

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

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ABSTRACT

In this study, the interrelation between bank concentration and stability is 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 five countries in Central Asia was obtained, specifically during 1993-2017. The results show 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

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INTRODUCTION

The financial sector's development is critical to economic development and is frequently used as a barometer of a country's success (Svirydzenka, 2016). However, disparities in the development of each country's financial sector can result in a divide between developing and developed countries. The Asian Region exemplifies the development divide between developing and developed countries, particularly in the financial sector (Svirydzenka, 2016; Shen & Lin, 2007). Moreover, the post-global financial crisis period indicates that increasing financial stability and performance in Asian banking is critical. This is because, as Vinayak et al. (2016) point out, Asian banks perform better than banks in other parts of the world, and hence have a significant impact on global banking stability and performance.

Surprisingly, since the turn of the millennium, Central Asian countries have 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) and 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). In comparison to Japan and South Korea, the productivity levels of Central Asian countries seem to have narrowed the productivity gap (Yormirzoev, 2021). However, financial stability in Central Asian countries has a propensity to worsen. For example, the 2015 banking crisis significantly eroded public confidence in the financial system's stability in Tajikistan (OECD, 2018). Meanwhile, other nations such as Uzbekistan,

Kazakhstan, and the Kyrgyz Republic have seen a drop in bank stability in recent years (World Bank, 2017).

At the same time, the average bank concentration in Central Asia has decreased since 2005, with a significant contribution from the Kyrgyz Republic and Tajikistan (World Bank, 2017). Indeed, Fu et al. (2014) demonstrate that increased bank market dominance in Asia benefits financial stability. However, there is no consensus on the bank concentration - stability hypothesis. 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). Therefore, authorities need to decide whether the strength of bank consolidation threatens the sector's stability, or it is helpful elsewhere.

Additionally, Central Asian countries remain classified as "mostly unfree" or "repressed" in terms of economic freedom (The Heritage Foundation, 2021). Banking dominates the financial sector, which is underdeveloped and lacks an effective regulatory infrastructure. As a result, credit costs continue to be high. Indeed, there is still no consensus on many studies analyzing the connections between capital regulation, financial liberalization, and bank stability. The effects of financial liberalization on bank stability make unambiguous hypotheses. According to Allen and Gale (2000), Demirgüç-Kunt and Detragiache (1999) and Cubillas and González,

(2014), financial liberalization may lead to instability. Contrastingly, Kaminsky and Schmukler (2008) and Santoso et al. (2020) reported a positive relationship between financial liberalization and bank stability. Moreover, 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). This study is motivated by this problem, providing an initial exploration of the role of financial freedom and capitalization on financial stability in Central Asia.

In this paper, the empirical link between concentration and stability is built by investigating the joint impact of capital regulation and financial openness. Using a dataset retrieved from the Global Financial Development Database provided by the World Bank, a sample of five 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 were also used to measure financial openness. This study finds that bank concentration and stability have a significant positive correlation. Therefore, this study supports the concentration-stability hypothesis. Furthermore, higher concentration and well-capitalized banks improve financial stability. However, the relationship between bank concentration and financial openness is negative and significant on bank stability. This implies that a combination of increased bank concentration and financial openness is damaging to bank stability.

This study contributes to the empirical literature in two ways. First, Pak and 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. (2020) 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. Second, it is one of few studies that consider the

importance of bank stability, extending the literature on concentration fragility and stability in Central Asia. Many studies on bank stability in Asia focus on Southeast and East Asia (Islam, et al. 2020; Soedarmono, et al 2013; Phan et al., 2019; Nguyen, et al., 2012;) or the Asia Pacific (Santoso et al., 2020; Fu et al., 2014). Finally, 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 (Pak & Nurmakhanova, 2013).

Sections II and III of this paper discuss the literature review and data and methodology, respectively. In sections IV and V, empirical results, discussion, and conclusion are elaborated.

LITERATURE REVIEW

Literature regarding the impact of bank concentration on stability can be categorized into two groups, specifically concentration-fragility and concentration-stability. Some empirical studies document the positive impact of bank concentration on stability. Matutes and 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 and 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 and 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 increased profit volatility. According to Allen and Gale (2000), supervision is relatively easier in a less concentrated system with a small number of large institutions in concentrated banking system with only a few large institutions. As a result, moral hazard issues are significantly reduced. A concentrated banking system that has more market power can boost revenues and limit risks due to strong market strength. As a result, the likelihood of a financial crisis is limited because bank insolvency is reduced. Yaldiz and Bazzana (2010) investigated the effect of market power on loans 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 is vital systemically. According to Pak and Nurmakhanova (2013), additional market strength significantly and positively affects bank stability. Fungacova and Weill (2009) and Kasman and Kasman (2015) supported 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 and Loukoianova (2007), there is a significant

positive relationship between concentration and failure. Boyd and De Nicolo (2005) stated that high market power makes banks riskier. Regarding the impact of banking concentrations on financial distress, Cipollini and Fiordelisi (2009) reported that the higher level of banking concentrations gives the shareholder more chance to see the value in distress. Uhde and Heimeshoff (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 and banking risks in South-East Asian countries. Between 2002 and 2015, Bahri and 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 and 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, the financial liberalization/bank stability nexus has not been examined. According to Allen and Gale (2000), financial liberalization triggers a financial crisis due to investors' credit creation and risk transfer. Demirgüç-Kunt and Detragiache (1999) reported that financial liberalization

pushed bank interest rates, leading to a banking crisis. However, Kaminsky and Schmukler (2008) stated that the crisis due to financial liberalization only occurred in developing countries with low institutional quality. Cubillasa and 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 assesses the interrelation between bank concentration and stability. It utilizes a country-level dataset from the Global Financial Development Database. The sample is constituted by unbalanced panel data consisting of five 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 were 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 & Runkle, 1993). The following formula is used to calculate the score:

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

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 consist of the concentration ratio (CR), capital requirements (CAR), and the Index of Financial Freedom (FIN). Following Pak and Nurmakhanova (2013), Cubillasa and González (2014), Kasman and Kasman (2015) Bahri and 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 are 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	CR	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, Eq. (1). In the 2nd and 3rd steps, Eq. (2) and Eq. (3) 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:

$$ZSCORE_{i,t} = \alpha_{i,t} + \beta_1 CR_{i,t} + \beta_2 CAR_{i,t} + \beta_3 FIN_{i,t} + \beta_4 EFI_{i,t} + \beta_5 OVE_{i,t} + \beta_6 NII_{i,t} + \beta_7 NIM_{i,t} + \beta_8 GDP_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$ZSCORE_{i,t} = \alpha_{i,t} + \beta_1 CR_{i,t} + \beta_2 CAR_{i,t} + \beta_3 CR * CAR_{i,t} + \beta_4 EFI_{i,t} + \beta_5 OVE_{i,t} + \beta_6 NII_{i,t} + \beta_7 NIM_{i,t} + \beta_8 FIN_{i,t} + \beta_9 GDP_{i,t} + \varepsilon_{i,t} \quad (2)$$

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

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	98	10.171	6.7867	0.7571	27.035
CR	56	82.746	13.302	52.790	100
CAR	55	22.349	6.3416	9.50	45.28
FIN	100	29.4	18.136	10	70
EFI	98	53.428	16.201	19.895	103.78
OVE	93	5.0999	3.9419	0.3208	23.713
NII	98	48.055	16.652	7.1428	88.157
NIM	93	5.8388	3.8232	0.4108	18.845
GDP	120	0.0322	0.0646	-0.2249	0.1512

Source: author's work.

Table 3: Multicollinearity Test (VIF)

Variables	CR	CAR	FIN	EFI	OVE	NII	NIM	GDP	VIF
CR	1.0000								2.55
CAR	0.4541	1.0000							3.47
FIN	-0.0877	-0.3631	1.0000						2.70
EFI	0.4088	0.7479	-0.4422	1.0000					4.89
OVE	0.5419	0.6153	-0.1738	0.4215	1.0000				4.15
NII	0.1232	0.4645	-0.7542	0.5533	0.2071	1.0000			3.77
NIM	0.4854	0.2147	0.2188	-0.1481	0.6502	-0.3542	1.0000		6.02
GDP	0.2646	0.0703	-0.3298	0.0380	0.0384	0.2415	-0.0971	1.0000	1.49

Source: author's work.

Table 4 presents empirical results regarding the effects 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 and Bazzana (2010), Agoraki et al. (2011), Pak and Nurmakhanova (2013), Fungacova and Weill

(2009), and Kasman and 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		
	(1)	(2)	(3)
CR	0.0703*** (0.0222)	0.0596*** (0.0200)	0.0689** (0.0274)
CAR	0.1496** (0.0673)	0.2016** (0.0856)	0.2079** (0.0877)
FIN	-1.1816 (2.5924)	0.0342 (0.0218)	0.0288 (0.0245)

Table 4: Continued

EFI		-0.0194 (0.0278)	-0.0197 (0.0282)
OVE		0.2993* (0.1641)	0.3052* (0.1667)
NII		-0.0254 (0.0331)	-0.0238 (0.0337)
NIM		0.0819*** (0.1548)	0.0749 (0.0541)
GDP			-4.1924 (8.2851)
Constant	-1.1816 (2.5924)	-1.8954 (3.0088)	-2.3831 (3.1982)
R Squared	0.6851	0.7839	0.8102
F Test	4.80	4.59	3.94
Prob > F	0.0072	0.0016	0.0034
Observation	39	39	39

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 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 which are well-capitalized increase financial stability. The empirical findings support Berger et al. (2009) and Santoso et al. (2020).

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

Explanatory Variables	Dependent Variable: ZCORE	
	(1)	(2)
CR	-0.1716* (0.0862)	-0.1877* (0.1025)
CAR	0.7838** (0.3677)	-0.8188* (0.4057)
CR*CAR	0.0110** (0.0040)	0.0113** (0.0043)
EFI	-0.0143 (0.0256)	-0.0057 (0.0262)
OVE	0.2190 (0.1547)	0.2092 (0.1561)
NII	-0.0206 (0.0303)	-0.0103 (0.0311)
NIM	0.1869 (0.1511)	0.2616 (0.1604)
FIN		0.0333 (0.0224)
GDP		4.3285 (8.2245)
Constant	18.9426** (6.9526)	17.6992** (8.3062)

Table 5: Continued

R Squared	0.7685	0.7004
F Test	6.04	4.98
Prob > F	0.0002	0.0006
Observation	39	39

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 Cubillas and González, (2014), who stated that due to no

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), who 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	
	(1)	(2)
CR	0.2258*** (0.0742)	0.2267*** (0.0758)
FIN	0.3085*** (0.1204)	0.3168** (0.1323)
CR*FIN	-0.0036*** (0.0015)	-0.0037*** (0.0016)
EFI	-0.0314 (0.0264)	-0.0316 (0.0269)
OVE	0.2305 (0.1556)	0.2270 (0.1599)
NII	-0.0654* (0.0353)	-0.0669** (0.0371)
NIM	0.0131 (0.1471)	0.0137 (0.1499)
CAR	0.2902*** (0.0884)	0.2902*** (0.0900)
GDP		1.3623 (8.1447)
Constant	-13.3702** (5.7009)	13.4863** (5.8477)
R Squared	0.7726	0.7598
F Test	5.31	4.55
Prob > F	0.0005	0.0011
Observation	39	39

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 examines the correlation between bank concentration and stability in five Central Asian 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 have a significant positive correlation. Therefore, this study supports the concentration-stability hypothesis. Furthermore, higher concentration and well-capitalized banks improve financial stability. However, the relationship between bank concentration and financial openness is negative and significant on bank stability. This implies that a combination of increased bank concentration and financial openness is damaging to bank stability. Empirical findings indicate that banks in nations with a higher degree of government control and a lesser degree of financial openness are likely to benefit from increased bank concentration, which tends to promote bank stability. This findings on the benefits of increased authority control in the financial sector in terms of enhancing the beneficial effect of bank concentration emphasize the critical role of financial regulation in enhancing bank stability and reducing risk-taking.

This paper presents 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, in light of the potential negative impact of financial openness on stability via increased bank concentration, authorities' control over banking must be strengthened in order to address financial instability.

This study has limitations, the most significant of which is that it uses country-level data and thus cannot control the size and ownership of banks. Therefore, further research is recommended using bank-level data and a more comprehensive analysis of bank stability by distinguishing between different types of banks, such as state-owned and private banks, or large and small banks.

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