

# Revenue Diversification and Total Assets in Commercial Banks: Evidence from Selected Asean Countries

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## **Abstract**

*This study reveals the impact of total asset size upon revenue diversification in commercial banks in five of the countries in the Association of Southeast Asian Nations (ASEAN) countries – Indonesia, Malaysia, the Philippines, Thailand, and Vietnam – during the period between 2005 and 2015. By applying the General Moment Method (the GMM) to the unbalanced panel data, this research has determined the impact of the total asset size, as well as the impact of a number of other factors, such as non-performing loans, net interest margin rates, owner equity, business cycles, and the years of the financial crisis. The empirical results show the positive impacts of total asset size, non-performing loans, and the years of the financial crisis upon the levels of revenue diversification. However, other variables are negatively correlated with revenue diversification, such as net interest margin rates, owner equity, and business cycles.*

**Keywords:** Revenue diversification; total assets; commercial bank; Association of Southeast Asian Nations; ASEAN.

**JEL code:** G21; G20; G18; G24.

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## 1. Introduction

Since the Asian financial crisis (AFC) of 1997-1998 and more recently, the global financial crisis of 2007-2008, ASEAN countries have faced a number of significant changes. Thailand and Indonesia both suffered dramatic losses during the AFC and subsequently reformed their financial structures (Cook, 2008; Soedarmono et al., 2011). Vietnam, as it did during the process of economic transition, has similarly restructured its banking system (Soedarmono et al., 2011). In addition, as ASEAN members, the commercial banks must adhere to international standards of banking supervision and regulation, such as minimum capital adequacy ratios, loan classifications, provisions for credit risk, as well as the removal of many previous regulations relating to the entry of new banks into the market. Logically, such an increase in the focus on regulation, together with the increase in competition, is likely to put a lot of pressure on ASEAN commercial banks, which is also likely to encourage them to diversify their revenue in order to maintain their profit margins in the future.

Most of the existing empirical studies have suggested that the diversification of income in the commercial banks income is often associated with an increase in their revenue from additional sources of non-interest income, such as loan origination, securitization, stand-by letters of credit, and derivative securities.

Prior studies of the sources of non-interest income of the commercial banks have been conducted in the US (Clark and Siems, 2002; DeYoung and Rice, 2004; Jagtiani et al., 1995; Rogers and Sinkey, 1999), in Europe (Carbo-Valverde and Rodriguez-Fernandez, 2007;

Lepetit et al., 2008a), and in Taiwan (Lieu, Yeh, and Chiu, 2005). These studies have each contributed empirical evidence to the academic research. Furthermore, empirical research on the relationship between non-interest bank income and a range of other factors has also been well documented. Lepetit et al. (2008b) conducted a study that focused on the relationship between non-interest income and net interest margins. Carbo-Valverde and Rodriguez-Fernandez (2007) and DeYoung and Rice (2004) took a closer look at the relationship between non-interest income and advances in technology. However, there are few studies in the world, and specifically for ASEAN countries, which have explored the relationship between non-interest income and total assets. Hence, there is a need to conduct some research into the relationship between revenue diversification and total assets in ASEAN banking systems.

There are several points that need to be highlighted in this research. The most important thing to note is that this study conducted research combining two independent academic research streams, namely the rate of income diversification on one hand, and the total asset size on the other. These two independent research streams have been thoroughly studied in developed countries, such as the US and the European countries. However, the number of previous studies which have conducted such research in combination with an analysis of emerging countries, specifically ASEAN countries, is very limited. By carrying out an empirical study, we found a relationship between total assets of commercial banks and revenue diversification, where with higher total assets, banks would more concentrate on revenue diversifica-

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tion. This is due to total assets giving ASEAN commercial banks more resources to establish their brand names and greater opportunities to cross-sell their underserved traditional and non-traditional financial products. Hence, as in the reason mentioned above, and results from empirical study, our results contribute to the prior research. Secondly, this study also contributes to methodology by addressing the simultaneous relation between bank total assets and income from non-traditional activities. To address this endogenous situation, we employ econometric methods in our study, particularly the GMM, instead of other traditional methods. As a result, the study can basically avoid the disadvantages of using panel data as it usually results in variable errors, autocorrelations, and endogenous variables.

## 2. Literature review

Revenue diversification is an important part of the financial sector. As competitive pressure is increasing, the diversification process is also becoming increasingly important, not only for credit institutions but also for commercial banks.

Diamond (1991), Rajan (1992), Saunders and Walter (1994), and Stein (2002) have suggested that, through the process of lending, banks have been able to collect information from customers in order to cross-sell products, such as insurance products, brokerage, underwriting, and mutual fund services. As such, commercial banks have been involved in a range of activities that have diversified their income.

Most of the studies of the situation in the US have shown that commercial banks have diversified their income primarily by increasing their non-interest income. DeYoung and

Roland (2001), Stiroh (2004a, 2004b, 2006), and Stiroh and Rumble (2006) have argued that the diversification of income in the commercial banks has resulted in the conversion of profit-driven activities into fee-charged activities, trust receipts, and other non-interest activities, such as trading of cash instruments and off-balance contracts as well as market-to-market changes in the carrying values of assets and liabilities.

Most of the studies of the situation in Europe have defined the revenue diversification of commercial banks from an economic standpoint. According to Mercieca et al. (2007), revenue diversification is an activity which is mainly based on traditional interest-based products or services, or non-interest based products or services, or a combination of both groups of products or services at the same time. Saghi-Zedek (2016) and Doumpos et al. (2016) have also suggested that revenue diversification has been a development of both traditional and non-traditional banking business activities.

In terms of the existing studies of revenue diversification in ASEAN commercial banks, Hidayat et al. (2012) were the first to conduct empirical research on the levels of product diversification in the banking sector. They explored the relationship between product diversification and the default risk levels of banks in Indonesia during the period between 2002 and 2008. Their research showed that when banks expand their businesses into fees and commissions, they also increase their default risk levels. The impact of such product diversification upon the default risk levels depended upon the size of the total assets. Banks with fewer total assets were less likely to diversify their prod-

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ucts. However, the research was still limited because of the small sample – banks in Indonesia, during the period between 2002 and 2008 – which is likely to have affected the results.

Nguyen et al. (2012a) and Nguyen et al. (2016) have defined income diversification as the development of additional sources of income from non-interest business activities. However, there are few empirical studies which have conducted research on the relationship between revenue diversification and the total asset size of commercial banks, especially the ASEAN banks.

By exploring the relationship between marginal interest rates and market power, Valverde and Fernández (2007) presented conclusions about the impact of total asset sizes upon levels of revenue diversification. The study used a two-step GMM approach for 19,322 banks in Europe – including banks in Germany, Spain, France, the Netherlands, Italy, the United Kingdom, and Sweden – during the period between 1994 and 2001. The results show that diversification helped commercial banks to increase their revenues, thus increasing their total assets. Non-traditional activities partly compensated for the losses in traditional banking (lending and raising funds).

Ovi et al. (2014) investigated the impact of market power upon credit risk, income diversification, and stability in five ASEAN countries: Indonesia, Malaysia, the Philippines, Thailand, and Vietnam. Their study drew a number of conclusions about the relationship between the total asset sizes of commercial banks and their levels of revenue diversification. The study used the GMM approach on a sample of 153 commercial banks during the period between

1998 and 2010. The results indicated a positive correlation between the size of the total assets and the levels of revenue diversification, suggesting that commercial banks with high levels of total assets tend to diversify their sources of income.

Nguyen et al. (2016) conducted research into the relationship between market power, ownership, regional presence, and income diversification in 346 commercial banks in 24 African countries during the period between 1996 and 2004. Through this study, they also showed a positive correlation between the size of the total assets and the levels of revenue diversification. They concluded that the larger a bank was, the more it expanded into non-interest income.

### **3. Sample and methodology**

#### ***3.1. Sample***

This research has studied 152 commercial banks in five ASEAN countries – namely Indonesia, Malaysia, the Philippines, Thailand, and Vietnam – during the period between 2005 and 2015. Other organizations such as investment banks, savings banks, cooperative banks, and non-bank financial intermediaries (such as insurance companies), have been excluded from the sample because they have different management policies in comparison with commercial banks (Perera, Skully, and Wickramanayake, 2007). In the case of mergers and acquisitions, the target companies and the acquirers have been treated separately, as long as they have provided separate financial statements.

Unbalanced panel data was used to avoid survivorship bias in the sample. Data from the separate financial statements (accounted in USD million) of 152 ASEAN commercial banks was extracted from the BankScope data-

**Table 1: Variable definitions**

Variable	Definition	Estimation	Expectation	References
<b>Dependent variable</b>				
REV	Revenue diversification	Total non-interest income/total assets		
<b>Independent variables</b>				
TTA	Total assets	Natural log of bank total assets	+	DeYoung and Rice (2004), Lepetit et al. (2008a), Nguyen et al. (2012a, 2012b), Nguyen et al. (2016)
EQT	Equity	Total equity/total assets	-	Rogers and Sinkey (1999), Kishan and Opiela (2000), Lepetit et al. (2008a, 2008b)
NPL	Non-performing loan	Loan loss provisions/net loans	+	Nguyen et al. (2012a, 2012b), Nguyen et al. (2016)
NIM	Net interest margin	Net interest income/total earning assets	-	Lepetit et al. (2008b)
CRS	Crisis years	Dummy variable	+	Nguyen et al. (2012a, 2012b), Nguyen et al. (2016)
BUS	Business cycle	Annual real GDP growth rate	-	Nguyen et al. (2012a, 2012b), Chen et al. (2014)

Source: Compiled by the authors based on theory and prior literature.

base, which is published by Fitch Ratings and Bureau van Dijk (2016). According to Nguyen et al. (2016), the years of the financial crisis assume the value of 1 for the years 2007 and 2008, and the value of 0 for the other years.

### 3.2. Model

This research is mainly based on the model of Nguyen et al. (2016). The analysis model for the ASEAN commercial banks for the years 2005-2015 is as follows:

$$REV_{i,t} = \alpha_0 + \beta_1 REV_{i,t-1} + \beta_2 TTA_{i,t} + \beta_3 NPL_{i,t} + \beta_4 NIM_{i,t} + \beta_5 EQT_{i,t} + \beta_6 BUS_{i,t} + \beta_7 CRS_{j,t}$$

Where subscripts *i* and *t* denote individual banks and years, respectively. Table 1 explains the definitions and measures of the variables that have been used in this research.

### 3.3. Methodology

Prior studies argue that banks can broaden their total assets to non-traditional banking business when they set a lower interest margin and/or charge a lower rate for traditional loan products. Therefore, it is possible that bank total assets and revenue diversification are simultaneously determined. In addition, a disadvantage of using panel data to draw broad observations from a relatively short period of time is that it often results in variable errors, autocorrelations, and endogenous variables. As a result, we subjected our analyses to a number of tests to ensure the accuracy of the data. After employing the Hansen test and Sargan test as suggested by Arellano and Bond (1991), it is indicated that there is endogenous phenomena in the empirical model.

To solve this endogenous problem, a num-

ber of prior studies employed the GMM in their practices, such as Nguyen et al. (2012a), Ovi et al. (2014), and Nguyen et al. (2016), etc. Additionally, there are several advantages of the GMM in comparison to other traditional methods. The GMM is basically designed to solve the following problems: (i) endogenous phenomena; (ii) panel data which draws broad observations from a relatively short period of time; (iii) linear relationships between a dependent variable and an independent variable; (iv) dynamic models with a lag variable; (v) independent variables which are not strictly exogenous, meaning that they can be correlated with the present residuals or existing endogenous variables in the model; (vi) problems of variance or self-correlation in idiosyncratic disturbances; (vii) the existence of fixed individual effects; (viii) where there is a variation or autocorrelation problem in each object (but not between objects).

Hence, as for the reasons above, we employ the GMM in this study.

## 4. Results

### 4.1. Descriptive statistics

Table 2 presents the descriptive statistics for

our regression variables. Table 2 shows that the REV has an average value of 1.914%, with a standard deviation of 1.576%, indicating significant differences in revenue diversification among banks. The highest REV of the 152 banks in the ASEAN countries was 22.341% (United Overseas Bank Philippines - 2005), while the lowest REV was 0.012% (PT Bank JTrust Indonesia Tbk of Indonesia - 2009).

Table 3 presents the mean values for each country in the sample. It shows that Indonesia has the highest number of observations, with 59 banks, followed by Vietnam, with 36 banks. Malaysia is the country with the lowest number of banks and the least number of observations, because Malaysia's 2005-09 data is incomplete.

### 4.2. Empirical results based on the GMM estimator

Table 4 presents the regression result of the GMM estimation with the totals of the six independent variables which have been used in this research. The empirical model of this research is based on the following GMM estimation:

$$REV_{i,t} = 1.404 + 0.085 * REV_{i,t-1} + 0.056 * TTA_{i,t} + 0.007 * NPL_{i,t} - 0.8442 * NIM_{i,t} - 0.039 * EQT_{i,t} - 0.336 * BUS_t + 0.057 * CRS_t$$

**Table 2: Summary statistics**

Variables	REV	TTA	NPL	NIM	EQT	BUS	CRS
Mean*	1.914	7.992	1.10-3	2.183	12.832	5.397	0.155
Max*	22.341	12.118	26.056	23.866	94.286	7.632	1.000
Min*	0.012	3.140	0.000	0.016	0.466	0.818	0.000
Standard deviation*	1.576	1.678	1.659	1.778	8.452	1.483	0.362
No. of observations	1,175	1,175	1,175	1,175	1,175	1,175	1,175

Note: \* = number is indicated in %

Source: Calculated from STATA

**Table 3: Mean values of variables from 2005 to 2015**

	Indonesia	Malaysia	Philippines	Thailand	Vietnam
No. of observations	476	64	196	171	268
Number of banks	59	16	21	20	36
REV	1.850	1.776	2.950	1.785	1.386
TTA	7.494	9.492	7.948	9.303	7.712
NPL	1.261	0.395	1.286	1.080	0.872
NIM	2.105	2.276	3.399	1.929	1.576
EQT	12.611	11.175	13.133	14.029	12.635
BUS	5.605	5.305	5.425	3.712	6.106
CRS	0.160	0.000	0.163	0.181	0.160

Source: Calculated from STATA

#### *Total assets (TTA)*

The empirical result of the relationship between revenue diversification and total asset size in the five selected ASEAN countries during the study period is indicated in Table 4. The regression results are consistent with the previous empirical studies by DeYoung and Rice (2004), Lepetit et al. (2008a), Nguyen et al. (2012a), Jin et al. (2013), and Nguyen et al. (2016). The results show that the total assets have helped the commercial banks in five ASEAN countries to establish their brands, to have greater influence in their negotiations with their customers, and to expand their development opportunities into non-traditional business fields. In addition, Nguyen et al. (2012b) have presented similar results that show that increasing the total assets for lending and deposit activities helps banks to increase their non-interest income.

#### *Non-performing loans (NPL)*

The regression result between the NPL ratio and the level of revenue diversification is also presented in Table 4. It indicates the positive

correlation between these two variables. The regression result also shows that the more banks focus on expanding their income diversification, the greater the pressure to generate more non-interest income. Hence, commercial banks have to expand their business to clients who are low in creditworthiness, leading in turn to an increase in the risk of bad debt. This result is consistent with the studies of Nguyen et al. (2012a, 2012b) and Nguyen et al. (2016).

#### *Net interest margin (NIM)*

The regression result between the REV and NIM produces the regression coefficient  $\beta = -0.8442$  and the P value =  $0.000 < 0.05$ , which indicates the negative effect. In other words, with a significance level of  $\alpha = 5\%$ , and with all other factors constant, the NIM increased by 1%, which reduced the income diversification by 0.8442%.

The net interest margin in this study has been measured by the ratio of net interest income to total assets. Lepetit et al. (2008b) have shown that high-fee-based activities will result in low interest rates, leading to a reduction in net in-

**Table 4: Association between revenue diversification and total assets for selected ASEAN commercial banks from 2005 to 2015**

REV	Coefficient	Standard Deviation	Z	P-values
REV L1.	0.085	0.014	6.29	0.000
TTA	0.056	0.008	7.26	0.000
NPL	0.007	0.001	5.38	0.000
NIM	- 0.844	0.012	- 73.29	0.000
EQT	- 0.039	0.003	- 12.32	0.000
BUS	- 0.336	0.051	- 6.55	0.000
CRS	0.057	0.015	3.73	0.000
_cons	1.404	0.116	12.15	0.000

Source: Calculated from STATA

terest income and a decrease in marginal interest rates. Therefore, the result is consistent with Lepetit et al. (2008b).

#### *Equity (EQT)*

The Equity ratio has a negative effect on revenue diversification during the period of the study, with a regression coefficient of -0.039 and a significance level of 0.05%. The result is consistent with Rogers and Sinkey (1999), Kishan and Opiela (2000), and Lepetit et al. (2008a, 2008b). In addition, customers often prefer larger banks because they think that these banks will be less risky. This also has a negative effect on the non-traditional activities of banks, which have limited equity.

#### *Business cycles (BUS)*

The regression result between the REV and the BUS shows the regression coefficient of  $\beta = -0.336$  and the P-value of  $0.000 < 0.05$ , which indicates a negative effect. With a significance level of  $\alpha = 5\%$ , and with all other factors constant, the result shows that when the annual real GDP growth rate increases by 1%, the revenue

diversification ratio of the commercial banks in the five ASEAN countries decreases by 0.336%. This implies that during the years of the financial crisis, the rate of traditional interest income of the commercial banks increased faster than the income from fees and commission. The regression result is consistent with Nguyen et al. (2012a, 2012b) and Chen et al. (2014).

#### *Crisis years (CRS)*

The regression results in Table 4 show that, during the years of the financial crisis, from 2007 to 2008, the level of revenue diversification was larger than for the years in which there was no crisis (corresponding to a dummy variable of 0). This implies that during the years of the financial crisis, from 2007 to 2008, credit losses prompted banks to diversify their income and to pursue non-credit activities in order to offset these losses.

### **5. Concluding remarks**

By applying the GMM method to the unbalanced panel data, this research has determined

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the impact of total assets, as well as the impact of other factors, such as non-performing loans, net interest margin rates, owner equity, business cycles, and the years of the financial crisis, upon revenue diversification in commercial banks in five ASEAN countries during the period between 2005 and 2015. The result shows that the size of total assets has a positive impact upon the revenue diversification of the commercial banks in these five ASEAN countries. This also indicates that the size of total assets allows the banks to have a greater influence in their negotiations with their customers, thereby broadening the development opportunities for non-traditional activities. In addition, the years of the financial crisis have had a positive impact upon the level of income diversification, implying that, during the years of the financial crisis, credit losses prompted the banks to diversify their income and their non-credit activities in order to offset these losses.

Based on the empirical results, this research will conclude by providing some suggestions and recommendations to policymakers and administrators, with a view to increasing profitability and operational efficiency in the banking system and the economy more generally.

Firstly, there is a need to strengthen financial capacity. According to the analysis, total asset size is one of the variables that has a positive impact upon the rate of income diversification. Therefore, commercial bank managers should have a policy of managing the size of their banking operations in order to take advantage of economies of scale and to increase their mar-

ket power, thereby diversifying their income streams.

Secondly, there is a need for commercial banks to strengthen the control and safety of their systems. According to the analysis, the NPL ratio has a direct correlation with the level of income diversification. This implies that when banks diversify their income by maintaining their margins, they tend to expand their business to customers who are low in creditworthiness, leading to an increase in the risk of bad debt. As banks seek to improve and maintain their competitive edge, and also to maintain their profit margins under greater competitive pressure, they must strengthen their inspections and management, as well as set operational safety principles.

Finally, the management of the banks might consider focusing on the development of customer services and the development of technology. Increasing the quality and accessibility of customer banking services has also been one way of improving the incomes of commercial banks. In order to improve the quality of their services, banks should focus on developing the diversification of their banking products, by launching new products and services for both deposit and credit accounts. In addition, and even though they have not been mentioned in this research, technical factors have also helped banks to diversify their income. Therefore, banks should also focus on investing and developing new technologies to serve their customers more efficiently.

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