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eterminants of Foreign Direct Investment in ASEAN

ปัจจัยที่กำหนดการลงทุนโดยตรงจากต่างประเทศ
ในกลุ่มอาเซียน

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บทคัดย่อ

งานวิจัยนี้ศึกษาถึงปัจจัยที่กำหนดการลงทุนโดยตรงจากต่างประเทศของกลุ่มอาเซียน โดยใช้ข้อมูลตัดขวางในปี 2546 การประมาณแบบจำลองจะใช้วิธี Generalized Least Square เพื่อที่จะขจัดปัญหา Heteroscedasticity ผลการศึกษาพบว่าการลงทุนโดยตรงจากต่างประเทศในกลุ่มอาเซียน ถูกกำหนดโดยขนาดการเปิดประเทศ ความแตกต่างระหว่างอัตราค่าจ้างในภาคอุตสาหกรรม และความเสียงของประเทศ นอกจากนี้ผลการศึกษายังชี้ให้เห็นว่าการลงทุนโดยตรงจากต่างประเทศจะเข้ามาในประเทศที่มีผลผลิตส่วนเพิ่มของแรงงานที่สูงกว่า

คำสำคัญ: การลงทุนโดยตรงระหว่างประเทศ กลุ่มอาเซียน

Abstract

This research investigates the determinants of foreign direct investment in ASEAN using cross sectional data in 2003. The model is estimated by generalized least square to correct heteroscedasticity. The results show that foreign direct investments in ASEAN

are determined by openness to trade, wages difference in the manufacturing sector, and country risk. Furthermore, it indicates that foreign direct investment comes to countries that have higher marginal product of labor.

Keywords: Foreign Direct Investment, ASEAN

Introduction

Foreign Direct Investment (FDI) is contemplated as an important factor that might improve production technology, employment, capital, and economic growth for receiving countries. ASEAN such as Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam are good examples of those improvements. The inward FDI between 1995 and 2003 to these countries are 205,490 millions of dollars or 94% of the total inward FDI to ASEAN countries. The important sources of the inward FDI in this period are United States, Japan, United Kingdom, Germany, France, Netherlands, China, South Korea, Hong Kong and Australia. They invested 128,840.64 millions of dollars or 59% of the total inward FDI (ASEAN Statistical Yearbook, 2004: 139).

These benefits from inward FDI result in competition on demands for FDI of developing countries and a large number of researches on determinants of inward FDI to both a specific country (Fedderke and Romm, 2006: 738-760;

Gao, 2003: 611-629; Giuliatti, Mccorriston, and Osborne, 2004: 653-663; Hatzuis, 2000: 117-148; Wei, 2005: 719-736; Yang, Groenewold, and Tcha, 2000: 45-54) and countries or a region (Filippaios, Papanastassiou, and Pearce, 2003: 738-760; Gao, 2005: 29-35; Janicki and Wunnava, 2004: 505-509; Lall, Norman, and Featherstone, 2003: 1485-1496; Resmini, 2000: 665-689; Yeaple, 2003: 726-734).

In this paper, the determinants of inward FDI to six countries in ASEAN, which are Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam are examined. Ten sources of FDI studied here are United States, Japan, the United Kingdom, Germany, France, Netherlands, Australia, South Korea, Hong Kong, and China. This would help these countries to devise policies that induce FDI from the source countries.

We present the theoretical framework of FDI determinants in Section II. Section III is data used in this paper. Section IV and V discuss on results and conclusion, respectively.

Theoretical Framework and Model

Two theories attempting to explain the determinants of FDI are the vertical models and horizontal models of multinational firms' location. The vertical models were proposed by Helpman (1984: 451-471). In these models, firms locate each stage of production to take advantage of the differences in factor prices, with the production facility producing for both the domestic market and the source country market. This implies that FDI have been observed between countries with sufficiently different factor endowments, or no FDI have been observed between countries with similar endowments.

The horizontal models were proposed by Markusen (1984: 205-226) and Horstmann and Markusen (1992: 109-129). The concept of these model is that the strength of the market access motive for FDI should vary with country industry pair characteristics such as transportation costs, tariffs, and plant- and corporate-scale economies. In the absence of trade costs, there would be no reason for multinational production, since firms could concentrate their production in the home country, taking advantage of economies of scale and serving the foreign market through trade. As trade cost increases, multinational production arises as long as plant-level economies of scale are not too high.

According to the two models; therefore, it is extensively adopted of the receiving countries characteristics: openness to trade, market size, labor costs, and country risk, as explanatory variables on *FDI* determinants (Janicki and Wunnava, 2004: 505-509; Resmini, 2000: 665-689; Yeaple, 2003: 726-734). In this paper, we use the share of import to GDP (*IMP*) as a measurement of openness to trade; market size has been measured by GDP per capita (*GDPPC*); wages difference in manufacturing sector measured in absolute value between a source country and a receiving country (*WD*) has been used to capture the effect of labor costs; credit risk index (*RISK*) has been used as a proxy of country risk.

We expect that *FDI* is positive relationship to *IMP*, *GDPPC*, and *WD* and is negative relationship to *RISK*. The following model is used in this study:

$$FDI_{ij} = \beta_0 + \beta_1 GDPPC_j + \beta_2 IMP_{ij} + \beta_3 WD_{ij} + \beta_4 RISK_j + \varepsilon_{ij}$$

where the subscripts *i* and *j* are the source and receiving countries, respectively.

Data

The cross sectional data in 2003 are used in this study. The bilateral FDI from the source countries to the receiving countries are obtained from ASEAN Statistical Yearbook. Data on

$GDPPC_j$ are GDP per capita also obtained from ASEAN Statistical Yearbook. The data source of wages to calculate the WD_{ij} ¹ is the World Development Indicators which is published by World Banks, and the source of $Risk_j$ is the Country Risk Classification published by OECD.

Results

Table 1 represents the parameter estimates using the Ordinary Least Square (OLS) method. We found that only the parameter of *IMP* is significant at a 0.01 level, while the other parameters are insignificant. The variation of FDI in ASEAN countries can be explained by the variation of these independent variables by 37.31%.

However, we found that the regression shows the heteroscedasticity problem. This can be seen in Table 2 which shows the white heteroscedasticity test, the chi-square value and its probability are 37.8720 and 0.0005, respectively. Hence, we reject the hypothesis of no heteroscedasticity in the model.

This study use the Generalized Least Square (GLS) method to correct the heteroscedasticity problem. The GLS estimators can be obtained by the following formula:

$$\hat{\beta}_{GLS} = (X' \hat{V}^{-1} X)^{-1} (X' \hat{V}^{-1} Y)$$

where X is the matrix of independent variable including the constant term, Y is the vector of dependent variable, \hat{V} is the matrix of estimated variance of the OLS residuals. The covariance matrix of the $\hat{\beta}_{GLS}$ is $(X' \hat{V}^{-1} X)^{-1}$.

Table 3 represents the parameter estimate using the GLS method. The results show that the parameter estimates of *IMP* and *RISK* correspond to expected relationships, while the parameter estimates of *GDPPC* and *WD* do not correspond to the hypotheses. The parameter estimate of *IMP* is 42.7945 and significant at a 0.01 level. This means that the *FDI* in ASEAN would increase 42.7945 millions of dollar when the percentage share of import value to *GDP* rises 1%. The coefficient of *GDPPC* is -0.0018 which means that the *FDI* in ASEAN would decrease 0.0018 millions of dollar in respond to 1 dollar rising in income per capita; however, this relationship is insignificant. *FDI* in ASEAN negatively responds to wages difference in the manufacturing sector between source and receiving country and is significant at a 0.10 level. Its coefficient is -0.0005, and this implies that when the wages difference rises 1 dollar, inward FDI to ASEAN would decrease 0.0005 millions of dollar.

¹ The latest updated of this data in World Development Indicators 2006 is the average of 1995-1999.

Moreover, we found that a unit increase in credit risk index would decrease inward *FDI* by 28.7681 millions of dollar at 99% confidence interval.

Table 1 The Estimate Parameters Using OLS Method

Variables	Coefficient
Constant	21.7810 (0.0859)
<i>IMP</i>	43.0202 (3.7616)***
<i>GDPPC</i>	0.0138 (1.1156)
<i>WD</i>	-0.0008 (-0.1675)
<i>RISK</i>	-22.6928 (-0.4571)
<i>Adjusted R²</i>	0.3731

t-values are in parenthesis.

*, **, and *** denote significant levels at 0.01, 0.05, and 0.10, respectively.

Table 2 White Heteroscedasticity Test

White Heteroskedasticity Test:

Obs*R-squared	37.87200	Probability	0.000544
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Test Equation:

Dependent Variable: RESID²

Sample: 1 60

Included observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	26010890	1.99E+08	0.130925	0.8964
IMP	-127858.4	61813.94	-2.068440	0.0444
IMP ²	11203.21	2397.528	4.672818	0.0000
IMP*GDPPC	-2.414126	2.134229	-1.131147	0.2640
IMP*WD	-2.055076	1.215783	-1.690332	0.0979
IMP*RISK	16834.50	8948.945	1.881171	0.0664
GDPPC	-4202.276	32744.32	-0.128336	0.8985
GDPPC ²	0.137690	1.075602	0.128012	0.8987
GDPPC*WD	0.004291	0.001255	3.418039	0.0013
GDPPC*RISK	778.2398	6208.840	0.125344	0.9008
WD	-38.56728	22.98524	-1.677915	0.1003
WD ²	0.000193	0.000410	0.472179	0.6391
WD*RISK	6.450594	3.098768	2.081664	0.0431
RISK	-10800129	84283003	-0.128141	0.8986
RISK ²	1127231.	8932545.	0.126194	0.9001
R-squared	0.631200	Mean dependent var	111846.2	
Adjusted R-squared	0.516462	S.D. dependent var	290978.4	
S.E. of regression	202337.3	Akaike info criterion	27.48558	
Sum squared resid	1.84E+12	Schwarz criterion	28.00916	
Log likelihood	-809.5673	F-statistic	5.501239	
Durbin-Watson stat	2.584882	Prob (F-statistic)	0.000006	

Table 3 The Estimate Parameters Using GLS Method

Variables	Coefficient
Constant	65.7940 (2.2572)***
<i>IMP</i>	42.7945 (44.4467)***
<i>GDPPC</i>	-0.0018 (-0.2942)
<i>WD</i>	-0.0005 (-1.7271)*
<i>RISK</i>	-28.7681 (-6.4472)***
<i>Adjusted R²</i>	0.3378

t-values are in parenthesis.

*, **, and *** denote significant levels at 0.01, 0.05, and 0.10, respectively.

Conclusion and Suggestion

This paper investigates the determinants of FDI in ASEAN using cross sectional data in 2003. The GLS method is adopted to solve the heteroscedasticity problem. We found that the parameter estimates of *IMP* and *RISK* correspond to the hypotheses, the parameter estimates of *GDPPC* and *WD* do not correspond to the hypotheses. However, the relationship between FDI and *GDPPC* is insignificant.

These results imply that openness to trade and country risk are the most important determinants of FDI in ASEAN, since the parameter estimates are large, 42.7945 and

-28.7681, respectively. Hence, a government in ASEAN should design policies that enhance international trade and confidence to foreign investors to induce more inward FDI.

The possible reasons of insignificant relationship between market size and FDI are that producers from source countries do not expect to sell their products in ASEAN and may need ASEAN to be only bases of production and export them to other countries.

The relationship between the wages difference in the manufacturing sector and FDI is negative which does not respond to the hypothesis. This implies that foreign investors prefer to invest in countries that have high

marginal product of labor, since a country that has higher in marginal product of labor would have higher in its wage rate. A government in ASEAN should develop skills of its workers to induce FDI.

The size of investors might affect the inward FDI; therefore, future research might add a dummy variable in the model to explain the effect of investors' size. Moreover, GDP might be examined instead of GDPPC.

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