Domestic credit and economic growth in ASEAN: Evidence from panel data

Borey Ea[1], Jirakom Sirisrisakulchai[2] and Jianxu Liu[3]

Faculty of Economics, Chiang Mai University, Thailand

[1]*eaborey2010@gmail.com*
[2]*sirisrisakulchai@hotmail.com*
[3]*liujianxu@163.com*

ABSTRACT

This paper examines the empirical question of whether domestic credit can help explain economic growth variation across eight countries in ASEAN member states excluding Myanmar and Lao PDR over the period of 2002 to 2013. We provide the new evidence using dynamic panel estimation techniques which suggest that domestic credit is statistically significant determinant of economic growth. Our finding shows that domestic credit is negatively related to economic growth. This result emphasizes the important of domestic credit as a key factor in ASEAN economy.

Keywords : domestic credit, economic growth, panel data, panel dynamic model, ASEAN.

JEL Classification : E51, E20, C23, R10

1. Introduction

During the financial crisis from 2008 to 2009, there were impacts to financial sectors especially banking. After the financial recovery, state-owned banks played more important roles in financial intermediary especially in small businesses (Onder, Z & Ozyildirim, S, 2013). However, the issue of the roles of state-owned banks on economy is controversial. For instance, la porta, et al (2002) shows that states control the banks having detrimental impacts to the productivity, output growth and financial structure progress. Micco, et al (2007) illustrates that state-owned bank has lower the profit ratios comparing to private-owned bank in developing countries and it frequently occurs during the election periods. Cornett et al. (2010) additionally emphasizes that it leads to more credit risk for those bank if under the control of government.

Beside the role of state-owned bank, private banks especially domestic credit to private sectors also play significant role to development of growth in the emerging market. The empirical results show that the growth of domestic credit plays more important roles in forecasting the crises resulting from financial and economic problems (Mendoza and Terrones, 2008; Gourinchas and Obsteld, 2012; Obstfeld and Rogoff, 2010; Schularick and Taylor, 2012; and Jorda et al, 2011). Declining of domestic credit can lead to lower economic performance and unstable financial sector. Luca and Spatafora (2012) showed that domestic credit is the important indicator for domestic private investment in emerging economics.

Mishkin (1995) states that those financial flow especially monetary transactions are conducted through four channels. First of all, Channel of interest rate illustrates that the more money supply it has, the lower rate of real interest rate it is due to cost of lower capital. It's favorable for investor and increment of household spending. So, the economy will lead to economic growth. Secondly, Channel of exchange rate states that when there is lower real interest rate and exchange rate, it leads to increase net export and output growth. Third channel is about other asset price. When money supply falls down, the other variables also decrease such as asset price, wealth, consumption, investment theory of Tobin's q, and output. Last but not least, Channel of credit results from agency problems of asymmetric information. When there is a decrease of money supply, the other variables also get impact to be declined such as bank deposits, bank loans, and price of equities, investment, cash flow, and output. In this paper, we include these control variables such as money supply M2, financial consumption, export, foreign direct investment, exchange rate and lending interest rate.

This research paper focuses on Association of Southeast Asia Nations (ASEAN). It's created on 8 August 1967. Its purpose is to collaboration of economic in ASEAN to be one single market. ASEAN communities consist of Singapore, Malaysia, Indonesia, Philippine, Brunei, Thailand, Cambodia, Laos, Vietnam and Myanmar. ASEAN communities aim to achieve to be the one vision, one identity and one community. As a result, through the efforts of ASEAN collaboration, ASEAN has created three pillars in order to response to these visions above such as ASEAN security and political community (ASPC), ASEAN Economic Community (AEC) and ASEAN social and cultural community (ASCC). So, ASEAN Economic Communities (AEC) Blueprint is one of the three pillars to apply in this research topic. AEC is created to have the integration among the member states in order to liberalize all goods, services, capitals, investment and other sectors in order to have dramatically free flow within intra-ASEAN to be single market by 2015.

Moreover, ASEAN will achieve to be ASEAN Banking Integration Framework (ABIF) in 2020 to have integration of financial system of Financial Services Liberalization (FSL) in

term of progressive of financial flow, Capital Account Liberalization (CAL) to have removal of the control of capital and restriction of capital flow, and Capital Market Development (CMD) to have the long term development of financial infrastructure of ASEAN capital market (Wihardja, 2013). Through ABIF in 2020, the domestic credit provided to private sector by bank will allow central bank to achieve the liberalization of those three elements as mentioned above in order to make an financial integration of ABIF and to have the stabilize economic in financial sector of each countries in ASEAN member states. This will lead to flexibilities and multilateral liberalization by 2020 in the case of a number of ASEAN commercial banks presences in ASEAN. Also, the major of commercial banks services are about bank credit and deposits. Most of cash flow of bank revenues comes from the bank lending to financial market.

In addition, some ASEAN countries are advance and emerging market. According to Leggett, R. J. (2014), he states that Singapore, Indonesia and Malaysia are transforming to be the regional business centers. However, some countries like Lao, Myanmar and Vietnam become as manufacturing hubs. Moreover, this ASEAN region approximately has 600 million consumers to allow many multinationals and each countries players plus local and foreign companies to enter the new market.

There are a few researchers have done the empirical analysis on banking lending, macroeconomic conditions and financial uncertainty in ASEAN. Ibrahim et al (2012) shows the empirical evidence from Malaysia. This author uses only time series method of vector autoregressions (VARs) model to explain those relationship between real output, bank credit and stock price. In this paper, we will bridge this gap by providing the evidence of domestic credit and economic growth relationship using panel data from ASEAN.

According to Baltagi, B (2013), panel data can provide us many pooling of observations by having the cross-sectional data for several periods of times in term of households, firms, and countries, etc. Also, this panel data helps us to manage individual heterogeneity because sometimes when we omit some variables, it will lead to bias in the resulting estimations. So, panel data can tackle this problem. Moreover, it enables us to manage the state or time invariant variables while times series or cross-section can't do. Secondly, it provides more information and variability from the data such as less collinearity, more degree of freedom, and efficiency. Also, it helps us examine the adjusted dynamics. It can determine pure time and cross section data. Furthermore, it also allows us to test the model with complicated behavior. Last but not least, to use this panel data, the micro and macro panel data provides us more accuracy and longer time series, respectively. Based on previous research, Bayraktar et al (2006), Monnin, P.,and Jokipii, T (2010), Wu et al (2011), Fernandez et al (2010) and Deidda, L., and Fattouh, B (2008) examine the relationship between bank credit and economic growth. The result shows the positively trend among the two variables. Zhang et al (2012) examines the correlations between financial development and economic growth in China by focusing on the city area. The result reveals that financial development has positive relationship to economic growth. However, it requires the financial reforms after China joining the World Trade Organization (WTO).

Figure 1: Domestic credit to private sector by banks among ASEAN
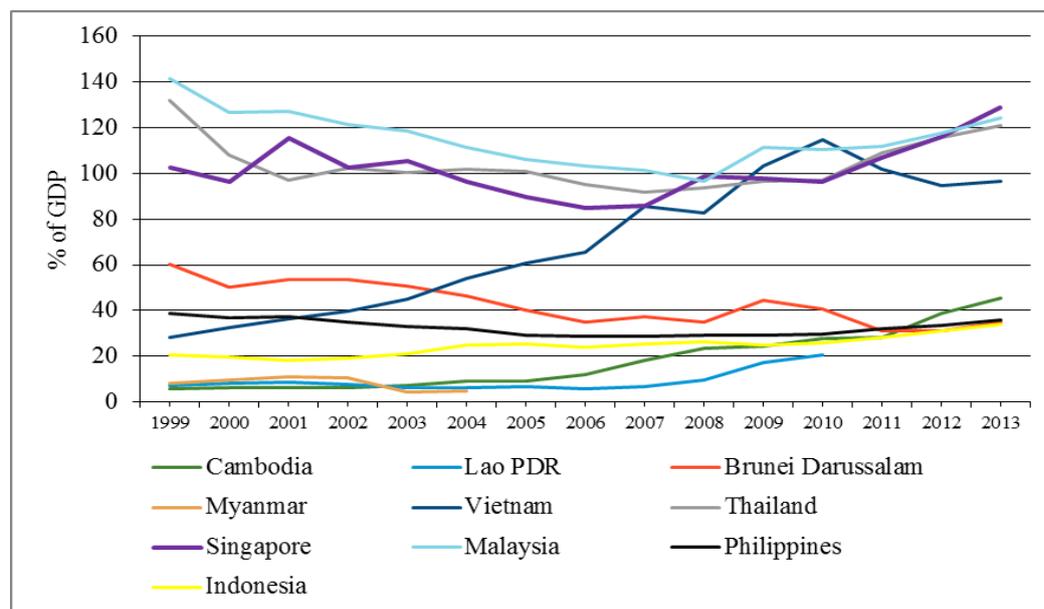
Source : World Development Indicators (WDI) from World Bank, February 2015

Figure 1 showed the bank loans of domestic credit provided to the private sectors as percentage of GDP. Comparing among the ten ASEAN member states, Malaysia, Singapore and Thailand had more domestic credit of loan than other. It showed the potential trends of market shares and competitiveness of these countries that tried to compete and capture the ASEAN market. For instance, Singapore had increased dramatically from 96.3% to 128.9% in 2000 and 2013, respectively.

This research will give the empirical evidence of the relationship between domestic credit and economic growth in ASEAN. The remaining parts of the research paper are organized as following. Section 2 focuses on literature review. Following literature review, it is data and methodology that are on sections 3 and 4, respectively. Section 5 shows empirical results. Last but not least, discussion and conclusion will be at the end of sections.

2. Literature review

Through the literature review, there are many researchers that have conducted the study between relationship of economic growth and banking sector by using times series models and panel data models. Ibrahim, M and Shah, M. E (2012), Bassett et al (2014), Bayraktar et al (2006), Monnin, P and Jokipii, T (2010), Amidu, M and Wolfe, S. (2013), Wu et al (2011), Dalis et al (2014), Gunji et al (2010), Fernandez et al (2010), Talavera et al (2012), Moshirian, F and Wu, Q (2012), and Deidda, L and Fattouh, B (2008) showed that financial sector especially domestic credit had correlation with GDP. However, Awdeh, A. (2012) and Halvorsen et al (2014) illustrated that domestic credit didn't have any positive impact to GDP at all. Based on the Awdeh, the research concluded that financial sector could not lead to economic growth in Lebanon. Also, Halvorsen stated that bank lending shock would have negative impact to output of the economy. The reason that Awdeh, A and Halvorsen were disagree with the above researcher was because banking sector couldn't have impact to economic growth but economic growth did impact to banking sector. Moreover, lagged-term credit to private sector, banking size, concentration of banking, efficiency of bank didn't have

any improvement to economic sectors in Lebanon. In addition, Halvorsen also supported the idea of Awdeh and it resulted from the shock of global financial crisis on bank lending.

Furthermore, through the data sets illustrated that there were some positive and negative relationship to the economic growth. As proof, some variables such as market share of assets of bank, growth rate of deposits, real credit, real stock price; foreign bank asset share, etc were positively impact to the output growth. For instance, Awdeh, A (2012) stated that growth rate of deposits mostly were benefits to local people in that country. In addition, Ibrahim, M and Shah, M. E (2012) showed real credit and real stock price also pushed economic growth and heightened market volatility causing the over expansion of bank lending. Also, Moshirian, F and Wu, Q (2012) proofed that foreign bank increased more trade finance and then led to demand more loans in the business sectors. Because of the higher foreign bank share, the lower cost of overhead and interest margin of bank it was. In contrast, the other variables such as credit, credit with lagged one period, interest rate spread, price of real estates, exchange rate, etc were negatively relationship to economic growth. For instance, Awdeh, A. (2012) illustrated that credit with one lagged period usually didn't concentrate much on productive sectors such as agriculture and industry. By doing so, people tended to invest in personal or consumption loan instead that couldn't push output growth at all. As proof, Lebanon was an example that majority of business was in the form of small and medium of family-own business without any transparency about asymmetric information.

3. Data

The data sources are collected from 8 countries in ASEAN except Myanmar and Lao PDR within the period from 2002 to 2013.The variables that are used in the research include GDP growth as dependent variable and independent variables consist of domestic credit to private sector by banks (DC), money and quasi money M2 (M2), final consumption expenditure (FC), export (Export), foreign direct investment of net inflows (FDI), official exchange rate (Ex) and lending interest rate (Int). All of the variables extract from the World Development Indicators, World Bank except lending interest rate of Cambodia gets from CEIC (IMF). Also, According to the World Bank, domestic credit to private sector by banks refers to the financial resources that are granted by the private sectors including corporation of depository except central banks. Those activities of domestic credit will be seen in the form of loan, non-equity securities purchase, trade credit and other accounts receivables for making repayment. Also, domestic credit to private by bank will be counted as percentage of GDP.

Table 1 presents the variables with descriptive statistics. We examine the four criteria of these variables based on mean, standard deviation (SD), description of variables from panel data of eight countries in ASEAN. Also, we can see that average of GDP growth and foreign direct investment is 5% accompanied with domestic credit provided to private sectors by banks by 63%. Money supply and final consumptions are the influential variables to push economic growth by 81% and 66%, respectively.

Table 1 : Variables with descriptive statistics

Variables	Mean	SD	Description of variables
GDP	5.047	3.121	GDP growth as percentage annually
DC	63.657	38.190	DC in term of percentage of GDP
M2	81.746	37.661	M2 as percentage of GDP
FC	66.940	14.952	FC as percentage of GDP
Export	80.827	52.321	Export as percentage of GDP
FDI	5.087	5.541	FDI in term of percentage of GDP
Ex	3847.275	6026.716	Exchange rate as USD dollar
Int	9.258	4.276	Lending interest rate as percentage

The above table describes the general data of descriptive statistics of mean, standard deviation (SD), description of variables. Following the statistics, it presents each variable namely GDP, DC, M2, FC, Export, FDI, Exchange and Interest by using panel data from eight countries in ASEAN. Mean is used for finding an average of its arguments or total numbers. Also, we use standard deviation based on sample that we have.

4. Methods

We specify a dynamic linear equation for economic growth which includes a lagged dependent variable as follows:

$$GDP_{it} = \beta_0 + \gamma GDP_{it-1} + \beta_1 DC_{it} + \beta_2 FC_{it} + \beta_3 EXPORT_{it} + \beta_4 FDI_{it} + \beta_5 Ex_{it} + \beta_6 Int_{it} + u_{it}$$

where i indicates country, t indexes time, $\gamma, \beta_0, ..., \beta_6$ are the parameters to be estimated, u_{it} is an error term that contains country and time specific fixed effects:

$$u_{it} = \mu_i + \eta_t + \varepsilon_{it}$$

where ε_{it} is assumed to be independent and identically distributed with zero mean and constant variance σ_ε^2.

The lagged dependent variable including in the empirical model implies the correlation between the regressors and the error term. Lagged economic growth depends on lagged u_{it}, which is a function of country specific fixed effect μ_i. This correlation leads to bias estimators in dynamic panel data model (Nickell, 1981). This bias will disappear only if time periods go to infinity. Arellano and Bond (1991) propose an estimator to address this bias in the estimation. They basically difference the model to eliminate country specific fixed effects. This also gets rid of any endogeneity that may be occurred due to the correlation of these country specific effects and the regressors.

The generalized method of moment (GMM) is then used to efficiently estimate the parameters. The moment conditions are the orthogonality conditions between the differenced errors and lagged values of the dependent variable. The assumption made in random error ε_{it} is no serial correlation. Therefore, the differenced error will be MA(1) with unit root. The diagnostic tests for the first order and the second order serial correlation in the disturbances have to be performed to ensure the valid assumptions of the models. The consistency of the GMM estimator relies upon the fact that $E(\Delta\varepsilon_{it}\Delta\varepsilon_{it-2}) = 0$. The valid model should reject the null of no first-order serial correlation and not reject the null of no second-order serial correlation.

Utilization of moment conditions as suggested by Arellano and Bond (1991) increases the number of moment conditions when time periods T increasing. Thus, we have to test for the over-identification restrictions. This test can be done using the Sargan test. Too many moment conditions introduce bias while increasing efficiency. One has to trade-off between the reduction in bias and the loss in efficiency. Baltagi (2005) suggest that the subset of these moment conditions can be used to take advantage of such trade-off.

5. Results

The result showed panel data from 8 countries of ASEAN in Table 2. It illustrated the model comparison of Ordinary Least Square (OLS) and Arellano and Bond of GMM estimation.

By based on model 1 of OLS estimation, there were seven variables such as one-lagged period of GDP, DC, exchange rate, lending interest rate, final consumption, foreign direct investment and export. DC seemed not significant at all by using the model. In contrast, final consumption and foreign direct invest had positively relationship with 0.100027 and 0.2515967 at the 1% level, respectively.

However, we looked at Arellano and Bond of GMM estimation by observing those control variables among GMM1, GMM2 and GMM3. In table 2 column 3 (GMM1), it showed that domestic credit (DC) for model 2 had negatively correlation to economic growth and significant at the 1% level with coefficient of 0.069518. However, foreign direct investment and export had positively relationship to economic growth and significant at the 1% level with coefficient of 0.3903789 and 0.0648985, respectively.

Also, through Table 2 in column 4 (GMM2), by adding three more important variables such as exchange rate, lending interest rate, final consumption, foreign direct investment and export, we could see that only DC, FDI and Export had interrelated relationship with economic growths at the significance of 1% level. DC still provided negatively relationship and coefficient of 0.0732986 to economic growth. In contrast, foreign direct investment and export seemed to have positively relationship and coefficient of 0.4196336 and 0.0833855, respectively. The Export and FDI had the significant 1% level. For instant, in ASEAN countries especially Cambodia, this country relied on export of agriculture sector to stimulate the economic growth and most of Cambodian with nearly 85% was farmers. According to U.S International Trade Commission (2010), it stated that from 2004 to 2008, Intra-ASEAN exports (priority sectors) included Agro-based products, Automotives, Electronics, Healthcare, Textiles and apparel and Wood-based products with total of all products of 24.8%, 24%, 25.2%, 25.3% and 27.6% in 2004, 2005, 2006, 2007 and 2008, respectively. Also, intra-regional trade with the same priority sectors above consisted of 4.2%, 4.1%, 4.3%, 4.3% and 4.6% in 2004, 2005, 2006, 2007 and 2008, respectively. Furthermore, based on U.S International Trade Commission (2010) reports, it illustrated that FDI inflow to ASEAN from 2004 to 2008 consisted of European Union (EU-25 countries), ASEAN, Japan, US and other countries in average of 22.4%, 13.2%, 16%, 8.4%, 40%, respectively. Therefore, in 2008, only four countries including Malaysia, Thailand, Vietnam and Indonesia earned the largest shares of FDI inflow within intra-ASEAN. Most of that FDI inflow investor came from Malaysia and Singapore. Among the 57.2% of total intra FDI inflow of ASEAN, Singapore was the major player in that period.

In addition, through table 2 in column 5 (GMM3), by dropping the DC, we could see that money supply M2, FDI and Export had significant level of 1%, 1% and 5%, respectively. Money supply M2 had negatively relationship to economic growth with coefficient of 0.1065641. FDI and Export seemed to have positively relationship as model 3 of GMM2.

In summary, DC in ASEAN had negatively sign might be because most of bank credit tended to be favorable to household by using those credit as personal consumption and personal spending rather than to business sector as investment to the economic growth. This explanation needs further investigation in the future work by decomposing the private credit into household and enterprise credits. In addition, DC also had negatively impact to economic growth based on the literature review above. For GMM2 and GMM3, the reason we didn't add DC and M2 together was because two of the variables had high correlation to each other.

In short, the last two rows provided the diagnostic tests, which were first order and the second order of serial correlation tests (AR-test) and Sargan test for over-identification restriction. Sargan tests confirmed the validity of instruments used in our models. For AR-test, the

absence of first order serial correlation was rejected, and the absence of second order serial correlation was not rejected indicating the validity of GMM estimators in Model GMM1 to GMM3.

Table 2 : Comparison of OLS & GMM estimation based on sample of 8 countries

Variables	OLS	GMM1	GMM2	GMM3
△GDP (-1)	0.0285031 (0.797)	-0.135807 (0.203)	-0.1408771 (0.180)	-0.2139467 (0.022)**
DC	-0.0027936 (0.815)	-0.069518 (0.002)***	-0.0732986 (0.015)***	
M2				-0.1065641 (0.000)***
Exchange	0.0000444 (0.523)		-4.96e-06 (0.982)	-0.0000979 (0.813)
Interest	0.0637004 (0.655)		-0.1279489 (0.457)	-0.2505127 (0.118)
FC	0.100027 (0.002)***		0.138992 (0.196)	0.0833853 (0.372)
FDI	0.2515967 (0.009)***	0.3903789 (0.000)***	0.4196336 (0.000)***	0.4352019 (0.000)***
Export	0.0037592 (0.784)	0.0648985 (0.005)***	0.0833855 (0.002)***	0.0896348 (0.026)**
Constant	-3.807466 (0.075)*	3.008456 (0.129)	-6.43272 (0.464)	2.643083 (0.738)
Sargan test		Valid	Valid	Valid
AR(1)		-2.2661 (0.0234)**	-2.3426 (0.0192)**	-2.1676 (0.0302)**
AR(2)		-0.1233 (0.9019)	-0.23839 (0.8116)	-0.70801 (0.4789)

Source : computed, Significant at 1%=***, Significant at 5%=**, Significant at 10%=*.

Through the table 2, it showed the results based on differenced-GMM estimation. The last three rows presented the Sargan test, AR(1) and AR(2). Sargan test was used to look at null hypothesis which focused on over-identifying restrictions whether it is valid or not. In order to do so, we needed to look on the p-value of Sargan test estimations based on the null testing. In addition, AR(1) and AR(2) were used to examine the zero autocorrelation of LM statistics addressed by Arellano-Bond test in first- and second-differenced errors (if null hypothesis: there was no first and second order autocorrelations, respectively). Through this testing, p-value determined the null and showed as brackets.

6. Concluding remarks

The purpose of this paper is to examine the relationship between domestic credit and economic growth in ASEAN when it will become ASEAN Economic Communities in 2015. These will help most of ASEAN economic growth and be one vision, one identity and one community. Our empirical result of analysis focuses on the Arellano and Bond of generalized method of moments (GMM) estimations. Also, we use the proxy of domestic credit provided to private sector by bank and other control variables. Our important finding domestic credit has significant at 1% level and negatively relationship with GDP. Therefore, our empirical results from panel data of 8 countries in ASEAN, those control variables as mentions have negatively relationship with GDP and consistence with our literature review of relevant theories while foreign direct investment and export has positively relationship. In summary, in order to achieve the goal of AEC 2015, government should focus on domestic credit

provided to private sector by banks by supporting the enterprises of credit market and increasing the bank lending share to the enterprises in each own countries. To do this, bank should also provide loan to productive enterprises that can push the economic growth and eliminate the gap of income inequality.

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