

## Mergers and Acquisitions and Greenfield Foreign Direct Investment in Selected ASEAN Countries

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**Abstract** Multinational enterprises undertake Foreign Direct Investments mainly through two different modes: Mergers and Acquisitions and greenfield investments. In the sizable empirical literature that examines the determinants of Foreign Direct Investments, very few studies investigated the determinants of these modes. This article empirically analyzes the extent to which determinants such as market size, exchange rate, and market openness in six selected ASEAN countries (ASEAN-6) influence the choice of one entry mode of Foreign Direct Investments over the other. A robust relationship between market size and exchange rate with greenfield inflows rather than Mergers and Acquisitions sales is found. Additionally, given an increase in market openness, foreign firms prefer Mergers and Acquisitions to greenfield investments. The results also confirm the fire-sale Foreign Direct Investments phenomenon during financial crises.

**Keywords:** Mergers and acquisitions, Greenfield investment, Foreign direct investment, ASEAN

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### I. Introduction

One of the major barriers for developing countries to promote economic development is the lack of capital needed to achieve potential growth. To solve this problem, developing countries have attempted to import capital from developed countries and have implemented several fiscal and monetary reforms to enhance capital inflows, especially during the last two decades. Capital inflows can be in the form of foreign direct investments (FDIs), portfolio investments, or economic grants and loans (Chayawisan 2015). Depending on the conditions of the capital recipient and

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source countries, the process can occur in different forms—the most important of which is FDI. Notably, other forms of capital flows only transfer physical capital, whereas FDI is a channel for transferring both physical and intangible assets, such as new technologies, managerial skills, and the host country's access to the global market. In particular, FDI flows to low-income countries through new technology transfers. Using low-cost endowments can create new capacities and enhance productivity, resulting in the host country's improved competitiveness, export performance, and economic growth. Meanwhile, ASEAN countries have become one of the most significant places for attracting FDI. FDI flows to these countries increased from 40 billion US dollars in 2005 to 136 billion US dollars in 2014, making them the largest FDI recipients in the developing world (ASEAN investment report 2016).

### **A. Trends in FDIs, mergers and acquisitions (M&A), and greenfield inflows of ASEAN countries**

According to a United Nations (UN) report, FDI can be considered approximately as the sum of M&A and greenfield investments (UNCTAD 2000). Following the UN report, we consider the differences between total net FDI inflows and M&A sales as the greenfield investment in the target countries<sup>1)</sup> (Column 5 in Table 1). This procedure has also been applied by Calderon, Loayza, and Serven (2004), Wang and Wong (2009), and Harms and Meon (2011).

As indicated in Table 1, the greenfield inflows account for approximately 86% of the total FDI received during 1990~2016 by the ASEAN countries. However, different trends were observed during the Asian financial crises (1997~1998 and 2007~2009), wherein the share of M&A inflows in total FDI increased sharply, and the share of greenfield investments in total FDI decreased dramatically. More precisely, the share of M&A in total FDI reached from 4.9% in 1996 to 14.6% in 1997 and 30.7% in 1998. However, during the same period, the share of greenfield investments in total FDI declined from 95% in 1996 to 85.3% in 1997 and 69.2% in 1998. A similar trend was observed during the 2007~2009 Asian crisis with different numbers (fire-sale FDI phenomenon).

Figure 1 shows the schematic trend in FDIs and its entry modes in the ASEAN region during 1990~2016 and depicts different patterns for M&A and greenfield inflows. Figure 1 also indicates that, sometimes, these trends opposed each other.

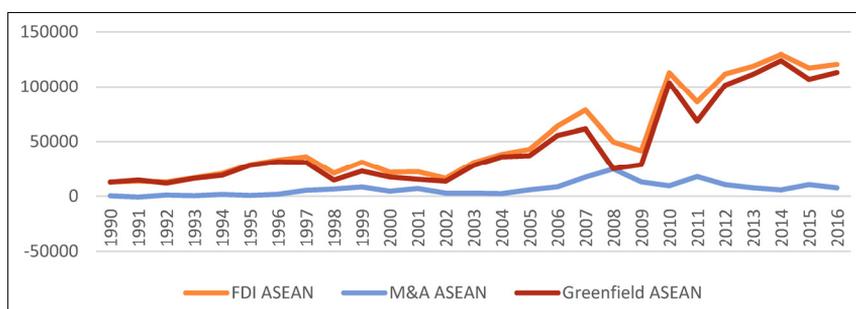
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1) This measure of greenfield investments is suggested by the UN; however, because the data are reported on a balance of payment basis, where inward FDI is measured as the aggregation of greenfield investments, M&A sales, reinvestments, and disinvestments, the measure of the share of greenfield investments would not perfectly reflect their actual value (Wang and Wong 2009).

**Table 1.** FDIs, M&A, and greenfield inflows to ASEAN, 1990~2016

Year	Total FDI Inflows (billion US dollars)	Total M&A Inflows (billion US dollars)	M&A/FDI %	Total Greenfield Inflows (billion US dollars)	Greenfield/FDI %
1990	12.820	0.288	2.252	12.532	97.747
1991	13.639	-0.824	-6.0466	14.464	106.046
1992	12.739	0.999	7.842	11.739	92.157
1993	16.585	0.387	2.333	16.198	97.666
1994	20.495	1.559	7.608	18.936	92.391
1995	28.632	0.582	2.034	28.049	97.965
1996	32.915	6.437	4.943	31.288	95.056
1997	35.939	8.305	14.630	30.681	85.369
1998	20.925	4.406	30.763	14.488	69.236
1999	31.011	6.914	26.783	22.705	73.216
2000	21.51	2.690	20.260	17.344	79.739
2001	22.161	2.711	31.199	15.247	68.800
2002	16.187	2.216	16.624	13.496	83.375
2003	30.649	2.711	8.845	27.942	91.154
2004	38.085	2.216	5.819	35.869	94.180
2005	42.738	5.708	13.355	37.030	86.644
2006	63.794	8.428	13.210	55.374	86.789
2007	78.584	17.168	21.844	61.424	78.155
2008	49.508	24.619	49.688	24.928	50.311
2009	41.386	12.759	30.792	28.677	69.207
2010	112.977	9.273	8.205	103.732	91.794
2011	86.012	17.641	20.499	68.417	79.500
2012	111.823	10.375	9.275	101.486	90.724
2013	118.913	7.399	6.219	111.564	93.780
2014	129.544	5.604	4.324	123.989	95.6755
2015	117.278	10.308	8.786	107.012	91.213
2016	120.607	7.476	6.198	113.136	93.801
AVERAGE	52.878	6.678	13.644	46.199	86.355

(Source) Author's calculation using data from world investment report, UNCTAD

**Figure 1.** Pattern of FDIs, M&A, and greenfield inflows to ASEAN countries (million US dollars) 1990~2016

(Source) UNCTAD, world investment report (2017)

## B. Effects of exchange rate on M&A and greenfield inflows

The effects of the devaluation or appreciation of currencies on FDI flows are crucial for both home and host countries. The countries whose currencies have appreciated are more likely to have acquiring firms, whereas countries whose currencies have depreciated are more likely to have acquired firms (Erel, Liao, & Weisbach 2012). However, this study focused on the levels of exchange rates in the host countries. An increase in the exchange rate in the host country means that the local currency has depreciated, which leads to a decrease in the value of local firms. Such a situation motivates multinational enterprises (MNEs) to engage in M&A activity because they can acquire local firms at low prices (Byun *et al.* 2012), i.e., firms that are more highly valued tend to purchase firms that are lower valued (Erel *et al.* 2012). Inversely, a decrease in the exchange rate of the host country (appreciation in the host country's currency) stimulates MNEs to opt for greenfield undertakings because their benefits in terms of the home country's currency are higher (Chen *et al.* 2006).

As shown in Table 2, during the two financial crises (1997~1998 and 2007~2008), the official exchange rates for six selected ASEAN countries increased on average. In these cases, the locals tended to sell their firms to foreign entities at low prices, which is called the fire-sale FDI phenomenon. In exact terms, the total average annual official exchange rate for these countries increased to 34.285% during the crisis of 1997~1998. This increase implies that these countries' currencies lost their values by approximately 34% on average. In the case of the 2007-2009 financial crisis, the official exchange rate increased by an average of 2.968%. Correspondingly, during the same periods, the share of M&A to total inward FDI also increased, but the share of greenfield investments to total FDI decreased (Table 1 and Figure 1).

**Table 2.** Average official exchange rate % changes of six ASEAN countries, 1997~1998 and 2007~2009

Year (financial crisis period)	LCU/US dollars (average LCU units)	Annual changes %	Year (financial crisis period)	LCU/US dollars (average LCU units)	Annual changes %
1996	13430.63	-	2006	25248.02	-
1997	14567.85	+9.137	2007	25331.74	+0.331
1998	23369.47	+59.433	2008	26083.6	+2.968
			2009	27541.97	+5.591
Total average	17152	+34.285	Total average	27541.97	+2.963

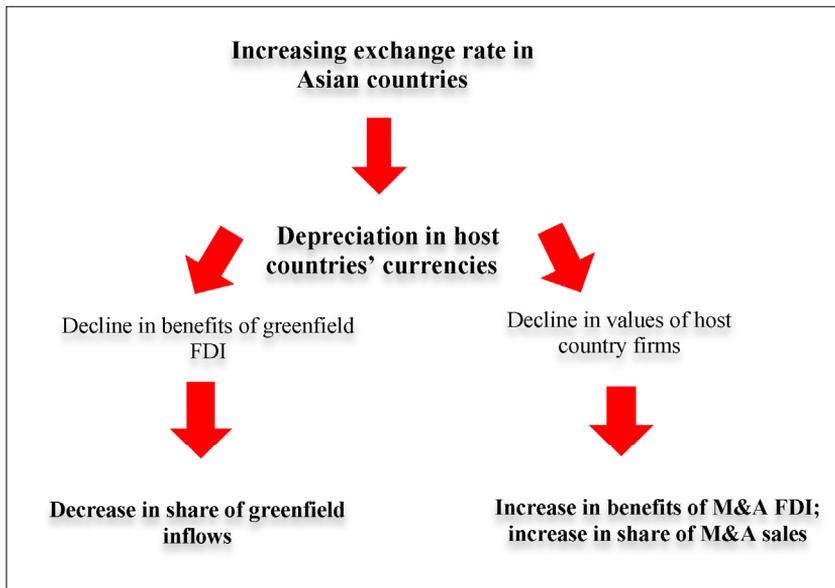
(Note) Local Currency Unit (LCU)

(Source) Author calculation based on the WDI database.

Figure 2 illustrates a flowchart of the effects of increasing the exchange rate on the M&A and greenfield investment shares of total FDI. Although an increase in the exchange rate leads to a decrease in aggregate FDI inflows, this decrease occurs only for greenfield shares but

not for M&A shares. For example, during the 2007~2008 Asian financial crisis, the aggregate FDI inflow decreased from 78.544 billion US dollars in 2007 to 49.508 billion US dollars in 2008, whereas total M&A sales reached 24.619 billion US dollars from 17.168 billion US dollars (Table 1).

**Figure 2.** Flowchart effects of increasing exchange rate on M&A sales and greenfield inflow shares



Therefore, in addition to the global environment, particular industry, and host country characteristics, firms' specific characteristics enable them to engage in FDI activities and determine the location and magnitude of FDI. Meanwhile, in the literature, host country-level factors are considered as important and influential factors that affect MNEs' FDI decisions. Nonetheless, only a few studies have analyzed the effects of these factors on choosing FDI modes by MNEs.

A stylized fact is that MNEs must choose one mode of FDI for FDI undertakings. Moreover, these modes are different, have specific advantages and disadvantages, and do not completely substitute for each other. Hence, relying only on the determinants of aggregate FDI may lead to inaccurate and ambiguous results. Consequently, this study seeks to determine why MNEs choose a certain type of mode for FDI undertaking. In other words, this study seeks to determine how aggregate FDI determinants affect MNEs' decisions when selecting a specific mode for the selected ASEAN-6 countries between 1990 and 2016. Hence, regarding the main determinants of FDI, we use host country-level factors, such as market size (*MR*) proxied by GDP per capita growth rate, market openness (*OPEN*), and the exchange rate (*R*) to proxy for financial risk. To estimate the model, the panel pooled mean group (PMG) dynamic method is used.

## II. Literature Review

External (global and regional) and internal (country-specific) factors influence MNEs' FDI decisions. External factors (industrial and global environment) that influence FDI decisions include elements such as rapid technological progress, the emergence of globally integrated production, and marketing networks. Internal factors (country-specific) that determine the location and magnitude of FDI activities include market size, trade openness, institutional quality, exchange rate, and the abundance of resources.

Dunning (1997) initially developed an eclectic paradigm to address the specific sources of advantage that may allow firms to become multinational entities and to engage in foreign markets. These particular sources are ownership (O), location (L), and internalization (I), and the model was called the OLI paradigm -O refers to MNEs' production processes, such as technological knowledge; L focuses on choosing an appropriate location; and I (internalization) explains why FDI takes place instead of licensing and exporting (Faeth 2009). According to Rugman (1980) and Blonigen (2005), firms' specific intangible assets, such as technological knowledge and managerial skills as fundamental determinants, enable them to engage in foreign markets because intangible assets may be applied to multiple plants. Additionally, such assets are public goods within a firm such that using the assets in one plant does not diminish their use in other plants. Subsequently, Dunning (2000) introduced four motives that encourage MNEs to select a specific location for FDI: market-seeking, resource-seeking, efficiency-seeking, and strategic asset-seeking. However, very few studies investigated the determinants of FDI modes. Matto *et al.* (2004) found that the competition in the specific industry, technology transfer costs, market structure, and the host country's policy intervention are key determinants of FDI entry modes. They also concluded that under an oligopoly, a foreign firm prefers acquisitions to greenfield investments. Additionally, Raff *et al.* (2009) indicated that the profitability of greenfield investments over exporting influences a local firm's decision on whether to accept a multinational firm's offer of M&A or joint venture.

Regarding the important role of FDI flows as an essential source of capital that complements the domestic counterpart for development through factors such as technology transfer, market expansion, employment creation, and innovation (Seetanah and Rojid 2011), many researchers attempted to determine the effect of different determinants and motives on FDI flows. For instance, Maskus (1998), Seetanah and Rojid (2011), and Blonigen (2005) used macro-level determinants to evaluate the directions and effects of these components on FDI flows.<sup>2)</sup> Masron and Nor (2013) analyzed the role of institutional quality (IQ) and other determinants, such as wage rate, education expenditures, and trade openness, on FDI inflows into the ASEAN-8

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2) Macro-level determinants mostly include market size, taxes, infrastructure, government policies, education expenditure, trade openness, wage rate, exchange rate, and inflation.

countries. The study focused on IQ as an influential determinant of FDI and used seven proxies, such as average total institutional quality, the voice of accountability, political stability, rule and law, regulatory quality, corruption control, and government effectiveness. This study's results indicated that except for regulatory quality, all other IQ components had significant positive effects on FDI inflows and stock of inward FDI as a percentage of GDP. Among all seven proxies of IQ, corruption control seemed to have a strong effect on the stocks of inward FDI for ASEAN countries. Additionally, Noorbakhsh, Paloni, and Youssef (2001) empirically investigated the impact of human capital on attracting FDI to developing countries by applying an OLS regression model for 36 developing countries over 14 years. This study emphasized the country-specific advantage, particularly skilled workers, with respect to attracting FDI to developing countries. Skilled workers are typically cheaper in developing countries. Another study by Yunus, Said and Azman-Saini (2015) found the spillover effect from FDI to be significant for upgrading skills, which in turn leads to an increased demand for skilled workers. Further, Demirhan and Masca (2008) explored the determinants of FDI inflows for 38 developing countries throughout 2000~2004, using the average value of all data. They investigated the effects of some country-level determinants as explanatory variables on FDI inflows for their sample countries. The results showed that the per capita GDP growth rate as a proxy for market size, telephone lines per 1,000 people as a proxy for infrastructure, and degree of openness as a proxy for a country's willingness to accept foreign investment had positive and significant effects on FDI inflows. Further, they showed that inflation appeared to be an indicator of economic stability and had a significantly negative impact on FDI. Therefore, low inflation rates were the compelling factor in attracting FDI to these countries, whereas labor cost per worker as a proxy or wages was a positive but not significant factor in the regression. Additionally, risk and taxes had adverse effects.

However, these studies provided different results because they mostly ignored FDI modes. Matto *et al.* (2004) found that the competition in the specific industry, technology transfer costs, market structure, and the host country's policy intervention are the key determinants of FDI entry modes. They also concluded that under an oligopoly, a foreign firm prefers acquisitions to greenfield investments. Moreover, Raff *et al.* (2009) indicated that the profitability of greenfield investments over exporting influences a local firm's decision on whether to accept a multinational firm's offer of M&A or joint venture. Makino and Beamish (1998) explained the effects of a host government's local ownership restriction as an influential determinant on the linkage between the choice of a joint venture and wholly owned greenfield FDI and its performance (financial performance and termination rate) on Japanese foreign subsidiaries in Asia. They concluded that the extent of restrictions imposed by a local government had a significantly negative impact on the financial performance of wholly owned subsidiaries. However, such restrictions do not directly influence joint ventures.

Another study by Dikova and Van Witteloostuijn (2007) investigated the effects of a host country's institutional environment on choosing different FDI modes. Although a large number of previous studies separately investigated the determinants of FDI modes (greenfield investments and acquisitions) and the form of subsidiary ownership (wholly owned and joint venture), this study bridges both streams of the literature and investigates the effects of the same set of determinants on dual entry-establishment mode choice by Western European MNEs in transition countries (CEE). The authors applied two sets of determinants: firm-level factors and host country institutional environment factors. The factors included political stability, government effectiveness, regulatory quality, rule of law, voice and accountability, and corruption control and evaluated their effects on the choice of establishment and entry mode. The authors marked the new measurements as institutional advancement, defined as the degree to which a host country's institutional environment matches the standards well established in developed market economies. Given the importance of firm-level factors on the choice between an acquisition and a greenfield investment and the forms of its subsidiary's ownership, this study emphasizes the moderating effects of the host country's institutional environment on a parent firm's decisions regarding establishment and choices of entry mode. They concluded that acquisitions are a suitable strategy only if the institutional environment is relatively advanced. Further, an advanced institutional environment promotes foreign investors to the choice of fully subsidiary ownership. However, institutional advancement played a central role in MNEs' investment decisions. For example, acquisition establishments preferred by MNEs aimed to achieve local customization. This strategy was positively influenced by advanced institutional development. Additionally, greenfield establishments would become very expensive without a satisfactory level of institutional advancement in transition economies.

In addition, Wang and Wong (2009) empirically investigated the effects of inward FDI on economic growth using a sample of 48 countries. This study highlighted the effects of the sufficient level of human capital on attracting M&A FDI. The authors investigated the literature on inward FDI effects on host countries' economic growth and found a contradiction. For example, Blomstrom and Lipsey (1986) showed the positive effects of FDI on economic growth in host countries. However, Alfaro *et al.* (2004) concluded that FDI had an ambiguous effect on economic growth in general. Based on such mixed results, they argued that one possible reason for this phenomenon is relying on aggregate FDI in empirical studies. Therefore, the study distinguished aggregate FDI from greenfield investments and M&A and separately estimated the effects of each FDI mode on economic growth. Moreover, because the two FDI modes are potentially different and not perfect substitutes for each other, the regression results on each one were entirely different. They found that greenfield investments stimulate economic growth, whereas M&A negatively affected host countries' economic growth. Furthermore, M&A was emphasized to be beneficial to a host country when the country reaches a certain level

of human capital.

In fact, when a firm decides to carry out its FDI, it can mostly do so by either greenfield investments or M&A. These modes are different, and each has specific advantages and disadvantages.<sup>3)</sup> The choice of entry mode influences FDI performance and the host country's welfare, localization of supplies, and human resource and technology transfers (Byun *et al.* 2012). In fact, M&A contributes to transfers of the local firm's ownership to foreign investors, whereas greenfield investments involve creating new capacity in the host country that could be in the form of building new factories and establishing new affiliates. Moreover, greenfield investments made by transferring both capital and intangible assets include new technologies and skilled management for establishing new operations and creating new capacities to generate additional jobs and economic growth in the host country (Wang and Wong 2009). However, some studies suggested that M&A investments do not have positive effects on the local economy. Nevertheless, MNEs link the host economy to global distribution networks through M&A investments because they are experts at global marketing. Furthermore, technology transfer for the reconstruction of the acquired firm by a foreign hand can enhance competitiveness and enhance economic growth in the host country (Alfaro, Chanda, Kalemli-Ozcan, & Sayek 2004). The determinants of M&A and greenfield investments are not quite in contrast to each other. However, each aggregate FDI determinant has a bigger, smaller, or opposite effect on FDI modes than the other because these two modes are not homogenous and are different. Thus, this study seeks to investigate the effects of *MR*, trade openness (*OPEN*), and exchange rate (*R*) on each FDI mode's (M&A and greenfield investments) inflows in the ASEAN-6 countries.

### III. Data and Methodology

This study focused on six selected ASEAN countries: Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam. We have used secondary data from World Development Indicators (WDI) and United Nations Conference on Trade and Development (UNCTAD) statistical databases. The variables used to estimate the FDI mode models are M&A and greenfield investments,<sup>4)</sup> both in current US dollars, to GDP (both as dependent variables). Further, we used the GDP per capita growth rate in annual percentage as a proxy for *MR*, trade openness (*OPEN*) as the sum of exports and imports to GDP, official exchange rate (*R*) (all as independent variables). All variables are in the natural logarithmic (*log*) form.

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3) Each FDI determinant is revealed to possibly have different effects on each FDI mode (e.g., Yip 1982, Chen *et al.* 2006, Wang and Wong 2009).

4) Net inflow of cross-border M&A data in current US dollars are available in the UNCTAD database, but the greenfield investments data used in this article are calculated by the authors using the UN procedure.

The PMG dynamic estimation method (Pesaran *et al.* 1999) used in this study has also widely used in the literature (Lee and Wang 2015, Jouini 2015, Attiaoui, Toumi, Ammouri, and Gargouri 2017, Aliyu and Ismail 2015, Ren, Karim, and Zaidi 2012). Further, the PMG method has the advantages of short- and long-run dynamic relationships that allow short-run coefficients and intercepts to vary across individuals but restrict long-run coefficient to remain common for all cross-sections. Moreover, the model comprises the panel sets with small cross-sections and relatively long time series,  $T > N$ , which is included in this study. Comparing the PMG to other conventional panel methods reveals that the mean group (MG) estimator provides consistent estimates but only for long-run coefficients, and it is more appropriate for sample data with large  $N$  and  $T$ . Furthermore, the DFE estimator allows only the intercept to vary across individuals and imposes homogeneity of all slope coefficients.

Pesaran *et al.* (1999) used the unrestricted specification for the autoregressive distribution lag (ARDL) as the empirical structure that is specified as follows:

$$y_{it} = \sum_{j=1}^p \lambda_{ij} y_{i,t-j} + \sum_{j=1}^q \gamma_{ij} x_{i,t-j} + u_i + \varepsilon_{it} \quad (1)$$

where  $y_{it}$  denotes the dependent variables for individual  $i$ ,  $x_{(i,t-j)}$  is the  $(k * 1)$  vector of explanatory variables for individual  $i$ , individuals are denoted by  $i = 1, 2, \dots, N$ ,  $u_i$  represent the fixed effects, and  $\varepsilon_{it}$  represents error terms. The model can be reparameterized as the Vector Error Correction Model that structures the long-run and short-run cointegration dynamic panel model as follows:

$$\Delta y_{it} = \theta_i (y_{i,t-1} - \beta_i x_{i,t-1}) + \sum_{j=1}^{p-1} \gamma_{ij} \Delta y_{i,t-1} + \sum_{j=1}^{q-1} \gamma'_{ij} \Delta x_{i,t-1} + u_i + \varepsilon_{it} \quad (2)$$

where  $\beta_i$  are the long-run parameters that ensure that these elements are common across countries and  $\theta_i$  are the equilibrium-correction parameters.

The empirical models for this study, all in natural logarithm form, are presented as follows:

$$LM\&A_{it} = \beta_{0t} + \beta_{1t} LMR_{it} + \beta_{2t} LOPEN_{it} + \beta_{3t} LR_{it} + u_i + \varepsilon_{it} \quad (3)$$

$$LGreenfield_{it} = \beta_{0t} + \beta_{1t} LMR_{it} + \beta_{2t} LOPEN_{it} + \beta_{3t} LR_{it} + u_i + \varepsilon_{it} \quad (4)$$

where M&A is merger and acquisition inflow into country  $i$  at time  $t$  (as a ratio of GDP), and greenfield is another type of FDI inflow into country  $i$  at time  $t$  (as a ratio of GDP).  $MR$  is the market size of country  $i$  at time  $t$  measured by the GDP per capita growth rate.  $OPEN$  is market openness of country  $i$  at time  $t$ , measured by the sum of export and import (as a

ratio of GDP).  $R$  is the official exchange rate in country  $i$  at time  $t$ , measured by the ratio of the local currency per one unit US dollar. This study was conducted during 1990~2016 for six selected ASEAN countries;  $i = 1, 2, \dots, 6$  and  $t = 1, 2, 3, \dots, 27$  for the number of countries and the number of years, respectively.

The dynamic panel ARDL (1,1,1,1) specification for Equation 3 is presented as follows:

$$LM\&A_{it} = \beta_{0t} + \beta_{1t}LMR_{it-1} + \beta_{2t}LOPEN_{it-1} + \beta_{3t}LR_{it-1} + \lambda_i LM\&A_{it-1} u_i + \varepsilon_{it} \tag{5}$$

The dynamic panel ARDL (1, 2, 2, 1) specification for Equation 4 is presented as follows:

$$LGreenfield_{it} = \beta_{0t} + \beta_{1t}LMR_{it-2} + \beta_{2t}LOPEN_{it-2} + \beta_{3t}LR_{it-1} + \lambda_i LGreenfield_{it-1} + u_i + \varepsilon_{it} \tag{6}$$

Before estimating the empirical models, the stationary character of the variables must be examined. Determining the order of integration is a pre-condition for using the cointegration test. Therefore, this study applied the often-used unit root tests, such as the Augmented Dickey-Fuller (ADF 1979), the Im, Pesaran, and Shin (IPS 2004), and the Levin, Lin, and Chu (LLC 2002) tests. The IPS unit root formulates as follows:

$$Y_{i,t} = a_i + \rho_i Y_{i,t-1} + \sum \varphi_k Y_{i,t-k} + \sigma + u \tag{7}$$

While the null states that each series in the panel contains the unit root, the alternative hypothesis allows some series to have the unit root. The alternative hypotheses are formulated as follows:

$$H_0 : \rho_i = 0 \text{ for all } i$$

$$H_1 : \rho_i < 0 \text{ for at least one } i$$

The IPS test allows heterogeneity on both coefficients and slopes but restricts a balanced panel for computing the  $t$ -bar test statistic.

Pedroni (2000~2004) cointegration tests have been widely used in the literature to examine the integration in the panel data. These tests allow for multiple regressors and include seven different cointegration statistics to capture the within and between effects (two categories). Moreover, the test has the property of heterogeneity in the errors across individuals. The Pedroni panel regression model is formulated as follows:

$$Y_{i,t} = a_i + \delta_t + \sum_{m=1}^M \beta_{mi} X_{mi,t} + u_{it} \tag{8}$$

where  $i = 1 \dots N$  for each individual and  $t = 1 \dots T$  for each time,  $\alpha_i$  and  $\delta_t$  are country- and time-fixed effects, respectively. The null hypothesis proposes cointegration for all cross-sections against the alternative of no cointegration for at least one cross-section.

Table 3 presents a summary of the variables and sources used for this study.

**Table 3.** Summary of variables and data sources

Variables	Sources
Cross-border Merger and Acquisition	UNCTAD
Greenfield	UNCTAD
Trade Openness	WDI
Official Exchange Rate	WDI
GDP Per Capita Growth Rate	WDI

## IV. Empirical Results

### A. Descriptive statistics

Table 4 shows the descriptive statistics (for both M&A and greenfield equations) using the real values. Through all of the variables, the official exchange rate (R) has the highest mean and highest standard deviation, at 3,756.223 and 6,151.589, respectively. This is because R in real values shows relatively large dispersion among the local currency values per US dollar of the ASEAN-6 (WDI)<sup>5</sup>. Therefore, in Table 4, the differences in the local currency values (among the ASEAN-6 countries) per US dollar have caused a significant standard deviation for this variable. However, M&A as a ratio of GDP shows the lowest mean and standard deviation among the variables, at 0.610 and 1.1190, respectively. The relatively small number of standard deviations for this variable suggests the similarity trend of M&A inflows into the ASEAN-6 economies on average.

**Table 4.** Descriptive statistics of variables

	Measurement	Obs	Mean	Std. Dev	Min	Max
<i>Greenfield</i>	% of GDP	162	4.608	5.488	-3.225	24.165
<i>M&amp;A</i>	% of GDP	162	.610	1.190	-4.189	7.221
<i>MR</i>	GDP growth %	162	3.667	3.423	-14.346	13.216
<i>OPEN</i>	% of GDP	162	151.022	103.670	37.438	441.603
<i>R</i>	LCU/US dollars	162	3756.223	6151.589	1.249	20933.42

(Note) Local Currency Unit (LCU)

5) Official exchange rate is computed using this procedure: local currency (LCU)/1 US dollars, (WDI).

## B. M&A determinants

### 1. Panel unit root test

The panel unit root test is crucial and widely used to examine the stationarity of the variables. As previously stated, this study uses the IPS (2004), LLC (2002), and ADF (1979) tests to investigate the probability of the presence of the unit root in the panel. Based on the results in Table 5, most of the variables are non-stationary with constant and time trends at their level. Therefore, the null hypothesis for the presence of the unit root cannot be rejected for

**Table 5.** M&A determinants of panel unit root results

Variables	ADF test			
	In levels		First difference	
	Constant	Trend	Constant	Trend
<i>LM&amp;A</i>	-7.774*** (0.000)	-3.722*** (0.000)	-15.260*** (0.000)	-13.999*** (0.000)
<i>LMR</i>	-9.806*** (0.000)	5.946*** (0.000)	-16.669*** (0.000)	-15.973*** (0.000)
<i>LOPEN</i>	-2.556** (0.005)	2.890 (0.996)	-9.956*** (0.000)	-8.768*** (0.000)
<i>LR</i>	3.226** (0.001)	1.840 (0.962)	-7.004*** (0.000)	-5.641*** (0.000)
	IPS test			
	In level		First difference	
	Constant	Trend	Constant	Trend
<i>LM&amp;A</i>	-3.801*** (0.001)	-3.315*** (0.000)	-10.154*** (0.000)	-8.668*** (0.000)
<i>LMR</i>	-5.543*** (0.000)	-4.708*** (0.000)	-11.276*** (0.000)	-9.762*** (0.000)
<i>LOPEN</i>	1.049 (0.853)	2.46 (0.993)	-5.692*** (0.000)	-6.228*** (0.000)
<i>LR</i>	0.335 (0.631)	1.576 (0.942)	-5.245*** (0.000)	-4.348*** (0.000)
	LLC test			
	In level		First difference	
	Constant	Trend	Constant	Trend
<i>LM&amp;A</i>	-4.252*** (0.000)	-3.814*** (0.000)	-8.757*** (0.000)	-6.673*** (0.000)
<i>LMR</i>	5.500* ** (0.000)	4.924*** (0.000)	-10.538*** (0.000)	-8.484*** (0.000)
<i>LOPEN</i>	0.081 (0.532)	-0.053 (0.521)	-4.418*** (0.000)	-5.160*** (0.000)
<i>LR</i>	-14.30*** (0.000)	0.649 (0.741)	-3.395*** (0.000)	-441*** (0.007)

(Note) \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively. The numbers in parentheses are *p*-values.

all variables at their level. The results further suggest that taking the first difference removes these roots from the series and rejects the null hypothesis, implying that all series are stationary of order 1.

## 2. Pedroni panel cointegration test

Several cointegration methods, such as Pedroni (1999, 2004), Kao (1999), and Fisher type tests, have been proposed to examine the presence of a long-run relationship in the series. As a comprehensive test, Pedroni permits multiple independent variables and proposes several tests for heterogeneous intercepts and trend coefficients across cross-sections. Table 6 displays the results.

**Table 6.** M&A Determinants of pedroni panel cointegration tests results (Dependent variable: M&A FDI)

Statistics	Panel Cointegration Test	
	Constant	Constant with trend
Panel V	0.760(0.223)	-0.908(0.181)
Panel rho	-2.32(0.010)	-1.319(0.093)
Panel PP	-5.6(0.000)	-5.871(0.000)
Panel ADF	-4.701(0.000)	-4.824(0.000)
Group rho	-1.533(0.062)	-0.4816(0.315)
Group PP	-6.202(0.000)	-5.904(0.000)
Group ADF	-5.404(0.000)	-4.996(0.000)

(Note) The numbers in parentheses are  $p$ -values.

The majority of all seven-panel cointegration tests reject the null hypothesis of no cointegration at the 1% significance level against the alternative hypothesis of cointegration.<sup>6)</sup> Hence, sufficient evidence exists for the presence of a long-run relationship between M&A sales and its determinants in the panel.

## 3. PMG, MG, and DFE estimation results

Initially, we consider three types of estimators: MG, PMG, and dynamic fixed effects (Table 7). According to the alternative estimates reported in Table 7, all three estimators' results suggest that *MR* has a negative long-run effect on M&A sales, with statistically significant coefficients present only for PMG and DFE models. However, *OPEN* and *R* have long-run positive effects on M&A for all models, whereas their coefficients are statistically significant only for the PMG estimator. Moreover, the results of the Hausman test suggest that the PMG estimator is the

6) The seven Pedroni cointegration types of the test include panel statistics of panel V, panel rho, panel pp, panel ADF (within dimension), and group panel statistics, group rho, group pp, and group ADF (between dimension).

most appropriate for this study. Therefore, we present our analysis based on the results of this model. The PMG estimations suggest a long-run relationship between M&A and its determinants, and all coefficients are statistically significant. Precisely, a 10% increase in GDP per capita growth (*MR*) leads to a 0.11% decrease in M&A sales in the ASEAN-6 countries. Moreover, with M&A, the PMG model outcomes suggest positive and significant relationships between *R* and *OPEN*. To be exact, over 1990–2016, a 1% increase in *OPEN* and a 5% increase in *R* lead to an increase of 0.55% and 0.18% in M&A sales, respectively. These results are consistent with the findings of Erel *et al.* (2012).

**Table 7.** PMG, MG, and DFE estimation results, ARDL (1, 1, 1, 1) (Dependent variable: M&A)

		N = 6		Obs. = 156		
		T = 27		Average T = 26		
				Log Likelihood = -93.151		
Long-run estimation						
	Coef: (PMG)	<i>p</i> -value	Coef: (MG)	<i>p</i> -value	Coef: (DFE)	<i>p</i> -value
<i>LMR</i>	-0.111*	0.074	-0.094	0.199	-0.207**	0.002
<i>LOPEN</i>	0.553***	0.001	0.955	0.214	0.365	0.270
<i>LR</i>	0.180**	0.020	0.216	0.715	0.110	0.586
Short-run estimation						
	Coef: (PMG)	<i>p</i> -value	Coef: (MG)	<i>p</i> -value	Coef: (DFE)	<i>p</i> -value
<i>Speed of adjustment</i>	-0.798	0.000	-0.984	0.000	-0.750	0.000
$\Delta LMR$	-0.025	0.553	0.012	0.819	0.061*	0.099
$\Delta LOPEN$	0.076	0.860	-1.181	0.155	0.497	0.401
$\Delta LR$	-0.354	0.611	-0.543	0.196	-0.308	0.536

(Note) \*, \*\*, and \*\*\* denotes significance at the 10%, 5%, and 1% levels, respectively.

## C. Greenfield determinants

### 1. Panel unit root test

Similar to the previous model, we consider the IPS (2004), LLC (2002), and ADF (1979) tests to investigate the presence of the unit root in the panel. Based on the results for the greenfield investments model in Table 8, most variables are non-stationary with constant and time trends at their level. Therefore, the null hypothesis for the presence of the unit root cannot be rejected for most of the variables at their level. Thus, taking the first difference removes these roots from the series and rejects the null hypothesis, implying that almost all of the series are stationary of order 1.

**Table 8.** Greenfield determinants, panel unit root results

Variables	ADF test			
	In levels		First difference	
	Constant	Trend	Constant	Trend
<i>LGreenfield</i>	-7.170*** (0.000)	-1.901** (0.027)	-13.277*** (0.000)	-10.174*** (0.000)
<i>LMR</i>	-6.447*** (0.000)	-1.842** (0.037)	-7.726*** (0.000)	-5.144*** (0.000)
<i>LOPEN</i>	-2.869*** (0.001)	2.770 (0.995)	-4.268*** (0.000)	-5.290*** (0.000)
<i>LR</i>	3.226*** (0.001)	1.840 (0.962)	-7.004*** (0.000)	-5.641*** (0.000)
	IPS test			
	In level		First difference	
	Constant	Trend	Constant	Trend
<i>LGreenfield</i>	-3.340*** (0.000)	-1.624* (0.052)	-8.065*** (0.000)	-6.256*** (0.000)
<i>LMR</i>	-2.947*** (0.001)	-1.851** (0.032)	-5.866*** (0.000)	-4.353*** (0.000)
<i>LOPEN</i>	0.532 (0.702)	2.082 (0.981)	-3.379*** (0.000)	-4.080*** (0.000)
<i>LR</i>	0.335 (0.631)	1.576 (0.942)	-5.245*** (0.000)	-4.348*** (0.000)
	LLC test			
	In level		First difference	
	Constant	Trend	Constant	Trend
<i>LGreenfield</i>	-2.618*** (0.004)	-1.458* (0.072)	-6.309*** (0.000)	-4.675*** (0.000)
<i>LMR</i>	-2.206** (0.013)	-7.353 (0.140)	-2.366*** (0.000)	-0.337 (0.367)
<i>LOPEN</i>	-0.483 (0.314)	-0.739 (0.229)	-0.890 (0.186)	-0.763 (0.222)
<i>LR</i>	-14.30*** (0.000)	0.649 (0.741)	-3.395*** (0.000)	-2.441*** (0.007)

(Note) \*, \*\*, and \*\*\* denotes significance at the 10%, 5%, and 1% levels, respectively. The numbers in parentheses are *p*-values.

## 2. Pedroni panel cointegration test

To specify the long-run relationship among variables in the panel, for the greenfield investments model, we again apply the Pedroni cointegration tests. Table 9 indicates the results of these tests for constant and constant with trend. The majority of all seven-panel cointegration tests rejected the null hypothesis of no cointegration at the 1% and 5% significance levels, against the alternative hypothesis of cointegration. Hence, in the panel, adequate evidence exists for the presence of a long-run relationship between greenfield investments and its determinants.

**Table 9.** Greenfield determinants for pedroni panel cointegration results (Dependent variable: greenfield FDI)

Panel Cointegration Test		
Statistics	Constant	Constant with trend
Panel V	0.596 (0.275)	-0.647 (0.258)
Panel rho	-1.963 (0.024)	-0.964 (0.167)
Panel PP	-4.217 (0.000)	-4.123 (0.000)
Panel ADF	-1.821 (0.034)	-1.536 (0.062)
Group rho	-1.162 (0.122)	0.098 (0.460)
Group PP	-4.696 (0.000)	-3.851 (0.000)
Group ADF	-1.735 (0.056)	-1.588 (0.056)

(Note) The numbers in parentheses are  $p$ -values.

### 3. PMG, MG, and DFE estimation results

We consider three types of models for estimating the greenfield investments model containing MG (Pesaran and Smith 1995), PMG (Pesaran, Shin, and Smith 1995), and DFE. The specifications of the three-estimator models were explained in the previous section.

According to the alternative estimates reported in Table 10, the results of all three estimators suggest that  $MR$  has positive long-run effects on greenfield inflows, with statistically insignificant coefficients present only for the MG estimator. However,  $OPEN$  and  $R$  have long-run negative effects on greenfield inflows for PMG and DFE estimators' methods. Moreover, the results of the Hausman test suggest that the PMG estimator is the most appropriate one for the greenfield investments model. Therefore, we present our analysis based on the PMG results. The PMG

**Table 10.** PMG, MG, and DFE estimation results, ARDL (1, 2, 2, 1) (Dependent variable: greenfield)

N = 6				Obs = 156		
T = 27				Average T = 26		
				Log Likelihood = -93.151		
Long-run estimation						
	Coef: (PMG)	$p$ -value	Coef: (MG)	$p$ -value	Coef: (DFE)	$p$ -value
$LMR$	0.510***	0.000	0.373	0.248	0.342**	0.003
$LOPEN$	-0.360	0.386	0.934	0.253	-0.568	0.255
$LR$	-0.547**	0.022	-1.146	0.386	-0.244	0.427
Short-run estimation						
	Coef: (PMG)	$p$ -value	Coef: (MG)	$p$ -value	Coef: (DFE)	$p$ -value
Speed of adjustment	-0.517	0.000	-0.750	0.000	-0.656	0.000
$\Delta L1MR$	-0.101	0.258	-0.035	0.822	-0.034	0.722
$\Delta L2MR$	0.015	0.730	0.007	0.930	0.054	0.237
$\Delta L1OPEN$	-0.342	0.644	0.990	0.362	-0.214	0.865
$\Delta L2OPEN$	-0.128	0.830	-0.662	0.428	-0.310	0.636
$\Delta LR$	2.303	0.214	1.120	0.544	0.933	0.185

(Note) \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels, respectively. The numbers in parentheses are  $p$ -values.

estimation reports the long-run relationship between greenfield investments and its independent determinants, with all coefficients being statistically significant except for *OPEN*. Specifically, a 1% increase in *MR* proxied by GDP per capita growth leads to a 0.51% increase in greenfield flows to ASEAN-6 countries. Moreover, the outcomes suggest a negative and significant relationship between the exchange rate (*R*) and greenfield investments. Precisely, a 5% increase in *R* led to a 0.54% decrease in greenfield inflows during 1990~2016.

## V. Conclusions and Discussion

Despite the growth in literature on aggregate FDI determinants, sufficient studies on the determinants of FDI modes (M&A and greenfield investments) are lacking. This study seeks to answer the question of how host country-level factors, such as *MR*, exchange rate (*R*), and trade openness (*OPEN*), affect MNEs' decisions to choose one entry mode over the other in the six selected ASEAN countries (ASEAN-6). This study's main finding is that the host country-level determinants have different effects on each FDI entry mode. Specifically, we found that an increase in the exchange rate (*R*) as a proxy of financial risk, for instance, during the Asian financial crises, has a negative association with greenfield inflows but has a positive association with M&A sales (fire-sale FDI phenomenon). This is due to an increase in *R* meaning that the devaluation of the local currency, which leads to a decrease in local firms' values. Market size (*MR*) as proxied by GDP per capita growth was also found to have a positive association with greenfield inflows but a negative relation with M&A sales. This finding implies that when the economy is growing, local businesses will be less inclined to sell to foreign entities. Further, the magnitudes of the *MR* and *R* coefficients were greater for greenfield investments than for M&A, implying that between the two modes, greenfield inflows have stronger associations with economic growth and the exchange rate. The outcomes of this investigation also suggest that the relation between M&A sales and *OPEN* is positive and significant, implying that M&A sales also increase with increasing trade between ASEAN-6 and the rest of the world. However, *OPEN* had a negative and weak association with greenfield investments. The possible interpretation is that M&A is export-oriented FDI and increasing trade in the ASEAN-6 motivates companies to choose to undertake M&A. However, greenfield investments represent market-seeking FDI, and any increase in *OPEN* confronts them with more competitors as importers of goods to the region, which then leads to less greenfield inflow. The ASEAN governments should focus on policies that make economic fundamentals stronger and create financial stability for attracting more greenfield FDI. Moreover, the trade expansion policy can enhance M&A sales to compensate for the lack of greenfield inflows, especially during the economic crises.

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