
Determinants of the US Cross-Border Bank Lending to the ASEAN-5 Economies

Agus Salim¹, Mochammad Ridwan G.²

Abstract

Abstract— Finance and bank liberalization have been being empirical debating in recent decades which focused on the benefit and cost. One of the products of financial liberalization is the international bank lending as intermediation of the global bank that flows from a developed country to the emerging market economies. This paper analyzes determinants of the international bank lending from the United States as a home country to the five Southeast Asian emerging market economies as host countries. The empirical framework based on the system-GMM revealed a high impact of push and pull macroeconomic factor variables to the dynamic of cross-border bank lending. The growth rate of the home and host countries shown as the most significant variables. Surprisingly, the interaction of the global banks' exposure and the US growth rate indicated the reaction of shock in the US economy which dominantly affects the dynamic of the US international bank intermediation have transmitted the global shock to the ASEAN-5 economies.

Keywords

cross-border bank lending, financial shock transmission, emerging market economies, ASEAN-5, GMM

1. Introduction

SINCE the beginning of the 1990s, some of the developed countries started their liberalization in the financial aspect. The global banks from developed countries provide their lending performance in the cross border economies with various expansion motive [1]–[3]. Developed countries have led to more strict competition and growing international intermediation to the developing countries.

Otherwise, the bank liberalization in developed countries is supported by deregulation of the financial market in developing countries at the same time. Banks in emerging market economies started changing in their source of financing from local to global funding [4]. Emerging market economies abandoned their control on cross-border bank capital flow by decreasing the financial entry barriers. Thus, banks from developed countries can acquire new investment freedom in order to expand their financial markets [2], [3]. A mutualism relationship in financial aspects between developed and emerging countries have been advancing through international bank lending. Home countries can expand their markets, and host countries of funding will earn some liquidity from developed countries.

The empirical studies of the investigating the determinants of international bank lending form developed to emerging economies have developed in the various instruments. It provided literature that divided the determinants into external (push) and internal (pull)

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factors [4], [5]. Following the bank lending flow factors, [6] have explained that shocks in an economy affected the lending flow, while a decrease cycle business in home countries have an ambiguous effect. Decreasing an economic condition in home countries will encourage a bank to decrease their lending to emerging economies in order to recover the home country economy. In another perspective, a decrease a home country's economy will also push bank out of border lending to averse the risk of default of their portfolio diversification motives.

Based on the balance sheet position of a bank, there are three reactions of a bank to respond to a shock in external liabilities [5]. First of all, the bank will increase domestic liabilities. Second of all, the bank will reduce the foreign asset by decreasing the lending to non-residents. Third of all, the bank will reduce domestic claims by decreasing lending to residents. Global shock in 2008 turns over a high contraction effect to the lending of the US cross-border bank following the second reaction. Aiyar [7] has argued that stress in the US banking system push the spread of foreign bank through funding market and shock in the banking systems was transmitted domestically to the foreign funding markets by reducing credit supply.

As a leading economy in the world, USA started their global funding through their banking expansion earlier to the emerging market economies [8], [9]. In another hand, [5] have stated that during the 1980s and 1990s, Southeast Asia where the member countries of this area are emerging market economies had opened their banking regulation in order to attract more the liquidity to finance rapid economic growth from developed countries.

Fig. 1 shows that the United States is the biggest lender countries outside of Asian lender countries in the total claims of the international banks in 2018. Bank for International Settlement (BIS) reported that over 2018, total claims of the US is USD 243,692 million following the total claims from the United Kingdom is USD 243,383 million. However, the total claims from the European Monetary Union (EMU) developed economies are still below USD 150,000 million. Regardless of the total claims from Japan as the highest banking share to ASEAN-5 economies, the total claims from the US banks are increasing every year.

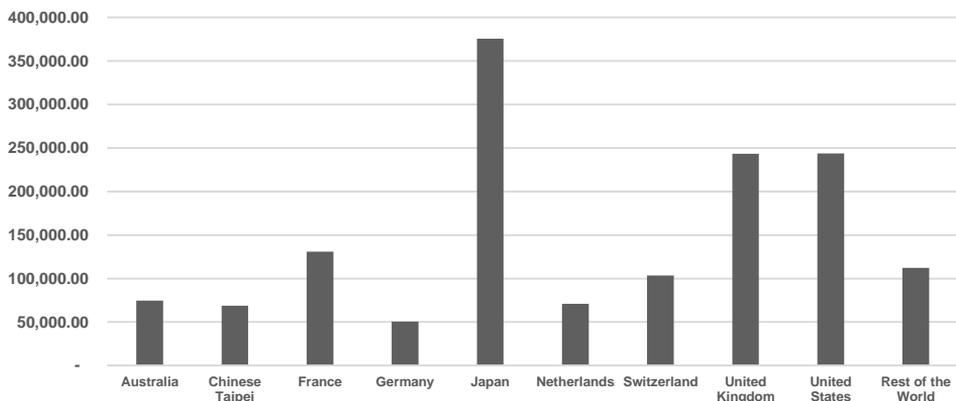


Fig. 1. Cross-Border Bank Lending to the ASEAN-5 economies by Home Countries in 2018 (Source: Consolidated Banking Statistic of BIS, 2019).

This study attempts to analyze the determinants of cross-border bank lending from the United States to the five of Southeast Asian countries namely Indonesia, Malaysia, Philippines, Singapore, and Thailand (ASEAN-5). The determinants are divided into push and pull factors as following the previous literature. Thereby, this study complements and extends the study of Ponties and Siregar [10] by adding the exchange rate variable and the

effect of the global transmission shock from the United States through cross-border bank lending to ASEAN-5 and investigate the type of the US bank reaction to responds the liability shock in the home country.

The next part of this study is organized as follows. The second part previews the previous related study about the determinants of the cross-border bank lending. The third part explains the research method including the data, measurements, econometric modeling and strategy to provide the most appropriate study. The result of this study will be discussed in the fourth part. Moreover, the last but not least is the conclusion will be summarized in part five.

2. Literature Review

The development of the study about determinants of the cross-border bank lending has never stopped to be discussed. The banking flow from more developed financial system countries provide consequences focused on both the advantages and disadvantages of their lending [11]. Some of the previous literature focused on the lender and recipient countries' macroeconomic and institution to explain the cross-border bank lending determinants which divided variables into push and pull factors.

Jeanneau and Micu [6] used panel data and Generalized Least Square (GLS) to analyze the determinants of international bank lending in some largest countries in Asia and Latin America. They divided the independent variables to become a push and pull factors. To prove to signal the future evolution of lending flows, they estimate each of push and pull factors, and international bank lending variable used Granger causality test. In Latin America, the push factor model seems to be the best predictor, and both factors are playing a more significant role in East Asian countries. They found that GDP as a proxy of the economic cycle in both lender and recipient countries positively and significantly affect the international bank lending. Also, they provided a positive and significant of the short-term interest rate in lending countries to emerging economies. Particularly, fixed exchange rate regimes encourage more bank capital flow to emerging market economies.

Papaoannou [12] used panel data estimation to estimate the cross-border bank flow from 19 developed countries including the United States to 51 emerging market economies including Indonesia, Malaysia, and the Philippines. The study divided the main result into pooled OLS and alternative estimators. Mainly reported, the gravity model showed significance variables highly. Specifically, real per capita GDP both home and host countries have a positive and significant effect on cross-border bank lending activities. Inversely, the home countries exchange rate has a negative and significant effect. However, the inflation rate of host countries showed an insignificant variable.

Silalahi, Wibowo, and Nurliana [13] decided to choose Arrelano-Bond GMM over two other estimation technique such as pooled OLS and fixed effect. They stated that the estimation of the autoregressive of pooled OLS has upward bias and the fixed effect has a downward bias. They employed cross-border data claims from developed countries namely Japan, United States, United Kingdom, and Germany to Indonesia in all total sectors. The result showed that home countries growth rate has negative and significant and host country growth rate showed inversely sign. However, interest rate both in home and host countries showed insignificant in the affecting of international bank lending flow to Indonesia. Correctly, they also used the variable of interaction between home countries growth rate and exposure to examine the global shock transmission. The variable show a positive and significant effect on the volatility of their cross-border bank lending in Indonesia.

Siregar and Choy [5] used panel data estimation based on OLS, specifically the random effect model based on their estimated equation result. They employed seven OECD countries as lender and nine East Asian countries including Indonesia, Malaysia,

Philippines, Singapore, and Thailand. The result of estimation based on the three gravity models that they used to analyze the cross-border bank lending determinants. The coefficient of the financial centers such as the ASEAN integration area and the dummy variables for colonial history have positively and significant affect. Particularly case for the bilateral trade has a positive and significant coefficient. Finally, they conclude that a financial risk in East Asian during the 1997 crisis associated with the higher bank lending attraction from OECD countries with a negative sign.

Haas and Horen [14] used the analysis of panel data OLS to estimate the international bank lending that focused on the crisis period. They used two pairs of bank-country and bank-firm level of data. They also divided the pre-crisis around July 2006 until June 2007 and the post-Lehman period around October 2008 until September 2009. They generally estimated four models such as sudden stop, volume, number, and exit. Notably, their result showed less relationship between the international bank lending and the changes in trade and changed FDI banks as variable controls. This insignificant result is showed for the models of a sudden stop, volume, and number.

3. Research Method

3.1. Data Source and Measurement

The data used for the following analysis includes quarterly data, from 1986:I to 2017:I. The original dataset mainly obtained from the official site of the Bank for International Settlement (BIS), International Monetary Fund (IMF), and the Organization for Economic Co-operation and Development (OECD). The dependent variable is the US cross-border bank lending to the ASEAN-5 countries. We obtained the data from Consolidated Banking Statistics of the official site of the Bank for International Settlement (BIS). There are two types of data provided, such as foreign bank claims, and cross-border bank claim [10], [13]. The cross-border bank claim is the bilateral data comprises the international claims, defined as the total credit lent by the foreign banks headquartered overseas in foreign currencies extended by the affiliates in host countries plus credit lent by the affiliates in host countries [10]. In this study, we focused on the cross-border bank lending from the United States Banks to all sectors in ASEAN-5 countries namely Indonesia, Malaysia, Philippines, Singapore, and Thailand.

Seven independent variables are used to estimate the cross-border bank lending movement. The lagged of cross-border bank lending automatically constructed from the dependent variables. The real gross domestic product (GDP) measured in current US dollar in the United States as a home country and ASEAN-5 as host countries are obtained from the official site of the World Bank. Since the data provided in yearly frequency, we employed the linear interpolation method. This data used to explain the business growth cycle in both home and host countries.

The US 3-months T-Bill rate (measured in percentage) obtained from the official site of the Fred Economic Data of Federal Reserve Bank of St. Louis, used to interpret the home country's interest rate. Additionally, the interest rate in ASEAN-5 countries represented by the interest rate of money market in percent per annum, obtained from the official site of the International Financial Statistic of the International Monetary Fund (IMF). The exchange rate of the ASEAN-5 currencies *vis-à-vis* the US dollar have also obtained from the official site of the International Monetary Fund (IMF). Additionally, in order to analyze the transmission effect of the global shock through the cross-border bank lending form the United States to ASEAN-5 economies, we extracted the variable from the US GDP growth and lending exposure of the US banks to ASEAN-5 economies.

3.2. Empirical Model

Since the main purpose of this study is to analyze the primary determinants of cross-border bank lending, we adopted the previous model from the study of Ponties and Siregar [10]. We modified the model by including and the exchange rate volatility by Jeanneau and Micu [6]. The original model of this study is transformed into econometrics model as outlined by eq. (1):

$$\text{LogCBL}_{i,j,t} = \alpha_0 + \alpha_1 \text{logCBL}_{i,j,t-1} + \beta_1 \text{logGR}_{i,t} + \beta_2 \text{logGR}_{j,t} + \beta_3 IR_{i,t} + \beta_4 IR_{j,t} + \beta_5 \text{logER}_{i,j,t} + \beta_6 \text{logGR}_{i,t} EX_{i,j,t} + \varepsilon_t \quad (1)$$

Where i and j represent the country pairs, i denotes the home country or lender of international bank lending which is the United States, while j denotes the host countries or recipient of international bank lending from the United States, namely Indonesia, Malaysia, Philippines, Singapore, and Thailand. The $\text{logCBL}_{i,j,t}$ represents the logarithmic of the cross-border bank lending from the home country i to the five host countries j ; $\text{logCBL}_{i,j,t-1}$ represents the lag lending of previous period; $\text{logGR}_{i,t}$ represents the economic growth cycle in home country; $\text{logGR}_{j,t}$ represents the economic growth cycle in host countries; $IR_{i,t}$ is nominal the interest rate of the home country; $IR_{j,t}$ is nominal the interest rate in host countries; $ER_{i,j,t}$ represents the exchange rate of each host country's currency *vis-à-vis* the US dollar; $GR_{i,t} EX_{i,j,t}$ represents the indicator of the home country's bank response to the global shock; and ε_t is the disturbance term.

Consider to right-hand side variables in eq. (1), the main determinants of cross-border bank lending are divided by home or push and host or pull factors as figured out by some previous literature, for example, see [4], [6]. We expect the positive coefficient of the real GDP of host countries as the higher returns earned from; the higher economic cycle should attract more the cross-border lending domestically. Whereas, there are two expected coefficients of the real GDP of the United States since the lower economic condition in the home country will encourage the bank lender to seek another market or the bank lender may catch a worsen signal of the capital position of foreign banks the should discourage their lending overseas.

To capture the rate of return in both home and host countries, we expect the negative coefficient of interest rate variable in the home country and a positive coefficient of interest rate in host countries. These expectations reflect that higher interest rate in the home country, banks will decrease their cross-border lending. Inversely, banks will increase more their cross-border lending when catching an increase in the host countries' interest rate. Besides, the exchange rate volatility of currency pairs is expected to be negative since the empirical evidence provided by Jeanneau and Micu [6]. Finally, the indicator of the home country's bank response to the global shock is expected to be negative, as the unstable economy, banks will more carefully lend their cross-border lending.

3.3. Method of Analysis

We employed the three dynamic model estimator namely Pooled Ordinary Least Square (OLS), Fixed Effect, and Generalized Method of Moments (difference-GMM) to estimate the determinants of the US cross-border bank lending as presented in eq. (1). In order to decrease the endogeneity effect of the model, we instrumented all potentially endogenous variables with their own suitably lags. Since recent study [10] explained that, the using of the dynamic model other than GMM, such as pooled OLS and fixed effect, generally, the result provides a bias in estimation, the autoregressive coefficient of OLS had an upward bias and the fixed effect model had a downward bias. Usually, the estimation of Arrelano-Bond used large sample provide a bias-free with assumed that the coefficient value should

be between the OLS and fixed effect estimates.

There are two types of GMM estimation, difference-GMM, and system-GMM. The difference GMM as the previous literature has suggested an indication of a transformation effect from the specification [15]. This estimator is widely used for modeling used a country-pairs variable. The estimator is based on the first difference variables, in order to eliminate the country-pair specific effect. However, the difference-GMM produced poorly estimator in case of small samples. Moreover, under such condition, lagged levels seem to have weak instruments for the difference variables and prone to go through from finite sample bias.

For the GMM analysis, we employed the system-GMM, a related dynamic panel estimator developed in 1998 [16], depending on the assumption that change in using instrumental variables are uncorrelated with the fixed effect. However, the system-GMM used to earn potentially considerable improvements over the difference-GMM in case of small samples. System-GMM composed by the first difference instrument on lag levels, and of levels instrumented on lag first differences. Specifically, the long-run deviation is not systematically related to the fixed effect. The reason for employing the system-GMM is more robust to measure the error cross-section estimation and remains consistent if the endogeneity problem detected.

4. Result and Discussion

4.1. Statistic Descriptive Analysis

The analysis begins from the summary statistic of data used to estimate the eq. (1). Generally, we employed the same number of observation for every six variables. However, other two variables, such as the lag of cross-border bank lending is generated from the dependent variable, and the indicator of the home country's bank response to the global shock is generated from by timing between the home country's growth rate and the exposure of lending by home country to the host country.

TABLE 1
SUMMARY STATISTIC OF VARIABLE

Variable	Obs.	Mean	Maximum	Minimum	Std. Dev.
$CBL_{i,j,t}$	600	5196.342	49310	306.25	8090.877
$GR_{i,t}$	600	1.12E+13	1.89E+13	4.75E+12	4.19E+12
$GR_{j,t}$	600	1.98E+11	9.62E+11	1.97E+10	1.87E+11
$IR_{i,t}$	600	3.225	8.54	0.01	2.512557
$IR_{j,t}$	600	7.297324	35.19667	-5.600473	6.407672
$ER_{i,j,t}$	600	1430.68	14900	0.468735	3355.907

(Source: Author's Computation Using E-views 10)

According to table 1 explained above, data spread among variables are quite high. Since the minimum value of interest rate in the home country is 0.01, the minimum value of growth rate in the home country is 4.75E+12. The mean of each variable is quite far from each other, except the value of interest rate in home and host countries. Table 1 above also reported the standard deviation for each variable that has high spread, especially between the growth rate and interest rate variables. Thus, we decided to apply the logarithmic terms for the high spread variables such as cross-border bank lending, home, and host countries growth rate, and exchange rate, to decrease the high difference spread among variables estimated.

4.2. Empirical Analysis and Discussion

Determinants of the cross-border bank lending from the United States as a home country to the five of ASEAN as host countries are mainly estimated through pooled ordinary least square (Pooled OLS), Fixed Effect Model, and the Generalized Method of Moment (GMM). We compared the result of these three dynamic model estimator since [10] have explained that, the using of the dynamic model other than GMM, such as pooled OLS and fixed effect, generally, provided a bias in estimation. The result of the estimation of eq. (1) is presented in table 2. We separated the result into three columns for Pooled OLS, Fixed effect, and system-GMM.

Considering the result of the autoregressive coefficient $\log CBL_{i,j,t-1}$, of pooled OLS is 0.735, the fixed effect is 0.780, and the system-GMM is 0.771 lies between the two other estimators. We conclude that our pooled OLS estimator has an upward bias and the fixed effect model has a downward bias. Since, generally, the estimation of Arrelano-Bond used big sample provide a bias-free with assumed that the coefficient value should be between the OLS and fixed effect estimates, we have concluded that our system-GMM employed passes the small sample bias test as referred by previous studies [10], [13].

TABLE 2
DYNAMIC PANEL ESTIMATION RESULT

Variable	(1) OLS	(2) Fixed Effect	(3) System-GMM
C	-17.914*** (4.211)	-13.500*** (1.555)	-15.957*** (1.747)
$\log CBL_{i,j,t-1}$	0.735*** (0.070)	0.780*** (0.016)	0.771*** (0.020)
$\log GR_{i,t}$	0.078*** (0.028)	0.154*** (0.034)	0.073*** (0.023)
$\log GR_{j,t}$	0.406*** (0.109)	0.228*** (0.065)	0.359*** (0.057)
$IR_{i,t}$	-0.013* (0.007)	-0.003 (0.004)	-0.010** (0.005)
$IR_{j,t}$	0.003 (0.003)	0.004* (0.002)	0.003 (0.002)
$ER_{i,j,t}$	-0.014** (0.006)	-0.020 (0.019)	-0.012*** (0.004)
$\log GR_{i,t} \cdot EX_{i,j,t}$	0.250*** (0.059)	0.191*** (0.016)	0.220*** (0.019)
Adjusted R2	0.971	0.977	0.970
Number of Instruments			8
J-statistic			4.02E-11

Figures reported on the parenthesis () are the standard error. An asterisk ***, **, and * indicates rejection of the null hypothesis at 1, 5, and 10 percent of significance level respectively (Source: Author's Computation Using E-views 10).

Generally, the result of pooled OLS and fixed effect showed a vast lack of significance variable estimates due to the endogeneity problem of these estimates. Thus, we suitably propose the system-GMM variable estimates are intended to analyze. The result of the system-GMM showed a more improved significance of the coefficient estimates since the problem of endogeneity is solved. The result of the system-GMM estimator is presented in column (3). We present the result in table 4 by highlighting the effect of the macroeconomic condition in home and host county conditions.

For instance, to answer the ambiguity of the coefficient of the real GDP of the home country, the result showed that the coefficient is statistically significant affected the dynamic

of the cross-border bank lending for each estimator. It implies that the US banks tend to focus their lending activities at the home when the decline in the economic cycle of the home country happened. This result confirms the study of [4], [12] that a decline in the home country's business cycle responded by a decline the international bank lending to host countries. However, it refused the empirical evidence provided by [2] for their case of South Korea, Greece, and Egypt.

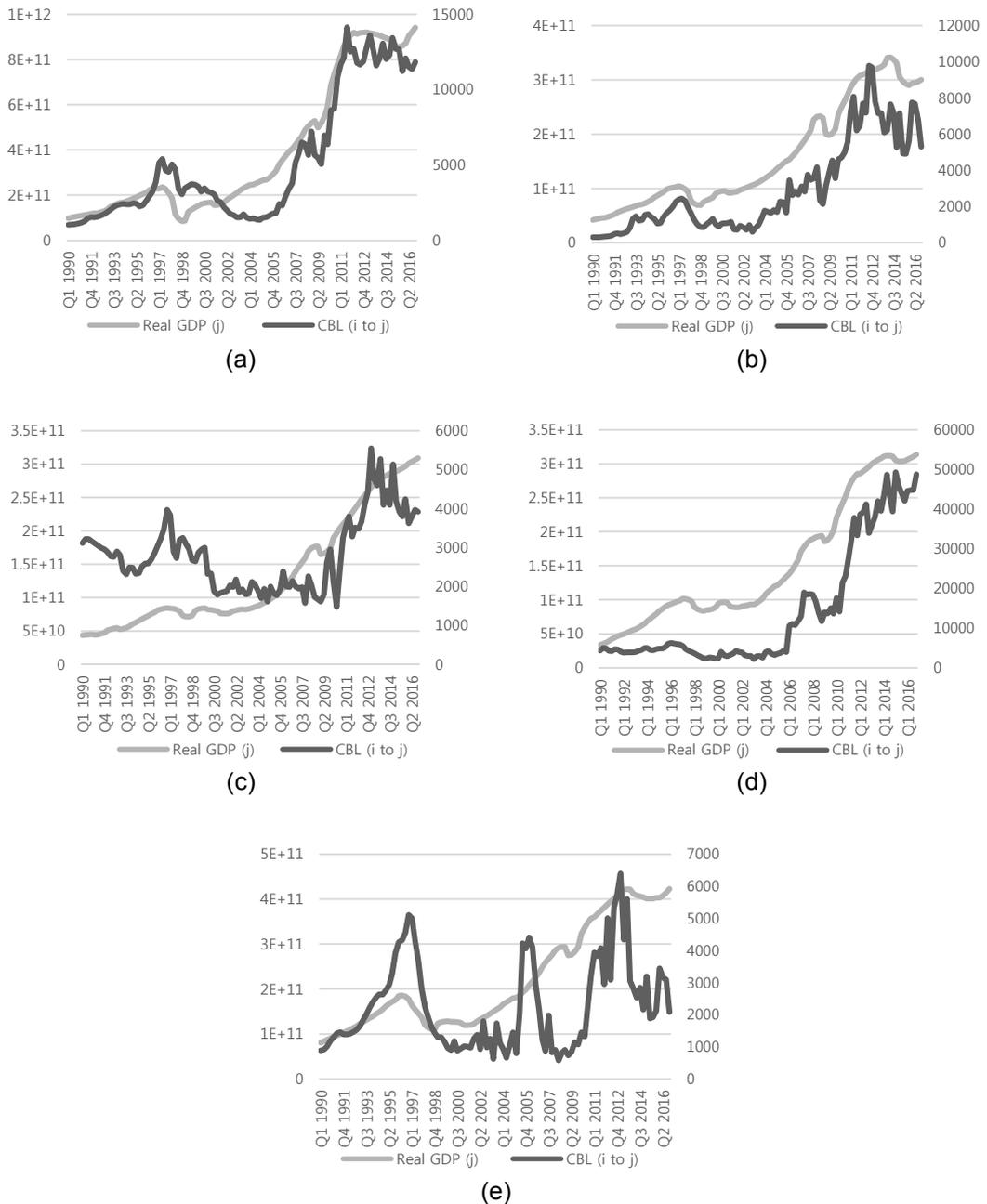


Fig. 2. Real GDP Growth and Cross-Border bank Lending in Host Country (a) Indonesia; (b) Malaysia; (c) Philippines; (d) Singapore; and (e) Thailand (Source: Consolidated Banking Statistic of BIS and World Bank, 2019).

Host countries' growth rate variable is strongly significant with a positive sign as well as the growth rate in the home country, pulled the cross-border lending at 1 percent significance level. Since the business cycle in ASEAN-5 countries is developed in recent years, banks from developed countries (i.e., the United States) have been fascinated to increase their lending. Following [4], [12], [17] concluded from their similar empirical findings that an economic downside in host countries, global banks reacted by decreasing their lending to host countries.

Fig. 2 shows that real GDP growth rate in host countries move together alongside with the lending from the US banks especially in Indonesia, Malaysia, and Singapore. Focused on the beginning of 1997 until the end of 1998, marked as the Asian financial crisis period, these variables move downward for each selected ASEAN country. This fall pattern explains the positive correlation between real growth rate in host countries and the international bank lending from home to host countries. A decline in growth rate in ASEAN-5 economies push the US banks by withdrawing their lending to averse the default risk they would earn. Another focused point is around 2008-2009 as marked the US subprime mortgage crisis have tackled down the US economy. Each figure appears a downward change in position of the lending from the US banks to ASEAN-5 countries. Since the result of the home country's growth rate is statistically significant, these figures provide graphically expressing the correlation between these two variables.

For the nominal interest rate of the home country, the result provides a significant effect with appropriate signs as expected. This result indicates this variable as one of appropriate push factor as a higher domestic interest rate, home country arranges a higher rate of return and attract the global banks for providing the domestic lending channel. Furthermore, empirical studies [6], [12] found the similar result that interest rate in home countries is statistically significant to affect the bank lending flow to emerging market countries. However, this result differs from the study of Wardhono, Salim, and Qoriah (2014) for their case of Indonesia.

Contradictorily, the variable of host countries' nominal interest rate has a positive sign as expected. Nevertheless, it is not significant in attracting the US bank lending to ASEAN-5 economies. Pontines and Siregar [10] found an identical result that the interest rate in developing countries did not affect the international banking flow to emerging market economies. As well [13] have explained that risks factors have also correlated to the bank lending captivation beside the interest rate.

The variable of the exchange rate between home and host countries confirms the result of [6] who disclosed a negatively significant effect to the cross border bank lending in emerging market countries. However, it diverges to the result of [9] who defined a positively significant for all models estimated. The bilateral exchange rate is an indicator of financial stability and exchange rate risk. Since we employed the value of spot rate of the currency pairs, the higher the value of the exchange rate means the more depreciate the host country's currency. It may become a risk factor that the global bank decrease their lending to emerging market economies.

The indicator of the home country's bank response to the global shock has as a positively significant coefficient of the variable. The result implies that the US banks reduced their international learning through increased exposure of the banking system in ASEAN economies as the reaction of the US economic decline or shock in their home country. It presents a shock transmission effect of the international bank lending from the United States to ASEAN economies. Likewise, this result has related to the previous study of [10], [13], [17] that global banks attracted their lending from developing countries when they found instability in the economy.

5. Conclusion

As one of financial liberalization product, the flows of cross-border bank lending has massively improved from a developed country to the emerging market economies. Since, we analyzed the determinants of the international bank lending from the United States as a home country to the five Southeast Asian emerging market economies as host counties, we provide some conclusions as follows: first, business cycle growth in developing economies has strongly pulled the international bank lending from developed countries. Second, banks in developed countries considered the risk factors rather than the interest rate in developing countries. It was shown by the insignificant interest rate in host countries and supported by the positively significant exchange rate between home and host countries currency pair. Third, international bank lending was indicated in transmitting the global shock to the host countries.

Considering the reaction of the global banks, when they found a signal shock in the parent banks in home countries, the global banks have shown decrease their lending to emerging economies. Thus, we suggest for strengthening the international bank regulation for the global bank intermediation in ASEAN. Moreover, the developing countries may support the subsidiary of foreign banks to reinforce the financial system with not eliminate possibility domestic bank for contributing in global financial intermediation, and actively participate in international bank lending supervision cooperation.

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