1. BANK CONCENTRATION and STABILITY in CENTRAL ASIA; the effect of CAPITAL REGULATION AND financial freedom

by Author Author

BANK CONCENTRATION AND STABILITY IN CENTRAL ASIA; THE EFFECT OF CAPITAL REGULATION AND FINANCIAL FREEDOM

ABSTRACT

In this study, the interrelation between bank concentration and stability was examined, focusing on the joint impact of capital regulation and financial openness. Using the data from the Global Financial Development Database provided by the World Bank and the Index of Financial Freedom from The Heritage Foundation and The Wall Street Journal, a sample of 5 countries in Central Asia was obtained, specifically during 1993-2017. The results showed that the relationship between bank concentration and stability supports the concentration-stability hypothesis. Moreover, higher concentration and well-capitalized banks increase financial stability. However, the effect of bank concentration and financial freedom on stability is negative and significant. Capital regulation and supervision from authority control in the financial sector need to be strengthened to solve financial instability.

Keywords: bank concentration, capital regulation, financial freedom, bank stability

INTRODUCTION

The banking sector has been greatly affected by the latest financial crisis. The insufficient discipline on banks through regulators and supervisors has motivated academics to reconsider the relationship between bank concentration and stability. Authorities need to decide whether the strength of bank consolidation threatens the sector's stability or it is helpful elsewhere.

The relationship between bank stability and concentration is addressed by two basic hypotheses, including concentration-fragility and concentration-stability. For instance, with concentrated markets, banks make large profits, a buffer against risks (Smith, 1984; Allen & Gale, 2000; Matutes & Vives, 2000; Márquez, 2002; Saez & Shi, 2004; Stever, 2007; Fungacova & Weill, 2009; Fernandez et al., 2010; Yaldiz & Bazzana, 2010; Turk-Ariss, 2010; Agoraki et al., 2011; Amidu & Wolfe, 2013; Soedarmono et al. 2013; Pak & Nurmakhanova, 2013; and Kasman & Kasman, 2015). Furthermore, research suggests a negative association between market concentration and financial stability. Market power might lead banks to charge borrowers exorbitant interest rates. Consequently, borrowers take excessive risks, raising the probability of default, a destabilizing financial effect (Boyd & De Nicolo, 2005; De Nicolo & Loukoianova, 2007; Berger et al., 2009; Boyd et al., 2009; Cipollini & Fiordelisi, 2009; Uhde & Heimeshoff, 2009; Nguyen et al. 2012; Fu et al., 2014; Bahri & Hamza, 2020). Also, there still no consensus on many studies analyzing the connections between capital regulation, financial liberalization, and bank stability. However, increased capitalization should assist banks in reducing default risk (Berger et al., 2009; Anginer et al., 2018; DeYoung et al., 2018; Abbas & Ali, 2020; Santoso et al., 2020). Similarly, increased capital may raise portfolio risk, leading to greater fragility (Koehn & Santomero, 1980; Calem & Rob,

1999; Bitar et al., 2018). The effects of financial liberalization on bank stability make unambiguous hypotheses. According to Allen & Gale (2000), Demirgüç-Kunt & Detragiache (1999) and Cubillasa & González, (2014), financial liberalization may lead to instability. Contrastingly, Kaminsky & Schmukler (2008); Santoso et al. (2020) reported a positive relationship between financial liberalization and bank stability.

In this paper, the empirical link between concentration and stability is built by investigating the joint impact of capital regulation and financial openness. Pak & Nurmakhanova (2013) assessed the influence of market power on bank risk However, the joint impact of capital regulation and financial openness on bank stability remains unexplored. Santoso et al. (2010) focused on the Asia-Pacific region when investigating the joint impact of capital regulation and financial openness on bank stability. In comparison, this study focuses on countries in Central Asia. Using a dataset retrieved from the Global Financial Development Database provided by the World Bank, a sample of 5 countries in Central Asia, specifically during 1993-2017, was obtained. Moreover, the Index of Financial Freedom variable from The Heritage Foundation and The Wall Street Journal was also used to measure financial openness. The study focused on Central Asia countries for three reasons. First, since the turn of the millennium, the region has recorded impressive economic growth. Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan, and Uzbekistan's aggregates of gross domestic product (GDP) grew an average of 7 percent per year during 2000-16 (OECD, 2018). Second, the financial system is sufficiently developed to contribute to economic growth at a different rate than the relatively well-established economies of central and eastern Europe (Djalilov & Piesse, 2011). Third, the average bank concentration in Central Asia has decreased since 2005, with a significant contribution from the Kyrgyz Republic and Tajikistan (Word Bank, 2017).

This study contributed to the empirical literature in two ways. First, it is one of the few studies that consider importance of bank stability, extending the literature on concentration fragility and stability in Central Asia. Second, it also extends the literature by assessing the determinants of the effect of capital regulation and financial openness on bank stability in Central Asia countries. This aspect was not considered in previous studies.

Section II and III of this paper discusses literature review and data and methodology, respectively. In section IV and V, empirical results, discussion, and conclusion are discussed.

LITERATURE REVIEW

The literature regarding the impact of bank concentration on stability can be categorized into two, specifically concentration-fragility and concentration–stability. Some empirical studies document the positive impact of bank concentration on stability. Matutes & Vives (2000) and Smith (1984) established that shareholders and management increase financial system stability by avoiding highly hazardous operations and choosing their customers in a concentrated banking market environment. This approach limits the possibility of a bank run. According to Saez & Shi (2004), in a concentrated system, the opportunity cost of bank bankruptcy is larger for the whole banking sector. This means that no bank has an interest in another bank's failure. Additionally, concentration enables large banks to facilitate access to information and reduces adverse selection problems and moral hazards (Márquez, 2002; Fernandez et al., 2010). Turk-Ariss (2010) stated that huge profits explain why higher market power enhances banking stability in developing countries. Amidu & Wolfe (2013) studied bank competition, revenue diversification, and financial stability. The results showed that greater competition increases the stability of banking. This is because banks were allowed to pursue income diversification in developed and developing countries from 2000 to 2007. According to Stever (2007), small banks are riskier because they have fewer diversification options, leading to increase profit volatility. According to Allen & Gale (2004), supervision is relatively easier in a less concentrated system with a small number of large institutions. a concentrated banking system with only a few large institutions. As a result, moral hazard issues are significantly reduced. A concentrated banking system has more market power can boost revenues and limit risks due to a strong market strength. As a result, the likelihood of a financial crisis is limited because bank insolvency is reduced. Yaldiz & Bazzana (2010) investigated the effect of market power on loan and overall bank risk indicators in Turkey. The results established some credence to the competition-stability hypothesis. According to Agoraki et al. (2011), market power negatively relates to banks' risk management. Soedarmono et al. (2013) stated that banks in less competitive markets are riskier since their capital ratios cannot cover additional risks, evidenced by higher-income volatility. However, this depends on the financial crisis in Asia and the mortal risk because of the bank size, which are vital systemically. According

to Pak & Nurmakhanova (2013), additional market strength significantly and positively affect bank stability. Fungacova & Weill (2009) and Kasman & Kasman (2015) supported8 the "concentration-stability hypothesis" in Russia and Turkey, respectively.

The second group supports the possibility of a negative relationship in the literature regarding concentration-fragility, which showed that a focused market power negatively affects bank stability. Berger et al. (2009) stated that higher concentrations hurt bank portfolios, confirming the concentration-fragility nexus. The bank with market power increases the loan rate, eliminating the least risky share of the customers. The risk of default will increase, leading to further bankruptcies. In general, very concentrated systems have greater risks, implying that the loan portfolio for bank risk-taking behavior is more negative. Boyd et al. (2009) showed that concentration has a positive and significant impact on the probability of bank failure. According to Nicolo & Loukoianova (2007), there is a significant positive relationship between concentration and failure. Boyd & De Nicolo (2005) stated that high market power make banks riskier. Regarding the impact of banking concentrations on financial distress, Cipollini & Fiordelisi (2009) reported that the higher level of banking concentrations gives the shareholder more chance to see the value in distress. Uhde & Heinshoff (2009) provide empirical evidence of the negative impact of the domestic banking concentration on the financial stability of European banks. Using a sample of commercial banks in the Asia-Pacific region, Fu et al. (2014) concluded that greater bank concentration at the national level promotes financial fragility. According to Nguyen et al. (2012), there is an inverse relationship between concentrations snd banking risks in South-East Asian countries. Between 2002 and 2015, Bahri & Hamza (2020) focused on the hypothesis of concentration-fragility in five European countries.

Bank capitalization and financial freedom may affect the concentration-stability nexus. There is still no consensus on many studies analyzing the relationship between capitalization and banking risk. The bank's capital ratio is viewed as a financial cushion that protects against various risks (Berger et al., 2009; Anginer et al., 2018; DeYoung et al., 2018). A larger capital ratio raises the cost of capital. This encourages banks to take more risks to cover the higher cost of capital (Koehn & Santomero, 1980; Calem & Rob, 1999; Bitar et al., 2018). Bahri & Hamza (2020) reported that an increase in the capital ratio increases the chance of a bank default in a less competitive banking market. An increase in capital buffer ratios in the USA decreases the banks' risks (Abbas & Ali, 2020). However, greater market strength in well-capitalized banks enhances bank stability in Asia (Santoso et al., 2020).

Like bank capitalization, financial liberalization/bank stability nexus has not been examined. According to Allen & Gale (2000), financial liberalization triggers a financial crisis due to investors' credit creation and risk transfer. Demirgüc-Kunt & Detragiache (1999) reported that financial liberalization pushed bank interest rates, leading to a banking crisis. However, Kaminsky & Schmukler (2008) stated that the crisis due to financial liberalization only occurred in developing countries with low institutional quality. Cubillasa & González, (2014) stated that financial freedom has a negative influence on bank stability in developing countries, not because of changes in bank competition, but for expanding the possibilities to take risks. Similarly, Santoso et al. (2020) established that lower levels of financial freedom with more financial sector authority control over banks lead to higher market power promote bank stability.

METHODOLOGY

This study assessed the interrelation between bank concentration and stability. it utilized a country-level dataset from the Global Financial Development Database. The sample is constituted by an deranged panel data consisting of 5 states in Central Asia (Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan) in 25 years. The Index of Financial Freedom variable from The Heritage Foundation and The Wall Street Journal was also included.

The dependent variable for the study is the bank stability Z-Score measure, a common measure in the related literature. Therefore, it is the standard deviations from the means of capital expenditure (Boyd and Runkle, 1993). The following formula is used to calculate the score:

$$Z - Score_{i,t} = \frac{ROA_{i,t} + EQ/TA_{i,t}}{STDV\ ROA_{i,t}} \tag{1}$$

where ROA is the return on assets for country i at time t, EQ/TA shows equity to total assets ratio, while STDV(ROA) indicate standard deviation of return on assets.

The main explanatory variables of interest consisted of the concentration ratio (CR), Capital requirements (CAR), and the Index of Financial Freedom (FIN). Following Pak & Nurmakhanova (2013), Cubillasa & González (2014), Kasman & Kasman (2015) Bahri & Hamza (2020), and Santoso et al. (2020), concentration was measured using the five largest banks. Capital Regulation measures the capital adequacy ratio, while the degree of financial liberalization measures the index of financial freedom. Several control variables were also considered, including efficiency, overhead, bank diversification, profitability, and economic growth (Table 1).

Table 1: Definition and Measure Variables

Variables	Symbol	Definition and measure	Expected Sign
Dependent			
Bank Stability	ZSCORE	(ROA+(equity/assets))/stdv(ROA); stdv(ROA) is the standard deviation of ROA. ROA, equity, and assets are country-level aggregate	
Independent			
Bank Concentration		The share of assets of the five largest banks	+/-
Capital Regulation	CAR	Bank regulatory capital to risk-weighted assets (%)	+
Financial Freedom	FIN	Index of Financial Freedom	+
Control			
Efficiency	EFI	Bank cost to income ratio (%)	-
Overhead	OVE	Bank overhead costs to total assets (%)	-
Bank Diversification	NII	Bank non-interest income to total income (%)	+
Profitability	NIM	Bank net interest margin (%)	+
Economic Growth	GDP	Growth GDP per capita	+

The analysis took place in 3 steps. In the initial step bank concentration, capital regulation, and financial openness were degenerated on bank stability and several control variables. In the 2nd and 3rd steps, Eq. (3) and Eq. (4) were adjusted by involving the interaction terms of bank concentration and capital regulation, bank concentration and financial freedom index to bank stability, respectively, as shown in the following equation:

$$ZSCORE_{i,t} = \alpha_{i,t} + \beta_1 CR_{i,t} + \beta_2 CAR_{i,t} + \beta_3 FIN_{i,t} + \beta_4 EFI_{i,t} + \beta_5 OVE_{i,t} + \beta_6 NII_{i,t} + \beta_7 NIM_{i,t} + \beta_8 GDP_{i,t} + \varepsilon_{i,t} \tag{2}$$

$$ZSCORE_{i,t} = \alpha_{i,t} + \beta_1 CR_{i,t} + \beta_2 CAR_{i,t} + \beta_3 CR * CAR_{i,t} + \beta_4 EFI_{i,t} + \beta_5 OVE_{i,t} + \beta_6 NII_{i,t} + \beta_7 NIM_{i,t} + \beta_8 FIN_{i,t} + \beta_9 GDP_{i,t} + \varepsilon_{i,t} \tag{3}$$

$$ZSCORE_{i,t} = \alpha_{i,t} + \beta_1 CR_{i,t} + \beta_2 FIN_{i,t} + \beta_3 CR * FIN_{i,t} + \beta_4 EFI_{i,t} + \beta_5 OVE_{i,t} + \beta_6 NII_{i,t} + \beta_7 NIM_{i,t} + \beta_8 CAR_{i,t} + \beta_9 GDP_{i,t} + \varepsilon_{i,t} \tag{4}$$

A static panel data analysis with country-level and year-fixed effects was used to estimate all models. A regression of fixed effects is an assessment technique used in the data set of a tablet. It makes it possible to control individual characteristics that have been unnoticed in time but can be correlated with independent variables observed. The Hausman test determined the possibility of using a fixed effect instead of a random effect model. This means the random effect estimator is not consistent, hence the fixed-effect method is preferred (Hill et al. 2018).

DISCUSSION

Table 2 presents the descriptive statistics of the entire aspects examined. The mean SCORE is 10.171, with a standard deviation of 6.7867. The average of the variables is larger than the standard deviation, meaning it might be a perfect representation for estimating. Table 3 shows that the correlation matrix is not highly correlated with the explanatory variables, and the VIF (Variance Inflation Factor) is less than 10, indicating that multicollinearity is not an issue.

Table 2: Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max.
ZSCORE					
CR					
CAR					
FIN					
EFI					
OVE					
NII					
NIM					
GDP					

Source: author's work.

Table 3: Multicollinearity Test (VIF)

Variables	CR	CAR	FIN	EFI	OVE	NII	NIM	GDP		VIF
CR										
CAR										
FIN										
EFI										
OVE										
NII										
NIM										
GDP										

Source: author's work.

Table 4 presents empirical results regarding the effect of bank concentration, capital regulation, and financial openness in banking. Concentration is positively and significantly linked to stability. According to the results, significant concentration in the banking system is associated with higher stability, supporting the concentration-stability hypothesis. It is in line with the findings of previous studies by Yaldiz & Bazzana (2010), Agoraki et al. (2011), Pak & Nurmakhanova (2013), Fungacova & Weill (2009), and Kasman & Kasman (2015). Moreover, the capital regulation coefficient is positive and statistically significant at the 1% level in all regression models. Therefore, banks that derived a significant proportion of capital to risk-weighted assets often report a greater financial stability. This supports the assertion that strengthening capitalization reduces bank risk. However, financial liberalization is not significantly related to the Z-score.

Table 4: Bank concentration and Bank Stability

Explanatory Variables	Dependent Variable: SCORE		
	I	II	III
CR			
CAR			
FIN			
EFI			
OVE			
NII			
NIM			
GDP			
Constant			

R Squared			
F Test			
Prob > F			
Observation			

Source author's work.
Note: *Levels of significance at 10%, **Levels of significance at 5%, and ***Levels of significance at 1%

In Table 5, the impact of the interaction term between bank concentration and capitalization on financial stability is examined. Table 5 shows that bank concentration positively and significantly influences the financial stability with greater capitalization. The positive sign of the coefficient proves that the occurrence of well-capitalized banks increases with bank stability. As a result, it can be concluded that the first transmission channel of bank concentration on financial stability is by capitalization. Therefore, banks with higher concentration and well-capitalized increase financial stability. The empirical findings provide Berger et al. (2009) and Santoso et al. (2020).

Table 5: Bank concentration, Capital Regulation, and Bank Stability

Explanatory Variables	Dependent Variable: SCORE	
	I	II
CR		
CAR		
CR*CAR		
EFI		
OVE		
NII		
NIM		
FIN		
GDP		
Constant		
R Squared		
F Test		
Prob > F		
Observation		

Source author's work.
Note: *Levels of significance at 10%, **Levels of significance at 5%, and ***Levels of significance at 1%

Table 6 shows the outcome of interacting bank concentration with financial openness measured by the Index of Financial Freedom. The interaction term between bank concentration and financial openness is negative and significant on bank stability. The results imply that higher banking concentration negatively affects bank stability in countries with greater financial freedom. This is in line with Cubillasa & González, (2014), which stated that due not to changes in bank competition, financial freedom negatively affects banking stability in developing countries and expands opportunities for taking risks. These findings are also consistent with Santoso et al. (2020), which established that banks with lower degrees of financial freedom and more financial sector authority oversight in Asia are more likely to benefit from increased market power, promoting stability.

Table 6: Bank concentration, Financial Freedom and Bank Stability

Explanatory Variables	Dependent Variable: SCORE	
	I	II
CR		

FIN		
CR*FIN		
EFI		
OVE		
NII		
NIM		
CAR		
GDP		
Constant		
R Squared		
F Test		
Prob > F		
Observation		

Source: author's work.

Note: *Levels of significance at 10%, **Levels of significance at 5%, and ***Levels of significance at 1%

CONCLUSION AND RECOMMENDATION

This study examined the correlation between bank concentration and stability in 5 Central Asia countries. The study used a dataset from the Global Financial Development Database during 1993-2017. The Index of Financial Freedom from The Heritage Foundation and The Wall Street Journal helped determine financial openness. Bank concentration and stability had a significant positive correlation. Therefore, this study supports the concentration-stability hypothesis. Furthermore, higher concentration and well-capitalized banks improves financial stability. However, the relationship between bank concentration and financial openness is negative and significant on bank stability. This indicates that higher bank concentration followed by financial openness makes it easier to take higher risks and reduces their incentives to behave prudently. This paper presents at least two policy consequences about banking reform in Central Asian countries, specifically during financial instability. First, the importance of capital regulation as a tool for increasing bank stability is highlighted. Second, regarding potential negative influence of financial openness on stability through increases in bank concentration helps deal with financial instability.

ABOUT THE AUTHORS

Rizky Yudaruddin, email: rizky.yudaruddin@feb.unmul.ac.id

Rizky Yudaruddin is a Lecturer in the Department of Management, Faculty of Economics and Business, Mulawarman University, Samarinda, Indonesia. His works focus on Banking Sector in Indonesia and Asia countries.

1. BANK CONCENTRATION and STABILITY in CENTRAL ASIA; the effect of CAPITAL REGULATION AND financial freedom

1 Wimboh Santoso, Inka Yusgiantoro, Wahyoe Soedarmono, Agustinus Prasetyantoko. "The bright side of market power in Asian banking: Implications of bank capitalization and financial freedom", Research in International Business and Finance, 2021
Publication

3%

2 Mohamed Sami Ben Ali, Timoumi Intissar, Rami Zeitun. "Banking Concentration and Financial Stability. New Evidence from Developed and Developing Countries", Eastern Economic Journal, 2018
Publication

2%

3 Elena Cubillas, Francisco González. "Financial liberalization and bank risk-taking: International evidence", Journal of Financial Stability, 2014
Publication

1%

4 Muhammad Natsir, Wahyoe Soedarmono, Wahdi Salasi April Yudhi, Irwan Trinugroho, Ari

1%

Warokka. "Foreign penetration, competition, and credit risk in banking", Borsa Istanbul Review, 2019
Publication

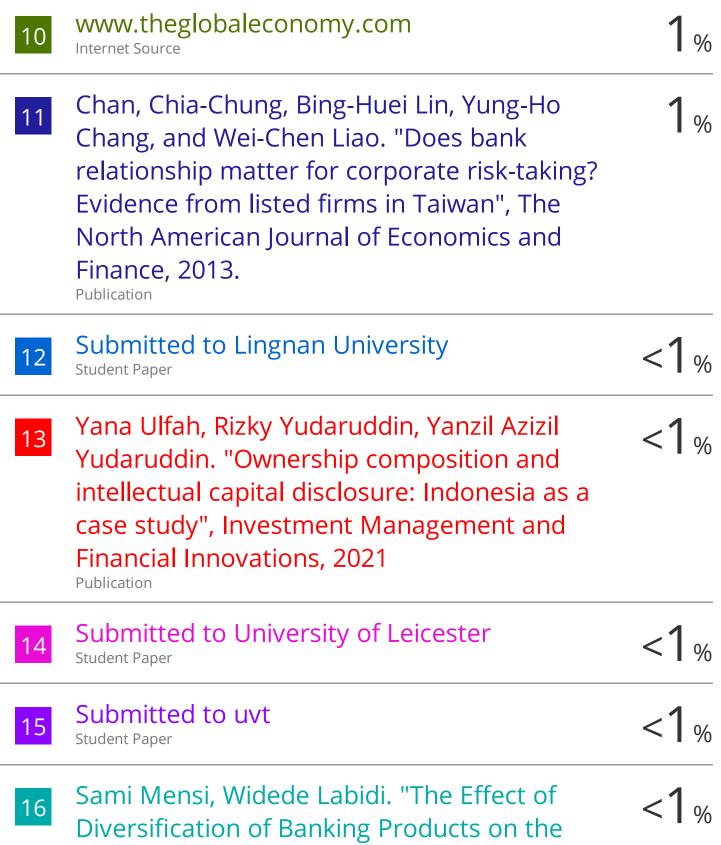5   pdfs.semanticscholar.org   1 %
Internet Source

6   Olga Pak, Mira Nurmakhanova. "The Effect of   1 %
Market Power on Bank Credit Risk-Taking and
Bank Stability in Kazakhstan", Transition
Studies Review, 2013
Publication

7   Zhiqiang Lu, Junjie Wu, Jia Liu. "Bank   1 %
concentration and SME financing availability:
the impact of promotion of financial inclusion
in China", International Journal of Bank
Marketing, 2020
Publication

8   Emmanuel Sarpong-Kumankoma, Joshua   1 %
Yindenaba Abor, Anthony Q. Q. Aboagye,
Mohammed Amidu. "Economic freedom,
competition and bank stability in Sub-Saharan
Africa", International Journal of Productivity
and Performance Management, 2020
Publication

9   Li, Mingsheng, and Xin Zhao. "Impact of   1 %
leveraged ETF trading on the market quality
of component stocks", The North American
Journal of Economics and Finance, 2014.

Publication

10	www.theglobaleconomy.com	1 %
	Internet Source	

11	Chan, Chia-Chung, Bing-Huei Lin, Yung-Ho Chang, and Wei-Chen Liao. "Does bank relationship matter for corporate risk-taking? Evidence from listed firms in Taiwan", The North American Journal of Economics and Finance, 2013.	1 %
	Publication	

12	Submitted to Lingnan University	<1 %
	Student Paper	

13	Yana Ulfah, Rizky Yudaruddin, Yanzil Azizil Yudaruddin. "Ownership composition and intellectual capital disclosure: Indonesia as a case study", Investment Management and Financial Innovations, 2021	<1 %
	Publication	

14	Submitted to University of Leicester	<1 %
	Student Paper	

15	Submitted to uvt	<1 %
	Student Paper	

16	Sami Mensi, Widede Labidi. "The Effect of Diversification of Banking Products on the Relationship between Market Power and Financial Stability", American Journal of Economics and Business Administration, 2015	<1 %

26   Peterson K. Ozili. "Does competence of central bank governors influence financial stability?", Future Business Journal, 2020
Publication

<1 %

27   Submitted to University of Macau
Student Paper

<1 %

28   docplayer.net
Internet Source

<1 %

29   www.icanig.org
Internet Source

<1 %

30   www.rug.nl
Internet Source

<1 %

31   Gamze Ozturk Danisman, Pelin Demirel. "Bank risk-taking in developed countries: The influence of market power and bank regulations", Journal of International Financial Markets, Institutions and Money, 2019
Publication

<1 %

32   Sok-Gee Chan, Eric H.Y. Koh, Fauzi Zainir, Chen-Chen Yong. "Market structure, institutional framework and bank efficiency in ASEAN 5", Journal of Economics and Business, 2015
Publication

<1 %

33   Hien Thu Phan, Sajid Anwar, W. Robert J. Alexander, Hanh Thi My Phan. "Competition,

<1 %

efficiency and stability: An empirical study of East Asian commercial banks", The North American Journal of Economics and Finance, 2019

Publication

---

34   Martin Boďa, Emília Zimková. "Overcoming the loan-to-deposit ratio by a financial intermediation measure – A perspective instrument of financial stability policy", Journal of Policy Modeling, 2021

Publication

<1 %

---

35   Wimboh Santoso, Inka Yusgiantoro, Wahyoe Soedarmono, Agustinus Prasetyantoko. "The bright side of market power in Asian banking: Implications of bank capitalization and financial freedom", Research in International Business and Finance, 2020

Publication

<1 %