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BANK CONCENTRATION AND ENTERPRISE BORROWING COST RISK: EVIDENCE FROM ASIAN MARKETS

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ABSTRACT

Based on data from nine Asian markets, this study investigates the relationship between bank concentration and the borrowing cost risk of firms. Over the study period, the concentration of banks increased in the developed countries and decreased in developing countries. After the 2007–2008 financial crisis, the borrowing cost risk increased in both the developed and developing economies. The empirical evidences show that bank concentration is positively related to the borrowing cost risk for developed economies only.

Keywords: Asia, Bank concentration, Borrowing cost risk, Competition, HHI, Logistic regression.
JEL Classification: D40, G20.

Contribution/ Originality

This paper's primary contribution is finding that, because of the liberalization of financial markets, competition among the banks in developing countries became stronger and bank concentration decreased. However, lower bank concentration did not result in a lower enterprise borrowing cost risk.

1. INTRODUCTION

Many banking studies (Molyneux and Thornton, 1992; Berger, 1995; Mirzaei *et al.*, 2013) report a positive relationship between concentration and profitability. Berger (1995) propose the structure-conduct performance (SCP) hypothesis and explain that banks in a concentrated banking system can impose higher loan rates. Mirzaei *et al.* (2013) assert that, as competition declines, banks earn more rents by charging higher interest rates. Boyd and De Nicolo (2005) believe that

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higher loan rates would imply higher risk for bank borrowers. Motivated by previous studies, this paper utilizes data from nine Asian markets over the period 2003-2011 to investigate empirically the relationship between bank concentration and the borrowing cost risk of firms.

The determinants of bank performance have attracted the interest of academic researchers (Bikker and Hu, 2002; Athanasoglou *et al.*, 2008; Mirzaei *et al.*, 2013). Numerous variables have been proposed for examining the effects of bank-specific, industry-level, and macroeconomic factors that affect profitability, such as bank size (Short, 1979; Smirlock, 1985), liquidity and management quality (Bourke, 1989), credit risk (Miller and Noulas, 1997), and inflation and interest rates (Bourke, 1989; Molyneux and Thornton, 1992; Perry, 1992).

Bank concentration, which represents market structure and power, is an industry-level determinant of bank profitability. The SCP hypothesis purports that increased market power yields monopolistic profits (Berger, 1995). Bourke (1989), Molyneux and Thornton (1992) and Dietrich and Wanzenried (2010) conclude that increased concentration indicates an increasing deviation from a competitive market structure, which leads to monopolistic profits. Mirzaei *et al.* (2013) illustrate that greater market power leads to higher bank profitability in advanced economies. However, market structure hypotheses do not support the profitability of emerging banks.

To improve profitability, a bank can enhance the efficiency of internal management to reduce costs. Meanwhile, external market power and competition could have a significantly effect on a bank's ability to generate revenue. A highly competitive environment could force banks to pursue riskier for loan and investment policies and facilitate better credit conditions for corporations, such as low credit requirements, and low borrowing rate, and high credit levels (Boyd and De Nicolo, 2005; Berger *et al.*, 2009). Therefore, a firm's risk can be reduced.

By contrast, in a more concentrated environment, a bank's ability to generate profit increases in conjunction with the concentration of the banking industry because the bank can pay less interest on deposits and collect more interest on loans and investments. In other words, in a low-competition (i.e., high concentration) market, banks may require high-quality loans to improve performance. Beck *et al.* (2006) support the concentration-stability theory, indicating that bank concentration tends to reduce the probability that a country would suffer a systemic banking crisis because of market power and profit buffers. Thus, companies must accept stricter credit limitations; consequently, they may experience difficulty borrowing sufficient funds for operations (Peeka and Rosengren, 1998), and must pay a higher interest rate. The increased borrowing cost and unstable fund sources increase a company's risks.

This study hypothesizes that bank concentration is an indicator of the competition banks encounter in the capital market. In a highly concentrated banking industry, competition is low, allowing banks to impose rigorous borrowing conditions on firms. High capital costs and difficulty in borrowing capital from banks increases a firm's risk. Conversely, in a less-concentrated environment, banks are more willing to take on risky projects, and firms have a better chance of obtaining more capital at a lower rate, which results in lower business risk. Additionally, bank

concentration alters a bank's attitude toward its credit policy and their internal control mechanisms, which are related to the government's financial supervision (Marcus and Shaked, 1984).

Normally, a difference exists between the financial supervision of developed and developing countries. This study uses two subsamples to determine the difference between developed and developing markets. Recently, Southeast Asia has emerged as a potentially integrated region of interest. Because it contains developed and developing economies, comparisons are possible between these two subsamples. Although the role of market concentration in determining bank profitability has been widely discussed, by examining the relationship between bank concentration and a firm's borrowing risks, the findings of this study can expand the breadth of issues regarding banking profitability and market structure.

The remainder of this paper is organized as follows. Section 2 briefly explains the data and methodology employed in this study. Section 3 discusses the empirical findings on bank concentration and enterprise borrowing cost risks for nine Asian economies, and Section 4 offers the conclusion.

2. DATA AND METHODOLOGY

This study employs a logistic model to investigate the relationship between bank concentration and enterprise risk. The research sample contains nine Asian economies. Specifically, Taiwan, Japan, Hong Kong, Korea, and Singapore, are considered developed economies, whereas China, Malaysia, the Philippines, and Thailand are considered developing countries. The study period is from 2003 to 2011. The total number of observations is 17, 712, including 11,790 and 5,922 from developed and developing markets, respectively. Firm and bank data are respectively obtained from the *Taiwan Economic Journal* (*TEJ*)[1] database and Bankscope.

Following the definition of enterprise fundamental risk in Penman (2001) this study applies borrowing cost risk (defined as net financial expense divided by net financial obligations). Most studies have applied the measurement of uncertainty or variation to represent the level of risk (Aven and Renn, 2009). The higher the variation is, the higher the risk level, and vice versa. To measure the changes in a firm's borrowing cost risk in year *t*, this study first calculates the variance of risks for (t, t + 2) and (t – 2, t), and defines the difference between these two values as a company's risk change in year *t*.

To measure bank concentration, following the calculation in Beck *et al*. (2006) and Yeyati and Micco (2007), this study applies the Herfindahl-Hirschmani index (*HHI*) and concentration ratio (*CR*) as the concentration variables, expressed as follows:

$$HHI_{it} = \sum_{i=1}^{k} MS_{it}^{2} \qquad (1)$$

[1] The data for Japanese firms in *TEJ* begin with those from 2006. Therefore, except for Japan, the study period for the eight countries/areas is 2003 to 2011, whereas that for Japan is 2006 to 2011.

$$CR_{nit} = \sum_{i=1}^{n} MS_{it} \qquad (2)$$

This study used the top five banks (n = 5) to compute the $CR_{n,}$, where k is the total number of banks,[2] and MS_{it} is the market share of bank i in year t. Market share can be evaluated based on total assets, deposits, or lending. Because the empirical results are similar, this paper reports only the findings for total assets.

For the control variables, the market-to-book ratio and firm size (using net assets as a proxy) are used. The macroeconomic environment is another crucial factor in determining a firm's risk (Aretz *et al.*, 2010). This study uses three macroeconomic variables (per-capita real gross domestic product growth rate, inflation rate, and nominal change in the exchange rate) that are collected from the World Development Indicators data bank.

3. EMPIRICAL RESULTS

Table 1 lists the 2005, 2007, and 2009 *HHI* and *CR* values of nine Asian markets.[3] On average, the banking sectors in the developed economies were less concentrated than those in the developing economies over the study period. This situation could be attributed to the openness and competitiveness of financial markets in developed countries. Banks with dominant market power are less likely to exist in developed countries. Over the study period, the concentration of Asian banks increased in the developed markets and decreased in developing countries. The integration of financial institutions in developed economies, which enhances a bank's economic scale and competitiveness, could explain the concentration. After the 2007–2008 financial crisis, some financial institutions that had been deeply involved in derivatives were possibly forced out of business, which may have created the concentrated environment. Regarding the Asian developing countries, as the financial market liberalized, bank concentration decreased throughout the study period.

Table 2 shows the empirical results of the fixed effect panel data model. The control variables include a time dummy variable, which is used to capture the possible impact of the 2007–2008 financial crisis.[4] In the overall sample, a significantly positive relationship exists between bank concentration and borrowing cost risk. However, the results differ between the two subsamples. Although the positive relationship remains significant for the developed economies, this relationship is not observed in the developing countries.

[2] Previous studies have used various numbers of the largest companies to measure market concentration. For example, Demirguc-Kunt and Huizinga (1999). use the top three, whereas Jeon and Miller (2002). use the top five and ten.

[3] Because bank competition does not change dramatically, this paper reports the results from 2005, 2007, and 2009, instead of from each year from 2005 to 2009.

[4] *Time Dummy* equals one after 2008, zero otherwise.

As we can observe in Table 1, bank concentration in developed economies increased over the study period. Although enlarging business scale and thus increasing bank concentration allows banks to increase their competitiveness, a firm's borrowing cost risk increased in the developed countries. Compared with the developing countries, the banking market was more concentrated in the developed economies, indicating that fewer large banks with dominant market power exist in those markets. Particularly in China, the scale of the major banks is considerable, and most of them are public banks. Because of a lack of competition, the relationship between bank concentration and borrowing cost risk is not as significant as that of developed countries. Finally, all of the *time dummy* coefficients are significantly positive, indicating that after the 2007–2008 financial crisis, the borrowing cost risk increased in both the developed and developing economies.

Because the trends of bank concentration for two subsamples are different, to further examine the possible impact of the trend on borrowing cost risk, quadratic terms of change in bank concentration are added to the model. Again, the results in Table 3 show that the coefficients of the quadratic terms for developed markets are significantly positive, indicating that an increasing bank concentration causes a high firm's borrowing cost risk in developed economies. However, the effect of the quadratic terms for developing countries is only marginally significant at the 10% level. Table 4 shows a coefficient difference between the bank concentration of the developing countries and that of the developed countries. Those significant differences demonstrate that the effects of concentration and trend of concentration on firm's borrowing cost risk differ between developed and developing markets.

4. CONCLUSION

This study empirically investigates the relationship between bank concentration and firm's borrowing cost risk for nine Asian markets during the period of 2003-2011. In developed economies, bank concentration increased over the study period because banks were pursuing higher efficiency and competitiveness. However, the empirical evidence indicates that firms face higher borrowing cost risk. One explanation is that a concentrated banking system allows banks to charge higher loan rates and hence may imply higher risk for firms. The result for developed economies supports the argument of Berger (1995) and Boyd and De Nicolo (2005). As the banks' competitiveness and efficiency improved in the developed economies, the banking sectors became more concentrated and companies faced increased borrowing cost risks.

Conversely, bank concentration in the developing countries decreased during the study period. Because the developing countries were attempting to liberalize their financial markets, competition among the banks became stronger and bank concentration decreased. However, a positive relationship between bank concentration and borrowing cost risk is not observed in the developing countries sampled. Although the trend of reducing bank concentration in developed economies is favorable for economic development, this study does not find the evidence of decreased borrowing cost risk.

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Table-1. Summary of bank concentration

	Developed Countries				
	Hong Kong	**Japan**	**Korea**	**Singapore**	**Taiwan**
HHI					
2005	1,310	839	1,199	1,269	793
2007	1,699	1,096	1,621	1,704	868
2009	1,879	1,202	1,845	1,789	912
CR_5					
2005	58.68	45.93	58.15	58.81	36.54
2007	76.05	54.96	69.79	71.23	37.03
2009	77.47	57.15	75.97	73.06	37.82
	Developing Countries				
	China	Malaysia	Philippines	Thailand	
HHI					
2005	2,765	2,290	2,284	2,320	
2007	2,367	2,169	2,070	2,082	
2009	2,184	2,120	1,862	1,916	
CR_5					
2005	80.32	76.98	71.22	72.45	
2007	76.44	72.68	68.84	70.52	
2009	71.07	71.35	65.67	68.19	

Note: CR_5 is the index of the bank concentration of the top five firms

Table-2. Results of regression model

	Overall				**Developed countries**				**Developing countries**			
HHI	0.028	**			0.033	***			0.017			
CR_5			0.270	**			0.317	***			0.166	
Constant	0.271	***	0.259	***	0.197	***	0.194	***	0.312	***	0.308	***
per capita real GDP growth rate	-0.307	*	-0.303	*	-0.324	**	-0.320	**	-0.287	*	-0.280	*
inflation rate	0.016		0.015		0.014		0.013		0.020		0.019	
nominal change of exchange rate	0.022	*	0.021	*	0.019	*	0.018	*	0.028	*	0.025	*
market-to-book ratio	-0.110	**	-0.107	**	-0.146	***	-0.143	***	-0.034	*	-0.031	*
firm size	-0.209	***	-0.202	***	-0.283	***	-0.275	***	-0.088	***	-0.062	***
time dummy	0.258	***	0.256	***	0.229	***	0.225	***	0.308	***	0.317	***
Hausman test	Prob>χ^2=0.0138				Prob>χ^2=0.0052				Prob>χ^2=0.0146			
number of observations	17,712				11,790				5,922			

*, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table-3. Results of modified regression model

	Overall				**Developed countries**				**Developing countries**			
HHI	0.027	**			0.032	***			0.016			
CR_5			0.263	**			0.318	***			0.162	
ΔHHI^2	0.040	**			0.034	***			0.061	*		
ΔCR_5^2			0.108	**			0.093	***			0.144	*
Constant	0.270	***	0.258	***	0.195	***	0.191	***	0.310	***	0.305	***
per capita real GDP growth rate	-0.304	*	-0.299	*	-0.319	**	-0.316	**	-0.282	*	-0.277	*
inflation rate	0.015		0.014		0.013		0.012		0.018		0.017	
nominal change of exchange rate	0.020	*	0.019	*	0.019	*	0.018	*	0.027	*	0.025	*
market-to-book ratio	-0.109	**	-0.106	**	-0.143	***	-0.140	***	-0.038	*	-0.034	*
firm size	-0.208	***	-0.201	***	-0.281	***	-0.274	***	-0.081	***	-0.068	***
time dummy	0.254	***	0.252	***	0.226	***	0.221	***	0.305	***	0.322	***
Hausman test	Prob<χ^2=0.0156				Prob<χ^2=0.0069				Prob<χ^2=0.0168			
number of observations	17,712				11,790				5,922			

Note: Compared with the model in Table 2, two quadratic terms (ΔHHI 2 and ΔCR52) of bank concentration were added to this model.
*, ** and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Table-4. Coefficient difference of bank concentration between subsample countries.

Variable		
HHI	0.016^{***}	
CR_5		0.156^{***}
ΔHHI^2	-0.027^{***}	
ΔCR_5^2		-0.051^{***}

*, ** and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.