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**Financial Deepening and Economic Growth:  
Evidence from ASEAN and the EU**

**Author:** Nauli Aisyyah Desdiani  
**Student number:** 475594  
**Thesis supervisor:** Dr. Tim Eisert  
**Second Assesor:** Dr. Sebastian Gryglewicz  
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## **Abstract**

This study aims at investigating the impact of financial deepening on economic growth from banking and capital market sectors in ASEAN and the EU from 1975 to 2016. Using cross-country panel fixed effects and the GMM dynamic panel approaches, the result indicates financial deepening can have a negative effect on growth. There is a diminishing effect of financial deepening on growth from banking indicators especially in developed countries in the European Union compared to developing countries in ASEAN. In contrast, financial deepening from the capital market sector can stimulate growth in these two regions although the effect on ASEAN is not as large as on the EU. Furthermore, the findings also document that the occurrence of financial crisis severely declines economic performance. Especially in the financial instability environment, financial deepening from massive credit allocations could generate risky lending and further increase systemic risk.

Keywords: financial deepening, economic growth, ASEAN, EU, financial crisis

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**Table of Contents:**

Abstract ..... 2

Acknowledgement..... 3

Chapter 1. Introduction ..... 7

Chapter 2. Literature Review ..... 10

    A review on the relationship between financial deepening and growth ..... 10

    Hypotheses ..... 13

    Research Framework..... 14

Chapter 3. Methodology..... 15

    Data ..... 15

    Model and Econometric Technique ..... 17

Chapter 4. Results ..... 21

    Descriptive Statistics ..... 21

    Correlation Matrix..... 25

    Empirical Results and Analysis..... 25

    GMM Dynamic Panel ..... 29

    Robustness Analysis..... 32

Chapter 5. Conclusion..... 38

Appendix: ..... 40

References: ..... 42

## List of Tables:

Table 1. Description of Variables .....	19
Table 2. Summary statistics .....	21
Table 3. Summary statistics of the European Union (EU).....	22
Table 4. Summary statistics of the Association of Southeast Asia Nations (ASEAN).....	23
Table 5. Correlation matrix .....	25
Table 6. Fixed effects panel regressions result of real per capita GDP growth (1975-2016) ..	30
Table 7. GMM Blundell-Bond dynamic panel regressions results of real per capita GDP growth (1975-2016).....	31
Table 8. Fixed effects panel regressions result of GNI per capita growth (1975-2016) .....	34
Table 9. GMM Blundell-Bond dynamic panel regressions results of GNI per capita growth (1975-2016).....	35
Table 10. Fixed effects panel regressions result of real per capita GDP growth for EU .....	36
Table 11. Fixed effects panel regressions result of real per capita GDP growth for ASEAN .	37
Table 12. Sample of Countries .....	40

**List of Figures:**

Figure 1. Domestic Credit to Private Sector by Banks (% of GDP) in ASEAN and average EU member countries ..... 8

Figure 2. Timeline of World Financial Crisis ..... 32

Figure 3. Real interest rates for firms in Europe ..... 40

Figure 4. Euro Area Capital Flows..... 41

Figure 5. EU Non-Performing Loans Ratio ..... 41

## **Chapter 1. Introduction**

The financial sector development is believed crucial in accelerating economic performance. From Schumpeterian view about the growth theory, entrepreneurs need funding to finance their investments. In addition to supporting the demand for money, financial institutions play as a supplier by allocating credit to the public from the households' savings. Banks and capital markets exist as financial intermediaries to support the investment and consumption activities in economy. Thus, a strong and resilient financial system is necessary to meet the demand for microcredit and further enhance the welfare of the economy. Therefore, the higher level of liquidity reflected from the deeper financial sector development might be strongly associated with a future improvement of economic growth.

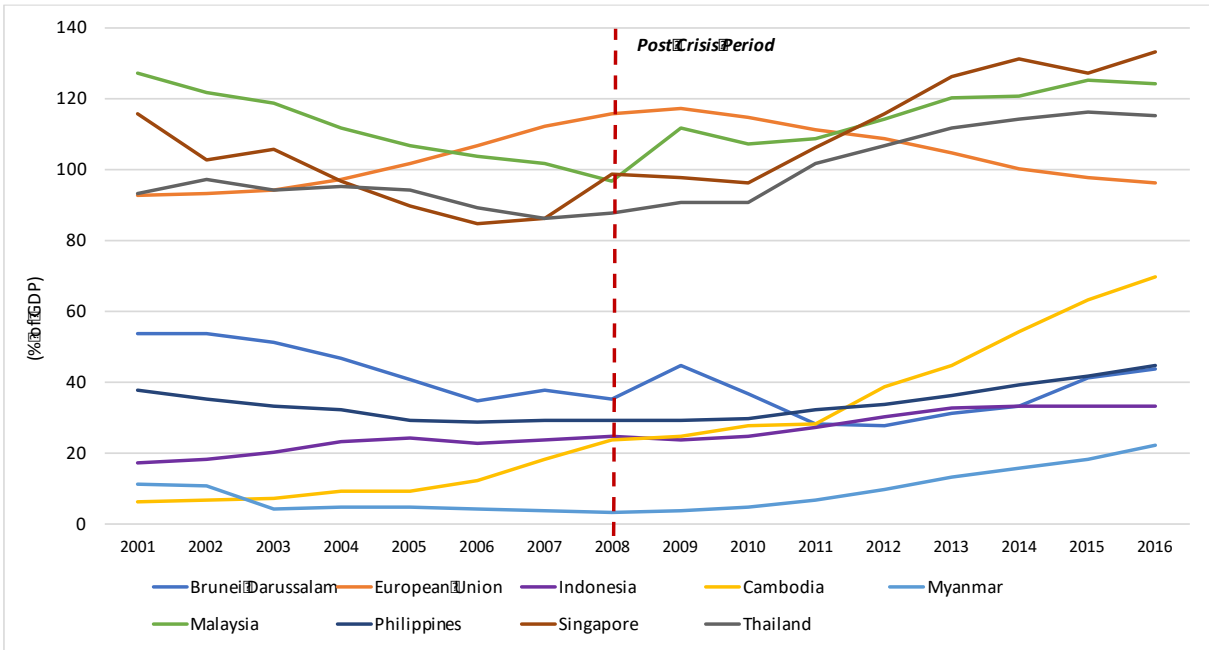
On the other hand, the occurrence of the financial crisis might cause instability in the macroeconomic environment and thus in reverse harm the economy if its exposure brings imbalance in financial systems. One evidence is the Asia financial crisis 1997-98 which was originated by a poor financial infrastructure. The collapse of several commercial banks in ASEAN countries at that time was because they have bank-centric financial system. When banks stop lending, firms find difficulties to search other market for raising debt financing. As a consequence, the financial crisis becomes systemic risk that spreads contagiously to other nations in the region and creates central bank to spend a considerable amount of liquidity funds.

Subsequently, there are several important reasons why ASEAN countries should deepen its financial system. First, the banking sector plays a dominant role in the financial market rather than the non-banking sector (stocks and obligations). The bank-based channel contributes 75% of the total funds provided by the financial sector in the average of ASEAN countries' economy. However, banks have a short-term fund structure and might be exposed to a mismatch risk. Thus, capital market utilization can be one long-term alternative source of funding.

Second, many countries in Southeast Asia have very wide areas and high-income inequality which caused financial sector is centered only in the big cities. The emerging economies in ASEAN, for instance, Indonesia, Philippines, and Thailand face challenges to improve the performance of financial instruments. The ASEAN countries need to promote financial inclusion and have a strong management in crisis prevention. Third, bond and stock market conditions in ASEAN are relatively young and shallow compared to other regions, where only Singapore, Malaysia, and Thailand which are already well-advanced.

Figure 1 depicts one measure of financial deepening which is the private credit by banks to GDP in the ASEAN and EU. As we can see, the average EU member countries have a large proportion of private sector credit by banks to GDP which accounts for over 80%. However, after the 2008 financial crisis, the credit in EU declines and stands below Singapore, Malaysia, and Thailand which are currently experiencing a rapid credit expansion. While in contrast, the other five countries in ASEAN (Brunei, Philippines, Indonesia, Cambodia, and Myanmar) have low proportions of private sector credit by banks.

Figure 1. Domestic Credit to Private Sector by Banks (% of GDP) in ASEAN and average EU member countries



Source: World Bank – World Development Indicators

The purpose of this research is to investigate the impact of financial deepening on economic growth in two different regions, ASEAN and EU, during the period 1975-2016. Specifically, this study will analyze to what extent financial depth indicators in both banking sectors and stock market sectors affect economic growth of ASEAN and EU member countries. I use cross-country panel regression and the GMM dynamic panel approach. At the end of this study, the author will suggest what are the policy implications in financial sectors that should be taken by the governments and policy-makers to accelerate economy based on the empirical estimation results.



This research will contribute to existing studies by presenting an empirical perspective. In particular, this study will assess financial deepening in the cross-countries approach in the two different regions, ASEAN and EU, and provide a comparison from the similarities and differences of financial depth conditions between developed and developing economic communities. Moreover, although previous studies have examined the role of financial deepening on economic performance, most researchers used banking sector approaches as a financial depth transmission. They rarely quantify various indicators of financial depth on growth from other sectors besides banks, for instance, the stock and bond market performances. Therefore, I attempt to distinguish from earlier studies by taking into account two broad financial depth measures, from bank and stock market, and then highlight the contrasting effects from the two financial depth channels on economic growth. In addition, I consider the incidence of financial crisis in the robustness check to observe whether there is a considerable change from the effect of financial deepening on growth in the unstable condition.

The findings indicate that the impact of financial deepening on growth is weakened in developed countries in the EU in compared to developing countries in ASEAN. In particular, the financial depth measures from banking channel have a negative impact on growth in both samples. Whereas, I also document that the financial depth indicators from the capital market channel show a positive relationship with growth in both regions. In addition, the incidence of financial crises can be problematic to the transmission of financial system and declines the influence of financial deepening on growth. In poor regulatory environments with poor lending standards, the liberalization of financial markets can produce a very fragile financial system. If the governments and banking sector cannot efficiently allocate credit, the massive lending will trigger an economic downturn. Moreover, I suggest the developing countries in ASEAN to optimally utilize their capital markets together with the improvement of financial inclusion in order to obtain a stable long-term funding.

The remainder of this thesis is organized as follows: Chapter 2 presents the theoretical basis of financial deepening and growth relationship from several related literatures about this subject and the hypotheses of this research. Chapter 3 describes data and econometric specification, including the model, the selection of explanatory variables, and the research design. Chapter 4 discusses the descriptive statistics, the empirical results, and the robustness tests. The last, chapter 5 concludes with recommendations, limitations of the research, and suggestions for the future research.

## Chapter 2. Literature Review

### A review on the relationship between financial deepening and growth

A number of previous studies have examined the role of financial deepening in improving economic growth, see McKinnon (1973), Shaw (1973), King and Levine (1993), Gregorio (1995), and Levine and Zervos (1996). Until recently, they give different emphasizes on how the transmissions and indicators of financial deepening can contribute to the growth. This section presents several literatures about the basic indicators of financial deepening which later can develop hypotheses in this paper.

Pro views highlight that financial deepening is a catalyst for the improvement of economy. There are several transmissions that the financial deepening can foster economic growth. First, they can support growth by effectively providing funds to both infrastructure development and the welfare improvement. Second, the financial development offers an opportunity for investors to invest in a project with higher returns, here they have an important role as facilitators to mobilize savings (Merton & Bodie, 1995). In addition, a well-developed financial system lower transaction costs and therefore encourages specialization. Broadly speaking, efficient and deep financial markets are specifications of growth and prosperity for a country.

On the other hand, while empirical studies often find a positive influence of financial deepening on growth, there are other researchers who reject that view and conclude there is no clear causal role for financial deepening in the growth process [e.g. Lucas (1988), Ireland (1994), and Shan (2005)]. Furthermore, the oppositions argue that the finance-growth relationship has weakened over time and might dampen the economic condition [e.g. Gregorio and Guidotti (1995), Loayza and Ranciere (2006), and Rosseau and Wachtel (2011)]. Moreover, Loayza and Ranciere (2006) state that a massive liberalization of financial deepening induces financial crisis and may in turn make financial deepening less effective afterwards. The conflicting predictions over this subject still have remained and therefore leads the author to contribute to the literature on the effects of financial deepening on growth from an empirical perspective, notably in the case of ASEAN and the EU, and then shed some light on this issue.

Tracing back to past early prominent literature, King and Levine (1993) find that financial development strongly promotes economic growth, the rate of physical capital accumulation, and the total factor productivity. They investigate empirical cross-country estimations using data from 80 countries during the 1960-1989 period. Basically, they construct four indicators

of financial depth measures: liquid liabilities, deposit money banks domestic assets to deposit money banks domestic assets plus central bank domestic assets, private credit by banks, and non-financial private sector credit. The first indicator, liquid liabilities, is commonly used in the majority of previous studies on this subject. McKinnon (1991) and other economists [e.g. Levine (2000), Klein (2008), Federici (2009), Kunt (2009)] have generally proxied financial deepening by the ratio of broad money supply to GDP or GNP. He argues that a high M3/GNP ratio indicates a large real flow to domestic loanable funds for a new investment. Thus, a higher rate of financial growth and rising M3/GNP ratios are expected to be positively correlated with higher growth in the real gross domestic product.

Furthermore, Levine et al. (2000) investigate the finance-growth nexus by employing the GMM dynamic panel techniques to deal with the endogeneity bias. They construct three indicators of financial depth which are improvements from King and Levine (1993). The indicators from bank-based channel are commercial bank assets to commercial banks and central bank assets which measures the degree to which commercial banks versus the central bank allocate society's savings and the private credit to GDP which defined as claims on the private sector by deposit money banks divided by GDP. A country with higher levels of private credit experiences an advancement of its financial intermediary development. Eventually, their results support the view that better functioning financial system accelerates economic growth. They highlight the importance of financial reforms that strengthen creditor rights, accounting practices, and contract enforcement can boost financial intermediary developments.

While most literature frequently analyzes the financial deepening only from bank-based measures, these following studies incorporate other financial depth measures from capital markets. By using time series method and data from five developed economies, Arestis et al. (2001) discover that although both banks and stock markets are contributed to promoting economic growth, the bank-based financial systems have a greater effect in accelerating growth than the capital-market based. They suggest that the stock market volatility may have a dampening effect on financial development and output, and this therefore negatively correlated with a real economic activity.

Investigating 40 countries for the period 1976-1998, Beck and Levine (2004) however find that the stock markets and banks are important and positively influence economic growth. They observe by using simple OLS panel regressions and GMM dynamic panel estimations based on Arellano and Bond (1991). The measurement of financial depth from bank-based system is a

bank credit. Whereas the measurements from the stock market sectors in their study are the turnover ratio which measures stock market liquidity, the value traded which measures trading activity relative to the size of economy, and the market capitalization ratio which explains the size of equity markets. Nevertheless, Levine and Zervos (1998) argue that a stock market capitalization is not a good predictor of economic growth.

Another study by Hasan et al. (2009) examine the role of institutional development, financial deepening, and political pluralism on growth using panel data in 31 Chinese provinces for the period 1986-2003. They document the regions that have well-developed financial markets, greater rule of laws, more property rights awareness, and more political pluralism are associated with stronger growth.

Bekaert, Harvey, and Lundblad (2005) investigate financial development and financial openness to economic growth. They use equity market turnover and private credit as indicators of financial development. While equity market liberalization is a measure of financial openness. Their finding demonstrates that equity market liberalization increases economic growth. More specifically, they note that countries with better financial development experience growth enhancing from equity market liberalization.

In addition to many literatures that suggest a positive effect of financial deepening on growth, several cross-sectional studies failed to address it. The study conducted by Gregorio and Guidetti (1995) empirically present the analysis of the relationship between financial development and the long-run economic growth in Latin America and in several group of countries based on their income per capita. They find the correlation between financial development and growth is significantly negative in Latin America. The underlying reason for this puzzling result is due to unregulated financial liberalization. Moreover, they argue that the influence of financial development is weak in the high-income countries. This literature further suggests that the effect of finance on growth is mainly because of its impact on the efficiency of investment instead of its volume.

Using a Vector Auto-regression (VAR) techniques, Shan (2005) find little evidence that the financial development supports economic growth. He stresses that financial development is not the most important factor, while it is only a contributing one. Another study by Loayza and Rancièrè (2006) consider a short and long-run impact of financial deepening. Using panel regression, they also link the financial depth and financial fragility (the banking crises and

financial volatility). They document there is a positive association of finance-growth relationship in the long-run while in the short-run, the effect is negative. Furthermore, countries that experiencing more in banking crises or having a severe financial volatility tend to have a negative impact of financial deepening on growth in the short-run.

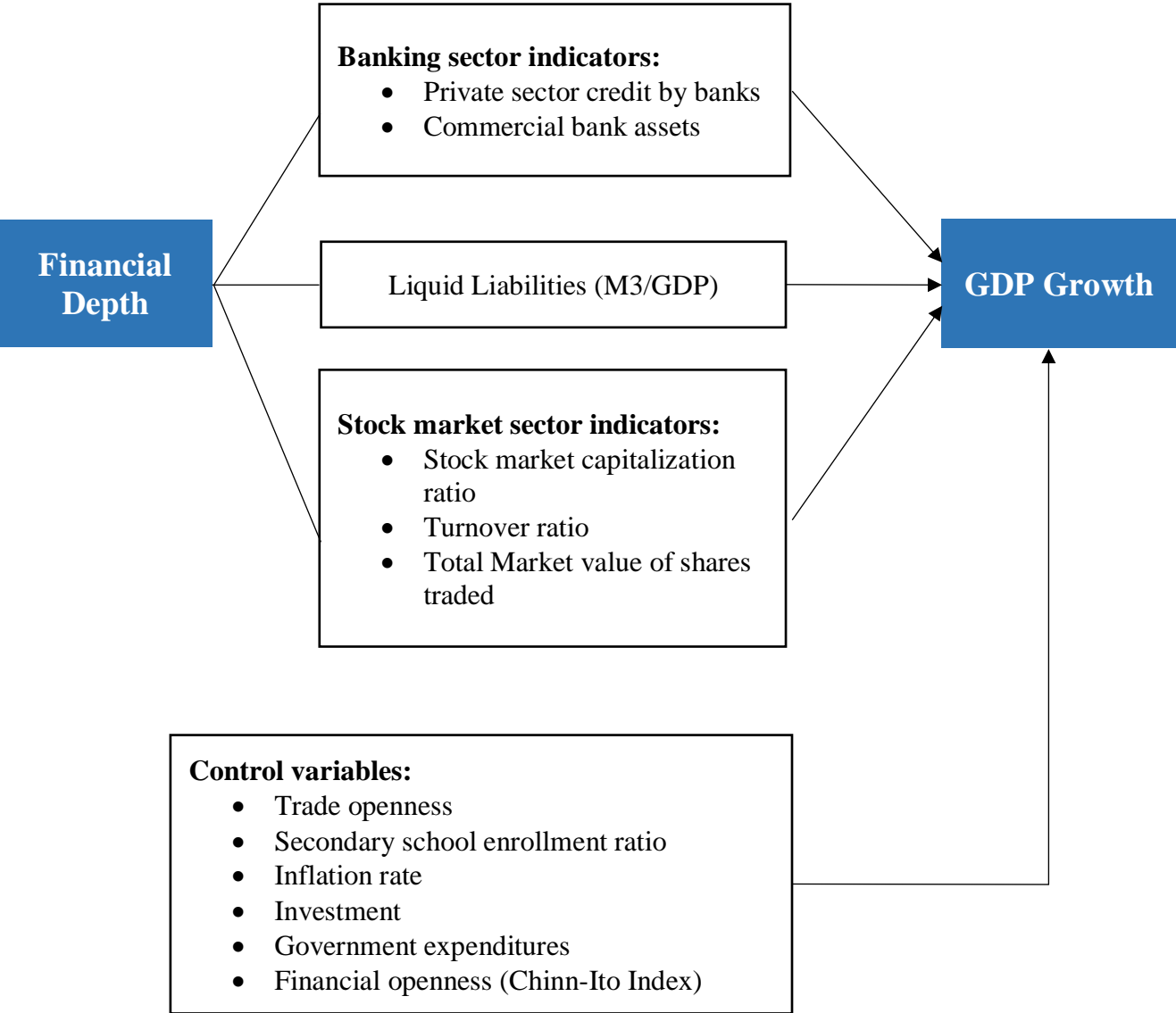
Hereinafter, Rosseau and Wachtel (2011) examine the classic theory on the cross-country relationship between financial deepening and growth. They find that the incidence of financial crisis reduces the impact of financial deepening on growth. However, when they employ international equity markets in recent years as an indicator of financial liberalization, there is no evidence that equity market substitutes the role of banks in debt financing.

### Hypotheses

Based on the theoretical background and prior literature review, the underlying hypotheses in this research are as follow:

- H1: There is a positive impact of financial depth indicators from both bank and stock market on economic growth in ASEAN and the European Union
- H2: Financial depth indicators influence the economic growth most in the advanced economies in the EU countries than in the emerging markets in ASEAN countries
- H3: Banking sector indicators play a greater significant role in promoting economic growth than stock market indicators

Research Framework



## Chapter 3. Methodology

### Data

The analysis in this thesis employs annual panel data on financial and macroeconomic indicators for 37 countries<sup>1</sup> over the period from 1975 to 2016. Specifically, the sample consists of in total 9 the Association of Southeast Asia Nations (ASEAN) member countries (Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam) and 28 the European Union (EU) member countries. However, I exclude Brunei Darussalam, Cambodia, Myanmar, and Vietnam from ASEAN sample due to lack of data availability. The data are obtained from the World Bank's - *World Development Indicators*, The European Central Bank (ECB) statistics, the Federal Reserve Bank of St. Louis (FRED), ASEAN statistics, and International Financial Statistics - IMF. The selection of countries is based on data available from the sources.

To investigate the relationship between financial depth and growth in ASEAN and EU, this research uses datasets of 6 financial deepening measures that could adequately capture all relevant aspect of financial deepening:

- 1). Liquid liabilities to GDP;
- 2). Private sector credit by banks to GDP;
- 3). Commercial bank assets to commercial banks and central bank assets;
- 4). Stock market capitalization ratio;
- 5). Stock market turnover ratio;
- 6). Total market value of shares traded to GDP;

In particular, the first indicator is a general measure of financial deepening that widely used in the previous studies on this subject. The second and third indicators are related to the banking sector and the rest three variables are associated with non-banking financial institution sectors (capital market). I believe they can truly represent the level of financial sectors development. The decision to choose the financial depth indicators is to enlarge the scope of analysis in understanding the different impact of those transmissions on economic performance in two different regions, EU and ASEAN. The condition of financial institutions in both regions are different. Most of the countries in the European Union are developed countries which have

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<sup>1</sup> See appendix for the detail sample of countries

advanced in capital market utilization. In contrast, most of the member countries in ASEAN are developing countries that still heavily depend on the bank-based financial system.

The dependent variable in this study which also acts as the main indicator of economic performance is the growth rate of real annual per capita GDP. However, in robustness analysis, I modify the dependent variable into the growth rate of real annual per capita GNI which also relevant to explain the economic performance.

For independent variables, I have in total 6 measurements of financial deepening and the composition of variables are similar between ASEAN and EU. The first financial deepening indicator is liquid liabilities. This variable presents the size of overall financial system activity and as a traditional and broad indicator of financial depth since it includes all banks, bank-like, and non-bank financial institutions (Beck, Demirgüç-Kunt, and Levine 2009).

Next, I have two groups of financial depth measures, one based on banks alone and the other based on capital market sector. The financial depth indicators that linked to the banking sector are the private sector credit by banks to GDP which equals to the total credit on the private sector by deposit money banks divided by GDP and commercial bank assets to commercial banks and central bank assets which measures the degree to which commercial banks versus the central bank allocate the society's savings.

Afterward, there are three financial depth indicators that associated with non-bank sources of private sector financing. First, the stock market capitalization which indicates the size of the stock market relative to the size of the economy. Second, the stock market turnover ratio which is a ratio of the value of total shares traded to average real market capitalization. The last is the total market value of shares traded to GDP which measures the activity of stock market trading volume as a share of national output and should reflect the degree of liquidity that stock market provides to the economy.

Finally, I incorporate several control variables that are commonly found in the previous empirical literature about the growth studies. First, the trade openness which is the ratio of exports and imports to GDP. This captures the openness of the local economy (Levine et al. 2000; Beck et al. 2004; Hasan et al. 2009). Second, a secondary school enrollment ratio which controls for the influence of human capital investments on growth and as the proxy for



education (Gregorio 1995; Levine et al. 2000; Apergis et al. 2007; Hasan et al. 2009; Rosseau et al 2011). Third, the inflation rate as one indicator of macroeconomic stability. Fourth, the output share of investment that measured from gross capital formation to GDP (Christopolous and Tsionas 2004; Apergis et al. 2007). Fifth, the government expenditure as a share of GDP to captures the impact of government involvement in the economy (Levine et al 2000; Apergis et al 2007; Rosseau et al 2011). The last control variable is a Chinn-ito index measuring a country's degree of capital account openness.

### Model and Econometric Technique

Subsequently, this part outlines the methodological steps in this analysis. Before observing the influence of explanatory variables on the dependent variable within a cross-section, I perform a Hausman test to decide which one is the best panel model that could capture the country characteristics of each cross-section. The result supports that the fixed effects model is preferred than the random effects. Moreover, according to Woolridge (2012), it is important to control heteroscedasticity problem during analysis, which is a situation when the error in the model has the same variance for the whole combinations of outcomes of the explanatory variables. Thus, I apply the robust standard error to control heteroscedasticity and ensure the estimation result is unbiased. Then, I start estimating financial deepening and growth nexus by fixed effects panel regressions with robust standard errors clustered by country. The regression will be examined by using STATA 15 software where the dependent variable is the annual growth rate of per capita GDP over our entire data period (i.e. 1975-2016).

The base model in this paper refers to Beck and Levine (2000), Hasan et al (2009), and Rosseau and Wachtel (2011) who have analyzed the empirical research of finance-growth relationship using cross-country data. The regression model to test the hypothesis is as follows:

$$Y_{i,t+1} = \alpha + \beta_{1i}F_{i,t} + \beta_{2i}X_{i,t} + \beta_{3i}Z_{i,t} + u_{i,t}$$

where subscripts i and t represent respectively country and time period;  $Y_{i,t+1}$  is per capita GDP growth;  $F_{it}$  is liquid liabilities to GDP;  $X_{it}$  is financial depth indicators from banking sector;  $Z_{it}$  is financial depth indicators from capital market sector; and  $u_{it}$  is the error term.

Next, after assessing the base estimation results for ASEAN and EU samples, I try to improve the models by incorporating several control variables such as trade openness, secondary school enrollment ratio, inflation rate, investment, the government expenditure, and financial openness index (Chinn-ito index). Essentially, my main interest is to find out to what extent the financial sector transmissions affect economic growth in the major emerging markets in ASEAN in comparison to the developed countries in the European Union. Thus, I can compare the results between ASEAN and the EU in order to observe what are the primary factors in financial deepening which can influence the growth most.

Furthermore, it is well known that an endogeneity problem sometimes arises when using the OLS estimations. Therefore, following Beck and Levine (2004) and Hasan et al. (2009), I replicate the base model using the system Generalized Method of Moment (GMM) dynamic panel estimation techniques developed by Blundell and Bond (1998). This method is specifically designed to minimize the econometric problems driven by unobserved country-specific effects and simultaneity bias of explanatory variables in lagged-dependent variable models. In the Blundell-Bond system GMM estimator, the instruments for the regression in levels are the lagged differences of the corresponding variables, while the instruments for the regression in differences are the lagged levels. Blundell and Bond (1998) argue that the system GMM estimator performs better than the difference GMM estimator because the instruments in levels become good predictors for endogenous variables. The GMM dynamic panel regression equation can be described in the following form:

$$y_{i,t} = \alpha + \beta y_{i,t-1} + \gamma F_{i,t} + \delta X_{i,t} + \vartheta Z_{i,t} + u_{i,t}$$

where subscripts  $i$  and  $t$  represent respectively country and time period;  $y_{i,t}$  is the dependent variable which is annual per capita GDP growth;  $y_{i,t-1}$  represents its lagged value;  $F_{i,t}$  is liquid liabilities to GDP;  $X_{i,t}$  is financial depth indicators from banking sector;  $Z_{i,t}$  is financial depth indicators from capital market sector; and  $u_{i,t}$  is the error term.

**Table 1. Description of Variables**

<b>Variable</b>	<b>Description</b>	<b>Source</b>
GDP per capita	Annual percentage growth rate of GDP per capita based on constant local currency, PPP (constant 2010 US\$)	World Bank – World Development Indicators
GNI per capita	Annual percentage growth rate of GNI per capita based on constant local currency. Aggregates are based on constant 2010 US\$.	World Bank – World Development Indicators
Liquid Liabilities to GDP	Currency plus demand and interest-bearing liabilities of banks and other financial intermediaries divided by GDP (M3/GDP)	International Financial Statistics - IMF
<i>Financial deepening indicators from banking sector</i>		
Commercial bank assets to commercial banks and central bank assets	Assets of deposit money banks divided by assets of deposit money banks plus central bank assets, times 100	FRED – Economic Data
Private sector credit by banks to GDP	Total credit by deposit money banks to the private sector divided by GDP	FRED – Economic Data
<i>Financial deepening indicators from capital market sector</i>		
Stock market capitalization ratio	It equals the value of listed shares divided by GDP. This variable indicates the size of the stock market relative to the size of the economy.	World Bank – World Development Indicators
Stock market turnover ratio	Ratio of the value of total shares traded to average real market capitalization.	World Bank – World Development Indicators
Total market value of shares traded to GDP	The total number of shares traded, both domestic and foreign, multiplied by their respective matching prices.	World Bank – World Development Indicators
<i>Control Variables</i>		
Trade	The ratio of exports and imports to GDP	World Bank – World Development Indicators
Secondary school enrollment ratio	The ratio of the total number of students enrolled in secondary school to the number of graduates from primary school	World Bank – World Development Indicators

Inflation rate	Inflation measured by consumer price index (CPI) is defined as the change in the prices of a basket of goods and services that are typically purchased by specific groups of households.	World Bank – World Development Indicators
Investment	Gross capital formation (percent of GDP)	World Bank – World Development Indicators
Government expenditure	General government final consumption expenditure includes all government current expenditures for purchases of goods and services including compensation of employees (percent of GDP)	World Bank – World Development Indicators
Chinn-ito index	An index measuring a country's degree of capital account openness. This index takes on higher values the more open the country is to cross-border capital transactions	International Monetary Fund (IMF)

## Chapter 4. Results

This chapter discusses the empirical results from the fixed effect panel and GMM dynamic panel regression. First, I provide the descriptive statistics of economic growth performance: GDP and GNI per capita as dependent variables, financial depth indicators from banking and non-banking sectors as independent variables, and control variables. Second, I present the correlation analysis of all independent and control variables. Third, I discuss the analysis of empirical evidence results. At the end of this chapter, I perform the robustness test in order to have more confident results.

### Descriptive Statistics

**Table 2. Summary statistics**

Variable	<i>N</i>	Mean	SD	Min.	Max.
<b>Annual growth rate of real GDP per capita</b>	1,330	2.65	3.80	-22.28	24.76
<b>Annual growth rate of GNI per capita</b>	1,135	2.39	3.77	-25.31	21.17
<b>Liquid Liabilities to GDP</b>	1,261	72.07	47.65	4.89	399.11
<b>Private sector credit by banks to GDP</b>	1,332	65.50	40.87	2.31	260.7
<b>Commercial bank assets</b>	1,222	92.06	14.22	11.29	100
<b>Stock market capitalization ratio</b>	944	48.04	47.43	0.03	265.56
<b>Stock market turnover ratio</b>	945	44.40	42.97	0.11	341.24
<b>Total market value of shares traded to GDP</b>	996	22.48	33.22	0	242.95
<b>Trade</b>	1,314	103.70	70.32	0.167	441.60
<b>Secondary school enrollment ratio</b>	1,240	89.77	23.96	16.54	166.80
<b>Inflation rate</b>	1,329	12.77	72.35	-6.04	1500
<b>Investment</b>	1,296	24.34	5.62	0.29	46.95
<b>Government expenditure</b>	1,302	17.58	5.07	3.46	29.86
<b>Chinn-ito index</b>	1,217	0.87	1.52	-1.90	2.37

*N* is number of observation from 37 countries from ASEAN and European Union during sample period 1975-2016. Annual growth rate in per capita real GDP is defined as annual percentage growth rate of GDP per capita based on constant local currency, PPP (constant 2010 US\$). Annual growth rate in per capita real GNI is defined as annual percentage growth rate of GNI per capita based on constant local currency. Liquid liabilities to GDP is defined as total currency plus demand and interest-bearing liabilities of banks and other financial intermediaries divided by GDP (M3/GDP). Private sector credit by banks to GDP is the sum of total credit by deposit money banks to the private sector divided by GDP. Commercial bank assets to commercial banks and central bank assets is assets of deposit money banks divided by assets of deposit money banks plus central bank assets. Stock market capitalization ratio is the value of listed shares divided by GDP. Stock market turnover ratio is a ratio of the value of total shares traded to average real market capitalization. Total market value of shares traded to GDP is the total number of shares traded, both domestic and foreign, multiplied by their respective matching prices. Trade is the ratio of exports and imports to GDP. Secondary school enrollment ratio is the ratio of the total number of students enrolled in secondary school to the number of graduates from primary school. Inflation rate is defined as the change in the prices of a basket of goods and services that are typically purchased by specific groups of households (this measured by Consumer Price Index, CPI). Investment is annual growth rate of gross capital formation based on constant local currency with 2010 as a base year. Government expenditure is a total general government final consumption expenditure which includes all government current expenditures for purchases of goods and services including compensation of employees to GDP. Chinn-ito index is an index measuring a country's degree of capital account openness, this index takes on higher values the more open the country is to cross-border capital transactions.

Table 2 presents the summary statistics of all the sample and variables included in this research from 1975 to 2016. As seen from the table 2, the mean value of real GDP per capita growth rate is 2.65 percent and the standard deviation is 3.80 percent. Similarly, the mean of GNI per capita growth is 2.39 with the standard deviation of 3.77 percent. In addition, all of the explanatory variables exhibit a reasonable amount of variation across time and country.

**Table 3. Summary statistics of the European Union (EU)**

Variable	<i>N</i>	Mean	SD	Min.	Max.
<b>Annual growth rate of real GDP per capita</b>	981	2.36	3.54	-14.55	24.76
<b>Annual growth rate of GNI per capita</b>	888	2.09	3.70	-25.31	21.17
<b>Liquid Liabilities to GDP</b>	952	76.02	50.25	6.87	399.11
<b>Private sector credit by banks to GDP</b>	1,018	69.79	40.35	4.25	260.7
<b>Commercial bank assets</b>	949	93.97	11.06	16.19	100
<b>Stock market capitalization ratio</b>	779	40.18	37.96	0.03	249.96
<b>Stock market turnover ratio</b>	780	44.96	45.67	0.11	341.24
<b>Total market value of shares traded to GDP</b>	813	20.78	33.21	0	242.95
<b>Trade</b>	995	96.64	56.32	27.76	410.17
<b>Secondary school enrollment ratio</b>	1,006	97.54	16.26	50.96	166.80
<b>Inflation rate</b>	998	14.81	83.26	-4.47	1500
<b>Investment</b>	995	23.66	4.61	0.29	41.53
<b>Government expenditure</b>	997	19.47	3.22	10.53	27.93
<b>Chinn-ito index</b>	914	1.12	1.46	-1.90	2.37

*N* is number of observation from 28 countries from the European Union during sample period 1975-2016. Annual growth rate in per capita real GDP is defined as annual percentage growth rate of GDP per capita based on constant local currency, PPP (constant 2010 US\$). Annual growth rate in per capita real GNI is defined as annual percentage growth rate of GNI per capita based on constant local currency. Liquid liabilities to GDP is defined as total currency plus demand and interest-bearing liabilities of banks and other financial intermediaries divided by GDP (M3/GDP). Private sector credit by banks to GDP is the sum of total credit by deposit money banks to the private sector divided by GDP. Commercial bank assets to commercial banks and central bank assets is assets of deposit money banks divided by assets of deposit money banks plus central bank assets. Stock market capitalization ratio is the value of listed shares divided by GDP. Stock market turnover ratio is a ratio of the value of total shares traded to average real market capitalization. Total market value of shares traded to GDP is the total number of shares traded, both domestic and foreign, multiplied by their respective matching prices. Trade is the ratio of exports and imports to GDP. Secondary school enrollment ratio is the ratio of the total number of students enrolled in secondary school to the number of graduates from primary school. Inflation rate is defined as the change in the prices of a basket of goods and services that are typically purchased by specific groups of households (this measured by Consumer Price Index, CPI). Investment is annual growth rate of gross capital formation based on constant local currency with 2010 as a base year. Government expenditure is a total general government final consumption expenditure which includes all government current expenditures for purchases of goods and services including compensation of employees to GDP. Chinn-ito index is an index measuring a country's degree of capital account openness, this index takes on higher values the more open the country is to cross-border capital transactions.

Table 3 and 4 present summary statistics for the European Union (EU) and the Association of Southeast Asian Nations (ASEAN), respectively. From the tables, the average countries in EU had lower growth rates in comparison with ASEAN countries. The mean of GDP and GNI growth rate in EU are 2.36 and 2.09 percent respectively while the mean of GDP and GNI growth rate for ASEAN are 3.46 and 3.48 percent respectively.

**Table 4. Summary statistics of the Association of Southeast Asia Nations (ASEAN)**

Variable	<i>N</i>	Mean	SD	Min.	Max.
Annual growth rate of real GDP per capita	349	3.46	4.36	-22.28	18.38
Annual growth rate of GNI per capita	247	3.48	3.81	-11.60	18.00
Liquid Liabilities to GDP	309	59.92	36	4.89	135.12
Private sector credit by banks to GDP	314	51.58	39.49	2.31	165.86
Commercial bank assets	273	85.44	20.59	11.29	100
Stock market capitalization ratio	165	85.15	66.49	0.41	265.56
Stock market turnover ratio	165	41.78	26.67	5.64	148.68
Total market value of shares traded to GDP	183	30.06	32.25	0.08	174.53
Trade	319	125.73	99.31	0.17	441.60
Secondary school enrollment ratio	234	56.39	23.08	16.54	129
Inflation rate	331	6.60	8.52	-6.04	58.38
Investment	301	26.59	7.73	10.43	46.95
Government expenditure	305	11.39	5.09	3.46	29.86
Chinn-ito index	303	0.11	1.44	-1.90	2.37

*N* is number of observation from 9 countries from ASEAN during sample period 1975-2016. Annual growth rate in per capita real GDP is defined as annual percentage growth rate of GDP per capita based on constant local currency, PPP (constant 2010 US\$). Annual growth rate in per capita real GNI is defined as annual percentage growth rate of GNI per capita based on constant local currency. Liquid liabilities to GDP is defined as total currency plus demand and interest-bearing liabilities of banks and other financial intermediaries divided by GDP (M3/GDP). Private sector credit by banks to GDP is the sum of total credit by deposit money banks to the private sector divided by GDP. Commercial bank assets to commercial banks and central bank assets is assets of deposit money banks divided by assets of deposit money banks plus central bank assets. Stock market capitalization ratio is the value of listed shares divided by GDP. Stock market turnover ratio is a ratio of the value of total shares traded to average real market capitalization. Total market value of shares traded to GDP is the total number of shares traded, both domestic and foreign, multiplied by their respective matching prices. Trade is the ratio of exports and imports to GDP. Secondary school enrollment ratio is the ratio of the total number of students enrolled in secondary school to the number of graduates from primary school. Inflation rate is defined as the change in the prices of a basket of goods and services that are typically purchased by specific groups of households (this measured by Consumer Price Index, CPI). Investment is annual growth rate of gross capital formation based on constant local currency with 2010 as a base year. Government expenditure is a total general government final consumption expenditure which includes all government current expenditures for purchases of goods and services including compensation of employees to GDP. Chinn-ito index is an index measuring a country's degree of capital account openness, this index takes on higher values the more open the country is to cross-border capital transactions.

In addition to financial depth indicator measures, liquid liabilities to GDP is higher in most EU countries than ASEAN countries with the average 76.02 percent in EU and 59.92 percent in ASEAN. Table 2 shows that from 1975 to 2016, the banking sector was more developed in the European Union than in Southeast Asia. In terms of financial depth indicators from the banking sector, both private sector credit by banks and commercial bank assets were higher in EU than in Southeast Asia countries. The mean value of private credit by banks is 69.79 percent in EU and 59.92 percent in ASEAN. Whereas the mean of commercial bank assets in EU and ASEAN are 93.97 percent and 85.44 percent, respectively.

In contrast, when looking at the financial depth measures from non-banking sectors, stock market capitalization ratio and total market value of shares traded to GDP, the two indicators show that EU countries experience lower numbers than ASEAN countries. The reason is there might be an outlier in ASEAN samples because the stock markets in Singapore, Malaysia, and

Thailand are already well-developed even though the condition of stock markets in the other ASEAN countries have been developing steadily over years in compared to the average EU countries that have an upward trend. Singapore, Malaysia, and Thailand had liquid stock markets with their total market value of shares traded to GDP ratio are above 100 percent. However, the stock market turnover ratio was higher in EU countries with the average of 44.96 percent compared to ASEAN countries with the average of 41.78 percent.

Table 3 and Table 4 also list summary statistics for control variables which are several macroeconomic variables that might influence growth. Based on the tables, trade is relatively larger in ASEAN than EU with the mean of total trade in ASEAN is 125.73 percent while in EU is 96.64 percent. Whereas, the average of secondary school enrollment ratio is much higher in the most EU countries than ASEAN, with the mean value of 97.54 percent and 56.39 percent respectively, indicating the average quality of education in EU member countries is well developed than ASEAN countries. Furthermore, it was discovered that during the period considered, the inflation rate was much higher in the European Union. This caused by the great recession which happened in the early 1980s when many European countries experienced high inflation. From 1975 to 2016, the average inflation rate is 14.81% in European Union and 6.6% in Southeast Asia. Afterward, the investment variable that measured from a gross fixed capital formation is slightly higher in ASEAN countries with the mean value of 26.59 percent compared to EU countries, 23.66 percent.

The other control variables incorporated in this thesis are government expenditure and Chinn-Ito index. For the government expenditure, the European Union has a larger number than ASEAN countries. As noted from Table 2, the mean value percentage of EU government expenditure is 19.47% with the maximum value of 27.93%. While in ASEAN sample, the mean value of government expenditure is 11.39% with the maximum value of 29.86%. Interestingly, the Chinn-Ito index which represents the financial openness index is larger in EU countries than in ASEAN. This index varies from minimum -1.90 to maximum 2.37. Thus, it can be noted that the European Union countries have more liberalized and innovated financial sectors than Southeast Asia countries.



## Correlation Matrix

Table 5 presents the correlation matrix among independent and control variables for all samples. As seen from the correlation matrix, the number of correlations is quite low (below 0.80) which indicates the multicollinearity will not be severe and affect substantially the results.

**Table 5. Correlation matrix**

	1	2	3	4	5	6	7	8	9	10	11	12	
1	Liquid Liabilities	1.000											
2	Private sector credit by banks	0.788	1.000										
3	Commercial bank assets	0.253	0.398	1.000									
4	Stock market capitalization ratio	0.334	0.404	0.239	1.000								
5	Stock market turnover	0.037	0.235	0.087	0.287	1.000							
6	Market value of shares traded	0.179	0.390	0.216	0.675	0.730	1.000						
7	Trade	0.443	0.205	0.216	0.175	-0.218	-0.082	1.000					
8	Secondary school ratio	0.048	0.199	0.235	0.111	0.202	0.285	-0.001	1.000				
9	Inflation rate	-0.239	-0.289	-0.314	-0.246	-0.062	-0.195	-0.148	-0.227	1.000			
10	Investment	-0.152	-0.128	0.086	0.085	-0.132	-0.081	0.061	-0.360	-0.103	1.000		
11	Government expenditure	-0.093	0.038	0.096	-0.086	0.126	0.138	-0.063	0.645	-0.175	-0.292	1.000	
12	Chinn-ito index	0.079	0.284	0.433	0.211	0.241	0.310	0.030	0.440	-0.379	-0.041	0.323	1.000

## Empirical Results and Analysis

This section provides the estimation results of the relationship between financial deepening and growth in ASEAN and EU. Following King and Levine (1993), I start with OLS panel fixed effects regressions that are shown in Table 6 with robust standard errors clustered by the country cross-section. The selection of fixed effect models instead of random effects is based on the result of Hausman test. Furthermore, I include country and time fixed effects in all panel estimations in order to avoid the influence of time trend and country specific. In addition, I also employ other econometric estimation with the generalized method of moments (GMM) dynamic panel techniques developed by Blundell and Bond, as shown in Table 7, to reduce any simultaneities bias which commonly found in the OLS panel regression. Several previous financial development and growth studies (e.g, Levine et al. 2000, Beck et al. 2000, Hasan et al. 2009, and Rosseau and Wachtel 2011) also analyze using this method.

Table 6 presents results for the baseline model (all financial depth measures and growth) and the models of bank and non-banking sector financial depth indicators with control variables for the full data period, 1975-2016, in ASEAN and EU. The dependent variable is the growth rate

of real per capita GDP. The proposed hypothesis in this analysis is all financial depth indicators will positively influence economic growth both in ASEAN and the EU.

From table 6, columns 1 and 5 report the baseline model regressions that only augmented by the two broad sector categories of financial depth. Overall, the results show there are obvious differences in financial deepening conditions on growth between the European Union and Southeast Asia countries. First, liquid liabilities as the main measures of financial depth is statistically significant in both regions. However, this variable affects growth positively in ASEAN at 10% significance level while it negatively influences growth in EU at 1% significance level for the whole sample period. The coefficient of liquid liabilities in column 1 is 0.021 indicates that 1 point increase in broad money to GDP will lead to a 0.021% increase in ASEAN countries GDP growth. This result supports the findings from Levine et al. (2000) and Apergis et al. (2007) who discovered a positive correlation between liquid liabilities and per capita GDP growth. Possible insight to explain this finding is because most of ASEAN countries are emerging markets where countries still rely excessively on financial sector to foster rapid economic growth and development. When the government increases the money supply, it will trigger the consumption and investment to rise and thus accelerates economic growth in the country.

In contrast, from the EU sample, the coefficient of liquid liabilities (column 5) is -0.020, meaning that if liquid liabilities increase by 1% will cause the decrease of 0.020% growth of the EU economy on average. The negative relationship between financial deepening and economic growth is also found in the previous study in Latin America by Gregorio and Guidetti (1995). They report that the negative impact of the developments in the financial sectors could be seen as the result of financial liberalization in a poor regulatory environment. In addition, Creel et al. (2014) find the similar evidence in the EU and they suggest that the financial depth in the EU has now reached a too-high level, as consequence finance effects are no longer favorable to economic performance.

Furthermore, another potential reason to consider on this finding can be caused by low inflation conditions of European Union countries in the last ten years. As the result, low inflation will lead to an increase in the real interest rates because it represents the real cost of borrowing for investment and consumption. Hence, even though the governments raise the money supply from increasing liquid liabilities, there is no incentive for society to invest. Moreover, the

society is also encouraged to saving abroad to countries that experiencing an expansionary economic growth. Thus, the higher money supply will inversely have a reducing impact on growth as there is an upward trend in the net capital outflow in the EU<sup>2</sup>.

Second, when looking at the banking sector financial depth indicators, private credit by banks and commercial bank assets, I find that private credit by banks has a significant influence on growth but with an opposite sign from hypothesis in all regressions. Similarly, there is a negative impact of commercial bank assets on growth in ASEAN and EU but this variable significant only in column 2 and 8. The coefficient of private credit by banks in ASEAN sample range from -0.032 to -0.054 percent while in EU countries it ranges around -0.013 to -0.023 percent. At first, this evidence may appear puzzling because it is not linear with expectations.

Nevertheless, these findings can become less surprising. Systemic crises with risky lending systems can be possible explanation of the negative relationship between banking credit and growth. In the aftermath of the 2008 financial crisis, there is an increasing trend in ASEAN leverage ratios. Banks credit has been growing rapidly across Singapore, Thailand, Malaysia<sup>3</sup> and less for the rest of ASEAN countries. The easy monetary conditions at that time in reverse bring debt burdens when interest rate eventually rise during 2013-2014. As a result, the slowdown of consumption and investment demand challenges real Southeast Asia domestic economic environment.

Similarly, the European countries also hit by the contagious effect from the 2008 global crisis and led them into the following subsequent crisis, the European sovereign debt crisis, starting in 2011. The austerity programs together with the increasing non-performing loans (NPL) of the European Union countries in 2011-2012 contributed to the deterioration of economic growth. The NPL of average European Union countries during the sovereign debt crisis is above 5% indicating a higher risk from the inability of the borrower to repay its loan.<sup>4</sup>

Hasan et al. (2009) discuss a similar phenomenon in China and report bank lending does not have a positive influence because banks engaged with non-performing loans and continued bad

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<sup>2</sup> See appendix for figure 3 and 4

<sup>3</sup> See figure 1. Thailand and Malaysia private credit by banks-to-GDP ratios have reached 100% and 120% respectively.

<sup>4</sup> See appendix for figure 5

lending practices. Another evidence from Latin America by Gregorio and Guidetti (1995) provides some support for this view. They state that the negative coefficient of bank loan on growth is due to the extreme liberalization of financial markets followed by their subsequent collapse. Therefore, in poor regulatory environments notably with poor lending standards, the liberalization of financial markets can produce a very fragile financial system. If the governments and banking sector cannot efficiently allocate credit, the massive lending will trigger economic downturn.

On the other hand, turning to the capital market depth variables, I find the stock market capitalization ratio is not statistically significant in the baseline equations (columns 1 and 5). However, it becomes significant only in the EU sample when I incorporate the control variables into regressions. In columns 7 and 8, the stock market capitalization ratio shows a positive and significant relationship with growth. The magnitude of this variable in the EU is 0.015 indicating the increase of 1% stock market capitalization ratio, will increase 0.015% growth in the average EU countries. Furthermore, the stock turnover ratio is also significant and has a positive influence on growth in the last two EU regressions and positively affect growth in third and fourth model for ASEAN sample. The coefficient of a stock turnover ratio in ASEAN is lower than EU, with 0.005 and 0.007 in ASEAN and 0.008 in the EU sample. For the market value of shares traded, I find this significant with growth in ASEAN sample but with the opposite sign.

Interestingly in this finding, the capital market improvement can enhance growth and further improve the living standard of the country. Although the effect in ASEAN countries is not as large as in the European Union, I argue the role of capital markets as an alternative source of funding is necessary for infrastructure development in the region. Especially, most ASEAN countries are emerging markets and heavily depend on banking sector than the financial market (including bond and equity market) to financial services. Therefore, the capital market utilization is very important to obtain stable long-term funding not only for the public sector but also for the private sector since banks have a short-term fund structure and might be exposed to a mismatch risk.

In contrast, most of the EU members are developed countries in which they are already optimal in allocating money to the most productive use in capital markets. Therefore, ASEAN countries should utilize their capital markets together with the improvement of financial inclusion such

as having more sophisticated and efficient financial instruments in order to facilitate liquidity in the economy. Regardless of the fact now in ASEAN, only Singapore, Malaysia, and Thailand which are already well-advanced in financial markets.

Another interesting finding here, when controlling for the explanatory variables the coefficient of Chinn-ito index is statistically significant in the ASEAN with a magnitude of 0.790 and 1.086. This indicates that the financial openness is essential in stimulating economic growth in ASEAN countries. This is reasonable because to have a sustainable economic growth, emerging markets in ASEAN need to develop not only their financial sector but also together with the effectivity of financial openness.

### GMM Dynamic Panel

I re-estimate all the equations of ASEAN and EU data during 1975 to 2016 periods using Blundell-Bond GMM dynamic panel estimation to control any endogeneity and simultaneity bias which commonly happen in the OLS regressions. Table 7 depicts the results of the GMM estimations. Overall, the results are essentially unchanged and the baseline model of independent variables performs better in the GMM regression than in the OLS panel fixed effects regression in table 6. Moreover, with dynamic system GMM, the effect of financial depth on growth becomes more significant during the period estimated.

It is also important to note that when I incorporate all control variables, these variables show the right signs as expected and statistically significant such as trade and investment that positively affect growth. Additionally, the other controls, inflation rate and the government expenditure negatively influence growth in both the EU and ASEAN samples.

**Table 6. Fixed effects panel regressions result of real per capita GDP growth (1975-2016)**

	Dependent Variable: % Growth of Real Per Capita GDP							
	ASEAN				EU			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	5.549** (2.67)	11.30*** (10.37)	13.77*** (6.10)	12.02** (4.03)	7.472*** (4.58)	8.808** (2.46)	0.866 (0.30)	6.694 (1.41)
Liquid Liabilities	0.021* (1.12)	0.001 (0.07)	-0.038** (-2.82)	0.016 (0.77)	-0.020*** (-2.82)	-0.005 (-0.37)	-0.002 (-0.26)	0.004 (0.46)
Private sector credit by banks	-0.038* (-2.21)	-0.032 (-1.19)		-0.054** (-4.30)	-0.017** (-2.53)	-0.023** (-2.35)		-0.013* (-1.84)
Commercial bank assets	0.013 (0.52)	-0.032** (-3.52)		-0.018 (-1.05)	-0.007 (-0.49)	-0.023 (-1.01)		-0.056** (-2.16)
Stock market capitalization ratio	-0.001 (-0.15)		0.001 (0.12)	-0.001 (-0.24)	0.003 (0.44)		0.015*** (3.07)	0.011** (2.16)
Turnover ratio	-0.000 (-0.33)		0.005* (2.74)	0.007** (2.87)	0.001 (0.25)		0.008* (2.00)	0.008* (2.05)
Market value of shares traded	-0.036** (-3.56)		-0.022 (-0.74)	-0.029 (-1.30)	0.008 (1.04)		-0.000 (-0.09)	-0.000 (-0.02)
Trade		-0.007 (-0.33)	0.027** (4.25)	0.041*** (6.83)		0.028* (1.98)	0.056*** (4.21)	0.057*** (4.40)
Secondary school enrollment ratio		-0.054 (-1.58)	-0.093* (-2.47)	-0.093* (-2.29)		-0.003 (-0.30)	-0.008 (-0.98)	-0.005 (-0.62)
Inflation rate		-0.029 (-0.88)	-0.121* (-2.71)	-0.116** (-3.17)		-0.007 (-1.45)	-0.076*** (-7.20)	-0.075*** (-5.81)
Investment		0.078*** (3.76)	-0.033 (-0.99)	0.020 (0.63)		-0.041 (-1.00)	-0.041 (-1.18)	-0.046 (-1.34)
Government expenditure		-0.079* (-2.09)	-0.153** (-3.59)	-0.120** (-4.51)		0.034 (0.29)	0.157 (1.54)	0.110 (0.92)
Chinn-ito index		0.790*** (5.00)	1.086* (2.30)	0.696 (1.37)		0.206 (1.07)	-0.135 (-0.99)	0.105 (0.61)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	246	287	205	205	717	794	659	647
R <sup>2</sup>	0.582	0.842	0.665	0.687	0.517	0.495	0.555	0.573

Dependent variable is annual per capita GDP growth. *N* refers to number of observations included in the estimation. Absolute values of *t*-statistics of the coefficient (based on clustered standard errors by country) independent variables are reported in parentheses. \*, \*\*, \*\*\* indicate significance levels of 10%, 5%, and 1%, respectively. Model 1 and 5 are the baseline estimation results of all financial deepening indicators without control variables in both regions, ASEAN, and EU, respectively; model 2 and 6 are the results of financial deepening indicators from banking sector with control variables in ASEAN and EU, respectively; model 3 and 7 are the results of financial deepening indicators from non-banking sector with control variables in ASEAN and EU, respectively; and model 4 and 8 are the results of all financial deepening indicators and control variables in ASEAN and EU, respectively.

**Table 7. GMM Blundell-Bond dynamic panel regressions results of real per capita GDP growth (1975-2016)**

	Dependent Variable: % Growth of Real Per Capita GDP							
	ASEAN				EU			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	-4.131* (-1.70)	7.064*** (6.68)	8.433*** (7.84)	-1.89** (-0.78)	2.558* (1.78)	9.954*** (4.13)	-0.999 (-0.52)	5.168*** (2.11)
Real per capita GDP <sub>t-1</sub>	0.218*** (4.46)	0.272*** (6.42)	0.223*** (4.79)	0.0243 (0.53)	0.244*** (9.31)	0.212*** (8.40)	0.146*** (5.31)	0.081*** (3.07)
Liquid Liabilities	0.029** (1.99)			0.050*** (3.53)	-0.018*** (-3.68)	-0.009 (-1.35)	-0.050*** (-8.28)	-0.009 (-1.20)
Private sector credit by banks	-0.073*** (-5.83)	-0.057*** (-6.72)		-0.104*** (-9.47)	-0.035*** (-7.90)	-0.043*** (-8.47)		-0.048*** (-9.35)
Commercial bank assets	0.088*** (3.23)	-0.046** (-3.82)		0.080*** (2.82)	0.019 (1.20)	-0.062*** (-3.67)		-0.061*** (-3.58)
Stock market capitalization ratio	0.021*** (3.57)		0.012*** (2.20)	0.010*** (2.01)	0.034*** (6.83)		0.037*** (6.86)	0.031*** (6.15)
Turnover ratio	-0.000 (-0.20)		-0.006*** (-2.59)	-0.006** (-2.18)	0.011*** (2.79)		0.020*** (5.33)	0.019*** (5.54)
Market value of shares traded	-0.009 (-0.78)		0.030* (1.77)	0.063*** (3.85)	-0.022*** (-3.39)		-0.038*** (-6.32)	-0.029*** (-5.05)
Trade		0.022*** (3.11)	-0.018*** (-2.94)	0.007 (1.01)		0.037*** (7.90)	0.038*** (7.40)	0.044*** (8.94)
Secondary school enrollment ratio		0.016 (1.33)	-0.041*** (-3.58)	-0.044*** (-3.84)		0.024 (2.85)	0.006 (0.68)	0.010 (1.18)
Inflation rate		-0.130*** (-6.75)	-0.266*** (-10.44)	-0.246*** (-10.19)		-0.007*** (-3.47)	-0.064*** (-5.16)	-0.072*** (-6.11)
Investment		0.144*** (6.00)	0.089*** (2.94)	0.226*** (6.65)		0.163*** (6.10)	0.283*** (9.21)	0.286*** (9.83)
Government expenditure		-0.248*** (-4.00)	-0.242** (-7.99)	-0.280** (-3.47)		-0.424*** (-7.26)	-0.212*** (-3.88)	-0.278*** (-5.36)
Chinn-ito index		0.100 (0.56)	-0.082 (-0.41)	-0.005 (-0.03)		0.327*** (2.73)	-0.696*** (-5.57)	-0.163 (-1.23)
<i>N</i>	226	250	205	185	702	772	649	637
Wald Chi <sup>2</sup>	119.54	320.74	285.74	450.87	446.17	729.12	608.16	791.55

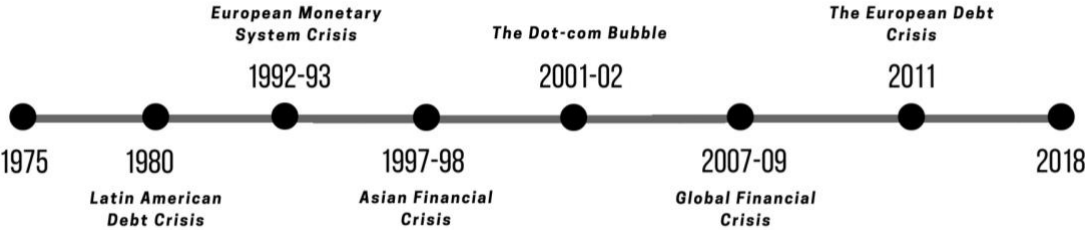
Dependent variable is annual real per capita GDP growth. *N* refers to number of observations included in the estimation. Specification statistics including Wald Chi<sup>2</sup> of the error terms is also reported. Absolute values of *t*-statistics of the coefficient independent variables are reported in parentheses. \*, \*\*, \*\*\* indicate significance levels of 10%, 5%, and 1%, respectively. Model 1 and 5 are the estimation results of main variables only (all indicators of financial deepening) without control in both regions, ASEAN and EU, respectively; model 2 and 6 are the estimation results of financial deepening from banking sectors with control variables in both regions respectively; model 3 and 7 are the results of financial deepening indicators from non-banking sectors with control variables in both regions respectively; model 4 and 8 are the results of all financial deepening indicators and control variables in both regions respectively.

Robustness Analysis

I perform several robustness tests in order to have more confident results. First, I investigate whether there are differences if I use another measure of economic performance. Here I re-estimate the models by replacing the dependent variable with the Gross National Income (GNI) per capita growth using the same regressions, the OLS panel fixed effects and the GMM dynamic panel for 1975 to 2016 periods.

Second, I take into account the impact of financial deepening on growth to the incidence of financial crises. Specifically, I divide the time periods into two sub-periods: 1975 to 1989 and 1990 to 2016. The first sub-period, 1975-1989, coincided only with the Latin American debt crisis which happened in the early 1980s. While for 1990-2016 sub-period, this largely related to many serial financial crises: the European monetary system crisis, the Asian financial crisis, the Dot-Com bubble, the global financial crisis, and the European debt crisis.

Figure 2. Timeline of World Financial Crisis



Results are provided in table 8 and 9 for the robustness of the financial depth and GNI per capita growth relationship. Overall, the results are largely similar to the base models. Liquid liabilities is negative and significant with GNI in EU samples however it is not significant in ASEAN regressions. Furthermore, the financial depth measures from the banking sectors also perform consistent with the main findings where private sector credit by banks negatively affects GNI in both ASEAN and EU models. However, I find commercial bank assets positively influence GNI growth only in ASEAN regressions while it is negative in the EU. Afterwards, the financial depth indicators from the capital market show similar signs with our baseline models. There are positive relationships between stock market capitalization and stock turnover ratio on GNI respectively but there is an unclear relationship between the market value of shares traded and GNI.



On the other hand, table 10 and 11 present results when I split the time period into two sub-periods, 1975-1989 and 1990-2016, in EU and ASEAN models respectively. As seen from table 10 in the EU sample, the evidence overall indicates the effect of financial deepening on growth disappears in 1990 to 2016, the sub-period that experienced many crises. The finding is in line with a prior study from Rosseau and Wachtel (2011). They find that the incidence of financial crises is related to the dampening effect of financial deepening on growth. Additionally, they argue that uncontrolled financial deepening or too rapid credit growth might lead to both inflation and weakened banking systems which creates a financial crisis that hampers growth. From table 10 and 11, the most obvious finding from the declining impact of financial deepening on growth is the liquid liabilities. In the EU sample, during 1975-1989, liquid liabilities have a positive effect on growth but it turns out to be negative in the 1990-2016 sub-sample period. A similar pattern also can be found in the ASEAN sample for this variable.

The finding of robustness analysis implies that in a financial instability environment, the widespread failures in money creation by financial institutions can contribute to the economic downturn. Excessive easy credit conditions could generate a risky lending and as a result, banks find themselves in danger of high probability of default. Furthermore, a high non-performing loan will increase systemic risk exposure in the economy. The European banking and sovereign debt crisis recently come as one underlying reason why financial deepening is no longer favorable to economic performance in the European Union. Moreover, most EU countries also affected by the global financial crisis in 2008 and then hit them into the subsequent recession, the European sovereign debt crisis. In contrast, the ASEAN countries do not seem to be exposed to the 2008 financial crisis and only suffer from the Asian crisis which happened in 1997-98. Thus, the declined impact of finance on growth is largely found in EU and this mainly caused by the increased evidence of financial crisis.

In sum, the robustness tests strongly confirm the findings that financial depth indicators affect economic performance in EU and ASEAN countries differently. Notably, the health of financial sector development will improve the economic condition. However, too rapid and massive money creation leads to financial crisis and reduce the benefit of financial deepening itself. The outcomes provide additional support to our conclusion that the incidence of financial crises declines the influence of financial deepening on growth.

**Table 8. Fixed effects panel regressions result of GNI per capita growth (1975-2016)**

	Dependent Variable: % Growth of GNI Per Capita							
	ASEAN				EU			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	-21.37** (-3.03)	-2.738 (-0.38)	18.56* (3.15)	5.989 (0.40)	8.201*** (4.81)	5.585 (1.65)	-0.311 (-0.10)	5.796 (1.42)
Liquid Liabilities	0.092 (1.57)	0.051 (0.90)	0.011 (0.35)	0.012 (0.34)	-0.045*** (-4.42)	-0.027** (-2.72)	-0.013 (-1.52)	-0.011 (-1.34)
Private sector credit by banks	-0.077 (-1.58)	-0.074* (-2.12)		0.028 (0.54)	-0.014** (-2.06)	-0.012** (-2.13)		-0.009 (-1.47)
Commercial bank assets	0.206** (3.55)	0.155 (1.90)		0.120 (1.13)	-0.000 (-0.01)	-0.051** (-2.21)		-0.056*** (-3.34)
Stock market capitalization ratio	-0.005 (-0.23)		0.040** (4.70)	0.035* (2.44)	0.011 (0.75)		0.010* (1.94)	0.007 (1.36)
Turnover ratio	0.042* (2.07)		0.016 (0.48)	0.027 (0.59)	0.003 (0.64)		0.005 (1.17)	0.005 (1.30)
Market value of shares traded	-0.029 (-1.82)		-0.001 (-0.04)	-0.005 (-0.22)	0.016 (1.19)		-0.000 (-0.06)	-0.000 (-0.08)
Trade		0.069*** (4.69)	0.024 (0.64)	0.041 (0.90)		0.061*** (5.13)	0.062*** (5.66)	0.064*** (5.62)
Secondary school enrollment ratio		-0.147** (-3.16)	-0.182** (-3.89)	-0.192* (-2.89)		0.005 (0.42)	-0.002 (-0.18)	0.001 (0.12)
Inflation rate		-0.166* (-2.31)	-0.801** (-5.45)	-0.824*** (-6.64)		-0.002 (-0.88)	-0.066*** (-7.25)	-0.066*** (-6.15)
Investment		-0.138** (-3.66)	-0.260** (-5.77)	-0.294*** (-9.85)		-0.025 (-0.46)	-0.025 (-0.67)	-0.040 (-1.03)
Government expenditure		0.114 (0.45)	0.415 (1.55)	0.470 (1.17)		0.189 (1.52)	0.168 (1.66)	0.124 (1.15)
Chinn-ito index		0.214 (0.41)	0.211 (0.30)	0.232 (0.32)		0.265 (1.17)	-0.101 (-0.68)	0.161 (0.92)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	224	206	205	183	686	722	629	617
R <sup>2</sup>	0.579	0.710	0.768	0.777	0.467	0.505	0.531	0.549

Dependent variable is annual growth of GNI per capita. *N* refers to number of observations included in the estimation. Absolute values of *t*-statistics of the coefficient (based on clustered standard errors by country) independent variables are reported in parentheses. \*, \*\*, \*\*\* indicate significance levels of 10%, 5%, and 1%, respectively. Model 1 and 5 are the baseline estimation results of all financial deepening indicators without control variables in both regions, ASEAN, and EU, respectively; model 2 and 6 are the results of financial deepening indicators from banking sector with control variables in ASEAN and EU, respectively; model 3 and 7 are the results of financial deepening indicators from capital market sector with control variables in ASEAN and EU, respectively; and model 4 and 8 are the results of all financial deepening indicators and control variables in ASEAN and EU, respectively.

**Table 9. GMM Blundell-Bond dynamic panel regressions results of GNI per capita growth (1975-2016)**

	Dependent Variable: % Growth of GNI Per Capita							
	ASEAN				EU			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	-3.688 (-1.50)	-5.214*** (-2.68)	-0.677 (-0.36)	-1.299 (-0.48)	3.536*** (1.83)	11.09*** (4.23)	2.602 (1.29)	9.465*** (3.50)
Real per capita GNI <sub>t-1</sub>	0.209*** (4.02)	0.234*** (4.64)	0.669*** (19.18)	0.214** (0.53)	0.261*** (8.97)	0.170*** (6.33)	0.140*** (4.87)	0.090*** (3.18)
Liquid Liabilities	0.019 (1.23)	0.056*** (3.54)	-0.033** (-2.35)	0.052*** (3.37)	-0.033*** (-6.62)	-0.004 (-0.50)	-0.037*** (-5.96)	-0.001 (-0.12)
Private sector credit by banks	-0.053*** (-3.95)	-0.092*** (-7.35)		-0.102*** (-8.28)	-0.024*** (-4.55)	-0.040*** (-7.08)		-0.042*** (-7.36)
Commercial bank assets	0.085*** (3.07)	0.087** (3.57)		0.087*** (2.72)	0.013 (0.59)	-0.064*** (-3.25)		-0.066*** (-3.45)
Stock market capitalization ratio	0.015** (2.53)		0.015** (2.03)	0.008 (1.42)	0.033*** (5.42)		0.036*** (6.29)	0.030*** (5.36)
Turnover ratio	-0.000 (-0.04)		0.006* (1.92)	-0.006* (-1.75)	0.009* (1.93)		0.012*** (3.16)	0.011*** (2.95)
Market value of shares traded	-0.009 (-0.71)		-0.032 (-1.44)	0.074*** (4.02)	-0.027*** (-3.36)		-0.036*** (-5.61)	-0.027*** (-4.27)
Trade		0.028*** (3.91)	0.021*** (2.15)	0.011 (1.46)		0.038*** (6.55)	0.035*** (6.16)	0.039*** (6.92)
Secondary school enrollment ratio		-0.044*** (-3.81)	-0.025* (-1.69)	-0.053*** (-4.37)		0.016* (1.86)	0.004 (0.44)	0.009 (1.01)
Inflation rate		-0.092*** (-3.53)	-0.125*** (-3.53)	-0.125*** (-4.48)		-0.007*** (-3.21)	-0.074*** (-5.67)	-0.084*** (-6.56)
Investment		0.130*** (3.85)	-0.046 (-1.17)	0.128*** (3.62)		0.158*** (5.48)	0.234*** (7.22)	0.231*** (7.20)
Government expenditure		-0.105 (-1.25)	0.523*** (6.63)	-0.252*** (-2.85)		-0.469*** (-7.59)	-0.352*** (-6.13)	-0.417*** (-7.35)
Chinn-ito index		-0.493*** (-2.80)	-0.372 (-1.40)	-0.025 (-0.12)		0.412*** (3.01)	-0.553*** (-4.03)	-0.019 (-0.13)
<i>N</i>	226	209	205	185	662	695	611	599
Wald Chi <sup>2</sup>	78.70	277.09	13,964	227.14	306.31	513.86	459.78	552.58

Dependent variable is annual growth of GNI per capita. *N* refers to number of observations included in the estimation. Specification statistics including Wald Chi<sup>2</sup> of the error terms is also reported. Absolute values of *t*-statistics of the coefficient independent variables are reported in parentheses. \*, \*\*, \*\*\* indicate significance levels of 10%, 5%, and 1%, respectively. Model 1 and 5 are the estimation results of main variables only (all indicators of financial deepening) without control in both regions, ASEAN and EU, respectively; model 2 and 6 are the estimation results of financial deepening from banking sectors with control variables in both regions respectively; model 3 and 7 are the results of financial deepening indicators from non-banking sectors with control variables in both regions respectively; model 4 and 8 are the results of all financial deepening indicators and control variables in both regions respectively.

**Table 10. Fixed effects panel regressions result of real per capita GDP growth for EU**

	Dependent Variable: % Growth of Real Per Capita GDP									
	1975-1989					1990-2016				
Liquid Liabilities	0.038 (1.35)		0.041 (1.51)	0.038 (0.49)	-0.023*** (-2.20)	-0.015 (-1.41)	-0.014 (-1.36)	0.000 (0.00)	0.009 (0.80)	
Private sector credit by banks		-0.070* (-2.13)	0.007 (0.23)	-0.103* (-2.23)		-0.021*** (-2.83)	-0.019*** (-2.88)		-0.016** (-2.41)	
Commercial bank assets		-0.082* (-2.06)	-0.044 (-1.28)	-0.062 (-0.96)		-0.007 (-0.42)	-0.030 (-1.28)		-0.064** (-2.14)	
Stock market capitalization ratio		0.027 (1.26)	0.038 (1.17)	0.038 (1.25)		0.003 (0.42)		0.016*** (2.96)	0.011* (1.94)	
Turnover ratio		0.009 (0.54)	0.026* (1.93)	0.047* (2.07)		0.001 (0.32)		0.007* (1.93)	0.007* (1.94)	
Market value of shares traded		-0.043 (-0.54)	0.160 (1.05)	0.007 (0.04)		0.008 (0.99)		0.000 (0.13)	0.001 (0.21)	
Trade	0.144*** (3.75)		0.049 (0.67)	0.141*** (3.48)	-0.012 (-0.19)	0.025* (2.00)	0.025* (1.71)	0.056*** (4.03)	0.059*** (4.24)	
Secondary school enrollment ratio		0.007 (0.24)	0.026 (0.44)	0.005 (0.17)	-0.021 (-0.40)	-0.016 (-1.30)	-0.012 (-1.15)	-0.014 (-1.35)	-0.008 (-0.98)	
Inflation rate	-0.278*** (-3.42)	-0.158** (-2.42)	-0.273*** (-3.22)	-0.055 (-0.79)	-0.006 (-1.24)	-0.006 (-1.20)	-0.006 (-1.20)	-0.077*** (-6.82)	-0.075*** (-5.43)	
Investment	-0.156** (-2.67)	-0.087 (-0.86)	-0.147*** (-2.21)	0.029 (0.23)	-0.004 (-0.09)	-0.003 (-0.09)	-0.003 (-0.09)	-0.045 (-1.16)	-0.052 (-1.31)	
Government expenditure	0.894*** (5.75)	0.609*** (3.55)	0.861*** (5.90)	0.585*** (2.48)	0.088 (0.72)	0.088 (0.72)	0.091 (0.74)	0.173 (1.42)	0.141 (1.02)	
Chinn-ito index	0.072 (0.16)	0.085 (0.14)	0.210 (0.44)	0.022 (0.05)	0.188 (1.40)	0.188 (1.40)	0.287* (1.92)	-0.113 (-0.72)	0.129 (0.69)	
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	249	263	378	249	249	632	727	700	729	700
R <sup>2</sup>	0.649	0.494	0.522	0.652	0.605	0.498	0.517	0.518	0.561	0.583

Dependent variable is annual per capita GDP growth. *N* refers to number of observations included in the estimation. Absolute values of *t*-statistics of the coefficient (based on clustered standard errors by country) independent variables are reported in parentheses. \*, \*\*, \*\*\* indicate significance levels of 10%, 5%, and 1%, respectively.

**Table 11. Fixed effects panel regressions result of real per capita GDP growth for ASEAN**

	Dependent Variable: % Growth of Real Per Capita GDP							
	1975-1989				1990-2016			
Liquid Liabilities	0.123*** (5.60)	0.093 (1.09)	-0.052 (-1.09)	0.368** (3.68)	0.029 (0.73)	0.022 (0.66)	-0.038* (-2.72)	-0.006 (-0.25)
Private sector credit by banks	-0.144*** (-5.43)	-0.105 (-0.97)		-0.426*** (-6.19)	-0.046 (-1.29)	-0.053 (-1.39)		-0.032 (-1.43)
Commercial bank assets	-0.034 (-0.95)	0.052** (2.86)		0.121** (4.22)	0.024 (0.34)	0.000 (0.04)		-0.008 (-0.19)
Stock market capitalization ratio	-0.034* (-2.19)		-0.096* (-2.16)	-0.109** (-3.63)	0.001 (0.09)		0.018 (1.68)	0.014 (1.26)
Turnover ratio	0.007 (1.44)		0.009** (3.65)	0.008* (2.78)	0.010 (0.65)		0.029*** (5.05)	0.027*** (5.53)
Market value of shares traded	0.110** (3.17)		0.104 (2.04)	-0.134 (-1.42)	-0.045** (-2.72)		-0.050* (-2.18)	-0.054* (-2.28)
Trade		0.081 (1.01)	0.034 (0.35)	0.063 (0.61)		-0.030 (-0.91)	0.023* (2.39)	0.025 (1.76)
Secondary school enrollment ratio		-0.081 (-0.47)	-0.008 (-0.11)	0.016 (0.23)		-0.003 (-0.05)	-0.073 (-2.11)	-0.066 (-1.42)
Inflation rate		-0.182*** (-11.58)	-0.104 (-1.56)	-0.101* (-2.48)		0.035 (0.60)	-0.131* (-2.26)	-0.127 (-2.12)
Investment		-0.177** (-3.61)	-0.248* (-2.13)	-0.024 (-0.16)		0.104* (2.40)	0.001 (0.05)	0.026 (0.74)
Government expenditure		-0.047 (-0.24)	-0.137 (-1.52)	0.310* (2.58)		-0.147 (-1.51)	-0.012 (-0.05)	-0.018 (-0.07)
Chinn-ito index		1.308 (1.76)	1.675 (1.29)	1.765 (1.48)		0.659* (2.13)	1.007*** (4.80)	0.905** (3.00)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	84	98	70	70	162	189	135	135
R <sup>2</sup>	0.683	0.823	0.733	0.806	0.597	0.523	0.687	0.694

Dependent variable is annual per capita GDP growth. *N* refers to number of observations included in the estimation. Absolute values of *t*-statistics of the coefficient (based on clustered standard errors by country) independent variables are reported in parentheses. \*, \*\*, \*\*\* indicate significance levels of 10%, 5%, and 1%, respectively.

## Chapter 5. Conclusion

The growing debates over finance and growth relationships remained a prominent and interesting topic to investigate. Over the last years, ASEAN countries have improved significantly in stimulating their economic growth. Even though, several developing countries in ASEAN excessively depend on bank-based channel to support debt to fund consumption and investment activities. Whereas, the European Union countries are already well-advanced in utilizing capital market as another source of financing. Therefore, this research examines an empirical study between financial deepening and economic growth in ASEAN and the European Union. The indicators of financial depth are from banking and capital market sector. I estimate using fixed effects panel regression with data sample consists of 37 countries during the period from 1975 to 2016. Then following Beck and Levine (2004), I develop our analysis by employing the GMM dynamic panel method to correct the endogeneity problem.

Overall, I reject the hypotheses and find financial deepening can have a negative effect on growth. The liquid liability has a negative effect in the EU countries, while this indicator has a positive influence on growth in ASEAN. In particular, the financial depth measures from banking channel, the private sector credit by banks, negatively affects growth in both samples. This puzzling finding emerges because the diminishing effect of financial deepening on growth occurs especially in developed countries in the European Union as a result of too rapid financial liberalization during the crisis period when compared to developing countries in ASEAN. Additionally, I argue that a minor effect of financial deepening in developed countries is because financial sector is no longer a major contribution to the real economic growth.

In contrast to the third hypothesis, I document that the stock market development has a greater influence in promoting growth than the banking sector development. Financial deepening from the capital market channel can enhance growth in these two regions although the effect on ASEAN is not as large as on the EU. The stock market capitalization ratio and stock market turnover ratio can stimulate a positive effect on economic growth. Furthermore, I also find that the occurrence of financial crisis declines economic performance. Especially in the financial instability environment, financial deepening from massive credit conditions could generate risky lending and further increase systemic risk.

Hereinafter, this study suggests that the government cannot ignore the development of financial sector. Several policy recommendations should be implemented to deepen the national financial system and further enhance the economic performance. First, the national financial authority in developing countries in ASEAN (e.g. Indonesia, Philippines, Brunei, Myanmar, and Vietnam) together with the central bank and the government should enhance a more innovative and sophisticated capital market system, which are the stock and bond market development. Second, establishing a high standard accounting system supported by more transparent and prudent in bureaucratic quality. Third, the government should promote greater banking sector development especially in least developed countries such as Myanmar and Laos. Fourth, raising public awareness in the importance of financial institutions to help their financing by increasing financial inclusivity and accessibility, for instance, by encouraging the development of mobile and internet banking or by building more commercial bank branches. Fifth, the government should ensure the stability of financial sector during the crisis period by restraining the money supply within threshold and implementing macro and micro-prudential supervision for credit allocation by commercial banks. Sixth, improving the regulatory and legal systems that protect the security of financial transactions and rights of market participants. The last is the need for raising the standard of domestic financial institutions to compete internationally through increasing capital mobility and trade openness.

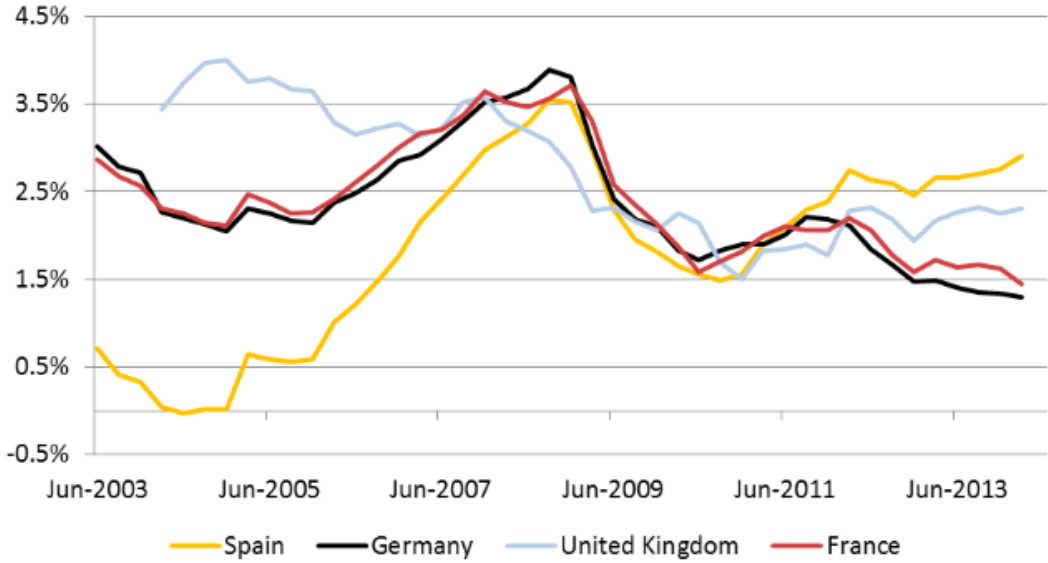
This study has successfully contributed to extensive knowledge about the impact of financial deepening on economic growth notably in the case of ASEAN and the EU from two broad different financial depth measures, bank and capital market sector. However, it might be interesting to take into account the financial inclusivity and financial regulation, which can bring more additional insight into the influence of financial sector development on growth performance. Another limitation of this study is caused by the lack of data in the sample region. Hence, the need for data collection notably in ASEAN sample might improve the analysis. Additionally, I suggest for further research to incorporate other financial depth indicators such as from bond market sector to have more accurate predictions in the finance-growth nexus. Finally, although the finance-growth relationship could be assessed in one direction, another interesting consideration to examine is the bi-directional causality from the supply-demand phenomenon between finance and growth performance.

**Appendix:**

**Table 12. Sample of Countries**

ASEAN countries	EU countries	
Brunei Darussalam	Austria	Italy
Cambodia	Belgium	Latvia
Indonesia	Bulgaria	Lithuania
Malaysia	Croatia	Luxembourg
Myanmar	Cyprus	Malta
Philippines	Czech Republic	Netherlands
Singapore	Denmark	Poland
Thailand	Estonia	Portugal
Vietnam	Finland	Romania
	France	Slovakia
	Germany	Slovenia
	Greece	Spain
	Hungary	Sweden
	Ireland	United Kingdom

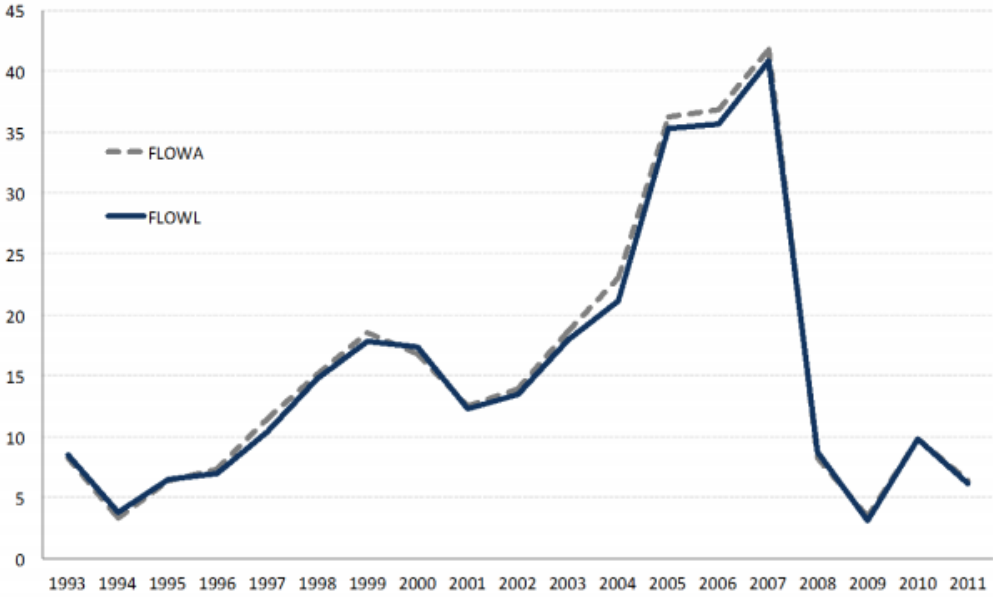
Figure 3. Real interest rates for firms in Europe



Source: Haver Analytics, CER calculation; the calculation is simplified: 1 to 5-year interest rates on firm loans minus current CPI (instead of inflation expectations) for the past, and IMF inflation expectations for 2014-2019.

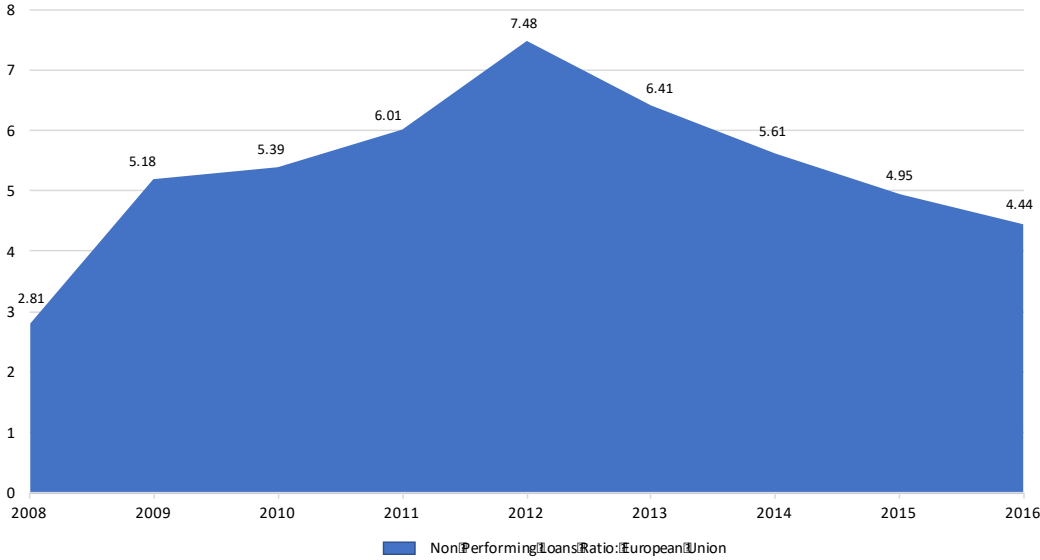


Figure 4. Euro Area Capital Flows



Source: IMF Balance of Payment Database

Figure 5. EU Non-Performing Loans Ratio



Source: IMF – Global Financial Stability Report

## References:

- Apergis, N., Filippidis, I., & Economidou, C. (2007). Financial Deepening and Economic Growth Linkages: A Panel Data Analysis. *Review of World Economics*, 143(1).
- Arestis, P., Demetriades, O., & Luintel, K. (2001). Financial Development and Economic Growth: The Role of Stock Markets. *Journal of Money, Credit, and Banking*, 33, 16–41.
- Arellano, M., & Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies*, 58, 277–297.
- Beck, T., Levine, R., & Loayza, N. (2000). Finance and The Sources of Growth. *Journal of Financial Economics*, 58, 261–300.
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2009). *Financial Institutions and Markets across Countries and Over Time-Data and Analysis* (No. 4943).
- Bekaert, G., Harvey, C., & Lundblad, C. (2005). Does Financial Liberalization Spur Growth? *Journal of Financial Economics*, 77(1), 3–55.
- Blundell, R., & Bond, S. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Model. *Journal of Econometrics*, 87, 115–143.
- Creel, J., Hubert, P., & Labondance, F. (2013). *Financial Stability and Economic Performance*.
- Federici, D., & Caprioli, F. (2009). Financial Development and Growth: An Empirical Analysis. *Journal of Economic Modelling*, 26, 285–294.
- Gregorio, J. De, & Guidotti, P. E. (1995). Financial Development and Economic Growth. *World Development*, 23(3), 433–448.
- Hasan, I., Wachtel, P., & Zhou, M. (2009). Institutional Development, Financial Deepening and Economic Growth: Evidence from China. *Journal of Banking and Finance*, 33, 157–170.
- Ireland, P. N. (1994). Money and Growth: An Alternative Approach. *American Economic Review*, 84(1), 47–65.
- King, R. G., & Levine, R. (1993). Finance and Growth: Schumpeter Might be Right. *The Quarterly Journal of Economics*, 108(3), 717–737.
- Klein, M. W., & Olivei, G. P. (2008). Capital Account Liberalization, Financial Depth, and Economic Growth. *Journal of International Money and Finance*, 27, 861–875.
- Levine, R., Loayza, N., & Beck, T. (2000). Financial Intermediation and Growth: Causality and Causes. *Journal of Monetary Economics*, 46, 31–77.

- Levine, R., & Zervos, S. (1996). Stock Market Development and Long-Run Growth. *The World Bank Economic Review*, 10(2), 323–339.
- Levine, R., & Zervos, S. (1998). Stock Markets, Banks, and Economic Growth. *American Economic Review*, 88, 537–58.
- Beck, T., & Levine, R. (2004). Stock Markets, Banks, and Growth: Panel Evidence. *Journal of Banking and Finance*, 28, 423–442.
- Loayza, N., & Ranciere, R. (2006). Financial Development, Financial Fragility, and Growth: Causality and Causes. *Journal of Money, Credit, and Banking*, 38, 1051–1076.
- Lucas, R. E. (1988). On the Mechanics of Economic Development. *Journal of Monetary Economics*, 22, 3–42.
- McKinnon, R. I. (1973). *Money and Capital in Economic Development*. Washington DC: The Brookings Institution.
- McKinnon, R. I. (1991). *The Order of Economy Liberalization: Financial Control in the Transition to a Market Economy*. Baltimore: Johns Hopkins University Press.
- Merton, R. C., & Bodie, Z. (1995). *A Framework for Analyzing the Financial System. The Global Financial System: A Functional Perspective*. Boston: Harvard Business School Press.
- Rousseau, P. L., & Wachtel, P. (2011). What is Happening to The Impact of Financial Deepening on Economic Growth? *Economic Inquiry*, 49(1), 276–288.
- Shan, J. (2005). Does Financial Development “Lead” Economic Growth? A Vector Autoregression Appraisal. *Journal of Applied Economics*, 37, 1353–1367.
- Shaw, E. S. (1973). *Financial Deepening in Economic Development*. New York: Oxford University Press.
- Wooldridge, J. M. (2012). *Introductory Econometrics: A Modern Approach* (5th edition). South-Western Cengage Learning.