Bank Competition, Institution and Economic Development: Evidence from Asia during 1999-2007

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Abstract

From a sample of Asian countries over the period 1999-2007, this paper investigates the link between bank competition and economic development. In general, although banking market power has a U-shaped relationship with economic growth, banking market power tends to improve economic growth. However, the positive impact of banking market power on economic growth only occurs in agricultural sector, but not in industrial sector. It is also shown that higher banking market power in countries with greater economic freedom erodes overall economic growth and industrial growth. On the contrary, there is no significant relationship between banking market power and agricultural growth in countries with greater economic freedom. Therefore, when economic freedom increases and financial service investments come into a country, any policy to boost banking competition becomes necessary. In this phase, as well, industrial sector is more important than agricultural sector.

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1. Introduction

The 1997 Asian crisis and the 2008 US crisis have revealed how the excessive risk taking by banking institutions can cause economic vulnerability which ended up in financial crisis. Banking competition is then often blamed for banking fragility in both developed and developing countries. Nevertheless, banking competition in some cases may also improve bank efficiency which in turn reduces intermediation costs for borrowers and matters for economic growth. In the context of Asia, the rapid growth of banking consolidations after the 1997 Asian crisis has changed the structure of banking market. As of 2003, M&As growth in Asian banking reached the 23% level per year. However, the impact of such consolidations on firms' financing constraints and hence, economic growth in Asia is not yet well-explored until nowadays. Likewise, the implementation of the ASEAN-China Free Trade Agreement (ACFTA) recently induces policy makers to reshape any strategy to take advantage of such a trend, so that long-run economic growth towards a prosperous Asia can be achieved.

As a matter of fact, there are at least two relevant factors beyond free trade and regional integration which are somehow ignored in the contemporary debate (Moshirian 2009). These consist of financial globalization and the quality of institutional environments. By awaring of the advantage of financial globalization, a country will gain more capital inflow which can be allocated to boost productive sectors. In turn, the development of productive sectors matters for increasing exports and the quality of economic growth. To boost financial globalization, institutional quality that ensures investor rights' protections is necessary.

With regards to the trend of financial globalization, it is also worthy to note that the 2010 Greek crisis has increased capital inflow into Asia. At the beginning of 2010, capital inflow to developing countries reached USD 722 billion, while only USD 435 billion in 2009. It is also indicated that a large part of such foreign capital flows to Asia, the most promising region (Suchanek and Vasishtha 2010). From such trends, capital inflow might influence financial services development and macroeconomic dynamic in Asia, since capital inflow could be in a form of foreign direct investment or financial services investments (Moshirian 2008). This paper deals with the latter issue.

Specifically, we build a bridge between the finance-growth nexus and financial globalization issues by considering that greater financial service investment entering Asia may result in an increase in the degree of competition in Asian banking. Since there is no previous study investigating the impact of bank competition on macroeconomic performance in Asia, this paper attempts to fulfill this gap. Aside from investigating the competition-growth nexus in general, we also disentangle economic development with respect to different economic sectors (agriculture and industry), a procedure that has never been taken into consideration in the previous literature. Building on the argument of Moshirian (2009) we further investigate the role of institutional development in affecting the competition-growth nexus.

The rest of this paper is structured as follows. Section 2 reviews the existing literature and describes our research focus. Section 3 describes brief institutional backgrounds from Asian countries used in the study. Section 4 lays out data, variables and descriptive statistics. Section 5 describes methodology and econometric specification. Section 6 discusses empirical results. Section 7 provides several sensitivity analyses, while Section 8 concludes the paper.

2. Existing Literature and Research Focus

In the academic literature, the impact of banking competition on economic development is mixed. The conventional wisdom suggests that in a market without asymmetric information, banking competition leads to higher economic growth. This is because banking market power results in higher loan pricing and less loan availability (Black and Strahan 2002, Degryse and Ongena 2005, Cetorelli and Gamberra 2001). Conversely, in a market with asymmetric information, higher banking concentration may increase banks' incentive to invest in relationship lending based on soft informations. As a result, such mechanism reduces firms' financing constraints, facilitates the availability of credit, and boosts economic growth (Boot 2000, Petersen and Rajan 1994, Petersen and Rajan 1995, Berlin and Mester 1998, González and González 2008).

With regards to the nature of bank competition, Boot and Thakor (2000) build a theoretical model with two forms of competition: capital market competition and inter-bank competition. Banks focusing on competition with capital market tend to invest in transaction-based lending. On the contrary, inter-bank competition creates incentives to differentiate a bank from other banks, thereby it positively affects relationship lending as a value-added strategy. This is because relationship banking will charge lower interest rate of loans to small businesses.

Further developments on the link between bank competition and relationship lending can not be separated from bank consolidation, e.g mergers and acquisitions (M&As). According to Frohlich and Kavan (1999), there are four motivations behind M&As : (1) creating economies of scales, (2) expanding geographically, (3) increasing the combined capital base (size) and product offerings, and (4) gaining market power. Berger *et al*. (1998) provide evidence that in static analysis, bank consolidation reduces small business lending as market power increases. This reduction could be influenced by other M&A banks' operation or individual distortion in management within the M&A banks themselves.

Conversely, Beck *et al.* (2004) find a positive link between bank market power and small firms' financing constraints. Since most of empirical studies focus on the US banking market with a specific regulatory and institutional effect, they focus on a cross-country setting. However, they only use bank concentration ratios to capture bank market power. They further indicate that the relation of bank market power and financing obstacles is dampened in countries with well developed institutions, higher levels of economic and financial development, and a larger share of foreign-owned banks.

Another contemporary issue is that bank market power could be more beneficial in solving adverse selection and moral hazard between firms and banks in developing markets with weak legal systems and poor institutional infrastructure. Meanwhile, by establishing long-term relationship, banks in these environments may solve optimally the problems with debtors (La Porta *et al*. 1998). Banking market power in these markets favors such a long-term relationship and thereby, spurs economic growth. This is because banking market power may substitute for strong legal protection of creditors and property rights; and by establishing relationships, banking market power works in the absence of strong institutions to reduce information asymmetries and agency costs between banks and firms' owners (Fernandez *et al.* 2010).

From 80 countries consisting of developing and developed country over the period 1980-2004, Fernandez *et al.* (2010) then provide evidence that bank concentration generally has a negative impact on economic growth. However, such a negative impact disappears in countries with poorer-quality institutional environments. This suggests that bank concentration contributes more to relationship lending developments when the poor quality of institutions impedes market developments. Rajan and Zingales (1998) and Yoshitomi and

Shirai (2001) also argue that relationship lending is relevant in East-Asian economies, since the laws are poorly implemented and contract are not well enforced. In this case, the limited liabilities of financial information can give the relationship banking a degree of domination which protects their investment through long-term relationship.

Although our research is close to Beck *et al.* (2004) and Fernandez *et al*. (2010), our contribution is twofold. First, we opt for the new industrial organization approach following Uchida and Tstutsui (2005) to capture the degree of market power in banking instead of drawing bank concentration ratios used by Beck *et al.* (2004) and Fernandez *et al.* (2010). When our study focuses on the impact of bank consolidations on economic growth in Asia, the use of bank market power indicators is more appropriate than bank concentration indicators[1]. Second, we disentangle economic development into two types of indicator with respect to different economic sector (agricultural and industrial sector growth). This procedure allows us to capture different strategy to boost tradable sector and hence exports, regarding to the different nature of economic freedom and competition in the banking market.

3. Brief Insitutional Background

We observe Asian countries that have been affected by the 1997 Asian crisis in which they have different economic structure and the degree of economic freedom. These countries include Indonesia, Malaysia, South Korea and Thailand that were severely devastated by the banking crisis, as well as China, India, Hong Kong, Pakistan, Philippines, and Taiwan that were less affected.

In Indonesia, the structure of economy is still dominated by agricultural sector. In 2005, the labour force by occupation in agriculture reached 42.1%, while only 18.6% and 39.3% in industry and service. In recent years, the growth rate of agricultural GDP (gross domestic product) has recovered to 3.45% per year during the period 2001-2006 (ICONE 2008). Meanwhile, agricultural products are one of the main export commodities in Indonesia. However, Indonesian farmers are mainly small-scale farmers with inadequate expertise. It is also reported that small-scale farmers increase more than 2.4% per year since the nineties[2].

Malaysia also still depends crucially on agricultural sector. Although the contribution of agricultural sector has declined from 18.7% in 1990 to 5.8% in 2005, Malaysia's exports from several agricultural products continue to develop and the government increases its intervention in boosting agricultural sector development (ICONE 2008).

In Thailand, the role of agricultural sector is still crucial, notably in the post-2000 period. The contribution of agricultural sector to alleviate unemployment can also be well maintained (Zamroni 2006). Thailand is also one of the world's top ten exporters of processed foods, where the share of processed foods export to agricultural product export jumped from 25% in 1988 to 35% in 2005 (ICONE 2008).

Among other Asian countries in our sample, Hong Kong, South Korea, and Taiwan are the ones that depend on industry instead of agriculture. In China, agricultural sector still plays a major role in the economy. China has always been one of the world's largest producers of grain (including rice, wheat, corn, beans, and tubers), and this remains their largest output today. Fruit is also a commodity that has grown significantly since 2000[3]. Meanwhile, India also depends crucially on agricultural sector. During the period 2006-2007,

[1] This is because one of motivations behind bank M&As is to obtain higher market power (Frohlich and Kavan, 1999). DeYoung et al. (2009) provides a more comprehensive view on the link between bank consolidation and market power in which banks are likely to gain greater market power after consolidation. On the contrary, consolidation does not itself necessarily create more concentrated banking market.

[2] Agriculture Census (2003), National Bureau of Statistic, Indonesia

[3] See Agriculture Yearbook (2006), http://www.stats.gov.cn/tjsj/ndsj/2006/indexeh.htm

agriculture accounts for 18% of India's GDP, while more than 43% of India's geographical area is used for agriculture. In Pakistan, the role of agricultural sector is still important, even though Pakistan has been a semi-industrialized country. In average, agriculture accounts for about 23% of Pakistan's GDP and employs about 44% of the labor force. Similarly, although Philippines is a newly industrialized country, agricultural sector still plays a crucial role in the economy. Agriculture accounts for 34% of Philippines's GDP, while industry only accounts for 15% of Philippines's GDP.

4. Data, Variables and Descriptive Statistics

We retrieve the data from several sources. Bank-level data come from BankScope Fitch IBCA to construct a sample consisting of an unbalanced panel of annual series for the period 1999–2007. We consider all commercial banks established in 10 countries in Asia (China (137), Hong Kong (53), India (74), Indonesia (80), Malaysia (51), Pakistan (30), Philippines (41), South Korea (21), Taiwan (49), and Thailand (23))[4]. Following Laeven (1999) who study Asian banks, we focus only on commercial banks because commercial banks tend to have more freedom to choose their business mix and face similar restrictions across countries. Country-level data are retrieved from the Asian Development Bank's statistics. The countries' financial structure data come from Beck and Demirgüç-Kunt (2009), and institutional development (economic freedom) data come from Heritage Foundation.

4.1. Bank Competition

The most important step in assessing banking market power is the choice of a competition measure. Claessens and Laeven (2004) argue that performance measures such as banks' net interest margin or profitability do not appropriately indicate the competitiveness of a banking industry. These measures can be influenced by a number of factors such as country specific performance and stability, the form and the degree of taxation of financial intermediation, the quality of institutions, and bank-specific factors.

Beck (2008) also highlights that traditional indicators of competition based on market structure and concentration measures, such as the number of banks operating in the industry, the Herfindahl index (HHI index), as well as concentration ratios, are rather crude measures that do not take differentiation strategies into consideration. For instance, banks may not compete directly with each other in the same line of business products. Hence, such indicators only capture the actual market share without allowing inferences on the competitive behavior of banks.

Meanwhile, the use of the H-statistic developed by Panzar and Rosse (1987) can be an alternative to infer the level of competition in the banking industry (Claessens and Laeven 2004). Nevertheless, a critical feature of the H statistic is that the Panzar-Rosse approach must be applied on the basis of observations that are in long-run equilibrium. An equilibrium test needs to be conducted by equalizing adjusted rates of return across banks. At equilibrium, the rates of return will not be correlated with input prices. When the equilibrium test is rejected, then the *H* estimates should be interpreted with great caution, as they may be based on observation from a disequilibrium situation (Bikker and Bos 2008).

For such reasons, we opt for the new industrial organisation approach following Uchida and Tsutsui (2005) in quantifying the degree of market power in Asian banking. This method permits to estimate a more accurate measure of competition for the purpose of our study for at least three reasons. First, based on panel data techniques, it provides the estimates

[4] The distribution of banks is shown in parentheses.

of the degree of market power in the banking industry for each period. Second, this type of measure does not require any information on the market structure of each bank and a market equilibrium assumption. Third, this method allows us to determine the degree of market power endogeneously.

More precisely, we jointly estimate a system of three equations that correspond to a translog cost function, to a bank profit maximization revenue function, and to an inverse loan demand function (System (1)). In defining revenue, we follow Brissimis *et al.* (2008) using total revenue from both interest and non-interest revenue[5]. This construction allows us to implicitly capture the implications of a shift from interest activities to non-interest activities for bank profitability, a trend which has been observed in most banking systems around the world.

$$
\begin{aligned}
\ln C_{it} &= b_0 + b_1 \overline{\ln q_{it}} + \frac{1}{2} b_2 \left(\overline{\ln q_{it}}\right)^2 + b_3 \overline{\ln d_{it}} + \frac{1}{2} b_4 \left(\overline{\ln d_{it}}\right)^2 + b_5 \overline{\ln w_{it}} + \frac{1}{2} b_6 \left(\overline{\ln w_{it}}\right)^2 \\
&\quad + b_7 \left(\overline{\ln q_{it}}\right)\left(\overline{\ln w_{it}}\right) + b_8 \left(\overline{\ln q_{it}}\right)\left(\overline{\ln d_{it}}\right) + b_9 \left(\overline{\ln d_{it}}\right)\left(\overline{\ln w_{it}}\right) + e_{it}^C \\
R_{it} &= \frac{\theta_t}{\eta_t} R_{it} + r_{it} q_{it} + c_{it} \left(b_1 + b_2 \left(\overline{\ln q_{it}}\right) + b_7 \left(\overline{\ln w_{it}}\right) + b_8 \left(\overline{\ln d_{it}}\right)\right) \\
&\quad + C_{it} \frac{q_{it}}{d_{it}} \left(b_3 + b_4 \left(\overline{\ln d_{it}}\right) + b_8 \left(\overline{\ln q_{it}}\right) + b_9 \left(\overline{\ln w_{it}}\right)\right) + e_{it}^S \\
\ln p_{it} &= g_0 - (1/\eta) \ln q_{it} + g_1 \ln GDPG_t + g_2 \ln OPL_{it} + e_{it}^D
\end{aligned}
\tag{1}
$$

Variables with bars are deviations from their cross-sectional means in each time period to reduce multicollinearity. The degree of competition in each year is given by $\theta_t \in [0,1]$ representing the well-known conjectural variations of elasticity of total industry outputs with respect to the output of bank *i*. In the case of perfect competition, $\theta_t = 0$; under pure monopoly, $\theta_t = 1$; and finally, $\theta_t < 0$ implies pricing below marginal cost and could result, for example from a non-optimizing behavior of banks. In the special case of Cournot competition, θ_{jt} is simply the market share bank *i*.

Specifically, C_{it} is measured by total expenses from both interest and non-interest income activities, q_{it} by total earning assets, d_{it} by total deposits and short-term funding, w_{it} by the ratio of operating expenses to total assets, R_{it} by total revenue, r_{it} by the ratio of interest expenses to total deposits, p_{it} by the ratio of total revenue to total earning assets, $GDPG_t$ and OPL_{it} are factors that affect demand, defined as the growth of country-level real gross domestic product (GDP), and the ratio of operating expenses to total loans, respectively.

Following Brissimis *et al.* (2008), we perform country-level estimations and specify the Seemingly Unrelated Regression (SUR) method to solve System (1) . To estimate θ_t we use annual time dummy variables, while to estimate η we use bi-annual time dummy variables (every two years). This is because the values taken by η are linearly dependent on the time-specific control variable (*GDPG*) in the third structural equation of System (1). In the subsequent analyses, θ_t denotes the Lerner index (*LERNER*) of the banking industry in country *j*.

[5]Uchida and Tsutsui (2005) only consider revenue generated by bank loans.

In this paper, we also consider the square term of banking market power ($LERNER^2$) to capture possible non-linearity effects of banking market power on economic development. To calculate $LERNER^2$, we set $LERNER^2$ equals to zero if *LERNER* is negative.

4.2. Economic Development

As a proxy of economic development, we use the real GDP growth (*GDPG*) following Claessens and Laeven (2005) without a separate role for unemployment. Moreover, we also investigate economic development with respect to different economic sectors by incorporating the real GDP growth of agricultural sector (*GDPGA*) and industrial sector (*GDPGI*). All these data are taken from the Asian Development Bank's statistics.

4.3. Control Variables

Four control variables are included. First, we incorporate the initial real GDP in order to account the convergence of development in the economy[6]. Second, we add economic freedom index (*ECOFREE*) taken from Heritage Foundation. Greater economic freedom can boost private sector developments, reduce "home bias" for cross-border investments, and allows banks to improve efficiency by diversifying financial service products and market segments, and thus matters for economic growth. Third, bond market may also play a role in the economy. For such a reason the ratio of public and private bond market capitalisation to GDP (*BOND*) is considered as control variable. *BOND* is taken from Beck and Demirgüç-Kunt (2009). Finally, as bank efficiency matters for economic development, the cost-to-income ratio (*CTI*) is also considered as control variable. *CTI* is defined as the aggregate ratio of total expenses to total income in the banking industry. *CTI* is taken from Beck and Demirgüç-Kunt (2009).

4.4. Descriptive Statistics

Table 1 provides descriptive statistics for all variables used in the study. Several restrictions to our dataset are also applied in order to eliminate outliers. More precisely, in Equation (1), we clean *w* and *OPL* by eliminating both their 2.5% lowest and 2.5% highest values, since both variables exhibit left-skewed and right-skewed distributions.

[6] We include *GDP_INI*, *GDPA_INI*, and *GDPI_INI* to capture respectively the initial real GDP in general, in agricultural sector, and in industrial sector.

Table 1. Descriptive Statistics

Variables	Definition	Mean	Median	Max	Min	Std. Dev.
Q	Total earning assets (million USD)	10580572	717091.5	8.63E+08	40.874	44235815
C	Total expenses (million USD)	562126.1	56354	43603212	-959907	2070488
D	Total deposit and short term funding (million USD)	9576041	682700	8.04E+08	7	39528240
R	Total revenue (million USD)	591999.3	63987.5	39037317	-131340	2102181
W	Total operating expenses to total assets	0.570559	0.02106	24.7477	1.54E-08	2.334638
R	The ratio of interest expenses to total deposits	0.052744	0.029492	9.390108	8.27E-05	0.321224
P	The ratio of total revenue to total earning assets	0.085879	0.059908	26.5119	-0.41208	0.46607
OPL	The ratio of operating expenses to total loans	0.052548	0.036881	0.326245	0.011159	0.04426
CTI	The ratio of total expenses to total income	0.6271	0.5855	1.43	0.3561	0.1939
GDPG	The annual growth rate of GDP	0.0064	0.0063	0.1140	-0.0022	0.0027
GDPGA	The annual growth rate of GDP from agricultural sector	0.0257	0.0286	0.1268	-0.0807	0.0349
GDPGI	The annual growth rate of GDP from industrial sector	0.0599	0.0594	0.1627	-0.0751	0.0437
ECOFREE	The Economic Freedom index	60.1197	55.20	90	42	11.448
BOND	The bond market capitalisation to GDP	0.376524	0.313223	1.069313	0.132142	0.214013

5. Methodology and Econometric Specification

First, we generally investigate the link between bank competition and economic development by using two stages estimation. In the first stage, we estimate (1) in order to obtain the country-level Lerner index (*LERNER*) by using a panel from bank-level data. Table 2 reports such Lerner index estimated from (1) using the SUR method.

Table 2. The Country-level Lerner Index (*LERNER*). Higher Lerner is associated with less competition in banking market.

	China	Hong Kong	Indonesia	India	South Korea
1999	0.472297	0.301222	0.368994	-0.162399	0.248986
2000	0.519364	0.287428	0.507071	-0.150857	0.268862
2001	0.570741	0.428638	0.504237	-0.143449	0.395923
2002	-1.000000	0.900392	0.489753	-0.118262	0.273264
2003	-0.997717	0.935591	0.60836	-0.02357	0.410607
2004	0.869957	0.70721	0.76211	0.000143	0.48544
2005	0.822429	0.43478	0.730938	-0.026172	0.492796
2006	0.797712	0.285657	0.688297	-0.075694	0.475937
2007	0.791171	0.366164	0.75164	-0.100164	0.357278
	Malaysia	Philippines	Pakistan	Thailand	Taiwan
1999	0.548657	0.561692	0.404705	0.516515	0.161426
2000	0.683819	0.496119	0.347082	0.502541	0.142652
2001	0.712439	0.513135	0.571413	0.523875	0.192371
2002	0.742263	0.635231	0.534409	0.498261	0.258088
2003	0.75319	0.732586	0.641901	0.566692	0.314807
2004	0.766969	0.545519	0.709296	0.721333	0.393059
2005	0.775379	0.619123	0.666741	0.807386	0.355359
2006	0.738516	0.638452	0.604942	0.761431	0.398816
2007	0.716482	0.669991	0.600564	0.724995	0.383869

In the second stage, we construct a panel with country-level data to estimate a regression model of economic development with *LERNER* and a set of control variables. For this purpose, we specify the following model

$$GROWTH_{j,t} = f(INI, LERNER, LERNER_{j,t}^2, X_{j,t}) \quad (2)$$

For country *j* at date *t*, *GROWTH* refers to the rate of economic growth and consists of *GDPG*, *GDPGA*, and *GDPGI*. Meanwhile *INI* refers to the initial level of real *GDP* and consists of *GDP_INI*, *GDPA_INI*, and *GDPI_INI*. *X* is a set of country-level control variables.

Second, the role of institutional development in affecting the competition-growth nexus is investigated. Following Fernandez *et al.* (2010), institutional development refers to the degree of economic freedom. To account for this dimension, we incorporate an interaction term between banking competition and economic freedom into the right-hand side of Equation (2) as follows

$$GROWTH_{j,t} = f(INI, LERNER, LERNER_{j,t}^2, ECOFREE * LERNER, X_{j,t}) \quad (3)$$

Equation (2) and (3) are both estimated using pooled ordinary least squares (OLS) and random-effect estimation, since we have a time-invariant variable in the right hand-side of the equations. As well, random-effect model permits to control for unobserved heterogeneity on an individual country with different environments compared to other countries (Uhde and Heimeshoff, 2009).

6. Empirical Results

6.1 Bank Competition and Economic Development

Table 3 (Regression 1 and 2) shows that there is a U-shaped relationship between *LERNER* and *GDPG* with an inflection point reaching the 0.36 level. From the distribution of *LERNER*, we notice that more than 70% of observation found above 0.36. This may suggest that although there is a U-shaped relationship between *LERNER* and *GDPG*, the relation between *LERNER* and *GDPG* tends to be positive.

Table 3. The impact of banking market power (*LERNER*) on economic growth (*GDPG*). The results are estimated using the Pooled OLS and Random-Effect estimation. The *t-statistic* values are reported in parentheses. Constants are included but not reported. (***) indicates significance at the 1% level, while (**) and (*) indicate significance at the 5% and 10% levels, respectively.

	Dependent Variable : *GDPG*			
Explanatory Variables	Pooled OLS (1)	Random Effect (2)	Pooled OLS (3)	Random Effect (4)
GDP_INI	-1.13E-06	-1.09E-06*	-0.0000013*	-0.0000013*
	(-1.551)	(-1.863)	(-2.207)	(-2.207)
LERNER	-0.0253***	-0.0216***	0.0804*	0.0804*
	(-3.001)	(-3.449)	(1.945)	(1.945)
$LERNER^2$	0.0355*	0.0312**	0.0762***	0.0762***
	(1.878)	(1.891)	(5.404)	(5.404)
Inflection Point	0.36	0.35	-	-
ECOFREE	0.00021	0.00017	0.0015**	0.0015**
	(0.4029)	(0.4095)	(2.437)	(2.437)
BOND	-0.0199*	-0.0203**	-0.0204**	-0.0204**
	(-1.733)	(-2.155)	(-2.602)	(-2.602)
CTI	-0.0457***	-0.0449***	-0.0417***	-0.0417***
	(-3.151)	(-4.021)	(-4.499)	(-4.499)
*LERNER*ECOFREE*			-0.0023***	-0.0023***
			(-2.871)	(-2.871)
Number of Obsevation	90	90	90	90
Adjusted R-square	0.18	0.15	0.23	0.23

When we disentangle *GDPG* into *GDPGA* and *GDPGI*, we find some interesting results. Table 4 (Regression 1 and 2) shows that higher banking market power (*LERNER*) improves agricultural sector growth (*GDPGA*), while there is no significant link between $LERNER^2$ and *GDPGA*.

Table 4. The impact of banking market power (*LERNER*) on agricultural sector growth (*GDPGA*). The results are estimated using the Pooled OLS and Random-Effect estimation. The *t-statistic* values are reported in parentheses. Constants are included but not reported. (***) indicates significance at the 1% level, while (**) and (*) indicate significance at the 5% and 10% levels, respectively.

	Dependent Variable : *GDPGA*			
Explanatory Variables	Pooled OLS (1)	Random Effect (2)	Pooled OLS (3)	Random Effect (4)
GDPA_INI	4.28E-05	4.28E-05	0.000039	0.000039
	(1.104)	(1.104)	(1.319)	(1.319)
LERNER	0.0142**	0.0142**	0.0367**	0.0367**
	(2.015)	(2.015)	(1.957)	(1.957)
$LERNER^2$	-0.0011	-0.0011	0.0077	0.0077
	(-0.0607)	(-0.0607)	(0.2345)	(0.2345)
Inflection Point	-	-	-	-
ECOFREE	-0.0013**	-0.0013**	-0.0011***	-0.0011***
	(-2.484)	(-2.484)	(-3.391)	(-3.391)
CTI	0.0235	0.0235	0.0242**	0.0242**

Continued.				
	(1.154)	(1.154)	(2.509)	(2.509)
BOND	0.0122	0.0122	0.0119*	0.0119*
	(0.7424)	(0.7424)	(1.771)	(1.771)
*LERNER*ECOFREE*			-0.00049	-0.00049
			(-0.8308)	(-0.8308)
Number of Obsevation	90	90	90	90
Adjusted R-square	0.11	0.11	0.11	0.11

This finding can be explained by the indication that in some Asian countries, agricultural sector is dominated by small-scale farmers and enterprises (ICONE 2008). Consistent with the old wisdom on the link between bank competition and firms' financing constraints, the opacity of small-scale farmers and enterprises dominating agricultural sector makes market power in banking more effective to develop relationship lending which leads to an increase in agricultural sector growth.

Conversely, a positive relationship between banking market power and economic growth disappears when we observe industrial sector. Table 5 (Regression 1 and 2) shows that there is no significant relationship between *LERNER* and *GDPGI*.

Table 5. The impact of banking market power (*LERNER*) on industrial sector growth (*GDPGI*). The results are estimated using the Pooled OLS and Random-Effect estimation. The *t-statistic* values are reported in parentheses. Constants are included but not reported. (***) indicates significance at the 1% level, while (**) and (*) indicate significance at the 5% and 10% levels, respectively.

	Dependent Variable : *GDPGI*			
Explanatory Variables	Pooled OLS (1)	Random Effect (2)	Pooled OLS (3)	Random Effect (4)
GDPI_INI	0.00011***	0.00011***	9.63E-05***	0.00009***
	(5.352)	(4.361)	(6.991)	(5.302)
LERNER	-0.00077	0.0011	0.0873*	0.1068**
	(-0.0577)	(0.0866)	(1.888)	(2.2216)
$LERNER^2$	-0.0107	-0.0079	0.0256	0.0361
	(-0.4237)	(-0.3003)	(0.8883)	(1.19)
Inflection Point	-	-	-	-
ECOFREE	-0.0018***	-0.0018***	-0.00083	-0.00061
	(-6.117)	(-4.901)	(-1.309)	(-0.7978)
CTI	0.0294*	0.0222	0.0316**	0.0253
	(1.715)	(1.139)	(2.197)	(1.43)
BOND	0.0442***	0.0396**	0.0435**	0.0375*
	(2.865)	(2.115)	(2.551)	(1.85)
*LERNER*ECOFREE*			-0.0019**	-0.0023**
			(-2.112)	(-2.362)
Number of Obsevation	90	90	90	90
Adjusted R-square	0.39	0.27	0.39	0.25

With regards to the economic structure of Asian countries in our sample, these results are quite interesting. For countries relying on industrial sector, such as Hong Kong, South Korea, and Taiwan, we can observe that from Table 2, their average Lerner index is relatively lower than the one observed in other Asian countries relying on agriculture sector, such as China, Indonesia, Malaysia, Pakistan, Philippines, Thailand. This observation supports our

empirical finding, where banking market power has no significant relationship with industrial growth.

6.2 When Institutional Development Matters

In Table 3 (Regression 3 and 4), we also investigate whether institutional development captured by the degree of economic freedom affects the link between bank competition and economic growth. We observe that in countries with greater economic freedom, higher banking market power (*LERNER*) deteriorates economic growth in general (*GDPG*). The positive relationship between *LERNER* and *GDPG* only occurs in countries with less economic freedom.

Interesting finding also appears when we observe industrial sector. Table 5 (Regression 3 and 4) reports that in countries with greater economic freedom, higher banking market power (*LERNER*) deteriorates industrial sector growth (*GDPGI*). Also, the positive relationship between *LERNER* and *GDPGI* only occurs in countries with less economic freedom.

Conversely, in agricultural sector, Table 4 (Regression 3 and 4) shows that there is no significant relationship between the interaction term (*ECOFREE*LERNER*) and agricultural sector growth (*GDPGA*). Meanwhile, a positive relationship between *LERNER* and *GDPGA* still occurs, although we incorporate *ECOFREE*LERNER* as explanatory variable. This further suggests that banking market power is important to promote agricultural sector growth only in countries with less economic freedom.

7. Sensitivity Analyses

In order to ensure the robustness of our results, we perform several sensitivity analyses. For brevity, the results of these sensitivity analyzes are not reported in the paper but are available from the author on request.

First, we include bank concentration ratio measured by the total asset of the three largest banks in a country (*CONC*). This data is provided by Beck and Demirgüç-Kunt (2009). Using this specification, we perform again the pooled OLS and random-effect estimation to estimate (2) and (3). The main findings obtained in Section 6 are not altered.

Second, we modify our estimation method to quantify the degree of market power in the banking industry by considering other variables than *OPL* (the ratio of operating expenses to total loans) in the demand function shown in System (1). These variables consist of the ratio of stock market capitalisation to *GDP* (or *STMKTCAP*) and the inflation rate (*INF*), since both of them may influence the demand for banking services. The data for *STMKTCAP* and *INF* are retrieved from Beck and Demirgüç-Kunt (2009) and International Financial Statistics, respectively. Using this alternative specification does not alter our findings discussed in Section 6.

Finally, for consistency with the majority of papers on cost efficiency/market power in the banking literature, Agoraki *et al*. (2009) use the Maximum Likelihood Estimation method (MLE) instead of running the SUR method used by Brissimis *et al. (*2008) and Uchida and Tsutsui (2005). Hence, we also run the MLE method for System (1) instead of using the SUR method. Overall, our results in Section 6 remain unchanged.

8. Conclusion

This paper deals with the impact of bank competition on economic development. In the context of Asia where bank consolidation grows with high rapidity, it is important to investigate such a trend on economic development. This research is also motivated by the argument that financial globalization becomes an important issue beyond the free trade implementation (Moshirian 2009).

Using a sample of Asian countries over the period 1999-2007 we find that banking market power is important to boost economic growth in general, although banking market power also exhibits a U-shaped relationship with economic growth. Interestingly, we further show that the positive impact of banking market power on economic growth only occurs in agricultural sector. In industrial sector, there is no significant impact of banking market power on industrial sector growth.

When we construct an interaction term between banking market power and economic freedom, we observe that industrial sector is more sensitive than agricultural sector to respond such an interaction term. For industrial sector, banking market power in countries with higher economic freedom tends to deteriorate industrial sector growth. Consequently, we may indicate that when economic freedom increases and financial service investments enter a country, banking competition becomes necessary and industrial sector needs to be taken into close consideration. Finally, overall economic growth can be improved.

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