

Joint Effect of Banking Competition and Risk-Taking on Profitability: Evidence from ASEAN's Countries

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Abstract— *Deregulation and financial reforms in the banking sector of ASEAN countries aim to foster a competitive environment in order to improve stability in the ASEAN banking sector. The joint effects of competition and risk-taking behavior on profitability in the banking sector have not been well studied in the literature. This research has implications for the importance of promoting competition in this region, while on the other hand, regulators need to take wise steps to reduce risk-taking behavior. This joint effect also shows the importance of competition in reducing risk-taking behavior, and this is evident through the interaction of both with significant positive effects on profitability.*

Keywords: *competition, risk-taking, profitability, join interaction*

I. INTRODUCTION

Banking plays an essential role in a country's economy, and even banks are a source of modern economic life. The bank facilitates the process of production, exchange, and distribution of wealth. On the other hand, the bank also acts as a payment system, the primary source of financing (credit), and is a safe place for people to save a certain amount of their funds (deposits).

The banking system becomes an institution of intermediation and transformation of assets. Allocate resources from parties with excess funds to those who are short of funds, through the transformation of assets that are relatively liquid and small assets into loans that are relatively illiquid and large. The intermediation process at the bank helps match deposit and loan supply and provides liquidity for economic activities. The efficient implementation of intermediation makes the demand for deposits and credit can be fulfilled at a low cost, thus benefiting various parties and the economy as a whole. [1].

On the flip side, the ASEAN banking industry has different characteristics. Some of these reasons include the regulator's policy to force banks to consolidate through mergers and acquisitions to ensure financial stability in the region. Furthermore, the decision to liberalize the market

through ASEAN Banking Integration Frameworks-ABIF [2]. This step can also increase the level of banking competition and ultimately lead to the consolidation of the domestic banking sector because banks need a large size to remain competitive.

Referring to the Structure-Conduct-Performance (SCP) hypothesis, low competition leads to a bank's tendency for collusion in obtaining supernormal profits [3]. However, another opinion states that a high level of bank competition causes a decrease in the level of interest income for banks. Therefore, bank profitability becomes eroded and ultimately causes the probability of bankruptcy to increase as well as disruptions to overall financial system stability [4-6].

Research sample data shows that the competition conditions of banks in ASEAN are quite high; this is based on the author's calculation with the Lerner index approach (mean = 0.479). This phenomenon is undoubtedly fascinating to evaluate whether these conditions affect the level of bank profitability or even vice versa. Evaluation of the level of competition in banking is relevant to the discussion. Many studies show that competition causes a moral hazard, and also because banks' performance and efficiency are more easily affected by competitive conditions.

In this research, we focus on the analysis of banking profitability in ASEAN, because new facts show several deregulations and financial innovations in the region are changing the structure of the market (see data on Lerner index values from year to year, indicating a higher level of competition). Besides, various deregulations and developments in the financial sector will undoubtedly change the behavior of banks towards risk. Risk-taking in this study is as taking an activity that contains uncertainty to increase profits where the activity contains the possibility of loss in the form of assets or loss of profit or economic capacity.

TABLE 1. Banking Competition in ASEAN (by country and year)

Country	Lerner
Cambodia	.536
Indonesia	.432
Malaysia	.508
Philippines	.565
Singapore	.586
Thailand	.553
Vietnam	.378

Var	Obs	Mean	SD	Min	Max
lerner	1174	.479	.139	.087	.709

Source: Authors calculation

Risk-taking increases the potential for banks to fail to We use the Z-Score as a proxy for risk-taking measurement; this measurement shows the ratio of how far the bank is to failure (insolvency). A high index value indicates that banks are more stable and vice versa. [7, 8].

This study contributes to the literature in several ways. First, this research fills a gap in the debate regarding whether competition is beneficial or destructive for bank profitability. Second, we use bank-level data so that we can illustrate the more profound effects related to the collective impact of bank competition and risk-taking on profitability. Third, interacting with bank competition and risk-taking will fill gaps related to whether competition and risk-taking banks have an impact on profitability.

The results showed that competition had a positive effect on profitability (the higher the competition, the higher the profitability). Conversely, low risk-taking (high Ln Z-Score) affects the high profitability of banks. Furthermore, when we interact between competition and risk-taking (CompRisk), the effect on positive profitability is significant. It shows that together, the high competition and low risk-taking (common effect) affect the high profitability, although partially the Low impact risk-taking affects the low profitability.

II. LITERATURE REVIEW

A. Banking Profitability

The performance of the banking sector is a subject that has received much attention in recent years. Now there is an extensive literature that has examined the role played by resource management in determining bank performance. It is generally agreed that better management of resource quality is a significant factor contributing to bank performance, as evidenced by various studies that focus on the US banking system [9]. Conversely, fewer studies have looked at bank performance in developing countries. Further, some literature shows that the determinants of profitability are internal determinants (liquidity, capital adequacy, and expenditure management) and external determinants (ownership, company size, and economic conditions).

Empirical literature outlines two strands of literature on bank profitability, studies in the discussion of single county and cross-country. However, based on the analysis method, the principal includes principal analysis, fixed effect estimator, and the Generalized Method of Moments (GMM) estimator [3]. Bank profitability is an exciting discussion for bank management, finance, regulators/policymakers, and academics. Some driving determinants include increasing consolidation, technological change, and regulation. As a result, explaining (changes in) bank profitability is an implicit or explicit subject of much of the banking literature. When estimating the market power model, we look for - abuse - market power as a way to explain increases and differences in profitability. Furthermore, when we use the efficient frontier model, we expect less than optimal management decisions regarding factors of production, leading to differences in profitability.

Determinants of profitability are divided into two main categories, namely internal determinants (liquidity, capital adequacy, and expenditure management) and external determinants (ownership, company size, and economic conditions). It was further explained that efficient expenditure management is one of the most significant in explaining high bank profitability. Among macro indicators, high-interest ratios are associated with low bank profitability, and inflation was found to have a positive effect on bank performance. Then measuring the relationship between economic and market conditions on bank profitability becomes necessary, some of the external variables including the natural log of GDP, annual inflation rates, and the growth of the money supply are used [10].

B. Banking Competition and Risk-Taking

The discussion about whether competition influences risk-taking has not yet reached a concession among academics and policy-makers. On one side, the findings show a positive effect, but the other side shows the opposite effect, even there are findings in the form of a U relationship. Excessive risk-taking by financial institutions is considered by many to be a key factor contributing to the 2007-09 crisis, encouraging some countries to adopt strategies to increase concentration to reduce competition [11].

Empirical literature uses several methods to estimate competition in the banking sector. One method for estimating bank competition is by measuring it based on market power proxies [12]. Other methods test based on the aggregate level of bank behavior. This model based on two structural equations, namely inverse demand equation and supply equation, both of which come from the first-order condition of profit maximization [13]. The method refers to a market structure measuring the extent to which changes in the input price vector reflected in gross income. This indicator measures bank competition through market strength analysis. There are two indicators used, namely Hirschman Herfindahl index (HHI) and concentration ratios that measure the level of market concentration [14].

The next approach is to use the Lerner index to measure market competition. The Lerner index is following the power of banks in influencing the prices of their banking products. Usually, the Lerner index is a mark-up of the price of bank products for their marginal costs. Higher values from the Lerner index indicate greater market power. We follow the previous work, the Lerner index is defined as the difference between price and marginal cost, divided by price and we impose the restriction of linear homogeneity in input prices by normalizing total costs and input prices by one input price [15].

III. METHODOLOGY

A. Data

We are using bank-level datasets from BvD BankFocus. Focus on ASEAN countries that have followed previous work in measuring competition [15], risk-taking [7], and their relationship to profitability [3, 16]. After each of our proxy values, we winsorize extreme values at the 1st and 99th percentiles and maintain the bank with a minimum of 4 observations. The final sample is 180 banks, with a total of 1446 observations. Regarding country-level data, we obtain inflation rates and GDP growth from the World Bank website.

B. Variables Dependent, Independent and Control

The dependent variable in our study is profitability. We use ROAA as a proxy for profitability, as in previous studies [3]. While the Z-Score measurement, we describe as follows [16]:

$$Z_{it} = \frac{ROA_{it} + CAR_{it}}{SDROA}$$

Where, ROA is a return on assets for bank i in year t, CAR is capital asset ratio for bank i in year t and SDROA is the standard deviation of ROA calculated for the overall sample. It was further explained that because of the highly skewed z-score distribution, it then follows calculations using the natural logarithm of the Z-Score.

Next to competition measurement, we use the Lerner index as previous research [15]:

$$\ln\left(\frac{TC}{w_3}\right) = \alpha_0 + \alpha_1 \ln y + \frac{1}{2}\alpha_2(\ln y)^2 + \alpha_3 \ln\left(\frac{w_1}{w_3}\right) + \alpha_4 \ln\left(\frac{w_2}{w_3}\right) + \alpha_5 \ln\left(\frac{w_1}{w_3}\right) \ln\left(\frac{w_2}{w_3}\right) + \frac{1}{2}\alpha_6\left(\ln\left(\frac{w_1}{w_3}\right)\right)^2 + \frac{1}{2}\alpha_7\left(\ln\left(\frac{w_2}{w_3}\right)\right)^2 + \alpha_8 \ln y \ln\left(\frac{w_1}{w_3}\right) + \alpha_9 \ln y \ln\left(\frac{w_2}{w_3}\right)$$

Where, *TC* denotes total cost, *y* total assets, *w₁* the price of labor, *w₂* the price of physical capital, and *w₃* the price of borrowed funds. The total costs are the sum of total interest income and total non-interest income. The estimated cost function coefficient is then used to calculate marginal costs.

Finally, we control with several proxies, both bank-specific factors and country control such as: capital adequacy ratio (EQTA), the ratio of total third-party funds to total assets (DEPO), company size (size), ratio of total loans to total assets (FIN), inflation (INFL) and gross domestic product (GDP).

C. Baseline Model

$$Y_{i,t} = \alpha_i + \beta[X]_{i,t} + \gamma[C]_{i,t} + \sum_{t=1}^8 Year_t + \epsilon_{i,t}$$

Where *Y_{i,t}* is the dependent variable that represents profitability. *[X] i, t* is a set of explanatory variables as explained above and *[C] i, t* is a set of control variables that will be used, these variables include bank-specific variables, microeconomics. Furthermore, *ε_{it}* represents the error term, while *α*, *β*, and *γ* indicate the parameters to be estimated in this study. We then interact between the proxy of competition and risk-taking to capture the mutual relationship between competition and risk-taking on the level of profitability. We estimate the models using a fixed-effect least square technique (static panel data method).

IV. EMPIRICAL RESULTS

A. Descriptive Statistics

TABLE 1 Descriptive Statistics by years

	roaa	lerner	LnZ	EQTA	DEPO	size	FIN	INFL	GDP
2011	1.32	.51	.	.124	.666	15.553	.571	6.953	5.202
2012	1.434	.512	.	.133	.692	15.618	.593	4.304	6.106
2013	1.102	.471	1.954	.155	.665	14.927	.569	4.457	5.344
2014	.973	.466	1.874	.147	.674	14.96	.571	4.385	5.05
2015	.723	.462	1.568	.155	.673	14.889	.593	2.658	5.213
2016	.733	.476	1.754	.158	.678	14.988	.589	2.422	5.193
2017	.914	.487	1.841	.159	.674	15.12	.594	3.061	5.616
2018	.899	.478	2.085	.155	.668	15.182	.604	2.736	5.528

Source: Author Calculation

The data above shows that there was an increase in the level of competition of banks in ASEAN countries during the period 2011-2018. This increase was also followed by a positive stability index (LnZ) trend.

Besides, descriptive statistics also show that based on the sample of each country shows a level of competition at a moderate level (leading to high market strength > 0.5). However, the value is different if we look at a sample of banks in Vietnam and Indonesia. The two countries in this study show a relatively high level of competition.

TABLE 2 Descriptive Statistics by country

	roaa	lerner	LnZ	EQTA	DEPO	size	FIN	INFL	GDP
Cambodia	1.4	.536	1.62	.249	.583	12.937	.567	3.195	7.186
Indonesia	.895	.432	1.714	.161	.722	14.259	.641	4.917	5.364
Malaysia	.919	.508	2.136	.144	.625	15.867	.536	2.38	5.175
Philippines	1.254	.565	1.942	.117	.738	15.643	.476	2.99	6.178
Singapore	.878	.586	2.34	.092	.757	18.036	.616	1.646	4.015
Thailand	.978	.553	1.897	.169	.567	16.18	.646	1.49	3.3
Vietnam	.704	.378	1.657	.108	.674	15.354	.543	6.282	6.209

Source: Author Calculation

B. Regression Analysis

Table 3 in this study shows a positive influence between competition on profitability. This finding certainly supports the promotion of stability in improving banking performance in ASEAN as per the ASEAN Banking Framework Integration (ABIF) framework.

TABLE 3 Regression Results

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4
lerner	6.425*** (0.467)		4.528*** (0.349)	4.036*** (0.358)
LnZ		0.0423*** (0.0122)	0.0354*** (0.0106)	-0.0908*** (0.0286)
CompRisk				0.403*** (0.0851)
EQTA	-2.644*** (0.685)	-0.0260 (0.647)	-1.353** (0.578)	-1.379** (0.568)
DEPO	-0.450 (0.448)	-2.101*** (0.372)	-1.773*** (0.335)	-1.844*** (0.329)
size	-0.199** (0.0973)	-0.0251 (0.0759)	-0.125* (0.0678)	-0.125* (0.0666)
FIN	0.251 (0.462)	1.522*** (0.363)	0.103 (0.338)	0.0318 (0.332)
INFL	0.0542*** (0.0140)	0.0263** (0.0127)	0.0492*** (0.0114)	0.0496*** (0.0112)
GDP	0.0186 (0.0285)	0.101*** (0.0298)	0.0416 (0.0265)	0.0373 (0.0261)
Constant	1.155 (1.581)	1.295 (1.259)	1.682 (1.129)	1.901* (1.110)
Observations	1,161	795	766	766
R-squared	0.189	0.115	0.312	0.337
Number of id	175	171	168	168

Source: Author Calculation

We also find that low risk-taking (high LnZ value) has a positive effect on bank profitability. It shows the importance of banks to pay attention to the level of risk-taking so that they can control the level of profitability. The high risk-taking is also wrong as an empirical fact that shows that the financial crisis is caused by excessive risk-taking.

An interesting finding, when we interacted with competition and risk-taking. Together, it shows that high competition and risk-taking have a positive impact on bank profitability. However, what is surprising about this equation is that the high Z-score harms the level of stability. It also indicates that risk-taking by banks is still in a favorable corridor when the competition is high. The Bank conducts a series of the business menu to anticipate the high competition, but still in the corridor of proper risk management. Finally, this research shows the bright side of high competition and low risk-taking in supporting high levels of profitability.

V. CONCLUSION

Academic literature has not shown concessions related to the effect of competition on stability/profitability. The same thing has not been found enough evidence that shows the joint impact of competition and risk-taking on profitability. This study examines the joint effects of bank competition, risk-taking, and profitability. The results showed a positive effect on profitability. This research has implications for the importance of promoting competition while continuing to monitor bank risk-taking through a series of regulations. Future research is undoubtedly proper if it can capture whether there is a simultaneous relationship between the three variables. This simultaneous relationship, of course, is needed to see the interrelationship of these three variables, which are likely to be interrelated.

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