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The determinants of foreign direct investment in ASEAN: New evidence from financial integration factor

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Abstract: This paper examines the impact of financial integration and other variables on foreign direct investment capital inflows in ASEAN3 (Cambodia, Laos, and Vietnam) and ASEAN5 (Indonesia, Malaysia, Philippines, Thailand, Singapore). Other variables are the gross domestic product, interest rate, infrastructure facility, labor cost, and trade openness. This paper uses the panel ordinary least square estimation with the method of first differencing for the period between 1996 and 2016. The authors divide ASEAN member countries into two groups by the level of economic development. The findings indicate that the coefficient of financial integration is positive and significant at 1 % level of significance on foreign direct investment capital inflows. The empirical results also support the hypothesis that foreign direct investment in ASEAN is positively correlated to market size, infrastructure facilities, and negatively correlated to labor cost as well as trade openness in ASEAN3.

JEL Classifications: E22, E44, F02, F15, F38

Keywords: Foreign direct investment, panel ordinary least square, first differencing, financial integration, Association of Southeast Asian Nations

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1. Introduction

The literature has indicated that foreign direct investment (FDI) inflows are determined by market size, degree of openness, the role of institutional factors and degree of economic integration. Besides, other factors such as labor, infrastructure, domestic tax rates, and institutional environments are correlated significantly with FDI inflows. Moreover, many studies discussed the elements that influence foreign direct investment inflows in ASEAN countries. However, none of the existing research articles proved the impact of financial integration (KAOPEN) on attracting FDI in those countries. This study has used the data of financial integration (KAOPEN) of Chinn et al. (2009) for research purposes.

According to Brouwer (2005), financial integration is an essential factor influencing the FDI attraction in ASEAN's countries. Before the two financial crises in Asian (1997-1998) and the global economic crisis (2007-2008), ASEAN4 members (Singapore, Malaysia, Indonesia, Thailand) were among the most popular destinations for the FDI outside of the Organisation for Economic Co-operation and Development (OECD) area, and they ranked in the fifth position behind the US, China, UK, and France (Maxim, 2014). However, everything changed after the Asian financial crisis struck in 1997. The crisis started in Thailand in July 1997 and then quickly spread to neighboring economies in the

region, generating significantly negative spillover effects in Latin America and Eastern Europe in 1998. The Asian financial crisis led a slowdown in the FDI inflows into the ASEAN countries. FDI inflows in 5 years from 1997 through 2002 decreased from 35940 million U.S. dollars to 17007 million U.S. dollars (Table 1). The global economic crisis (2007-2008) has been the worst financial crisis since the Great Depression of the 1930s. As a result, the FDI inflows decreased from 83810 million U.S. dollars in 2007 to 49907 million U.S. dollars in 2008 and 46642 million U.S. dollars in 2009 (Table 1).

TABLE 1. FDI INFLOWS IN ASEAN COUNTRIES FROM 1990 TO 2016 (in million \$)

YEAR	1990	1991	1992	1993	1994	1995	1996	1997	1998
FDI inflow	12821	13639	12739	16585	20496	28632	32915	35940	20926
Year	1999	2000	2001	2002	2003	2004	2005	2006	2007
FDI inflows	31011	22515	21867	17007	31352	40151	43085	63238	83810
Year	2008	2009	2010	2011	2012	2013	2014	2015	2016
FDI inflows	49907	46642	110559	94866	108095	126148	130428	126639	101099

Source: UNCTAD (2019).

Therefore, in this research, the authors build a model called "The determinants of foreign direct investment in ASEAN: New evidence from financial integration factor " with focus on financial integration and other variables such as gross domestic product (GDP), interest rate, infrastructure facility, labor cost, trade openness. The aim of the study is to see their impact on attracting FDI in ASEAN member countries.

Because there are a lot of existing differences between countries in the ASEAN region, the authors divide the ASEAN member countries into two groups based on their level of economic development: ASEAN3 (Cambodia, Laos, and Vietnam) and ASEAN5 (Indonesia, Malaysia, Philippines, Thailand, Singapore). Brunei and Myanmar are excluded from this study due to the limitation of the data.

The study contributes to a better understanding of the relationship between the time-invariant and time-variant unobservable effects in the FDI determination by using the method of first differencing. Furthermore, the authors expect the results of this study that can be the guideline for government agencies in host countries in designing policies to attract FDI into their countries as well as a new trend for scholars in the field of FDI.

The rest of the paper is organized as follows. Section 2 discusses the financial integration in ASEAN countries. Section 3 presents the theoretical background and hypothesis development. Section 4 introduces the methodology of this paper. The results and conclusions are in Sections 5 and 6, respectively.

2. Literature review

2.1. Literature review

The eclectic theory of Dunning has become a common analytical framework for understanding FDI as it successfully combined the knowledge of determinants of FDI with other theories related to FDI such as international trade theory, location theory, and imperfection market approach. This theory analyzed why, where, and how FDI

enterprises operate in host countries (Dunning 1998). Several determinants affect the FDI; however, this paper focused on the factors influencing the foreign direct investment in ASEAN countries based on the availability of data set such as financial integration, gross domestic product, interest rate, infrastructure, wage rate and, trade openness. These variables have been widely used and were tested in empirical studies for many developing and developed countries (Asiedu, 2002; Cuyvers, Soeng, Plasmans, & Van, 2011; Hussain & Kimuli, 2012; Khan & Khachoo, 2012; Kolstad & Villanger, 2008; Nunnenkamp, 2002; Tintin, 2013; Tomio, Amal, & Raboch, 2010). The studies by Ang (2008), Bhatt (2008), Hoang & Goujon (2014), Ismail (2009), Tsen (2005), Zebua (2016) and Thangavelu & Narjoko (2014) studied factors that influence FDI inflow in developing countries of ASEAN.

Financial integration (KAOPEN)

Many studies mentioned the effect of financial liberalization policies on economic performance and tried to measure costs and benefits of capital controls. According to Chinn et al. (2009), it is difficult to measure the extent of capital account controls because properly measuring the extent of openness or restrictions in cross-border financial transactions is almost impossible. Moreover, they said that it is complicated to distinguish between de jure and de facto controls on capital transactions.

The de jure measure of capital financial openness as a binary variable is based on the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). This variable cannot represent the actual capital controls due to the differences in the capital controls depending on the type of capital flows (inflows or outflows) and the kind of financial transactions. De facto is based on the index of the volume of capital flows relative to GDP Lane & Milesi-Ferretti (2007), the equality of real interest rate Chen (1981) or the international capital-asset-pricing model (ICAPM) De Gregorio (1998). Consequently, the researchers often interpret it as de facto restrictions on capital transactions when referring to financial integration among countries (De Gregorio, 1998; Rajan & Zingales, 2003).

In their research, Chinn et al. (2009) pointed out that governments of developing countries have converged to the middle ground of 'Impossible Trinity': managed exchange rate flexibility, controlled financial integration, and limited monetary autonomy. They also introduced the scale of 'Impossible Trinity' and developed a set of "trilemma indexes." This study has used the data of financial integration (KAOPEN) for research purposes. KAOPEN is based on the data reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). By looking at the KAOPEN index of a nation, an economist or a researcher can tell whether the country is implementing a multiple exchange rate policy or not.

This is the mechanism that forms a kind of rates for transactions on the current account and a type of exchange rate applied to the capital account. The KAOPEN index is computed from binary dummy variables. Subsequently, it is constructed by using the principal component analysis. This technique is summed up by the matrix $(4 \times n)$ in which 4 is the number of turns, and n is the set of data over the years into a matrix $(1 \times n)$ expressing the KAOPEN index through the year. KAOPEN varies between 0 and 1. Higher values of the index mean that a country is more open to cross-border capital transactions.

Gross domestic product (GDP)

The gross domestic product is the value of the output of all goods and services produced domestically in a year. It can be estimated as the sum of private consumption plus the sum of government spending plus the sum of the country's investment plus the sum of the nation's total net exports. GDP reflects the market size and market growth as they are key factors to attract FDI with many multinational corporations (MNCs) choosing to expand into new markets. Before investing, investors often consider economic indicator like GDP. Besides, Thangavelu, & Narjoko (2014) proved that countries with a large domestic market tend to attract more FDI as they pose significant advantages in production and consumption.

Trade openness (OPN)

Openness is used to measure the trade openness of a country, and it also means the level of economic integration in the host country compared to the world economy. Openness helps a country reducing the trade barriers for goods with the rest of the world. According to Helpman (2014) who related international trade to vertical and horizontal FDI, trade openness is an opportunity for foreign investors who can exploit the comparative advantage of the host country to re-export to another nation. Studies made by Ang (2008), Asiedu (2002), Bhatt (2008), Khan & Khachoo (2012), Kolstad & Villanger (2008), Mina (2007), Tintin (2013) proved a significantly positive effect of openness to FDI. This variable is created as $OPN = (Exp + Imp)/GDP$, where OPN represents for trade openness, Exp and Imp are for exports and import, GDP is for the gross domestic product.

Interest rate (IR)

This variable reflects the cost of capital when investors need to use the financial resources in the host country; it also represents the entry costs of production activities and business. Low-interest rates will be encouraged the investors to raise capital and guaranteed their investment activities. Consequently, the interest rate is an essential factor for FDI inflows. Hoang & Goujon (2014) and Zebua (2016) found out that interest rates have a negative effect on bilateral FDI flows intra-ASEAN. Similarly, Cuyvers et al. (2011) discovered that the difference in interest rates between the two countries leads to a negative relationship with FDI inflows. In this study, the authors used the lending interest rate for the variable and expected a negative correlation between the interest rate and FDI.

Labor cost (WAGE)

It is an essential factor in the production process that influences the economic profit of investors. Foreign investor minimizes production costs through cheap labor in ASEAN countries. Research by Cuyvers et al. (2011), Hoang & Goujon (2014), Khachoo & Khan (2012) proved the positive relationship between labor costs and FDI inflows. The authors used the wage and salaried workers in the manufacturing division representing the labor cost variable. All wage data in each country is transformed into U.S. dollars.

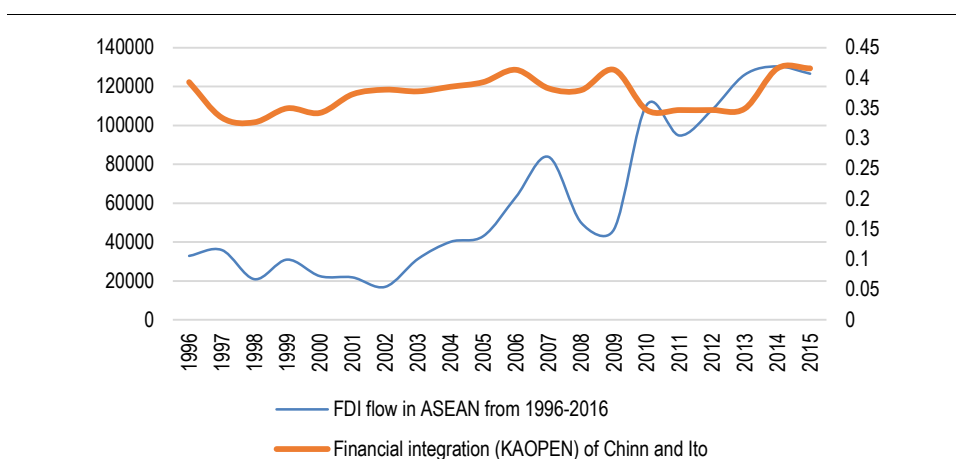
Infrastructure facility (INF)

The primary basis for an investment decision is whether the investment environment supports foreign-invested enterprises' activities or not. The investment environment can be seen as the infrastructure that promotes economic activities such as harbors, roads, communications, electricity, and water systems. Khachoo & Khan (2012) indicated that countries with improving infrastructure are more likely to be favored by investors. In order to measure infrastructure facility, the sum of the active number of analog fixed telephone lines, voice-over-IP (VoIP) subscriptions, fixed wireless local loop (WLL) (per 100 people) of each country were applied in the estimation.

2.2. Financial integration in ASEAN countries

The Association of Southeast Asian Nations (ASEAN) includes a group of ten fast-growing countries in economic and financial development: Brunei Darussalam, Cambodia, Indonesia, Lao PDR., Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. Their populations are young and growing and have high saving rates (Almekinders et al., 2015).

FIGURE 1. FDI INFLOWS AND FINANCIAL INTEGRATION IN ASEAN COUNTRIES IN 1996-2015



Source: UNCTAD (2019); Chinn-Ito's website.

According to Almekinders et al. (2015), after the 1997-98 Asian financial crisis, ASEAN countries have taken significant steps forward in their macroeconomic stability and confirmed their external positions. There has been an increase in trade and capital flows between countries in the area, as well as with the rest of Asia and the world. ASEAN financial integration has also improved as a consequence of FDI and FII increases; cross-border banking system linkages have expanded, and foreign participation in ASEAN capital markets has increased (Almekinders et al., 2015).

From 2000 to 2015, ASEAN economic growth has averaged 5% per annum. As the living standard of people improved, the excellent export strategy helped most of the ASEAN member states to increase their annual average GDP growth rates. Generally, the degree of financial integration of each country is likely to increase with its degree of trade integration. However, Unterberdoerster and Pongsaparn (2011) indicated most of the ASEAN countries 'economies' as in quick expansion into global trade had not been well suited by a commensurate increase in their degree of financial integration. Unterberdoerster and Pongsaparn (2011) also introduced a model which relates to the degree of financial integration. The results of the model showed the degree of financial integration of many ASEAN economies is significantly lower than the world's average, and in several cases lags far behind the norm for Latin America and Eastern Europe.

The second issue of ASEAN's financial integration is the level of banking integration. ASEAN's banking sector is relatively small and limited as most activities cannot extend cross-border (Almekinders et al., 2015). According to Vinokurov & Libman (2017), at the end of 2013, the market capitalization of all of the 24 ASEAN commercial banks combined is smaller than that of Hongkong and Shanghai Banking Corporation (HSBC), or China Construction Bank. Since there are no large banks to secure the economic stability and economic development in each member states and the region, it is very difficult to mitigate the impact of a crisis when one takes place. Vinokurov & Libman (2017) pointed out the dependence of domestic banks on foreign banks. In 2015, the bulk of payment orders was largely handled by banks from the EU (27.2%) and the US (29.4%). A substantial part of regional liabilities was also concentrated in the EU (36.9%) and the US (32.9%).

Due to concerns over the penetration of foreign banks, domestic banks sometimes set up barriers for international credit and financial institutions. Therefore, each ASEAN member state probably needs to attain a certain threshold level of development of the banking services sector before being able to benefit from its liberalization and integration. Until this is done, the negative effects of market liberalization continue to outweigh its benefits.

3. Model and data

According to Weeks (2002), the unobservable effects, which can be time-variant or time-invariant namely government policies, licensing organizational, law and management skills, etc. The authors include these unobservable effects into the model of the factors influencing FDI, where those of time-invariant are represented by α_i and those of time-variant are represented by time dummy variables. Based on the aforementioned hypotheses, the authors estimated the following model:

$$FDI_{it} = \alpha_0 + \alpha_1 d1_t + \alpha_2 d2_t + \dots + \alpha_T dT_t + \beta_1 KAOPEN_{it} + \beta_2 GDP_{it} + \beta_3 OPN_{it} + \beta_4 IR_{it} + \beta_5 WAGE_{it} + \beta_6 FTS_{it} + \alpha_i + u_{it} \quad (1)$$

Where it represents for country i at time period t ($i = 1, \dots, N$, $t = 1, \dots, T$), $d\tau_t$ is time dummy variables, which is 1 if $\tau = t$, and is 0 if otherwise, u_{it} is the idiosyncratic error. FDI is foreign direct investment, $KAOPEN$ is the financial integration, GDP is gross

domestic product, OPN is the trade openness, IR is the interest rate, $WAGE$ is the labor cost and FTS is the infrastructure facilities. Follow the hypothesis development, the authors expected that $\beta_1, \beta_2, \beta_3, \beta_6 > 0$, and $\beta_4, \beta_5 < 0$.

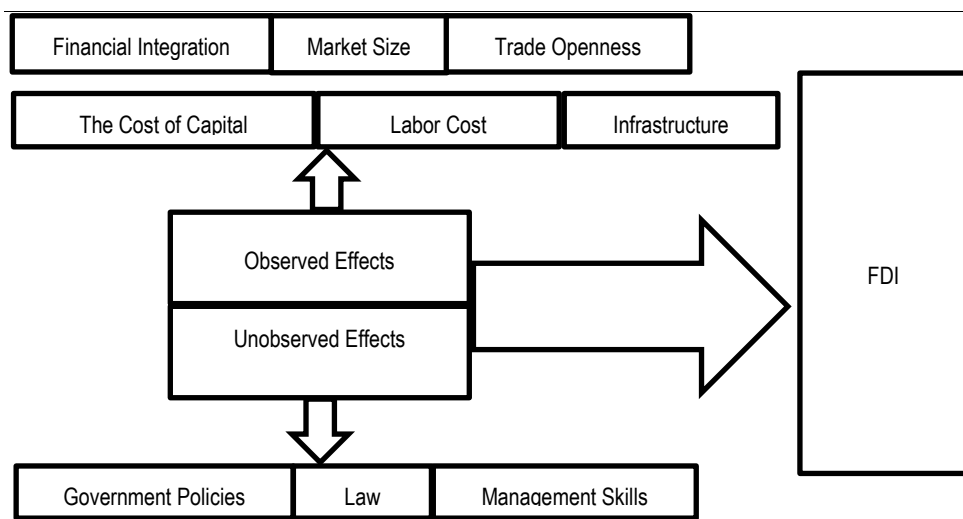
Weeks (2002) indicated the panel ordinary least square (POLS) estimation would give biased estimators when a_i is correlated with regressors. Based on the panel data model as shown in equation (1), the government policies related to FDI of each nation, which is included in the time-invariant unobservable effect, a_i can be correlated with GDP, hence $Cov(GDP_{it}, a_i) \neq 0$.

To obtain the unbiased results, Weeks (2002) suggested removing the time-invariant unobserved effects, a_i will out from the equation by using the method of first differencing (FD). Hence, the authors estimate the parameters in ASEAN 3 and ASEAN 5 models as expressed in Equation (2) below:

$$\Delta FDI_{it} = \alpha_1 + \alpha_2 d2_t + \dots + \alpha_T dT_t + \beta_1 \Delta KAOPEN_{it} + \beta_2 \Delta GDP_{it} + \beta_3 \Delta OPN_{it} + \beta_4 \Delta IR_{it} + \beta_5 \Delta WAGE_{it} + \beta_6 \Delta FTS_{it} + \Delta u_{it}, \quad (2)$$

Where $t = 2, 3, \dots, T$. To capture the aggregate time effects, the authors of this study use the intercept and the time dummy variables since 1998 in the model.

FIGURE 2. THE OBSERVED AND UNOBSERVED EFFECTS INFLUENCING TO FDI



Source: Elaborated by the authors.

This study collected the data from ASEAN member countries, including eight countries like Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, and Vietnam in the period from 1996 to 2016. Necessary data were collected from the Vietnam General Statistic Office, the Foreign Investment Agency - Ministry of Planning and Investment,

the Ministry of Finance, the International Monetary Fund, the World Bank Group, and the United Nations Conference on Trade and Development. Brunei and Myanmar were excluded from this study due to the limitation of the data

4. Empirical results

Following the main goal of the research in this study, the POLS estimation by using the method of FD was conducted to test each hypothesis. This study did not find the existence of Autocorrelation as well as Heteroskedasticity in ASEAN3 and ASEAN5 estimation. Moreover, the panel unit root of Δu_{it} was tested by the method of (Levin, Lin, & James Chu, 2002). The results of t-statistics to test for the existence of the unit root in ASEAN3 and ASEAN5 equation were -4.72 and 5.49, hence the authors rejected the null hypothesis of common unit root process at 1 percent significant level. That implies that Δu_{it} is stationary and spurious regression is not the problem in this case. Since some time-dummy variables were insignificant, the authors developed the model by removing each time dummy variable one by one until they appeared in the model are significant. The final result is shown in Table 2 & 3.

Table 2 & 3 summarizes the results of panel data analysis, which indicate that GDP has 1% of significance as a factor influencing the FDI inflow in ASEAN3 and ASEAN5, and it is consistent with hypothesis 2 (H2). This is also aligned with Dunning's classification of FDI that FDI firms are looking for broader market opportunities to meet the product demand of the large population within ASEAN countries. Many authors such as Bhatt (2008), Cuyvers et al. (2011), Hoang & Goujon (2014), Ismail (2009), Khan & Khachoo (2012), Kolstad & Villanger (2008), Nunnenkamp (2002), Zebua (2016) confirmed this finding. They supported the GDP hypothesis in attracting foreign investment.

TABLE 2. THE PARAMETER ESTIMATES OF ASEAN3

VARIABLES	COEFFICIENT	SE	T-STATISTICS	P-VALUE
Constant	-2.075	0.674	-3.079	0.003
$d2002$	-0.638	0.245	-2.609	0.012
$d2003$	-0.575	0.241	-2.387	0.021
$d2004$	-0.575	0.239	-2.691	0.009
$d2007$	0.741	0.236	3.135	0.003
$\Delta KAOPEN$	1.394	0.579	2.405	0.019
ΔGDP	1.648	0.129	12.799	0.000
ΔOPN	-0.955	0.150	-6.350	0.000
ΔIR	-0.009	0.005	-1.703	0.095
$\Delta WAGE$	-0.019	0.013	-1.443	0.155
ΔFTS	0.313	0.192	1.627	0.110
Adjusted R ²	0.855			

Source: Calculated by the authors.

The coefficient sign of infrastructure facilities (ΔINF) is positive as expected based on the original hypothesis (H6). However, the coefficient estimate of this variable is insignificant (p-value of ΔINF is more than 5%). The sign of the coefficient of $\Delta WAGE$ (labor cost) is negative as expected based on hypothesis 5 (H5). However, the p-value of the regression result is not statistically significant at 5 percent level of significance in ASEAN3 (Table 2).

This indicates that labor cost does not only have an inverse relation on FDI, but it also plays a less important role when MNEs take FDI decisions ASEAN3. This finding contradicts the theory of Dunning's classification of FDI as cheap labor cost-seeking FDI motive. The studies by Hussain & Kimuli (2012), Zebua (2016) confirmed that labor cost is an insignificant determinant. They argued that the availability of human capital was a major driver of FDI companies many years ago, but everything changed when the competition was increasing in global trade. MNEs started looking for skilled labor rather than cheap one as before. According to Thangavelu & Narjoko (2014), a host country that has this advantage can attract more and better quality FDI than other countries. The coefficient of the interest rate (ΔIR) is negative as expected based on the original hypothesis (H4). This implies that interest rate, as the measurement of monetary policy, discourage or have an opposite effect on FDI inflows in ASEAN countries. Therefore, ASEAN member countries with a lower interest rate will be considered to be stable money market; thus, more likely to be preferred as FDI destinations.

This study also shows an interesting result realized in a relationship between trade openness and FDI. The coefficient of trade openness (H3) is negative and significant at 1 % level in ASEAN3, but a positive and moderate impact on FDI in ASEAN5. This result of ASEAN3 is contrary to previous studies by authors such as Ang (2008), Asiedu (2002), Cuyvers et al. (2011), Hoang & Goujon (2014), Ismail (2009), Khan & Khachoo (2012), Kolstad & Villanger (2008), Zebua (2016) that confirmed that trade openness of a country influences FDI inflows positively. It can be interpreted that a country's broader trade openness in this region simply reflects the sub-contracting nature of the domestic economy of that country. In the world, the big economies have lower openness because they can produce almost every item to serve their demand and commercial relations take place mainly within their economies (Table 4). The countries with high degrees of trade openness are generally more affected after the global market boom and are easily harmed by global economic shocks. This will affect directly and the most strongly to the foreign direct investment (FDI) sector. In brief, in this case of ASEAN3, where the higher degree of trade openness reflects the sub-contracting nature of the domestic economy and does not mean that those ASEAN countries have the higher level of global economic integration and trade liberalization.

TABLE 4. TRADE OF GOODS AND SERVICES IN ASEAN3
AND OTHER ECONOMIC COUNTRIES (in million \$)

	2014	2015	2016	2017
Vietnam	169.5345	178.7674	184.6863	200.3093
Laos	99.05974	85.79863	75.09182	75.82659
Cambodia	129.6122	127.8641	126.950	124.8947
China	44.87656	39.45307	37.03382	37.80434
Japan	37.54577	35.5964	31.26658	-
United States	30.16366	27.89004	26.57992	-

Source: World Bank Open Data.

The main discussion for this part relates to financial integration (KAOPEN) in ASEAN member countries. As can be observed from Table 2 & 3, an impressive result might be found with a comparison between KAOPEN and FDI. The coefficient of KAOPEN is

positive and significant at 1 % level, that is in line with the prior expectation based on the research purpose and hypothesis one (H1). According to Almekinders et al. (2015), after the Asian financial crisis of 1997-1998, ASEAN financial integration has also improved as FDI and FII rose; cross-border banking system linkages expanded, and foreign participation in ASEAN capital markets increased.

5. Study limitations

This study aims to empirically examine the effects of financial integration and other control variables on foreign direct investment capital inflows in ASEAN member countries. However, it, reveals certain limitations and opens avenues for future studies. Initially, the research model was tested with eight countries collected the data from 1996 to 2016. The sample size is quite modest; it should be checked with other countries like Brunei, Myanmar as well as a new member like Timor-Leste to enhance the generalizability of the results. This also leaves rooms for future studies. Future studies can use this model to formulate new research or increase the generalizability of this study in another industry, especially policy analysis of FDI in ASEAN as well as developing countries. Time-series data of a longitudinal study would allow researchers to have a better understanding of a causal relationship between financial integration and FDI. This is highly recommended directions for future studies.

6. Conclusion

The main aim of this study was to find out the primary determinants that affect FDI inflow in ASEAN by using POLS estimation with the method of FD from 1996 to 2016. The study was conducted based on theories of FDI, theoretical models, and hypothesis testing quantitative research approaches. The model result analysis was carried out to test the original hypotheses.

The results of this research show that labor cost and interest rate variables have the expected sign on their coefficient values. However, the labor cost factor is not found to be significant when considering the influence of FDI flows in ASEAN3 because of MNEs started looking for skilled labor rather than cheap one as before. This study shows that market size and trade openness are significant determinants of FDI inflows into ASEAN.

The new finding of this study involves financial integration variable (KAOPEN). The coefficient of KAOPEN is positive and significant at 1 % level, that is in line with the prior expectation based on the research purpose. An exciting result also relates to the estimated sign of trade openness variable in ASEAN3. This indicates ASEAN3's higher trade openness concerning other countries, and it represents the sub-contracting nature of the domestic economies.

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