-0.071*** (0.005)	-0.055*** (0.004)	-0.054*** (0.004)
Economic risk	-0.041*** (0.013)	-0.107*** (0.012)	-0.083*** (0.010)
Financial risk	-0.070*** (0.010)	-0.054*** (0.009)	-0.052*** (0.009)
Number of banks	594	594	594
No. of observations	5576	5576	5576
Log likelihood	-1669.315	-1680.278	-1775.289

Note: Numbers in the parentheses are standard errors.
** Significant at the 10% level, **Significant at the 5% level, ***Sigificant at the 1% level.*

Table 6

The Impact of Country Risk on Bank Stability-Mixed Effects Model

Variable	Capital and asset risk	Earnings and profitability risk	Liquidity risk
Intercept	4.815*** (0.167)	3.044*** (0.187)	3.597*** (0.218)
Political risk	-0.031*** (0.002)	-0.016*** (0.002)	-0.026*** (0.002)
Economic risk	-0.043*** (0.004)	-0.036*** (0.004)	-0.026*** (0.004)
Financial risk	-0.023*** (0.003)	-0.012*** (0.003)	-0.018*** (0.003)
Number of banks	594	594	594
No. of observations	5576	5576	5576
Log likelihood	-4466.580	-4757.586	-4727.995

Note: Numbers in the parentheses are standard errors.
** Significant at the 10% level, **Significant at the 5% level, ***Significant at the 1% level.*

5. Conclusion

In this paper, we provide further insight into the effect of country risk on bank stability using commercial bank samples from 21 developed and 18 emerging countries over the period 2009-2018. To construct the variables of the quantile regression analysis, we employ the factor analysis on 25 CAMEL indicators of the bank risk rating system to identify four factors that are more useful in explaining the variance for bank stability, and utilize 22 indicators of the ICRG country rating system to produce three one-dimensional factors for country risk, because bank stability and country risk are multi-faceted concepts.

To the best of our knowledge, we believe that the study is the first examining the relationship between country risk and bank stability. Several salient features in our study contribute to answers regarding the impact of country risk on bank stability. Firstly, we present consistent evidence for a negative association between country risk and our indicators of bank stability,

which implies that bank stability tends to decrease with increased country risk. Furthermore, this effect is more significant on bank stability with banks exhibiting high instability, although financial risk only has a significant negative influence on bank stability among highly unstable banks. Secondly, when banks exhibit in high instability, we also find that financial liberalization, bank concentration, size of bank, and dispersed ownership are the factors that significantly increase banking risk, making banks less stable. Thirdly, by separating samples into developed and emerging countries, we find that the effect of country risk on bank stability is more pronounced in the emerging countries. In view of its importance, the measures for bank stability must consider the factor of country risk, in particular, paying more attention to its effect on bank instability in the emerging countries. Finally, we conclude that political risk, economic risk and financial risk as well as country risk exert their impacts mainly by affecting banks' capital adequacy and asset quality, earnings and profitability, and liquidity, and then the effect shifts to affect bank stability. Prominently, these findings can shed some light on the necessity to distinguish the components of country risk when predicting the variation of bank stability, and on how country risk is translated into bank risk as well as affecting bank stability.

There are several policy implications. First, we provide useful insights for bank managers and supervisors to understand how country risk affects bank stability and what are the differences of impact on bank stability between the developed countries and the emerging countries. Second, our findings reveal that various country risks may substantially reduce the stability of banks, which would help in strategy formulation and risk management for bank managers as well as investors. Finally, regulators should pay more attention to financial institutions that are more vulnerable to particular types of risks, such as political risk, economic risk and financial risk. Our findings call for further research on how much additional explanatory power can be attributed to the effect of country risk for explaining bank stability when controlling for financial regulation and supervision.

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Appendix A

Table A1

Distribution of Banks Across Countries

Developed Countries	Number of Banks	Coefficient of Variation
Australia	11	1.535
Austria	7	1.073
Belgium	8	5.318
Canada	13	2.296
Demark	10	2.633
Finland	5	0.548
France	14	0.720
Germany	34	1.635
Hong Kong	23	0.480
Ireland	8	3.356
Italy	39	1.039
Japan	48	7.003
Netherland	10	2.012
New Zealand	6	0.375
Norway	18	0.472
Singapore	4	0.315
Spain	12	4.370
Sweden	10	1.034
Switzerland	6	0.934
U.K.	23	2.591
U.S.	90	1.074
Subtotal	399	3.220
Emerging Market Countries	Number of Banks	Coefficient of Variation
Brazil	25	1.035
Chile	8	0.575
China	22	0.601
Hungary	5	1.614
India	20	0.390
Indonesia	12	0.999
Israel	7	0.671
Korea	6	0.494
Malaysia	6	1.122
Mexico	8	0.488
Morocco	5	0.237
Pakistan	10	1.173
Peru	4	0.458
Philippine	9	0.515
Poland	9	0.618
Taiwan	14	3.621
Thailand	11	1.460
Turkey	14	1.426
Subtotal	195	1.166
Total	594	1.718

Notes: *This table reports the number of banks in our sample countries and the coefficient of variation of the banks' asset size in a particular country.*

Table A2

Critical Factors in the ICRG Country Rating System

Factor	Points	Percentage of Individual Index	Percentage of Composite	Label
Political risk				
Government Stability	12	12	6	P1
Socio-economic Conditions	12	12	6	P2
Investment Profile	12	12	6	P3
Internal Conflict	12	12	6	P4
External Conflict	12	12	6	P5
Corruption	6	6	3	P6
Military in Politics	6	6	3	P7
Religion in Politics	6	6	3	P8
Law and Order	6	6	3	P9
Ethnic Tensions	6	6	3	P10
Democratic Accountability	6	6	3	P11
Bureaucracy Quality	4	4	2	P12
Total political points	100	100	50	
Economic risk				
GDP Per Capita	5	10	2.5	E1
Real GDP Growth	10	20	5	E2
Annual Inflation Rate	10	20	5	E3
Budget Balance as a % of GDP	10	20	5	E4
Current Account as a % of GDP	15	30	7.5	E5
Total economic points	50	100	25	
Financial risk				
Foreign Debt as a % of GDP	10	10	5	F1
Foreign Debt Service as a % of the Exports of goods and Services	10	20	5	F2
Current Account balance as a % of the Exports of Goods and Services	15	20	7.5	F3
Net International Liquidity as Months of Import Cover	5	20	2.5	F4
Exchange Rate Stability	10	30	5	F5
Total financial points	50	100	25	
Overall Points	200		100	

Source: www.prsgroup.com.

Notes: *The PRS Group publishes the ICRG every month. This guide contains an individual index for three sub-categories: political risk, which is broken down into 12 subjective variables grouped by of social and political factors; economic risk, whose main objective is to indicate the degree of soundness or weakness of an economy; and financial risk, which reflects the capacity of a country to finance its debt. These final two sub-indexes each contain five variables, scored by means of the objective analysis of quantifiable data. In total, the ICRG thus consists of 22 variables integrated into the composite index (San-Martín-Albizuri and Rodríguez-Castellanos, 2012). As the higher the score obtained by a country, the lower its risk is.*

Table A3

Variable Definitions and Descriptive Statistics

Variables	Definition	Sources	Mean	Median	Std. dev.
Bank stability					
Capital and asset risk	The dependent variable, bank stability, estimated by the CAMEL indicators is distinguished by its variations in the level of stability. The two variable-specific factors, capital adequacy that consists of total equity/total asset and total capital ratio, and asset quality that consists of loan loss provision/total loans, nonperforming loans/total loans, unreserved impaired loans/equity and impaired loans/equity, are converted into the capital and asset of risk variable by the factor analysis. Higher value implies a higher level of bank risk, *i.e.*, a lower level of bank stability.	Bankscope and authors' own calculation	0.746	0.629	0.665
Earnings and profitability risk	The dependent variable, a proxy of bank stability for earnings and profitability risk, is measured by return on equity, return on assets and log (bank *Z*-score) of the CAMEL indicators using the factor analysis. A higher value represents a higher degree of bank risk, or alternatively speaking, a lower degree of bank stability.	Bankscope and authors' own calculation	0.652	0.543	0.758
Liquidity risk	The dependent variable, a proxy of bank stability for liquidity risk, is obtained by employing factor analysis on liquid assets/total assets, total loans/deposits, fixed assets/total assets, subordinated debt/equity, liquid assets/customers and short-term funds, due to central bank/total equity, and due to commercial banks/total equity of the CAMEL indicators. A higher value represents a higher level of bank risk, *i.e*., a lower level of bank stability.	Bankscope and authors' own calculation	0.740	0.598	0.672
Country risk					
Political risk	This index measures the political stability of the country based on twelve risk components that cover both political and social attributes. The ICRG data is available on a monthly index of political risk which we average into annual scores in our empirical analysis. The index varies from 0 to 100, where a higher value indicates a lower degree of political risk or higher political stability and vice versa.	ICRG Group	73.341	76.000	10.590
Economic risk	This index measures the economic stability of the country based on five risk components that indicate the degree of soundness or weakness of an economy. The index varies from 0 to 50, where a higher value indicates a lower risk or higher stability and vice versa.	ICRG Group	38.103	38.000	4.028
Financial risk	This index measures the financial stability of the country based on five risk components that reflect the capacity of a country to finance its debt. The index varies from 0 to 50, where a higher value indicates a lower risk or higher stability and vice versa.	ICRG Group	40.439	40.500	4.811

Variables	Definition	Sources	Mean	Median	Std. dev.
Control variable					
Economic development	Annual percentage growth rate of GDP per capita is used to control for differences in economic development.	World Bank, IFS	1.347	1.338	2.026
Financial liberalization	The index measures banking efficiency and independence from government control and interference in the financial sector. The index ranges from 0 to 100, with higher values representing more liberalization.	Heritage Foundation, IFS	63.464	62.320	27.593
Banking supervision	This value is used to determine whether the supervisory authorities have the power to take specific actions to prevent and correct problems. The values are 0-16, with higher values indicating greater power.	World Bank Survey	11.362	11.814	3.416
Bank concentration	The assets owned by the largest three banks as a share of total banking sector assets to calculate a concentration index via HHI.	Bankscope	0.517	0.461	0.493
Average bank size	Logarithm of average banks' assets of each country.	Bankscope	7.662	7.375	1.827
Dispersed ownership	A dummy variable taking the value 1 if a bank has a shareholder which has an ownership of more than 25%.	Bankscope	0.118	0.000	0.325
Government ownership	A dummy variable taking the value 1 if a bank is owned by more than 50% by domestic government, public institutions or state-owned enterprises.	Bankscope	0.126	0.000	0.302

Notes: This table summarizes the description of all variables, the source of data and the major descriptive statistics. Meanwhile, the definition of the main variables in the table refers to the relevant literature, such as Klomp and De Haan (2012), Belkhir et al. (2019), Shaddady and Moore (2019), Al-shboul et al. (2020), Wu et al. (2020) and Athari (2021).