Determinants of bank stability in a small island economy: a study of Fiji

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Abstract

Purpose – This study aims to examine the determinants of bank stability based on three measures of bank stability while accounting for key bank-specific, macro-finance and structural variables. The aim is to underscore key indicators of stability that can be tracked by analysts, bank managers and regulators, especially in small economies such as Fiji.

Design/methodology/approach – The sample comprises a balanced panel of seven banking and financial institutions over the period 2000-2018. For consistency of data and similar functions in terms of deposit and loans, this paper considers five commercial banks and two credit institutions in Fiji. A fixed-effect method of regression is applied, to control for bank heterogeneity. The dependent variable is bank stability, which is based on three measures – the Z-score, the risk-adjusted return on assets and the risk-adjusted equity to assets ratio.

Findings – It is noted that bank size, funding risk, credit risk and Herfindahl-Hirschman index are positively associated with bank stability. In the extended model, both inflation and economic growth are positively associated with bank stability, although only inflation is statistically significant. Moreover, factors having a negative association with bank stability are the liquidity risk, the net interest margin and the remittances inflow. Additionally, the domestically generated political crises of the years 2000 and 2006 and the global financial crisis of 2007–2008 are negatively associated with bank stability.

Originality/value – This study empirically examines the determinants of bank stability in Fiji's banking sector. Unlike previous studies, this study considers three measures of stability, with z-score as the dominant measure and as explanatory variables, bank-specific, macro-finance and structural variables. The bank-specific data used in the study were hand-picked from the disclosure statements of banks and macro-finance data were extracted from the World Bank Indicators. The study underscores pertinent factors associated with bank stability in the small island economy of Fiji, which can be of interest to analysts, bankers, regulators and researchers in this domain.

Keywords Banking stability, Fiji, Z-score, RAROA, RAEA

Paper type Research paper

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Introduction

Financial stability describes a condition in which the financial system, comprising financial markets and the financial institutional structure, is resilient to economic shocks. A stable financial system is capable of fulfilling its basic functions, *inter alia*, providing reliable financial services pertaining to individual's funds and giving assurance to investors regarding their investments (Acemoglu *et al.*, 2015; Beck *et al.*, 2009).

However, unstable financial institutions can lead to a banking crisis, which has huge adverse repercussions on the economy. Banking crises disrupt the process of credit intermediation, which negatively affects output (Hutchison and Noy, 2005; Hoggarth *et al.*, 2002) and reduce the supply of credit and money. A declining supply of credits forces firms and households to reduce investment and consumption, which shrinks overall output and can result in an economic recession. Moreover, the extent of the damage caused by the failure of one bank depends on how much it is interconnected and interdependent with other financial and credit institutions (Shahzad *et al.*, 2017). As noted from the global financial crisis (GFC) 2008/2009, a chain of reactions can lead to the bankruptcy of a number of banks. Matthews and Thomson (2014) note that in the case of Argentina (1980-1985) and Chile (1981-1985), the economic losses due to bank failure accounted for more than 40% of the gross domestic product (GDP). Similarly, Montagnoli and Moro (2018) conclude from their study on European countries, that financial crises in the period 1980-2011 negatively affected individual well-being beyond the costs attributed to losses of income, GDP, increasing inflation and unemployment rates.

At least from the above studies, it is clear that a stable financial sector is necessary for economic stability and small island economies are no exception. The small island economies in the Pacific are characterized by geographic remoteness, small population, dependence on a few key export industries like tourism and agriculture and the presence of few banks with plausibly different institutional settings.

Some recent studies related to bank stability in small island economies include Prasad *et al.* (2018), Sharma *et al.* (2014) and Prasad *et al.* (2020). Prasad *et al.*'s (2018) study examined the relationship between financial development with factors such as economic growth, poverty and income inequality in Fiji over the period 1990–2016. The study notes that the performance of financial institutions has been promising and comparable to a set of economies. Moreover, the development of the financial sector has brought about economic growth, reduced poverty and income inequality (Beck *et al.*, 2007) and the sector could contribute to the increase of the life expectancy of its citizens (Prasad *et al.*, 2020). Sharma *et al.* present an analysis of the financial system of Fiji from 2000 to 2011 in comparison with Australia, regions such as the South Pacific, the East Asia and Pacific and the countries in the upper middle income. They conclude Fiji's financial sector is weak in terms of efficiency but similar in terms of financial stability.

The above studies underscore the plausible linkages and necessity of bank stability in small island economies like Fiji. However, it remains an area of interest to study the determinants of bank stability in small island economies. Thus, in this paper, we explore the influence of bank-specific, macro-finance and structural factors on bank stability in Fiji. We consider three measures of bank stability, with z-score as the dominant measure.

Fiji, like other small island economies, has a managed-exchange rate system and strong capital controls which reduces the strength of international integration of the Fijian financial sector. The services provided by the financial sector are largely restricted to retail banking in which savings and lending are dominant. Fiji has experienced episodes of financial

distress (Kumar *et al.*, 2018; Gounder and Sharma, 2012; Lodhia and Burritt, 2004; Overton, 2003; Grynberg *et al.*, 2002) and like other small island states, is particularly vulnerable to natural disasters which cause relatively greater damaging effects in small island countries than in developed countries (Zhang and Managi, 2020; IMF, 2016).

Despite a marginal increase in the number of banks and other financial institutions (FIs) in Fiji, the level of competition for services such as deposits and lending remains low (Dulare, 2011; Kumar and Patel, 2014), which implies that a financial institution which is able to secure more funds is likely to have greater market share. In terms of the allocations of loans to sectors, a significant proportion of business loans are provided to the wholesale, retail, tourism and hospitality sector. Moreover, because of an increase in the demand for housing, there has been a subsequent increase in loans for housing which accounts for some 80% of the personal loan assets of banks (PFIP, 2010, p. 17). Given that bank lending is largely for domestic purposes, the overall economic performance will influence bank stability. The remainder of the paper is set out as follows. Section 2 covers theory and selected empirical studies. Section 3 presents the data and the methodology used. Section 4 discusses the key results and Section 5 concludes the paper.

Literature review

Theory

According to agency theory, company owners and executives may have conflicting objectives. While the owners are interested in profit maximization, those who are running the company are trying to achieve their private advantage at the owner's cost (Crutchley and Hansen, 1989; Gabaix and Landier, 2008; Jensen, 1986; Murphy, 1985). The too big to fail hypothesis put forward by Mishkin (1999) argues that bigger banks and those banks with higher market power are always systematically essential for the economic growth of the country. Hart and Zingales (2014) argue that in the case of a bank's bankruptcy, the majority of subjects who are affected are in a strong need for liquidity due to liquidity constraints. The theory lends support for the negative association between bank stability and bank size.

Under the stewardship theory it is assumed that managers of the firm are trustworthy (Davis *et al.*, 1997). Stewardship theory argues that managers of the firm are intrinsically motivated to work for others or for organizations to accomplish the tasks and responsibilities with which they have been entrusted. Similarly, the charter value hypothesis of Marcus (1984) argues that larger banks have higher charter values, thus increasing their opportunity cost of becoming bankrupt, and hence discouraging them from taking risky activities. Both theories approve of a positive relationship between bank stability and bank size.

Empirical studies

Čihák and Hesse (2010) examine the relationship between bank size and the financial stability of Islamic banks. The authors use a Z-score method to determine bank stability and measure size by the natural logarithm of total assets. They note that bank size does not have a statistically significant association with bank stability. Berger *et al.*'s (2009) study focus on the association between bank competition and bank stability using data for 8,235 banks in 23 developed nations. Their analysis reveals that banks with a greater degree of market power have less overall risk exposure. The study notes a positive association between market power and loan portfolio risk. Using a sample of 821 banks in 60 countries over the period 1999-2005, Ariss (2010) concludes that an increase in the degree of market power, proxied by the Lerner's index, leads to greater stability. The results coincide with other

studies arguing that enhanced competition can undermine bank stability and adversely impact banking systems in developing economies (Troug and Sbia, 2015).

On the contrary, Fu *et al.* (2014) examine the influence of bank competition, concentration, regulation and national institutions on bank stability in 14 Asia-Pacific countries from 2003 to 2010. They find that greater concentration leads to financial instability and that less market power induces bank risk exposure once the macroeconomic, bank-specific, regulatory and institutional factors are taken into account. The results also reveal that regulation and institutions have positive and statistically significant effects on bank stability. Similarly, Schaeck and Cihák (2014) find a positive association between competition, efficiency and stability of the European banks and that stability-enhancing effects of the competition are greater for healthy (profitable) banks than for fragile ones. Fiordelisi *et al.* (2011) note that in the case of European banks, lower bank efficiency causes higher bank risk and that a higher level of capital is required to achieve long-term efficiency gains.

Tan (2016) notes mixed results in the case of Chinese banks in terms of the impact of bank competition and risk on banks' profitability. Azmi *et al.* (2019) note the absence of statistically significant effects of competition and diversification on stability in both conventional and Islamic banks over the period 2005–2016. Kakes and Nijskens (2018) consider 38 advanced emerging economies. Based on the correlation analyzes between the size of the banking system and several systemic risk indicators, they note an absence of any clear-cut relationship between bank size and financial stability.

Köhler (2015) examines the impact of business models on bank stability for 15 EU countries between 2002 and 2011. The business models of banks are expressed as the non-interest revenue share of total operating income and the non-deposit financing share of total liabilities. The results show the share of non-interest income is positively associated with bank stability and profitability. However, such associations were stronger for savings and cooperative banks than investment banks which heavily relied on interest income. Ghenimi *et al.* (2017), investigate the effects of liquidity risk and credit risk on the stability of banks operating in the Middle East and North America region. They use a sample of 49 banks over the period 2006-2013. Their results show that both credit risk and liquidity risk have a negative and statistically significant relationship with bank stability.

Data, variable definition and method

Data

Two sets of data are used for estimation. First, bank-specific data are collected from the annual key disclosure statements available from the Reserve Bank of Fiji (RBF) (RBF, 2019). Second, macro-finance data are collected from the World Bank (2019) database. A balanced sample of seven FIs is considered over the period 2000–2018. The sample consists of five retail banks and two non-bank financial institutions (NBFIs). The retail banks are, Australia and New Zealand Banking Group (ANZ), Bank of the South Pacific (BSP), Bank of the Baroda (BOB), Westpac Banking Corporation (WBC), Home Finance Corporation (HFC); and the two NBFIs are the Merchant Finance Limited (MFL) and Credit Corporation Fiji Limited (CCFL), which, similar to commercial banks, provides services of lending and deposit and are required by the RBF to furnish key disclosure statements.

Variable definition and possible signs

Dependent variables. The definitions of the above variables and their expected signs with respect to the dependent variables are provided in Table A1 (Appendix 1). The Z-score as a

measure of bank stability accounts for profitability, the leverage ratio and the volatility or the standard deviation of profit ratio (Azmi, *et al.*, 2019); and it is computed as:

$$Z-\text{score}(BSTAB)_{i,t}=\left[\frac{ROA_{i,t}+E_{i,t}/A_{i,t}}{\sigma\left(ROA_{i,p}\right)}\right] \tag{1}$$

where $BSTAB_{i,\ t}$ denotes the stability based on Z-score of bank i in year t, $ROA_{i,t}$ is the return on assets of bank i, $E_{i,t}/A_{i,t}$ indicates the equity to asset ratio and $\sigma(ROA_{i,p})$ indicates the standard deviation of return on assets (ROA) of bank i over the sample period (Ali and Puah, 2018). The stability measure indicates the number of standard deviations a bank's ROA has to fall for the bank to become insolvent, hence the Z-score is an indicator of insolvency risk. The higher the Z-score, the lower is the risk of a bank becoming insolvent. The additional measures of stability are the risk-adjusted ROA (RAROA) and the risk-adjusted equity to assets (RAEA) ratio, computed as follows:

$$RAROA_{i,t}=\frac{ROA_{i,t}}{\sigma\left(ROA_{ip}\right)} \tag{2}$$

$$RAEA_{i,t}=\frac{E/A_{i,t}}{\sigma\left(ROA_{ip}\right)} \tag{3}$$

Independent and control variables. The key bank-specific independent variables are bank size (SIZE) and funding Risk (FRISK). SIZE is measured by the natural logarithm of total assets of the banks. Large banks have more market power which can enable them to increase profit and build up high capital buffers, thus making them less susceptible to liquidity or macroeconomic shocks (Adusei, 2015). More assets like loans mean banks can generate more revenue and by charging relatively higher or competitive interest rates due to economies of scale, they will be able to increase their business value:

H1. SIZE is positively associated with bank stability.

To compute funding risk (FRISK), the following formula is used [1]:

$$Z-\text{score}(FRISK)_{i,t}=\left[\frac{\left(DEP_{i,t}/TA_{i,t}\right)+\left(E_{i,t}/TA_{i,t}\ \right)}{\sigma\left(\frac{DEP}{TA}_{ip}\right)}\right] \tag{4}$$

where FRISK is calculated as the sum of deposit-to-total asset (DEP/TA) ratio and the equity to total asset (E/TA) ratio, divided by the standard deviation of deposit-to-asset (DEP/TA) ratio. FRISK is used to analyze bank stability because retail banks mobilize customer deposits for their funding related activities (Ali and Puah, 2018):

H2. FRISK is positively associated with bank stability.

Liquidity is important for banks' profitability and survival (Waleed *et al.*, 2016). Lack of liquidity can trigger a shortage of funds, resulting in a fire-sale of assets. A prolonged period of liquidity risk can cause a bank to become financially insolvent (Imbierowicz and Rauch, 2014):

H3. LRISK is negatively associated with bank stability.

A higher loans-to-assets ratio indicates a bank has more loans issued or loans issued makes up a large portion of total assets. Thus, if a large number of borrowers or borrowers with huge loan amounts default, the bank's insolvency risk increases (Ghenimi *et al.*, 2017). Also, if a greater proportion of the loans are given for domestic use, then while the geographic exposure is less, poor economic performance, the slowdown in economic activity or economic uncertainty will hinder the borrowers' ability to pay, and hence affect bank stability:

H4. CRISK is negatively associated with bank stability.

Bank profitability is essential as it builds buffers against negative shocks, thus promoting stability. Moreover, the prospect of future profits restrains banks' risk-taking behavior as they have more "skin in the game" (Miller and Noulas, 1996, p. 496):

H5. ROE is positively associated with bank stability.

As noted by Ariss, banks with greater market share and market power are more stable. Additionally, continuity in generating interest income is necessary for banks to remain profitable and operational over a long time horizon (Adusei, 2015):

H6. Herfindahl-Hirschman index (HHI) is positively associated with bank stability.

H7. NIM is positively associated with bank stability.

To gain additional insights on bank stability, we include some macro-finance and structural variables. These variables include economic growth (GDP), inflation rate (INF), worker's remittances (REM). Economic growth generally improves the household income level, savings and prospects for investment and borrowings, which strengthens bank performance and, hence supports bank stability (Kosmidou, 2008):

H8. GDP is positively associated with bank stability.

Regarding inflation, one argument is that if inflation is anticipated and interest rates are adjusted accordingly, the effect of inflation on banks' profitability is positive, otherwise the effect is negative (Adusei, 2015). On the negative association, Umar *et al.* (2014) argue that because inflation affects the purchasing power, worsens loan policy and disrupts business plans, the performance of banks is adversely affected. Zermeño *et al.* (2018) show that inflation has a consistently negative and non-linear effect on financial variables, with a strong effect on banks in developing countries and an insignificant effect on banks in developed countries:

H9. INF is negatively associated with bank stability.

Giuliano and Ruiz-Arranz (2009) state that remittances can enhance economic growth especially if the financial sector cannot meet the credit needs of the population. Therefore, the inflows of remittances would also mean that people will have more funds coming via the financial sector. Also, a continuous inflow of remittances adds to the liquidity position of banks. Thus, we hypothesize a positive relationship between bank stability and workers' remittances (REM):

H10. REM is positively associated with bank stability.

On structural variables, we use a dummy variable for the years 2007 and 2008 (FINCRS) to denote the global financial crisis (GFC) and a dummy variable for the years 2000 and 2006 to denote domestic political crisis (COUP). The financial crisis led to disturbances in the overall financial sector. Political disturbances create economic uncertainty and exacerbate the emigration of people and capital outflows, thus reducing the liquidity in the domestic banking system. Consequently, the financial sector suffers from low demand for loanable funds and less supply of deposits:

H11. FINCRS is negatively associated with bank stability.

H12. COUP is negatively associated with bank stability.

Models

The following models are specified and tested:

$$\text{Model 1}: BSTAB_{it}^{z-score} = \alpha + \beta_1 SIZE + \beta_2 FRISK_{i,t} + \beta_3 LRISK_{i,t} + \beta_3 CRISK_{i,t} + \beta_4 ROE_{i,t} + \beta_5 NIM + \beta_k^i \boldsymbol{Z}_t + \varepsilon_{it} \quad (5)$$

$$\text{Model 2}: BSTAB^{RAEA}{}_{i,t} = \alpha + \beta_1 SIZE_{i,t} + \beta_2 FRISK_{i,t} + \beta_3 LRISK_{i,t} + \beta_3 CRISK_{i,t} + \beta_4 ROE_{i,t} + \beta_5 NIM + \beta_k^i \boldsymbol{Z}_t + \varepsilon_{it} \quad (6)$$

$$\text{Model 3}: BSTAB^{RAROA}{}_{i,t} = \alpha + \beta_1 SIZE_{i,t} + \beta_2 FRISK_{i,t} + \beta_3 LRISK_{i,t} + \beta_3 CRISK_{i,t} + \beta_4 ROE_{i,t} + \beta_5 NIM + \beta_k^i \boldsymbol{Z}_t + \varepsilon_{it} \quad (7)$$

where $\boldsymbol{Z}_{i,t} = (GDP_t, INF_t, REM_t, FINCRS, COUP)$, is a vector of macro-finance and structural variables. $BSTAB_{it}^{z-score}$, $BSTAB^{RAROA}$ i, t and $BSTAB^{RAEA}$ i, t represent the three measures of bank stability as mentioned earlier [Equations (1)-(3)] and Table A1. Furthermore, α is the constant term, β are the coefficients of the respective variables and $\varepsilon \sim N(0, \sigma^2)$ is the error term. The subscript, i, t denotes the respective bank and time, respectively. The models are estimated initially with bank-specific factors as control variables. The models are then re-estimated with macro-finance and structural variables to check the robustness of the results and to gain additional insights. The suitability of the estimation method is verified from the Hausman test (Ali and Puah, 2018).

Results

Descriptive statistics and correlation

In Appendix 1, we report the descriptive statistics (Table A2) and correlation matrices (Tables A3-A4). The results of the Hausman test (Table A5) support the fixed-effect model.

K-bank concentration ratio and HHI

The CR2 ratios based on assets, deposits and loans are reported in Figures A1-A4 (Appendix 2). As noted, the HHI based on all measures decreased by just about 1.5% per year over the sample period, indicating only marginal growth in the level of competitiveness. Moreover, more than two-thirds (65-70%) of the banking sector is

dominated by two banks, ANZ and WBC, respectively. According to the CR4 ratios, about 90% of the market share in the sector is captured by four banks.

Regression results

The regression results of the base models are reported in Tables 1-3. In Table 1, we present the results where the Z-score is the dependent variable and it is our main measure of stability. The other two measures of stability are RAEA and RAROA and the results are reported in Tables 2 and 3, respectively. The adjusted R-square in all three estimations is at least 90%, which implies the models capture around 90% of the relationship.

As noted from Tables 1-3, the respective coefficients of SIZE are positive and statistically significant and the coefficient is between 0.27 and 3.48. Therefore, bank SIZE is positively associated with stability, which implies that larger or dominant banks in Fiji are generally more stable. Hence, we do not reject *H1*. The positive association can be explained by the basic nature of the banking operations, which is largely characterized by savings and

Table 1.
Model 1 – Z-score as a measure of bank stability

Variable	Coefficient	Standard error	*t*-value	Probability
Constant	−112.703***	17.801	−6.331	<0.01
SIZE	3.488***	1.340	2.602	<0.01
FRISK	2.395***	0.804	2.976	<0.01
LRISK	−9.214***	3.085	−2.986	<0.01
CRISK	53.028***	1.751	30.281	<0.01
ROE	7.116	4.946	1.438	0.153
HHI_LOAN	0.007***	0.002	2.876	<0.01
R^2	0.984	Mean dependent variable		22.898
Adjusted R^2	0.983	SD dependent variable		49.356
SE of regression	6.451	Sum squared residual		4,994.239
F-statistic	633.855	Durbin-Watson statistics		1.126
Prob. (F-statistic)	0.000	*N*(sample)		133

Notes: ***Indicates statistical significance at 1% level; fixed-effect option was selected for estimation
Source: Authors' own estimation

Table 2.
Model 2 – RAEA as a measure of bank stability

Variable	Coefficient	Standard error	*t*-value	Probability
Constant	−108.471***	17.539	−6.185	<0.01
SIZE	3.214***	1.329	2.418	<0.01
FRISK	2.374***	0.800	2.967	<0.01
LRISK	−9.248***	2.882	−3.208	<0.01
CRISK	52.579***	1.752	30.000	<0.01
ROE	0.412	4.900	0.084	0.933
HHI_LOAN	0.006***	0.002	2.618	<0.01
R^2	0.985	Mean dependent variable		19.688
Adjusted R^2	0.984	SD dependent variable		49.036
SE of regression	6.268	Sum squared residual		4,717.036
F-statistic	663.293	Durbin-Watson statistics		1.129
Prob. (F-statistic)	0.000	*N*(sample)		133

Notes: ***Indicates statistical significance at 1% level; fixed-effect option was selected for estimation
Source: Authors' own estimation

Variable	Coefficient	Standard error	*t*-value	Probability
Constant	−4.232***	1.701	−2.487	<0.01
SIZE	0.274***	0.109	2.514	<0.01
FRISK	0.021	0.058	0.361	0.719
LRISK	0.034	0.434	0.078	0.938
CRISK	0.449***	0.118	3.802	<0.01
ROE	6.703***	1.188	5.644	<0.01
HHI_LOAN	0.000***	0.000	3.715	<0.01
R^2	0.900	Mean dependent variable		3.211
Adjusted R^2	0.890	SD dependent variable		1.934
SE of regression	0.641	Sum squared residual		49.352
F-statistic	90.075	Durbin-Watson statistics		1.453
Prob. (F-statistic)	0.000	*N*(sample)		133

Notes: ***Indicates statistical significance at 1% level; fixed-effect option was selected for estimation
Source: Authors' own estimation

Table 3.
Model 3 – RAROA as a measure of bank stability

lending, high capital-to-asset ratios and low volatility in the financial performance of banks. Also, the positive association with stability supports the argument that large banks have greater potential to achieve economies of scale because they have the resources to efficiently carry out intermediation, monitoring, pricing and diversification strategies (Ibrahim and Rizvi, 2017) [2].

The coefficient of FRISK is positive (Tables 1-3) and statistically significant at 1% level in two (Tables 1-2) out of the three estimations. Based on the overall results, we do not reject *H2*. Furthermore, the coefficient of LRISK is negative and statistically significant in two models (Tables 1-2), hence we do not reject *H3*. The results confirm that LRISK is a significant predictor of bank stability in Fiji and that it is negatively associated with bank stability. The coefficient of CRISK is positive and statistically significant at the conventional levels in all the three models (Tables 1-3). This implies that a higher ratio of a loans-to-total asset of banks' in Fiji contributes to bank stability. Noting the positive relationship between CRISK and bank stability, we reject *H4*. For small island countries like Fiji, which has fewer banks and less sophisticated financial products, loans are the major revenue-generating activity of banks. While an increase in loans can create potential credit risk, increases in carefully structured loans expand the asset of banks and, hence contributes to their stability. Moreover, we note that the profitability ratio, measured by ROE is positively associated with bank stability (Tables 1-3) although the ratio is statistically significant in one of the models (Table 3). The positive association implies that profitability promotes bank stability. Hence, based on positive associations, *H5* cannot be rejected.

The concentration ratio, measured by the HHI based on total loans, has a positive and statistically significant relationship with bank stability (Tables 1-3). This implies that an increase in the market power of banks can increase bank stability. Based on the results, the current banking structure, which is relatively concentrated, supports bank stability. Hence, we do not reject *H6*.

Macro-finance and structural factors

We re-estimate the three models with the inclusion of macro-finance (NIM, GDP, INF_CPI and REM) and structural variables (FINCRS and COUP). Overall, the results of the base

Variable group	Variable	Coefficient	Std. error	*t*-statistic	Prob.
Bank-specific	CONSTANT	−36.63	27.739	−1.321	0.189
	SIZE	0.091	2.054	0.443	<0.01
	FRISK	2.354***	0.804	2.930	<0.01
	LRISK	−10.27***	2.322	−4.423	<0.01
	CRISK	51.94***	2.019	25.724	<0.01
	ROE	8.464	5.382	1.573	0.119
	HHI_LOAN	0.004*	0.002	1.942	0.055
Macro-finance	NIM	−1.173**	0.593	−1.978	0.050
	GDP	0.083	0.212	0.389	0.698
	INF_CPI	0.254*	0.135	1.879	0.063
	REM	−1.107**	0.473	−2.340	0.021
Structural	FINCRS	−2.069*	1.142	−1.811	0.073
	COUP	−5.181***	1.256	−4.125	<0.01
Diagnostics	R^2	0.986	Mean dependent variable		22.898
	Adjusted R^2	0.984	S.D. dependent variable		49.356
	SE of regression	6.259	Sum squared residual		4,465.9
	F-statistic	449.68	Durbin-Watson stat		1.234
	Prob. (F-statistic)	0.000	*N*(sample)		133

Table 4.
Model 4- Z-Score model with macro-finance and structural factors

Notes: ***, ** and *Indicate statistical significance at 1%, 5% and 10% level, respectively; fixed-effect option was selected for estimation
Source: Authors' own estimation

Variable group	Variable	Coefficient	Std. error	*t*-statistic	Prob.
Bank-specific	CONSTANT	−33.416	27.159	−1.230	0.221
	SIZE	1.073*	2.044	0.525	0.060
	FRISK	2.329***	0.803	2.899	<0.01
	LRISK	−10.27***	2.124	−4.835	<0.01
	CRISK	51.53***	2.023	25.471	<0.01
	ROE	2.144	4.657	0.460	0.646
	HHI_LOAN	0.004*	0.002	1.661	0.099
Macro-finance	NIM	−1.173**	0.577	−2.032	0.045
	GDP	0.068	0.211	0.324	0.746
	INF_CPI	0.228*	0.117	1.944	0.054
	REM	−1.207***	0.450	−2.680	<0.01
Structural	FINCRS	−2.052**	1.020	−2.012	0.047
	COUP	−5.080***	1.284	−3.957	<0.01
Diagnostics	R^2	0.987	Mean dependent variable		19.688
	Adjusted R^2	0.985	S.D. dependent variable		49.036
	SE of regression	6.065	Sum squared residual		4,193.327
	F-statistic	473.03	Durbin-Watson stat		1.239
	Prob. (F-statistic)	0.000	*N*(sample)		133

Table 5.
Model 5 – RAEA model with macro-finance and structural factors

Notes: ***, ** and *Indicate statistical significance at 1, 5 and 10% level, respectively; fixed-effect option was selected for estimation
Source: Authors' own estimation

Variable group	Variable	Coefficient	Std. error	*t*-statistic	Prob.
Bank-specific	CONSTANT	−3.215	2.430	−1.323	0.189
	SIZE	0.163	0.128	1.271	0.206
	FRISK	0.026	0.058	0.445	0.658
	LRISK	−0.001	0.432	−0.002	0.998
	CRISK	0.402***	0.103	3.899	<0.01
	ROE	6.320***	1.309	4.827	<0.01
	HHI_LOAN	0.001***	0.000	3.234	<0.01
Macro-finance	NIM	0.000	0.063	−0.005	0.996
	GDP	0.014	0.018	0.798	0.426
	INF_CPI	0.025	0.028	0.893	0.374
	REM	0.100	0.065	1.546	0.125
Structural	FINCRS	−0.017	0.297	−0.058	0.954
	COUP	−0.101	0.110	−0.918	0.360
Diagnostics	R^2	0.903	Mean dependent variable		3.211
	Adjusted R^2	0.888	S.D. dependent variable		1.934
	SE of regression	0.648	Sum squared residual		47.89
	F-statistic	58.99	Durbin-Watson stat		1.440
	Prob. (F-statistic)	0.000	*N* (sample)		133

Notes: ***Indicates statistical significance at 1%, level; fixed-effect option was selected for estimation
Source: Authors' own estimation

Table 6.
Model 6 – RORO A model with macro-finance and structural factors

remain consistent after including the macro-finance and structural variables in the estimations. The results are reported in Tables 4-6.

As noted, the net interest margin (NIM) has a negative association with bank stability in two out of three models (Tables 4-5) and it is statistically significant within the conventional levels. Thus, we reject *H7*. Relatively high NIM can discourage savers, and hence divert savings into consumption activities. Moreover, holding the demand for loans fixed (or increasing), a decrease in sources of funds like deposits will constraint bank loans, which, in turn, can affect bank profitability, and hence bank stability. Also, an increase in bank interest rates, *ceteris paribus*, does not necessarily increase the supply of funds immediately because investors would need time to re-adjust their investment portfolio. Hence, while NIM increases, there can be a minimal improvement in the sources of funds to support lending, and hence profitability, thus having a similar negative effect on bank stability. Similarly, a significant spread between the lending and savings interest can put pressure on the existing pool of borrowers, especially in times of economic slowdown. This increases the probability of default and could lead to an increase in non-performing loans.

The GDP growth rate, a measure of economic growth, has a positive relationship with bank stability (Tables 4-6), although not statistically significant within conventional levels. The positive association implies that expansion in economic activity such as investment and consumption activities are supported bank stability, and hence we do not reject *H8*.

Notably, inflation measured by the changes in the consumer price index (INF_CPI), is positively associated with bank stability; and it is statistically significant in two out of the three models (Tables 4-6). Thus, inflation and bank stability are positively linked, and hence, we reject *H9*. A moderately high inflation rate can signify economic expansion and growth in aggregate demand. In times of high inflation, purchasing power declines, and hence the real value of money. In such situations, borrowings for investments in assets become attractive than savings. This is plausible in markets like Fiji with its limited investment

opportunities in financial assets and capital controls. Moreover, a moderately rising inflation coupled with economic growth can spur real estate activity, which is mostly financed through borrowings and, hence linked to banking sector expansion. Consequently, this can improve bank assets, profitability, and hence stability.

Remittance inflow (REM) has a negative and statistically significant relationship with bank stability in two of the three models (Tables 4-5). Thus, we reject *H10*. It is likely that remittances are mainly used for the purpose of consumption, and hence withdrawn from the financial system without adding significantly to the conventional sources of funds that banks usually keep to meet the demand of loans. Moreover, remittances can be a substitute for borrowings, and hence reduce the reliance on loans from the borrower's point of view. In this regard, remittances can reduce the reliance on bank financing, at least to some extent, and hence reduce the interest income that could have been potentially generated in the absence of remittances. Moreover, remittances transferred through banking channels can have a momentary stopover, thus creating unexpected shocks in the funding pool, which can negatively influence bank stability.

The GFC denoted by FINCRS has a negative association with bank stability in Fiji (Tables 4-6). Thus, we do not reject *H11*. The result indicates that a financial crisis like GFC negatively affects bank stability in Fiji. Similarly, the domestic political uncertainties of 2000 and 2006 (COUP) are negatively associated with bank stability (Models IV-VI). As a result, we do not reject *H12*; and it is clear that political uncertainties are not favorable for bank stability.

5. Conclusion

In this study, we examine the determinants of bank stability using Fiji as a case. We invoke three theories that link banks' size, risk and stability. These are agency theory, charter value hypothesis (CVH) and too big to fail hypothesis (TBTFH). A balanced panel comprising of five commercial banks and two credit institutions over the period 2000 to 2018 was used. We use the fixed effect method for estimations.

Three measures of stability are used – Z-Score, RAEA and RAROA. The bank-specific variables used are SIZE, FRISK, LRISK, CRISK, ROE and HHI based on loans. The analyzes are extended with macro-finance variables (NIM, GDP, INF_CPI, REM) and structural variables like the GFC (FINCRS) and the domestic political uncertainty (COUP).

We note that variables SIZE, FRISK, CRISK and HHI have a positive effect on bank stability. It can be argued that large and dominant banks have the capacity to sustain loan losses and also achieve economies of scale and scope. Additionally, large banks have a wider pool of customers to select from which is advantageous in terms of credit scoring and creating a diversified loan portfolio. Also, large banks have the advantage of a good monitoring system, with relatively more resources and expertise. A higher HHI indicates higher market concentration. Thus, a few large and well-established dominant or leading banks ensure stability in the financial sector.

Funding risk is positively associated with bank stability. This implies that deposits and equity are important drivers of stability in Fiji's banking sector. It is important that banks attract sufficient deposits or recover existing loans as a source of funds to meet their ongoing lending commitments.

Credit risk, measured by loans to total asset ratio has a positive association. This indicates banks are generally stable with higher loans relative to total assets. However, liquidity risk, measured by cash to total asset ratio, has a negative association with bank stability, thus implying that retaining more cash in the balance sheet is not desirable. In this

regard, banks have to maintain an appropriate balance between the sources and uses of funds.

The results obtained from the extended models show that inflation is positively linked with bank stability. This could mean that banks in Fiji are able to track inflation and accordingly adjust or incorporate them in pricing their products. Furthermore, rising inflation creates more demand for assets, and hence the demand for loans.

Variables like net interest margin and remittances are negatively associated with bank stability. The negative association between NIM and stability implies that higher NIM can adversely affect bank stability. The negative relationship between remittances and bank stability is plausible when remittance inflow enters the financial system, however with a short-term stopover thus creating volatility in the sources of funds. On one hand, remittances can be an alternate source of finance and can increase demand, especially in the real estate sector while reducing the reliance on bank loans. On the other hand, an increase in the demand can create artificially high values of assets, and hence the demand for mortgages. While the latter may improve the assets of banks willing to provide loans, it must be noted that in times of economic uncertainty or when alternate sources of finance like remittances shrink, it can lead to a decrease in demand, and hence asset values and eventually leading to defaults. In summary, remittances inflow may not support not bank stability.

Additionally, the GFC and the domestic political uncertainties are negatively associated with bank stability implying that global financial turbulences and domestic political disturbances jeopardize the smooth functioning of banks and the financial sector in general and affect the overall financial stability of banks.

The study considered commercial banks and the NBFIs in a small island economy of Fiji. A common feature of these institutions is that they engage in savings and loans as one of their core operations. Some interesting observations are made in terms of bank stability, namely, a set of bank-specific, macro-finance and structural factors in a small island economy of Fiji. While the study is among the very few on bank stability in small island economies, it has limitations. To gain more comprehensive insights, the study can be extended to other financial institutions like insurance companies. Furthermore, replicating the studies to other small countries in the Pacific may permit interesting comparisons to be made with this study. However, this will be dependent on the availability of data. While a linear relationship between bank stability and its determinants is consistent with other studies in the literature, future research can explore non-linear effects including threshold effects of size on stability (Degl'Innocenti *et al.*, 2018). Finally, we acknowledge the findings of the study can be enriched by considering the effect of other factors such as non-interest income, the effects of natural disasters and the causality dynamics between bank-specific, macro-finance and structural factors, namely, bank stability.

Notes

1. For other variants of Z-score for measuring systemic risk, see Li *et al.* (2019).
2. Similar findings were obtained for saving banks for Germany (Beck *et al.*, 2009).

References

Acemoglu, D., Ozdaglar, A. and Tahbaz-Salehi, A. (2015), "Systemic risk and stability in financial networks", *American Economic Review*, Vol. 105 No. 2, pp. 564-608.

Adusei, M. (2015), "The impact of bank size and funding risk on bank stability", *Cogent Economics and Finance*, Vol. 3 No. 1, pp. 1-19.

Ali, M. and Puah, M. (2018), "Does bank size and funding risk effect banks' stability? A lesson from Pakistan", *Global Business Review*, Vol. 19 No. 5, pp. 1166-1186.

Ariss, R.T. (2010), "On the implications of market power in banking: evidence from developing countries", *Journal of Banking and Finance*, Vol. 34 No. 4, pp. 765-775.

Azmi, W., Ali, M., Arshad, S. and Rizvi, S.A.R. (2019), "Intricacies of competition, stability, and diversification: evidence from dual banking economies", *Economic Modelling*, Vol. 83, pp. 111-126.

Beck, T., Demirgüç-Kunt, A. and Levine, R. (2007), "Finance, inequality and the poor", *Journal of Economic Growth*, Vol. 12 No. 1, pp. 27-49.

Beck, T., Hesse, H., Kick, T. and von Westernhagen, N. (2009), "Bank ownership and stability: evidence from Germany", VOX CEPR Policy Paper, available at: https://voxeu.org/article/bank-ownership-and-stability-evidence-germany (accessed 7 April 2020).

Berger, A.N., Klapper, L.F. and Turk-Ariss, R. (2009), "Bank competition and financial stability", *Journal of Financial Services Research*, Vol. 35 No. 2, pp. 99-118.

Čihák, M. and Hesse, H. (2010), "Islamic banks and financial stability: an empirical analysis", *Journal of Financial Services Research*, Vol. 38 Nos 2/3, pp. 95-113.

Crutchley, C.E. and Hansen, R.S. (1989), "A test of the agency theory of managerial ownership, corporate leverage, and corporate dividends", *Financial Management*, Vol. 18 No. 4, pp. 36-46.

Davis, J.H., Schoorman, F.D. and Donaldson, L. (1997), "Toward a stewardship theory of management", *Academy of Management Review*, Vol. 22 No. 1, pp. 20-47.

Degl'Innocenti, M., Grant, K., Šević, A. and Tzeremes, N.G. (2018), "Financial stability, competitiveness and banks' innovation capacity: evidence from the global financial crisis", *International Review of Financial Analysis*, Vol. 59, pp. 35-46.

Dulare, C. (2011), "Banking services in Fiji: from consumers' perspective. A consumer council of Fiji report", Consumer Council of Fiji, Fiji, available at: www.consumersfiji.org/upload/Reports/CCF%20Bank%20Services%20Rpt.pdf (accessed 20 April, 2020).

Fiordelisi, F., Marques-Ibanez, D. and Molyneux, P. (2011), "Efficiency and risk in European banking", *Journal of Banking and Finance*, Vol. 35 No. 5, pp. 1315-1326.

Fu, X.M., Lin, Y.R. and Molyneux, P. (2014), "Bank competition and financial stability in asia pacific", *Journal of Banking and Finance*, Vol. 38, pp. 64-77.

Gabaix, X. and Landier, A. (2008), "Why has CEO pay increased so much?", *Quarterly Journal of Economics*, Vol. 123 No. 1, pp. 49-100.

Ghenimi, A., Chaibi, H. and Omri, M.A.B. (2017), "The effects of liquidity risk and credit risk on bank stability: evidence from the MENA region", *Borsa Istanbul Review*, Vol. 17 No. 4, pp. 238-248.

Giuliano, P. and Ruiz-Arranz, M. (2009), "Remittances, financial development, and growth", *Journal of Development Economics*, Vol. 90 No. 1, pp. 144-152.

Gounder, N. and Sharma, P. (2012), "Determinants of bank net interest margins in Fiji, a small island developing state", *Applied Financial Economics*, Vol. 22 No. 19, pp. 1647-1654.

Grynberg, R., Munro, D. and White, M. (2002), *Crisis: The Collapse of the National Bank of Fiji*, Crawford House Publishing Goolwa.

Hart, O. and Zingales, L. (2014), "Banks are where the liquidity is", National Bureau of Economic Research Working paper w20207, NBER, pp. 1-41.

Hoggarth, G., Reis, R. and Saporta, V. (2002), "Costs of banking system instability: some empirical evidence", *Journal of Banking and Finance*, Vol. 26 No. 5, pp. 825-855.

Hutchison, M.M. and Noy, I. (2005), "How bad are twins? Output costs of currency and banking crises", *Journal of Money, Credit, and Banking*, Vol. 37 No. 4, pp. 725-752.

Ibrahim, M.H. and Rizvi, S.A.R. (2017), "Do we need bigger islamic banks? An assessment of bank stability", *Journal of Multinational Financial Management*, Vol. 40, pp. 77-91.

Imbierowicz, B. and Rauch, C. (2014), "The relationship between liquidity risk and credit risk in banks", *Journal of Banking and Finance*, Vol. 40, pp. 242-256.

IMF (2016), "Small states resilience to natural disasters and climate change-role of the IMF", Washington, DC, 1 December.

Jensen, M.C. (1986), "Agency costs of free cash flow, corporate finance, and takeovers", *The American Economic Review*, Vol. 76 No. 2, pp. 323-329.

Kakes, J. and Nijskens, R. (2018), "Size of the banking sector: implications for financial stability", No. 1606, Netherlands Central Bank, Research Department.

Köhler, M. (2015), "Which banks are more risky? The impact of business models on bank stability", *Journal of Financial Stability*, Vol. 16, pp. 195-212.

Kosmidou, K. (2008), "The determinants of banks' profits in Greece during the period of EU financial integration", *Managerial Finance*, Vol. 34 No. 3, pp. 146-159.

Kumar, R.R. and Patel, A. (2014), "Exploring competitiveness in banking sector of a small island economy: a study of Fiji", *Quality and Quantity*, Vol. 48 No. 6, pp. 3169-3183.

Kumar, R.R., Stauvermann, P.J., Patel, A. and Prasad, S.S. (2018), "Determinants of non-performing loans in banking sector in small developing island states: a study of Fiji", *Accounting Research Journal*, Vol. 31 No. 2, pp. 192-213.

Li, X., Tripe, D., Malone, C. and Smith, D. (2019), "Measuring systemic risk contribution: the leave-one-out z-score method", *Finance Research Letters*, Vol. 36, available at: https://doi.org/10.1016/j.frl.2019.101316

Lodhia, S.K. and Burritt, R.L. (2004), "Public sector accountability failure in an emerging economy: the case of the national bank of Fiji", *International Journal of Public Sector Management*, Vol. 17 No. 4, pp. 345-359.

Marcus, A.J. (1984), "Deregulation and bank financial policy", *Journal of Banking and Finance*, Vol. 8 No. 4, pp. 557-565.

Matthews, K. and Thomson, J. (2014), *The Economics of Banking*, 3rd edition, John Wiley and Sons, Chichester.

Miller, S.M. and Noulas, A.G. (1996), "The technical efficiency of large bank production", *Journal of Banking and Finance*, Vol. 20 No. 3, pp. 495-509.

Mishkin, F.S. (1999), "Financial consolidation: dangers and opportunities", *Journal of Banking and Finance*, Vol. 23 No. 4, pp. 675-691.

Montagnoli, A. and Moro, M. (2018), "The cost of banking crises: new evidence from life satisfaction data", *Kyklos*, Vol. 71 No. 2, pp. 279-309.

Murphy, K.J. (1985), "Corporate performance and managerial remuneration: an empirical analysis", *Journal of Accounting and Economics*, Vol. 7 Nos 1/3, pp. 11-42.

Overton, J.D. (2003), "Understanding coups", *Asia Pacific Viewpoint*, Vol. 44 No. 3, pp. 351-355.

PFIP (2010), "Fiji financial services sector assessment. United nations development programme pacific Centre", available at: www.pfip.org/wp-content/uploads/2016/08/fssa_booklet_1.pdf (accessed 24 April 2020).

Prasad, K., Alam, M.S. and Sharma, P. (2018), "Finance and socio-economic development in Fiji: some stylized facts", Working Paper 5, Reserve Bank of Fiji.

Prasad, K., Karan, S., Javawardena, N., Alam, S. and Sharma, P. (2020), "Does finance matter for health in the PICs? A case study of Fiji", Working Paper 14, Griffith University, Queensland.

Reserve Bank of Fiji (RBF) (2019), "2017-18 Annual report of the reserve bank of Fiji", Suva.

Schaeck, K. and Cihák, M. (2014), "Competition, efficiency, and stability in banking", *Financial Management*, Vol. 43 No. 1, pp. 215-241.

Shahzad, S.J.H., Nor, S.M., Kumar, R.R. and Mensi, W. (2017), "Interdependence and contagion among industry-level US credit markets: an application of wavelet and VMD based copula approaches", *Physica A: Statistical Mechanics and Its Applications*, Vol. 466, pp. 310-324.

Sharma, P., Doca, E., Dakai, V. and Manoa, S. (2014), "An assessment of Fiji's banking sector on a global scale: 2000-2011" Working Paper 1, Reserve Bank of Fiji, pp. 1-31.

Tan, Y. (2016), "The impacts of risk and competition on bank profitability in China", *Journal of International Financial Markets, Institutions and Money*, Vol. 40, pp. 85-110.

Troug, H.A. and Sbia, R. (2015), "The relationship between banking competition and stability in developing countries: the case of libya", *International Journal of Economics and Financial Issues*, Vol. 5 No. 3, pp. 772-779.

Umar, M., Maijama'a, D. and Adamu, M. (2014), "Conceptual exposition of the effect of inflation on bank performance", *Journal of World Economic Research*, Vol. 3 No. 5, pp. 55-59.

Waleed, A., Pasha, A. and Akhtar, A. (2016), "Exploring the impact of liquidity on profitability: evidence from banking sector of Pakistan", *Journal of Internet Banking and Commerce*, Vol. 21 No. 3, pp. 1-12.

World Bank (2019), "World development indicators and global development finance", World Bank.

Zermeño, M.Á.T., Martínez, V.F. and Preciado, V.H.T. (2018), "Effects of inflation on financial sector performance: New evidence from panel quantile regressions", *Investigación Económica*, Vol. 77 No. 303, pp. 94-129.

Zhang, D. and Managi, S. (2020), "Financial development, natural disasters, and economics of the pacific small Island states", *Economic Analysis and Policy*, Vol. 66, pp. 168-181.

Appendix 1

Variable	Definition	Symbol	Expected sign	Source
Dependent variable				
Bank stability	Z-score comprises of ROA, equity-total assets and standard deviation of ROA	Z_BSTAB	N/A	RBF
	Risk-adjusted equity to assets ratio	BSTAB_RAEA	N/A	RBF
	Risk-adjusted return on assets ratio	BSTAB_RAROA	N/A	RBF
Independent variables				
Bank size	Natural logarithm of total assets	SIZE	+	RBF
Funding risk	Z-score computed as deposits to assets ratio divided by the standard deviation of deposits to assets ratio	FRISK	+	RBF
Bank-specific variables				
Liquidity risk	Cash at other depository institutions divided by total assets	LRISK	+	RBF
Credit risk	Total loans to total assets	CRISK	–	RBF
Profitability	Return on equity	ROE	+	RBF
Concentration ratio	Herfindahl-Hirschman index based on loans	HHI_LOAN	+	RBF
Macro-finance variables				
Net interest margin	Calculated as the difference of interest earned on loans and interest expenses on deposits divided by total assets	NIM	+	RBF
Economic growth rate	Yearly GDP growth rate in percentage	GDP	+	WDI
Inflation rate	Yearly inflation rate	INF_CPI	+	WDI
Remittances	Workers remittances as a percentage of GDP	REM	+	
Structural dummy variables				
Financial crisis	2007-2008 were taken as dummy variables for the financial crisis as these were the years where there was GFC	FINCRS	–	WDI
Political crisis	2000, 2002 and 2006 were taken as dummy variables for political crises as these were the years where there were political disturbances in the economy	COUP	–	WDI

Notes: RBF = Reserve Bank of Fiji (RBF, 2019); WDI = World Development Indicators (World Bank, 2019); N/A = Not applicable
Source: Authors' compilation

Table A1. Variable description, notations and expected signs

Variables	Mean	Maximum	Minimum	SD	Observations
Z_BSTAB (Z-score)	22.90	576.63	2.23	49.36	133
BSTAB_RAEA (ratio)	19.69	572.86	2.00	49.04	133
BSTAB_RAROA (Ratio)	3.21	8.95	−1.14	1.93	133
SIZE	12.79	14.94	10.64	1.24	133
FRISK (Z-score)	11.57	29.69	0.17	9.57	133
LRISK (ratio)	0.07	1.00	0.00	0.14	133
CRISK (ratio)	0.82	10.77	0.03	0.89	133
ROE (ratio)	0.21	0.94	−0.26	0.12	133
HHI LOAN (index)	2604	2929	2033	245.6	133
GDP (%)	2.13	5.60	−1.70	2.11	133
INF_CPI (%)	3.34	7.73	0.53	1.85	133
REM (%)	5.18	6.76	2.57	0.93	133

Table A2.
Descriptive statistics

Source: Authors' own estimation

Variables	SIZE	FRISK	LRISK	CRISK	ROE	HHI_LOAN	GDP	INF_CPI	REM	NIM
SIZE	1									
FRISK	−0.31	1								
LRISK	−0.24	0.15	1							
CRISK	−0.23	−0.02	0.23	1						
ROE	0.16	0.09	−0.06	−0.19	1					
HHI_LOAN	−0.27	−0.03	−0.01	0.10	0.02	1				
GDP	0.18	0.01	0.038	−0.14	−0.01	−0.43	1			
INF_CPI	0.01	0.01	0.04	0.08	−0.03	0.23	−0.22	1		
REM	0.03	0.06	−0.03	0.03	0.26	−0.09	0.16	−0.13	1	
NIM	−0.26	−0.04	0.07	−0.11	0.21	0.16	−0.01	−0.05	−0.3	1

Table A3.
Pearson correlation matrix

Source: Authors' own estimation

Variables	Z_BSTAB	SIZE	FRISK	LRISK	CRISK	ROE	HHI_LOAN	GDP	INF_CPI	REM	NIM
Z_BSTAB	1										
SIZE	−0.09	1									
FRISK	0.06	−0.31	1								
LRISK	0.16	−0.24	0.15	1							
CRISK	0.96	−0.23	−0.02	0.23	1						
ROE	−0.13	0.16	0.09	−0.06	−0.19	1					
HHI_LOAN	0.1	−0.27	−0.03	−0.01	0.1	0.02	1				
GDP	−0.15	−0.26	−0.04	0.07	−0.11	0.21	0.16	1			
INF_CPI	−0.12	0.18	0.01	0.04	−0.14	0	−0.43	0	1		
REM	0.09	0.01	0	0.04	0.07	−0.03	0.23	−0.05	−0.22	1	
NIM	0.02	0.03	0.01	−0.03	0.03	0.27	−0.09	−0.3	0.16	−0.14	1

Table A4.
Correlation matrix between the dependent and independent variables

Source: Authors' own estimation

Test statistic	Chi-sq statistic	Chi-sq.d.f	Prob.
Cross-section random	171.46	6	0.0000*

Note: **Represents significance at 0.01 level*
Source: Authors' own estimation

Table A5.
Summary of the
Hausman test

Appendix 2

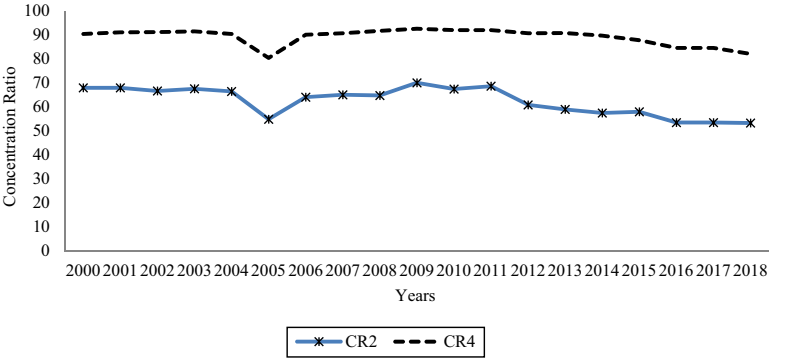


Figure A1.
Concentration ratios based on total assets

Source: Authors' compilation

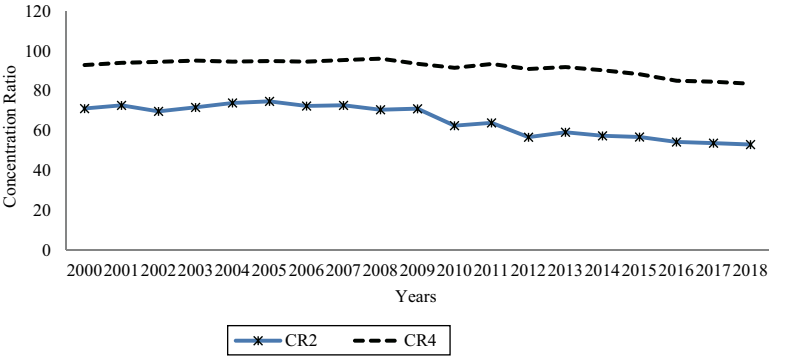


Figure A2.
Concentration ratios based on total deposits

Source: Authors' compilation

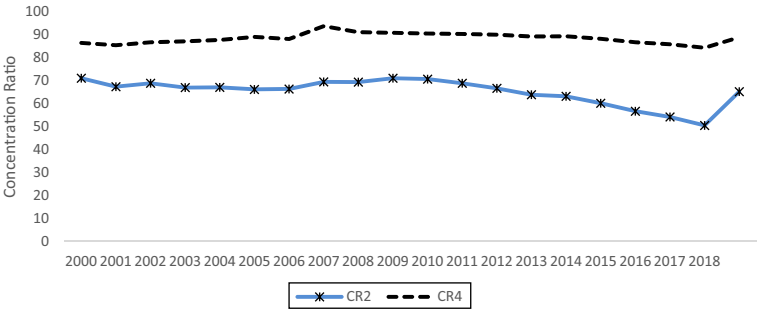
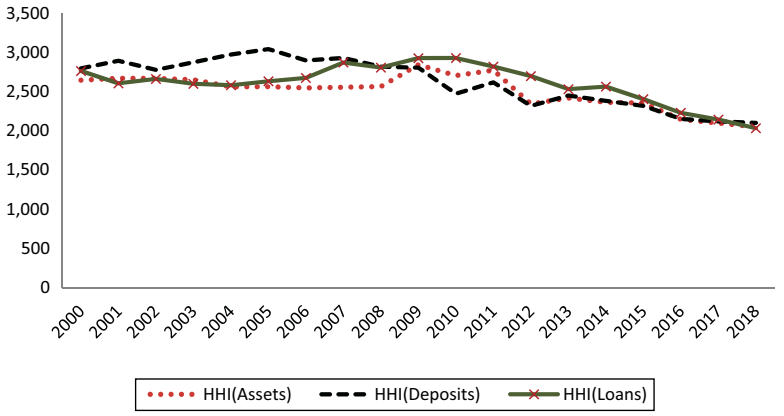


Figure A3.
Concentration ratios based on total loans

Source: Authors' compilation



Source: Authors' compilation

Figure A4.
HHI index based on total assets, total deposits and total loans

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