

# On the Determinants of Outward Foreign Direct Investment: Empirical Evidences from Thailand

**Hsiang-Hsi Liu**

*Corresponding Author, Distinguished Professor  
Graduate Institute of International Business  
National Taipei University, No.151, University Road, Sanhsia  
23701, Taipei County, Taiwan, ROC  
Tel: 886-2-2673-6270; Fax: 886-2-2673-6271  
E-mail: hsiang@mail.ntpu.edu.tw*

**Pitprapha Dejphanomporn**

*Master, Graduate Institute of International Business  
National Taipei University  
E-mail: paullenelin@gmail.com*

## Abstract

Foreign direct investment (FDI) has played an important role in Thailand's economic growth and development in the Asia-Pacific area. Since 1988-1990, Thailand has been a major destination for FDI, but rapid increasing trend in outward FDI was not seen until 2003. Empirical results of this study show that major determinants such as Thailand's openness and bilateral trade agreements have positive and statistically significant effects on Thailand's outward FDI. On the other hand, exchange rates and global financial crisis have negative and statistically significant effects. Hopefully, the empirical results provide investors and policymakers some implications to select the appropriate investment decisions.

**Keywords:** Foreign Direct Investment, Panel Data Model, Fixed Effects, Generalized Least Squares (GLS), Thailand Economy

**JEL Classification:** F3

## 1. Introduction

Throughout many years, foreign direct investment (FDI) has played an important role in Thailand's economic growth and development. Since 1988 Thailand has always been a major destination for inward FDI. However, outward FDI suddenly increased during 2003-2011. Thailand has since become a net exporter of direct investment even though originally it started as a net importer. Thailand has entered the emerging stage of outward FDI since 2003 and still shows this increasing trend. As of which the main determinants of this increasing trend are important issues for this study.

Outward FDI (OFDI) in Thailand began in the late 1980s and there are four phases of Thai outward investment. The early stage in the 1980s started with a few Thai financial institutions' investment abroad. The second phase (take-off stage), during the period of 1986-1996, is characterized by the rapidly increasing numbers of both manufacturing and service enterprises' oversea investments. The primary destination was the ASEAN due to the cost advantage and large market size. In the third phase (financial crisis stage), during the period of 1997-2002, outward investments declined because

of the Tom Yum Kung Crisis in 1997. Several firms that borrowed in foreign currencies hoping to expand the business were affected by the crisis. Almost every industry was impacted from a dramatic decrease in OFDI. In the fourth phase (recovering stage), from 2003 to the present, Thai outward activities increased because there has been eminent governmental support encouraging investors to invest overseas. Manufacturing was the most active sector for Thai OFDI (Pananond, 2007; Wee, 2007). Outward direct investment overtook inward flows for the first time in 2012 as Thai corporations capitalized on the strength of the funds with government support.

When a firm or an industry chooses to directly invest in a host country, it not only can make full use of the host country's resources for producing and marketing but also reduce the distance between them and their end consumers and avoid trade barriers, delivery costs and transaction costs. Thailand has also followed this process to implement outward FDI to expand industrial growth and strengthen economic development. Furthermore, FDI is crucial to the economic development of developing countries and developed countries. For example, for a country such as Thailand, OFDI not only reaches foreign resources and markets, but also captures technological, management and intellectual capital. Other benefits of OFDI also include employee training during new business operation, which contributes to human capital development in the home country. These will increase the competitiveness of a nation in global market and stimulate the growth of its economy.

OFDI from Thailand seeks for resource and new distribution channels in new markets, where efficiency-seeking and the strategic asset-seeking are the priorities. Additionally, outward FDI offers a panacea for Thailand to seek new business opportunities abroad and enjoy synergies with foreign markets. The aftermath of the global financial crisis witnessed the trend that Thailand has emerged as a global investor tapping business opportunities overseas, mainly driven by the need to access new markets, improve corporate financial positions, recover from global financial crisis and follow regional and bilateral free trade agreements. Now that Thailand's competitiveness is focused on OFDI, it seems imperative for Thai entrepreneurs to switch business strategies away from conventional approaches that put undue emphasis on domestic markets toward more pro-active investment by venturing overseas, exploring business opportunities in new markets and tapping on synergies and complementarities with foreign partners.

As more Thai firms become global business players, they will face constraints and challenges that will require an optimal mix of longer-term business strategy together with steady government support to overcome collective action problems and reduce transaction costs. Thus, the growing internationalization of Thai firms in the foreseeable future has far-reaching implications for Thailand's industrial upgrading imperatives and international competitiveness. Thailand has faced substantial growth in outflows of FDI globally and this situation has drawn scholars and researchers to put more effort into understanding the empirical relationships between a country's growth and outward FDI decision. Though on this aspect, there are still very few studies (Wee, 2007; Passakornjaras, 2012). Even studies considering Thailand's outward FDI only considered a unilateral perspective and single industry within the countries (Hill and Jongwanich, 2009; Poomlamjiak, 2013). These issues suggest that it would be important to identify the main determinants of outward FDI in Thailand for future governmental and business policies. To produce more complete examination of the determinants of Thailand's outward investment, this study will specify an empirical model that allows detection of the factors affecting outward investment in Thailand using panel data for different countries to specify a more appropriate model and secure more realistic information for FDI decision making.

The reminders of this study are organized as follows. Section 2 discusses a review of the relevant literature. Section 3 presents model specification and hypotheses development. Section 4 describes the empirical results. This study provides the concluding remarks in Section 5.

## **2. Literature Reviews**

Before embarking on a detailed analysis for the determinants of OFDI in Thailand, the related literatures are reviewed in order to obtain the more realistic revelations for model specifications in this study. In this section, we will depict the literature review on Thailand's outward FDI.

Thailand's outward FDI began to emerge in 2003 and has steadily continued to sustain the growth and development of Thailand. Pananond (2004) detected that after the 1997 Asian crisis, the international expansion of Thai MNCs depended on both the firm's networking capabilities and specific technology. Networking relationships with foreign technology partners, access to finance, and political connections with the home or host government are important. Pananond (2007) investigated the changing dynamics of Thai multinationals after the Asian Financial Crisis and found that during the pre-crisis period, Thailand's outward FDI relied more on networking capabilities than on industry-specific technological skills, while in the post-crisis period, Thai multinational firms relied more on enhancing their specific technological capabilities and transforming their personalized, relationship-based networks into more transparent and formal connections. Wee (2007) examined the internationalization of Thai firms through outward FDI. The policy implication for this result was that government encouragement of Thai firms investing abroad, through the provision of financial facilities, clearly influenced the internationalization of Thai enterprises.

Hill and Jongwanich (2009) investigated the relationship between outward FDI and the Financial Crisis in the developing countries of East Asia by examining the two interrelated aspects of Asian economic dynamism and the management of external shocks. Their study highlighted that the effect of events such as the Asian Financial Crisis of 1997–1998 and the Global Financial Crisis of 2008–2009, are subject to country-specific characteristics that have substantial and unpredictable influences on FDI behavior, with the general expectation being that FDI should be less volatile than portfolio investment. During the Global Financial Crisis, investment outcomes had enhanced the growing importance of developing East Asian economies. As East Asian economies represent a growing share of global FDI, Masron and Shahbudin (2010) investigated the factors that have driven MNEs from Malaysia and Thailand to engage in outward FDI during the 1980–2006. They found that domestic market conditions, domestic production costs, domestic business competition and the host country's government policy are all significant determinants of FDI, followed by the home government's policies. Among the factors not considered in their analysis are cyclical factors, structural change, resource depletion and the level of technology.

In a case study of FDI in the garment industry, Passakornjaras (2012) explored the reasons that firms in the Thai garment industry engaged in outward FDI using interviews and surveys during June and December 2008. The result was that the most important motive for the garment industry to engage in outward FDI is the efficiency-seeking motive due to the push factors of labor shortages and cost pressures in the home country. Firms engaging in outward FDI have greater expertise in management skill and production technology, and thus most activities emphasize the production base, with a focus on destinations with lower labor costs and less cultural distance. Sermcheep (2013), considered the effect of accessing knowledge and technology abroad on Thai outward FDI. The empirical results indicate that increases in outward FDI by Thailand mean that they are still reliant on a new wave of outward FDI to drive growth. Sermcheep mentioned that are two main theories on the transition pattern observed in FDI; the first is the revised version of the investment development path (IDP), supported by Narula and Dunning (2010). Second, the change in the FDI pattern could be explained by the stages theory of competitive development developed by Porter (1990). Jeenanunta, Rittippant, Chongphaisal, Thumsamisorn, and Visanvetchakij (2013) investigated the keystone to invest and process of knowledge transfer involved in Thai outward investment. They characterized three cases of Thai MNEs that were successful in their foreign investment. The results signified that market expansion, resource seeking and capability augmenting are the main motives for foreign investment. They showed that Thai MNEs have sought to expand their market share within developing countries and also accessed new technological know-how or even cutting-edge technology from developed countries.=

It needs to be noted that the above literatures each used different main determinants for Thailand's outward FDI: including: market size, openness, wage rate, exchange rate, country distance, R&D intensity, trade agreement, political and financial crisis. However different literatures showed different effects (signs and magnitudes). Clearly there is no consensus among these studies on the factors affecting OFDI in Thailand, as different studies show different determinants influencing outward FDI flows. Likewise, they mostly consider time series analysis as combined OFDI amount from all sources (aggregate FDI data) and neglect to consider country specific aspects (cross sectional heterogeneity). Our approach involves the use of panel data of Thailand FDI outflows by source country, in order to allow us to determine the temporal evolution of groups of countries rather than analyzing the temporal behavior of each of them. And thus reduce the likelihood of obtaining biased regression estimates through variable misspecification or omissions, taking into account the individual heterogeneity, permitting a larger number of data points and improving the efficiency of estimates.

### 3. Model Specifications and Hypotheses Development

Based on the related literatures reviewed in this study, when choosing the variables, we focus on determinants (variables) that are realistically related to the main source countries of outward FDI. The model specification and hypotheses development are discussed as follows.

#### 3.1 Model Specifications

In this section, the econometric model is outlined followed by a discussion of the variables, their measurements and expected effects.

$$LOFDI = f(LRGDP, LTOPEN, LRWage, LREX, LDIST, LRD, TBA, D_{0814}, D, T)$$

The dynamic panel data model is utilized to incorporate the time-series and the cross-sectional aspects of the five countries under studies.

$$\begin{aligned} LOFDI_{jt} = & \beta_0 + \beta_1 LRGDP_{jt} + \beta_2 LTOPEN_{jt} + \beta_3 LRWage_{jt} + \beta_4 LREX_{jt} \\ & + \beta_5 LDIST_{jt} + \beta_6 LRD_{jt} + \beta_7 TBA_{jt} + \beta_8 D_{0814} \\ & + \sum_{j=9}^{12} \beta_j D_{jt} + \beta_{13} T_{jt} + \varepsilon_{jt} \end{aligned} \quad (1)$$

The expected signs of the coefficients are

$$\beta_1 > 0, \beta_2 > 0, \beta_3 < 0, \beta_4 < 0, \beta_5 < 0, \beta_6 > 0, \beta_7 > 0, \beta_8 < 0$$

where

$LOFDI_{jt}$ : the annual outflows of Thailand's real FDI to country j

j: Country (Japan, Hong Kong, the Netherlands, Singapore, the United States)

t: Time (2004-2014)

$LRGDP_{jt}$ : Market size, relative per capita GDP between host countries and Thailand

$LTOPEN_{jt}$ : Openness, ratio of Thailand's exports plus imports to GDP

$LRWage_{jt}$ : Relative wage rate, relative real wages between host countries and Thailand

$LREX_{jt}$ : Relative exchange rate, relative exchange rates between host countries and Thailand

$LDIST_{jt}$ : Geographical distance, distances between host countries and Thailand

$LRD_{jt}$ : Relative R&D intensity, relative R&D expenditures between host countries and Thailand

$TBA_{jt}$ : Bilateral trade agreement, the number of bilateral agreements signed by Thailand

$D_{0814}$ : Global Financial Crisis, Subprime Mortgage and Financial Tsunami 2008-2014, where 1 = Subprime Mortgage and Financial Tsunami (2008-2014), 0 = Otherwise

$D_{jt}$ : Country factors, where 1= Japan, 0= Otherwise; 1=Netherlands,

0= Otherwise; 1= Singapore, 0= Otherwise; 1= United States, 0= Otherwise

$T_{jt}$ : Time trend

$\varepsilon_{jt}$ : Error term

The models based on our discussions above suggest a log-linear model; therefore, the data for the variables were transformed into natural logarithms, as we expect nonlinearities in the relationships based on theory and previous empirical work.

### 3.2 Hypothesis Development

After considering the main percentage of Thailand's OFDI for the first five countries we selected the ones that represent more than 60% of the total outward investments. These five countries are: Japan, Hong Kong, the Netherlands, Singapore and the United States. Hence, this study focuses on these countries that have the most realistically impact on OFDI of Thailand during the 2004-2014 periods. Here, we will discuss the theoretical effects of the independent variables - on the dependent variable, leading to the hypotheses development.

### 3.3 Dependent Variable

*Defining and Measures of OFDI (LOFDI<sub>jt</sub>)*

In this study, we use panel data model to conduct an empirical study. Here, LOFDI<sub>jt</sub> indicates the amount of outward FDI during the 2004-2014 periods from Thailand to each selected country: Japan, Hong Kong, the Netherlands, Singapore and the United States. We use the statistical amount of Thailand outflow FDI from the BOT website and then compute a logarithm variance stabilizing transformation.

### 3.4 Independent Variables

The Expected Effects of Independent Variables on Dependent Variable

*Market Size (LRDGP<sub>jt</sub>)*

For Thailand to consider investing in a new country, the country must have a potential or large enough market. Market size is an influential factor in FDI decisions for Thai outward FDI, especially the market-seeking motive. The desire to grow, expand markets and support trade and distribution channels were and still are the main drivers of Thai outward FDI. In many studies (Chakrabarti, 2001; Sahoo, 2006; Shahmoradi and Baghbanyan, 2011) of FDI determinants, we often find that market size is the most important determinant. Per capita GDP is used as a measure of the potential of the host country's domestic market. This study will use the relative per capita GDP between the FDI host countries and Thailand to indicate the effect of market size on Thailand's OFDI. It is expected to be a positive determinant of FDI outflows. It is therefore hypothesized that

*H1: The relative per capita GDP between home countries and Thailand would have positive effects on Thailand's outward FDI.*

*Thailand's Openness (LTOPEN<sub>jt</sub>)*

The openness of Thailand is measured as the sum of exports and imports divided by the gross domestic product. Foreign production can replace exports of a product but usually boosts demand for intermediate goods or raw materials from the home country (Sermcheep, 2013), which may support the imports and exports of Thailand. As Ng (2010) mentioned, trade flows are significantly and positively correlated with investment flows, and it is expected that Thailand's openness will have a positive effect on FDI outflows. Based on above discussion, it is therefore hypothesized that

*H2: The openness of Thailand's economy would have positive effects on Thailand's outward FDI.*

*Relative Wage (LRWage<sub>jt</sub>)*

Because wage costs are an important part of total production costs, especially in labor-intensive manufacturing, lower wages in the host country make it more attractive for foreign investment. Wages cost have been regarded as one of the most prominent indicators of FDI. This study will look at the

relative labor wages of the host countries and Thailand. In general, proponents of the dependency and modernization hypotheses agree on the importance of cheap labor in attracting multinationals with diverse implications. Culem (1988), Daly and Tosompark (2011), Schneider and Frey (1985), Shahmoradi and Baghbanyan (2011) showed that higher wages (relative real wages between host and home country) discourage outward FDI. It is expected that relative wages will have the negative effect on Thailand's outward FDI, it is therefore hypothesized that

*H3: A real wage for the host country relative to the home country would have negative effects on Thailand's outward FDI.*

#### **Relative Exchange Rate (LREX<sub>jt</sub>)**

When Thai firms look to invest in a country, the strength of a currency (exchange rate) is used as proxy for the level of inflation and the purchasing power of the investing firm. This study will look at the relative exchange rate between the host countries and Thailand. Devaluation of a currency would result in reduced exchange rate risk. As the host's currency appreciates, the purchasing power of the investors in foreign currency terms is weakened (Chakrabarti, 2001); thus, we expect a negative and significant relationship between the currency value and FDI outflows. The currency value can be determined by the relative exchange rate between the host country and Thailand, and we expected that the relative exchange rate will have a negative effect on FDI outflows, it is therefore hypothesized that

*H4: The exchange rates are expected to have negative effects on Thailand's outward FDI.*

#### **Geographical Distance (LDIST<sub>jt</sub>)**

In this study, the distance between Thailand and the FDI host capitals of these countries will be used to determine the geographical distance. The geographical distance between two countries is usually measured by the spatial distance between the capitals of these countries (Bergstrand, 1985), but this may provide some misleading information for our estimation. As the distance between Thailand and the host country decreases, there is potentially greater similarity and insight into a host country's investment opportunities, customs, legal system and culture. Intuitively, greater geographical distance between two countries may cause more differences in political institutions, language, and regional and social customs, which are potential barriers to capital flows, i.e., Thailand's outward FDI decreases. Here, the geographical distance is measured in kilometers and a natural logarithm is computed for a variance stabilizing transformation. We expect a negative relationship between the geographical distance and Thailand's FDI outflows, it is hypothesized that

*H5: The geographical distance between home countries and Thailand is expected to have negative effects on Thailand's outward FDI.*

#### **Relative Research and Development Intensity (LRD<sub>jt</sub>)**

Higher technological capability though R&D intensity is positively related with attracting more FDI (Tomiura, 2003). The R&D intensities are measured as the host country relative to Thailand's R&D intensity. For Thailand to engage in outward FDI, it expects to gain better access to foreign proprietary technologies, strategic assets and capabilities (brands, distribution channels, foreign capital markets and so forth). Other expectations are to exploit new markets and to diversify business activities in a manner that seeks to improve their international competitiveness; it will also increase Thailand's outward FDI. Here, the relative R&D intensity is measured relative R&D expenditure between host country and Thailand. Thus, we expect a positive relationship between relative R&D intensity and Thailand's outward FDI, it is therefore hypothesized that

*H6: The relative R&D intensity between Thailand and the home countries is expected to have positive effects on Thailand's outward FDI.*

### ***Bilateral Trade Agreement by Thailand (TBA<sub>jt</sub>)***

Bilateral trade agreements are signed between two nations. They are fairly easy to negotiate and give those two nations favored trading and investing status. Some studies have found that openness to trade and regional trade and investment agreements were important determinants of FDI during the 1990s (Binh and Haughton, 2002; Banga, 2004). Thailand's outward FDI may seek to reduce tariffs faced when exporting into other countries and free trade agreements between the host countries and the export market are relatively important (Passakornjaras, 2012). Outward FDI will increase where there is large numbers of bilateral trade agreements signed by Thailand. Therefore, we expected that number of bilateral trade agreements signed by Thailand will have the positive effect on FDI outflows and hypothesized that

*H7: The bilateral trade agreement signed by Thailand is expected to have positive effects on Thailand's outward FDI.*

### ***Global Financial Crisis 2008-2014(D<sub>0814</sub>)***

The financial tsunami of 2007–2008, also known as the global financial crisis and the 2008 financial crisis, is considered by many economists as the worst financial conditions since the Great Depression of the 1930s. It threatened the total collapse of large financial institutions, which was prevented by bailout form national governments, although financial markets and economic situations still deteriorated worldwide. An unstable global economic environment due to this financial crisis event would also cause outward FDI from Thailand (Pananond, 2004; Pananond, 2007). Therefore, facing the subprime mortgage crisis and financial tsunami in 2008-2014 is expected to have a negative effect on FDI outflows. To consider the effect of the subprime mortgage crisis and financial tsunami on Thailand's outward FDI, we use a dummy variable as a proxy, where Crisis=1 for the 2008-2014 period, and Crisis =0 otherwise. . It is hypothesized that

*H8: The global financial crisis is expected to have a negative effect on Thailand's outward FDI.*

### ***Country Factor (D<sub>jt</sub>)***

To consider the effects of country factors on Thailand's outward FDI, we use dummy variables (D<sub>jt</sub>, where 1=Japan, 0=Otherwise; 1=Netherlands, 0=Otherwise; 1= Singapore, 0= Otherwise; 1=US, 0= Otherwise) as proxies for country effects to control for country-specific fixed effect, such as investment subsidies, tax systems or culture and language (Dunning, 1993).

### ***Time-Trend (T<sub>jt</sub>)***

To consider time trend effect for Thailand outward FDI to host countries (Japan, Hong Kong, the Netherlands, Singapore, the US), we use dummy variable (T<sub>jt</sub>; t=2004-2014) as a proxy for time trend effect.

The summary of measurement, the predicted effects and data sources for all determinants are given in appendix A.

## **4. Empirical Results and Implications**

In this section, we provide the results of the econometric model and explore which of the aforementioned results were supported by the panel statistical data. Basic statistics are estimated using SAS program. The panel unit root tests employed are LLC(Levin, Lin and Chu, 2002) and IPS(Im, Pesaran and Shin, 2003) unit root tests; model selection is estimated using F-test, Breusch-Pagan LM test and Hausman test (Hausman,1978) using R statistical program. Finally, the Generalized Least Squares (GLS) method applied to estimate the coefficients of our specified model with SAS to obtain the empirical results. This study focuses on the countries that have the most realistic impact through the outstanding outward investment countries (Japan, Hong Kong, the Netherlands, Singapore and the United States) from Thailand during the 2004-2014 periods.

## 4.1 Data Descriptions

Before analyzing relationships between Thailand's outward FDI decision and its influence factors, the statistical test diagnostics are undertaken to check the characteristics of the aforementioned data. The summary of descriptive statistics for the variables which expressed in the model transformed into natural logarithms, including means, standard error, skewness and kurtosis are shown in Table 1. As for the variables explaining Thailand's OFDI, the statistics show that the mean value for each variable is quite different while the standard error of the variables such as LREX, LRGDP and LDIST are higher than others. The sample skewness statistics for most variables LOFDI, LRGDP, LRWage, LREX, LDIST, LRD are nonnegative. The sample kurtosis statistics are less than 3. Both the sample skewness and kurtosis statistics indicated the distribution pattern for each variable.

## 4.2 Results of Panel Unit Root Tests

To avoid considering a spurious relationship that will cause misinterpretation of the empirical results, the time series of the variables used in this study need to be tested

**Table 1:** Description statistics of dependent and independent variables in outward FDI paneldata model

	<b>LOFDI</b>	<b>LRGDP</b>	<b>LTOPEN</b>	<b>LRWage</b>	<b>LREX</b>	<b>LDIST</b>	<b>LRD</b>
Mean	4.0101	3.6476	2.1445	1.7112	2.0249	3.6351	-0.9191
Median	4.0016	3.5124	2.1578	1.6017	1.6262	3.6421	-0.9812
Maximum	4.0815	4.8813	2.1770	2.3949	3.5333	4.1433	-0.4424
Minimum	3.9592	2.8483	2.0705	1.3314	1.0948	3.1474	-1.2169
Std. Dev.	0.0237	0.7498	0.0325	0.3064	0.8236	0.4031	0.2297
Skewness	1.3892	0.3299	-1.0718	0.9630	0.8428	0.0091	1.0002
Kurtosis	2.5917	-1.5315	0.2089	-0.3666	-0.7431	-1.7174	-0.2483

Source: This study.

Notes: 1. Observations for all series in the whole sample period are 55.

2. All variables are the logarithm of outward FDI determinants.

for stationarity by employing LLC and IPS panel unit root tests. The results of the LLC and IPS unit root tests are indicated in Table 2, which shows that all series of variables are stationary and indicate that the results of the empirical models do not appear spurious.

**Table 2:** Panel unit root test of outward FDI

	<b>None</b>	<b>With drift</b>	<b>With drift and time trend</b>	<b>Maximum lag Period</b>
<b>LLC unit root test</b>				
LOFDI	-9.3140***	-8.2676***	-6.1307***	[4]
LRGDP	-6.2574***	-5.3029***	-5.0203***	[4]
LTOPEN	-8.2807***	5.2729***	7.6376***	[4]
LRWagetj	-10.9243***	-7.2165***	-6.6864***	[4]
LREX	-8.1846***	-4.7065***	-4.2407***	[4]
LDIST	-4.7282***	-2.3741***	-2.7998***	[4]
LRDtj	-14.3496***	-12.1706***	-11.6714***	[4]
<b>IPS unit root test</b>				
LOFDI		-10.5342***	-10.4206***	[4]
LRGDP		-8.4057***	-8.3262***	[4]
LTOPEN		-5.9984***	-5.4859***	[4]
LRWagetj		-9.9714***	-9.8043***	[4]
LREX		-8.0320***	-7.7190***	[4]
LDIST		-4.4824***	-3.7604***	[4]
LRDtj		-13.5064***	-13.6492***	[4]

Source: This study.

Notes: 1. \*\*\* denotes statistical significance at the 1% level.

2. Brackets [] indicate the variables of AC maximum lag



### 4.3 Results of Selection for Panel Data Model

This study uses panel data (time series and cross-sectional data) to estimate how each determinant affects outward FDI from each selected country during the study years. To select the suitable model, we will use the F test, LM test and Hausman test to decide among ordinary least squares (OLS), fixed effects or random effects models.

Table 3 shows that the F-test rejects the null hypothesis and implies that the fixed effects model is more appropriate than the Ordinary Least Squares (OLS) model. Based on results of the Breusch-Pagan LM test, the random effects model is better than OLS model. Therefore, we use a Hausman test to compare the fixed effects model with random effects model and find that the fixed effects model is superior to the random effects model.

**Table 3:** Selections for OLS, fixed and random effects model results of outward FDI

	F Test	LM test	Hausman test
<u>Hypotheses</u>			
H <sub>0</sub> :	OLS	OLS	Random effect
H <sub>A</sub> :	Fixed effect	Random effect	Fixed effect
	F = 2.8184** (F <sub>7,43</sub> )	LM = 20.7383*** ( $\chi^2_1$ )	Hausman = 31.2176*** ( $\chi^2_7$ )
Result	Fixed model is better	Random model is better	<b>Fixed model is better</b>

Source: This study.

Note: \*, \*\*, \*\*\* denote statistical significance at the 10%, 5%, 1%, respectively.

### 4.4 Empirical Results for the Determinants of OFDI

In this study, we use cross-sectional and time series panel data to estimate the regression models to explore the powerful determinants of outward FDI from Thailand. Basically, we use cross-sectional data for the selected five countries (Japan, Hong Kong, the Netherlands, Singapore and the United States) over the 2004-2014 period and employ the generalized least squares (GLS) to obtain the panel fixed effects regression parameters. The estimated results will be shown in Table 4.

Based on our empirical results (Table 4), we found that the effect ( $\beta_1=0.0257***$ ) of relative per capita GDP of host countries to Thailand has a positive and statistically significant coefficient at the 1% level. Hypothesis  $H_1$  is supported. This implies that higher market potential, enhanced purchasing power of local citizens and higher market demand allow Thai's firms to have more opportunities to achieve economies

**Table 4:** Empirical results of determinants of OFDI in Thailand by GLS

Variable	Coefficients	Parameter Estimate	t Value	Pr >  t
Intercept	$\beta_0$	4.1380***	16.43	0.0001
LRGDP	$\beta_1$	0.0257***	2.03	0.0087
LtOPEN	$\beta_2$	0.1957***	2.82	0.0096
LRWage	$\beta_3$	0.0510*	1.89	0.0646
LREX	$\beta_4$	-0.1135**	-2.31	0.0253
LDIST	$\beta_5$	-0.1004***	-2.95	0.0051
LRD	$\beta_6$	0.1543**	-2.59	0.0128
TBA	$\beta_7$	0.4323**	2.61	0.0128
D0814	$\beta_8$	-0.0444***	-2.25	0.0098
Dj	$\beta_9$	0.2171**	2.29	0.0268
Dn	$\beta_{10}$	0.1226**	2.22	0.0317
Ds	$\beta_{11}$	0.0110	0.77	0.4470
Du	$\beta_{12}$	-0.1203**	-2.32	0.0249
T	$\beta_{13}$	0.0085***	3.28	0.0020
R <sup>2</sup>		0.3987	Adjusted R <sup>2</sup>	0.2785
F-stat(13,42)		13.32***	White test	3.1542
Durbin-Watson		2.371	Breusch-Pagan test	3.6241

Source: This study.

Notes: 1. \*, \*\*, \*\*\* denote statistical significance at the 10%, 5%, 1%, respectively.

2. The software used is SAS.

of scale and lower production costs in the host country. Moreover, market size affecting FDI may also create agglomeration effects that are important factors in Thai firms' decisions to invest abroad. These results are consistent with and supported by previous researches such as Kyrkilis and Pantelidis (2003), Sahoo (2006), Nunes, Oscategui and Peschiera (2006) and Daly and Tosompark (2011) who found that a larger host country's economy tends to attract more Thailand outward FDI. The level of Thailand's openness ( $\beta_2=0.1957***$ ) is shown to have a positive effect on OFDI, which is significant at the 1% level and hypothesis  $H_2$  is supported. This implies that Thailand's OFDI is complementary to its international trade when the foreign affiliates use home inputs to produce outputs in the host country. Kim (2000) also argued that FDI outflows lead to both export-replacing effects and export-supporting effects. Foreign production can replace exports of that product but could also boost demand for intermediate goods or raw materials from the home country. Higher level of Thailand's openness can reduce restrictive controls and enable firms to acquire information about foreign markets for Thailand's FDI outflows. Previous studies by Kravis and Lipsey (1982), Culem (1988), Edwards (1990), Pärletun and Thede (2008) and Ng (2010) also found significant correlation of openness to FDI, which support our results.

Lower relative wages have obvious attraction for foreign multinational investment. But in our studies, the relative wage ( $\beta_3 =0.0510^*$ ) has a positive effect on Thailand's outflow FDI at the 10% significance level. This means that hypothesis  $H_3$  is not supported. The positive sign seems to indicate that Thailand's outflow FDI has increased even when the relative wages between host countries and Thailand is higher. A positive relationship is also thought to be possible in the literature, as the wage rate could be regarded as a signal for labor quality. Higher wages may indicate higher skilled labor, human and knowledge capital or management know-how (Daly and Tosompark, 2011), which Thai investors seek through their outward FDI countries. The relative exchange rate has a negative and significant effect ( $\beta_4 =-0.1135^{**}$ ) on Thailand's outward FDI at the 5% significance level, meaning that hypothesis  $H_4$  is supported. It implies that an increase in relative production costs caused by relative exchange rate appreciation in the host country will decrease Thai firms' outward FDI to host country. This information indicates to investors that, in a situation where there is full pass-through of changes in exchange rates into production costs, a depreciation of the host local currency should promote Thai FDI outflows to host countries because foreign costs of production have decreased. This result is supported by Froot and Stein (1991), Chakrabarti (2001) and Furceri and Borelli (2008).

The effect of geographical distance ( $\beta_5 =-0.1004***$ ) on Thailand's outward FDI is negative significant at the 1% level and hypothesis  $H_5$  is supported. This means that the distance between Thailand and the host country is still a concern for firms investing outside of Thailand. This important implication signifies that Thailand makes outward FDI decisions not only considering transportation costs but also considering transaction costs such as information costs or the time to understand institutional factors (trade regulation, political institutions, language, religion and social custom), which are potential barriers to capital flows. This result is supported by previous studies, such as Ledyeva and Linden (2006), Fratianni, Marchionne and Oh (2011), Folfas (2011), Paniagua (2011) and Leibrecht and Riedl (2014). On the other hand, relative R&D intensity ( $\beta_6=0.1543^{**}$ ) has a significantly positive effect on Thailand's outflow FDI at the 5% level. The hypothesis  $H_6$  is supported. This result shows that increased relative R&D intensity in the host countries are the main attractions for Thai firms to engage in outward investments. This means that higher relative R&D intensity in the host country will attract Thai outward investments in order to obtain the R&D in manufacturing and management expertise. Specifically, in recent years, Thailand's outward FDI has been used to access advanced proprietary technologies and strategic assets (e.g., brands, local distribution networks), hence causing Thailand outward FDI to increase. Our result is supported by Zhang (2001), Buckley, Clegg and Wang (2006) and Lee (2011).

The effect of bilateral trade agreement ( $\beta_7 =0.4323^{**}$ ) on Thailand's outward FDI is positive and significant at the 5% level. The hypothesis  $H_7$  is supported. This indicates that bilateral trade agreements are also important determinants of increased Thai outward FDI. Although host countries

are characterized by different conditions and heterogeneous policies among different regions, trade bilateral agreements can also increase international trade and outward FDI. Relatively, the global financial crisis from 2008 to 2014 ( $\beta_8 = -0.0444^{***}$ ) is shown to have a significantly negative influence on Thailand's outward FDI decision at the 1% level. Indicating that hypothesis  $H_8$  is supported, where the global financial crisis lead Thai investors to have less confidence in outward FDI to host country, which is also asserted by previous studies (Alfaro and Chen, 2012).

For country factors, the coefficient estimations for outward FDI was positive for both Japan ( $\beta_9 = 0.2171^{**}$ ) and the Netherlands ( $\beta_{10} = 0.1226^{**}$ ) with positive statistically significant effects at the 5% level. Singapore also has a positive effect ( $\beta_{11} = 0.0110$ ), but it is not statistically significant. The US ( $\beta_{12} = -0.1203^{**}$ ) has a negative effect at the 5% level of statistical significance. As for the effects of country factors, the country dummies (from Thailand to host countries) appear to vary in both size and direction. It seems that country effects are attributable to both national culture and public policies after all. The time trend factor ( $\beta_{13} = 0.0085^{***}$ ) shows an increasing trend over time in outward FDI, with positive and statistically significant effects at the 1% level. These indicated that Thailand's outward FDI to Japan, Hong Kong, the Netherlands, Singapore and the United States have significant increasing trends during our study period of 2004-2014.

As indicated in Table 4, overall, the empirical results of our GLS estimation have adequate goodness of fit, with  $R^2$  0.3987, adjusted  $R^2$  0.2785 and F-Stat 13.32 (at 13, 42 degrees of freedom). The Durbin-Watson statistic equals 2.371, White-statistic 3.1542 and Breusch-Pagan test 3.6241, which show no autocorrelation or heteroscedasticity in the estimated error term. This information also indicated that our discussions of these determinants affecting Thailand's outward FDI are appropriate.

The results of the above empirical analysis for the hypotheses tested are summarized in Table 5.

**Table 5:** Summary of findings of determinants on Thailand's outward FDI

Hypotheses		Results
$H_1$	The relative per capita GDP per capita between home countries and Thailand would have positive effects on Thailand's outward FDI.	Accepted
$H_2$	The openness of Thailand's economy would have positive effects on Thailand's outward FDI.	Accepted
$H_3$	A real wage for the host country relative to the home country would have negative effects on Thailand's outward FDI.	Rejected
$H_4$	The exchange rates are expected to have negative effects on Thailand's outward FDI.	Accepted
$H_5$	The geographical distance between home countries and Thailand is expected to have negative effects on Thailand's outward FDI.	Accepted
$H_6$	The relative R&D intensity between Thailand and the home countries is expected to have positive effects on Thailand's outward FDI.	Accepted
$H_7$	The bilateral trade agreement signed by Thailand is expected to have positive effects on Thailand's outward FDI.	Accepted
$H_8$	The global financial crisis is expected to have a negative effect on Thailand's outward FDI.	Accepted

Source: This study.

## 5. Concluding Remarks

In this study, we investigated the determinants of Thailand's outward FDI by the panel data model that utilized to incorporate the time-series (2004-2014) and the cross-sectional data (Japan, Hong Kong, the Netherlands Singapore and the United States). The empirical results indicate that the market size (relative per capita GDP), Thailand's openness, relative real wage, relative R&D intensity, bilateral trade agreements have positive and statistically significant effects on Thailand's outward FDI. Relative exchange rates, geographical distance, global financial crisis are negative and statistically significant effect on Thailand's outward FDI.

To promote Thailand outward FDI, the relative per capita GDP between host country and Thailand, measured as market size, is the most important determinant of outward FDI. Market size and growing market demand of host countries (Japan, Hong Kong, the Netherlands, Singapore and the

United States) can encourage Thailand to enlarge outward FDI. The openness of Thailand is another key point to promoting outward FDI. The higher level of Thailand's openness will promote more OFDI according to expanding import and export flows. Thailand's openness can support for less restrictive controls and by enabling firms to acquire information about foreign markets. For the Thai government, increasing Thailand's openness by promoting import and export sector can be enforced by adjusting tariff/non-tariff barriers to remain at a level of openness and legislated trading policies or international trade agreements to support Thailand's import and export sectors in promoting outward FDI. The bilateral trade agreements signed by Thailand and the host country are important determinants to promote Thailand's outward FDI. Even though host countries are characterized by diverse conditions and heterogeneous policies by region, but having a bilateral trade agreement can increase international trade as well as Thailand's outward FDI.

The relative exchange rates between the host countries and Thailand have significantly negative effects on Thailand's outward FDI decision. In a situation where there is full pass-through of changes in exchange rates into production costs, a depreciation of the host local currency should promote Thai FDI outflows to host countries because foreign costs of production have decreased. Where the relative wage rates of host countries to Thailand is positively significant, indicates that in case of Thailand's outward FDI to Japan, Hong Kong, the Netherlands, Singapore and the United States, is an opportunity for Thai firms to upgrade the globalization of their companies. Higher wage rates may indicate higher skilled labor (human and knowledge capital or management know-how) that Thai investors seek from their outward FDI host countries.

Relating to relative R&D intensity on Thailand's OFDI, it shows that the increasing of relative R&D intensity in host countries will lead Thailand's outward FDI. To promote Thailand's outward FDI to host countries, firms or government sectors may consider obtaining higher R&D in manufacturing technology, management know-how, advanced proprietary technology and strategic assets (e.g., brands, local distribution networks) and other capabilities abroad. Since geographical distance will have a negative effect on Thailand's outward FDI. The policy implication signified that when Thailand makes outward FDI decision, it needs to consider transportation costs or even transaction costs, such as information cost and time to understand the institutional factors (trade regulations, political institutions, language, religion and social customs) that are potential barriers to capital flows. In this study, the global financial crisis has significant negative influence on Thailand's outward FDI. Firms or government sectors should concern about financial risks. The addition of country dummy variables have shown different effects (size and direction) on Thailand's OFDI, country-specific factors need to be involved in promote Thailand's OFDI to different countries.

In sum, the findings of this study may contribute additional facts to support or enhance the theories of FDI. It also provides policy or managerial strategic implications for the Thailand government and related investors to develop appropriate FDI policies or strategies to promote outward FDI.

## References

- [1] Alfaro, L. and Chen, M. X. (2012). Surviving the Global Financial Crisis: Foreign Direct Investment and Establishment Performance. *American Economic Journal: Economic Policy*, 4(3), 30-55.
- [2] Banga, R. (2004). Impact of Japanese and US FDI on Productivity Growth: A Firm-level Analysis. *Economic and Political Weekly*, 39(5), 453-460.
- [3] Bergstrand, J. H. (1985). The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence. *The review of economics and statistics*, 67(3): 474-481.
- [4] Binh, N. N. and Houghton, J. (2002). Trade Liberalization and Foreign Direct Investment in Vietnam. *ASEAN Economic Bulletin*, 19(3), 302-318.

- [5] Buckley, P. J., Clegg, J. and Wang, C. (2006). Inward FDI and Host Country Productivity: Evidence from China's Electronics Industry. *Transnational Corporations*, 15(1), 13-37.
- [6] Chakrabarti, A. (2001). The Determinants of Foreign Direct Investments: Sensitivity Analyses of Cross-Country Regression. *Kyklos*, 54(1), 89-114.
- [7] Culem, C. G. (1988). The Locational Determinants of Direct Investments among Industrialized Countries. *European Economic Review*, 32(4), 885-904.
- [8] Daly, K. and Tosomark, C. T. 2011. Determinants of Foreign Direct Investment in Thailand. *The Impact of the Global Financial Crisis on Emerging Financial Markets*, 93, 709-718.
- [9] Dunning, J. H. (1993). *Multinational Enterprises and the Global Economy*. Wokingham, Addison-Wesley, UK.
- [10] Edwards, S. (1990). *Capital Flows, Foreign Direct Investment, and Debt-Equity Swaps in Developing Countries*. National Bureau of Economic Research. MA: US.
- [11] Folfas, P. (2011). *FDI between EU Member States: Gravity Model and Taxes*. Poland.
- [12] Fratianni, M. U., Marchionne, F. and Oh, C. H. 2011. A Commentary on the Gravity Equation in International Business Research. *Multinational Business Review*, 19(1), 36-46.
- [13] Froot, K. A. and Stein, J. C. (1991). Exchange Rates and Foreign Direct Investment: An Imperfect Capital Markets Approach. *The Quarterly Journal of Economics*, 106(4), 1191-1217.
- [14] Furceri, D. and Borelli, S. (2008). Foreign Direct Investments and Exchange Rate Volatility in the EMU Neighborhood Countries. *Journal of International and Global Economic Studies*, 1(1), 42-59.
- [15] Hausman, J. A. (1978). Specification Tests in Econometrics. *Econometrica*, 46(6): 1251-1271.
- [16] Hill, H. and Jongwanich, J. (2009). Outward Foreign Direct Investment and the Financial Crisis in Developing East Asia. *Asian Development Review: Studies of Asian and Pacific Economic Issues*, 26(2), 1-25.
- [17] Im, K. S., Pesaran, M. H. and Shin, Y. (2003). Testing for Unit Roots in Heterogeneous Panels. *Journal of Econometrics*, 115(1), 53-47.
- [18] Jeenanunta, C., Rittipant, N., Chongphaisal, P., Thumsamisorn, A. and Visanvetchakij, T. (2013). Knowledge Transfer of Outward Foreign Direct Investment by Thai Multinational Enterprises. *Asian Journal of Technology Innovation*, 21(1): 64-81.
- [19] Kim, S. S. (2000). Korea's Segyehwa Drive: Promise Versus Performance. *Korea's Globalization*, 1-28.
- [20] Kravis, I. B. and Lipsey, R. E. 1982. The Location of Overseas Production and Production for Export by US Multinational Firms. *Journal of International Economics*, 12(3), 201.
- [21] Kyrkilis, D. and Pantelidis, P. (2003). Macroeconomic Determinants of Outward Foreign Direct Investment. *International Journal of Social Economics*, 30(7), 827-836.
- [22] Ledyeva, S. and Linden, M. (2006). *Foreign Direct Investment and Economic Growth: Empirical Evidence from Russian Regions*. Paper presented at the Bank of Finland Institute for Economies in Transition Discussion Papers, Finland.
- [23] Lee, C. Y. (2011). The Differential Effects of Public R&D Support on Firm R&D: Theory and Evidence from Multi-Country Data. *Technovation*, 31(5), 256-269.
- [24] Leibrecht, M. and Riedl, A. (2014). Modeling FDI Based on a Spatially Augmented Gravity Model: Evidence for Central and Eastern European Countries. *The Journal of International Trade and Economic Development*, 23(8), 1206-1237.
- [25] Levin, A., Lin, C. F. and Chu, C. S. J. (2002). Unit Root Tests in Panel Data: Asymptotic and Finite-Sample Properties. *Journal of Econometrics*, 108(1), 1-24.
- [26] Masron, T. A. and Shahbudin, A. S. M. (2010). Push Factors of Outward FDI: Evidence from Malaysia and Thailand. *Journal of Business and Policy Research*, 5(1): 54-68.
- [27] Narula, R. and Dunning, J. H. (2010). Multinational Enterprises, Development and Globalisation: Some Clarifications and a Research Agenda. *Oxford Development Studies*, 38(3): 263-287.

- [28] Ng, J. 2010.*The Political Economy of Democracy and FDI Inflows in Oil Countries*. (Masters Degree). Columbia University, New York.
- [29] Nunes, C. L., Oscategui J. andPeschiera,J. (2006). Determinants of FDI in Latin America.*Documento De Trabajo*, 252, 57-76.
- [30] Pärletun, J.andThede,S. (2008).*The Determinants of Foreign Direct Investment: A Regional Analysis with Focus on Belarus*. Lund University, Sweden.
- [31] Pananond, P. (2004).Thai Multinationals after the Crisis: Trends and Prospects,*ASEAN Economic Bulletin*. 21(1): 106-126.
- [32] Pananond, P. (2007). The Changing Dynamics of Thai Multinationals after the Asian Economic Crisis.*Journal of International Management*, 13(3), 356-375.
- [33] Paniagua, J. (2011).*FDI Gravity Equation: Models, Estimations and Zeros*. Catholic University of Valencia, Valencia.
- [34] Passakornjaras, S. (2012). Thailand's Outward Foreign Direct Investment: The Case of the Garment Industry.*ASEAN Economic Bulletin*, 29(2), 101-115.
- [35] Poomlamjiak, B. (2013).*The Causal Relationship between GDP, Exports, Energy consumption, and CO<sub>2</sub> in Thailand and Malaysia*. (Master Thesis), Chinese Culture University, Taiwan.
- [36] Porter, M. (1990).*The Competitive Advantage of Nations*. Free Press, New York: US
- [37] Sahoo, P. 2006*FDI in South Asia: Trends, Policy, Impact and Determinants*. Tokyo:Japan.
- [38] Schneider, F.andFrey,B. S. (1985). Economic and Political Determinants of Foreign Direct Investment.*World development*, 13(2), 161-175.
- [39] Sermcheep, S. 2013.*Foreign Direct Investment and Economic Growth: The Case of Thailand's Inward and Outward FDI*. (Master's degree), Chulalongkorn University, Thailand.
- [40] Shahmoradi, B.andBaghbanyan,M. (2011). Determinants of Foreign Direct Investment in Developing Countries: A Panel Data Analysis,*Asian Economic and Financial Review*, 1(2), 49-56.
- [41] Tomiura, E. (2003).The impact of import competition on Japanese manufacturing employment,*Journal of the Japanese and International Economies*, 17(2): 118-133
- [42] Wee, K. H. (2007). Outward Foreign Direct Investment by Enterprises from Thailand.*Transnational Corporations*, 16(1), 89-116.
- [43] Zhang, K. (2001). Does Foreign Direct Investment Promote Economic Growth? Evidence from East Asia and Latin America.*Contemporary Economic Policy*, 19(2), 175-185.

**Appendix****Appendix A: Variable descriptions of Thailand's outward FDI**

<b>Symbol</b>	<b>Determinants</b>	<b>Measures</b>	<b>Expected Effect</b>	<b>Data Source</b>
LOFDI	Outward FDI	Annual outflow from Thailand to five FDI partner countries		Bank of Thailand (BOT)
LRGDP	Relative GDP	Relative GDP between host country and Thailand	Positive	Trading Economics (2015)
LtOPEN	Thailand's Openness	Ratio of Thailand's exports plus imports to GDP	Positive	Trading Economics (2015), World Bank
LRWage	Relative wage rate	Relative wages between host country and Thailand (hourly compensation cost in US dollars)	Negative	The Conference Board, International Labor Comparisons program (December 2014)
LREX	Relative Exchange rate	Relative exchange rate between host country and Thailand	Negative	Trading Economics (2015)
LDIST	Geographical Distance	Natural logarithm of spatial distance between the capitals of host country and Thailand	Negative	CEPTII
LRD	Relative R&D Intensity	Relative R&D expenditures between host country and Thailand	Positive	World Bank
TBA	Bilateral Trade Agreement	Number of bilateral agreements signed by Thailand	Positive	UNCTAD
PR	Political Risk	Political Risks in Thailand (2004, 2009, 2013-2014)	Negative	
D0814	World Financial Crisis	Subprime Mortgage and Financial Tsunami 2008-2014,	Negative	

Source: This study