Empirical Analysis of the Determinants of FDI in Thailand

A Case Study of FDI from Singapore

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Supervisor : Xiang Lin (PhD in Economics)
The thesis analyzes the determinants of Singaporean foreign direct investment in Thailand during the years 1981-2009, taking into account the relevant previous studies. The research comprises of analyzing the patterns of Singapore’s OFDI to Thailand, literature reviews of theories and empirical studies of Singaporean OFDI in general, and also an econometric analysis of the determinants of Singapore’s total FDI in Thailand.

Singapore is the largest overseas investors in Thailand when compare to other countries in ASEAN. More specifically, Singaporean investors make the decision to invest abroad, in this case is Thailand, base on home country factors and host country factors. In terms of home country factors, Singaporean FDI in Thailand is caused by the limited Singapore’s domestic market and also rapid changing in the comparative advantages of Singapore. While, for host country factors, the econometric approach is utilized to observe in this study.

In form of econometric analysis, the two regression models with time series data between the years 1981 and 2009 are employed to analyze. To be exact, in the first regression model, the Singaporean FDI in Thailand (RFDI) is treated as the dependent variable, while the growth rate of Thai domestic market (GRGDP), the Thai real wage rate (RWAGE), the relative price of Thailand and Singapore (PTS), the nominal relative exchange rate (EXR) and the dummy variable of the Asian crisis (AC) are treated as dependent variables. While, in the second model, RFDI is also the dependent variable but PTS and EXR are combined to be the real relative exchange rate of Thailand and Singapore or RER (PTS*EXR).

However, in order to reach the conclusion of observing the determinants of Singaporean FDI in Thailand, OLS technique is utilized in two regression models. The OLS results present that GRGDP, PTS and RER have an influence on RFDI. Further, the long run relationship between the variables is also observed in this study by using the Johansen cointegration test. The results of the test indicate that there are cointegrating equations or the long-run relationships among the variables in model 1 and model 2. Apart from that, the Error Correction Mechanism (ECM) is also employed with the purpose of illustrating that when RFDI of two models deviate from their long-run equilibrium, an adjustment to pull the actual
RFDI to the long-run equilibrium will take place. However, empirical evidences present that the speed of adjustment is rather rapid in both of models.
ACKNOWLEDGEMENTS

I would like to express my sincere appreciation to those who contributed in one way or another to the process of having this paper written.

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Thanks are due to my friends who made this experience wonderful. I am so grateful to them Alongkorn, Piyayuth and Napatsanun. They always provided me a lot of suggestions on my paper.

My special thanks also go to my family, particularly my beloved father for who always support for my success. Their love and always proved a key source of motivation in all step of my life.

Rattiya Ratiphokhin
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADF</td>
<td>Augmented Dickey-Fuller (test)</td>
</tr>
<tr>
<td>AEG</td>
<td>Augmented Engle-Granger (test)</td>
</tr>
<tr>
<td>AIC</td>
<td>Akaike Information Criteria</td>
</tr>
<tr>
<td>ASEAN</td>
<td>Association of Southeast Asian Countries</td>
</tr>
<tr>
<td>BOI</td>
<td>Board of Investment (Thailand)</td>
</tr>
<tr>
<td>BOT</td>
<td>Bank of Thailand</td>
</tr>
<tr>
<td>DSP</td>
<td>Different-Stationary Process</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>ECM</td>
<td>Error Correction Mechanism (test)</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GNP</td>
<td>Gross National Product</td>
</tr>
<tr>
<td>IFDI</td>
<td>Inward Foreign Direct Investment</td>
</tr>
<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>LR</td>
<td>Likelihood Ratio Statistic</td>
</tr>
<tr>
<td>MNE</td>
<td>Multinational Enterprise</td>
</tr>
<tr>
<td>NESDB</td>
<td>National Economic and Social Development Board</td>
</tr>
<tr>
<td>NIE</td>
<td>Newly Industrializing Economy</td>
</tr>
<tr>
<td>OFDI</td>
<td>Outward Foreign Direct Investment</td>
</tr>
<tr>
<td>OLS</td>
<td>Ordinary Least Square Method</td>
</tr>
<tr>
<td>PP</td>
<td>Phillips-Perron (test)</td>
</tr>
<tr>
<td>UECM</td>
<td>Unrestricted Error Correction (test)</td>
</tr>
<tr>
<td>UNTAD</td>
<td>United Nations Conference on Trade and Development</td>
</tr>
<tr>
<td>WTO</td>
<td>World Trade Organization</td>
</tr>
</tbody>
</table>
CHAPTER 1
INTRODUCTION

Foreign Direct Investment (FDI) is “the process whereby residents of the source country obtain ownership of assets for the purpose of controlling the production, distribution and other activities of a firm in the host country. It also involves the transfer of financial capital, technology and other skills such as managerial, marketing and accounting”, etc (Moosa, 2002, p.1 and Imad A.M 2002, p.1).

However, the general definition of FDI, as stated by the World Bank (2000, p.337), is the net inflow of investment with the objective of acquiring a long-term management interest (i.e. minimum 10 percent of ordinary shares or voting power) in an operating enterprise located in a non-resident country of the direct investor. Nonetheless, it should be noted that some countries also consider data which includes direct investors in possession of less than 10 percent of ordinary shares, although it is not recommended by international standards (IMF, 2003, p.23-24).

In addition, Frankel and Romer stated that “FDI is often seen as one of the important catalysts for economic growth in the developing countries” (Frankel & Romer, 1999, p795). To explain it more, FDI is acting as an important vehicle for developed countries to transfer technology to developing nations. Further, FDI also encourages investment of domestic firms so as to compare with overseas investors and improve human capital in the host countries. And, in comparing with other capital inflows of a nation, FDI is expected to have the stronger effects on economic growth of a country as FDI provides “more than just capital”. To be precise, FDI offers access to internationally available technologies and management know-how and may render it easier to penetrate world markets (Nunnenkamp, 2001, p.27).

1.1 Background and Significance

In terms of economic growth and development countries, Thailand is classified into one of developing economy nations. It is newly industrialized and can be denoted as the fastest growing economies in the world like China, India, Malaysia, Turkey and so on. However, Thailand’s economic growth average was 7.5 percent per year in the divide into four parts of
century that preceded the financial crisis in the year 1997. After this year, Thailand output dropped dramatically and did not recuperate to its 1996 level until the year 2002. To explain it more, between the years 1996 to 2002, Thailand’s economic growth average was only 1.5 percent per year. Since then, Thailand economy had been growing at an average of 4.7 percent until the year 2006.

Figure 1.1: Thailand’s yearly economic growth average rate between the years 1952 and 2005

![Figure 1.1: Thailand’s yearly economic growth average rate between the years 1952 and 2005](image)

Source: National Economic and Social Development Board (NESDB).

As it is broadly agreed, FDI is the main driving force behind Thailand economic growth. Thailand was flourishing in attraction a high proportion of investment flows which come into Southeast Asia (Udomsaph, 2002). The vital nations that invest in Thailand are Japan, followed by the United States, Hong Kong, EU and Singapore. However, Thai economy has obtained the positive benefits from FDI. It has created not only enhancing economic growth and a spillover of effectiveness but also transferability of new technology which everyone accepts that it is very important for production process in Thailand.

However, to explain it more, in form of the amount of FDI in Thailand, over the years 1975 to 1987, the level of FDI inflows in Thailand was moderately low. Its annual average rate was only 0.6 percent to GDP, Thailand’s economic crisis in the year 1984 was the main inducement of low rate of FDI at that time. Afterward the years 1988 to 1996, Thailand’s FDI had tended to increase continuously. Not only the more stabilization of Thai economy and currency (Baht) but also the Plaza Accord Agreement in the year 1985 which made the FDI
rate had risen up. Its annual average rate between the years 1988 and 1996 was 1.8 percent to GDP.

Nevertheless, the years 1997 to 2000, the rate of FDI inflows in Thailand was still being high. Its annual average rate was 4.1 percent to GDP. Moreover, in the year 1998, it was the time that Thailand’s FDI reached to the highest point (6.7 percent to GDP). Increasing in stock capital for subsidiary companies which had to face the problems after the crisis (1997) as well as devaluation in Thai currency were the main causes of lofty inward of FDI. Furthermore, after the crisis, the Thai government has been trying to recover overseas investors’ confidence by providing them a large number of incentives via the policies.

After the year 2000, in order to achieve the objective of attracting FDI is not effortless for Thailand. Thai administrators are concerned that China and Vietnam have developed into the major investment attractions in Asia. To be precise, China joined the World Trade Organization (WTO) and Vietnam has been denoted as the country which its labor force is the cheapest in Southeast Asia (Sangiam, 2006). Apart from these reasons, the September 11, 2001 attacked on the U.S., the war in Iraq and SARS were also the causes of declining in Thailand’s FDI especially in the year 2002.

Consequently, over the years, the Thai government has tried to encourage FDI in Thailand through different policy reforms. In addition, Thailand has several advantages over other nations in Southeast Asia. Those are greater in natural resources, a larger domestic market, and a lower cost of labor and also trade barriers. By doing this, Thailand is still being the country where FDI rate has been in high level.

**Table 1.1: Thailand’s Net Flow of Foreign Direct Investment Classified by Country**

(Unit: Millions of US Dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Japan</th>
<th>United States of America</th>
<th>EU</th>
<th>Singapore</th>
<th>Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>21.18</td>
<td>40.95</td>
<td>9.61</td>
<td>2.66</td>
<td>12.84</td>
<td>87.24</td>
</tr>
<tr>
<td>1976</td>
<td>21.21</td>
<td>22.25</td>
<td>16.13</td>
<td>15.44</td>
<td>5.67</td>
<td>80.70</td>
</tr>
<tr>
<td>1978</td>
<td>33.81</td>
<td>30.73</td>
<td>11.43</td>
<td>0.73</td>
<td>-20.83</td>
<td>55.87</td>
</tr>
<tr>
<td>1979</td>
<td>12.05</td>
<td>11.10</td>
<td>16.40</td>
<td>-1.19</td>
<td>16.93</td>
<td>55.29</td>
</tr>
<tr>
<td>1980</td>
<td>44.06</td>
<td>35.72</td>
<td>26.65</td>
<td>13.32</td>
<td>69.25</td>
<td>189.00</td>
</tr>
<tr>
<td>1981</td>
<td>63.51</td>
<td>108.10</td>
<td>35.55</td>
<td>45.62</td>
<td>36.22</td>
<td>289.00</td>
</tr>
<tr>
<td>1982</td>
<td>45.07</td>
<td>37.25</td>
<td>67.52</td>
<td>-17.08</td>
<td>55.28</td>
<td>188.04</td>
</tr>
<tr>
<td>1983</td>
<td>105.62</td>
<td>54.96</td>
<td>91.94</td>
<td>23.39</td>
<td>80.09</td>
<td>356.00</td>
</tr>
<tr>
<td>Year</td>
<td>Japan</td>
<td>United States of America</td>
<td>EU</td>
<td>Singapore</td>
<td>Others</td>
<td>Total</td>
</tr>
<tr>
<td>------</td>
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<td>----------------------------</td>
<td>----</td>
<td>-----------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>1984</td>
<td>110.18</td>
<td>158.51</td>
<td>20.19</td>
<td>48.44</td>
<td>74.68</td>
<td>412.00</td>
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<tr>
<td>1985</td>
<td>56.19</td>
<td>87.13</td>
<td>17.42</td>
<td>-42.43</td>
<td>41.69</td>
<td>160.00</td>
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<tr>
<td>1986</td>
<td>115.60</td>
<td>49.05</td>
<td>22.51</td>
<td>15.30</td>
<td>59.54</td>
<td>262.00</td>
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<tr>
<td>1987</td>
<td>128.09</td>
<td>70.94</td>
<td>38.52</td>
<td>21.09</td>
<td>95.36</td>
<td>354.00</td>
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<tr>
<td>1988</td>
<td>577.54</td>
<td>125.88</td>
<td>90.68</td>
<td>62.29</td>
<td>249.61</td>
<td>1,106.00</td>
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<tr>
<td>1989</td>
<td>730.89</td>
<td>203.22</td>
<td>158.96</td>
<td>104.88</td>
<td>582.05</td>
<td>1,780.00</td>
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<tr>
<td>1990</td>
<td>1,096.01</td>
<td>241.47</td>
<td>173.49</td>
<td>242.82</td>
<td>788.21</td>
<td>2,542.00</td>
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<tr>
<td>1991</td>
<td>615.15</td>
<td>233.24</td>
<td>166.26</td>
<td>260.29</td>
<td>758.07</td>
<td>2,033.01</td>
</tr>
<tr>
<td>1992</td>
<td>344.05</td>
<td>466.65</td>
<td>288.50</td>
<td>283.01</td>
<td>768.79</td>
<td>2,151.00</td>
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<tr>
<td>1993</td>
<td>305.67</td>
<td>286.02</td>
<td>243.25</td>
<td>61.10</td>
<td>835.96</td>
<td>1,732.00</td>
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<td>1994</td>
<td>123.39</td>
<td>155.87</td>
<td>121.61</td>
<td>184.48</td>
<td>758.07</td>
<td>1,325.00</td>
</tr>
<tr>
<td>1995</td>
<td>556.46</td>
<td>259.95</td>
<td>179.94</td>
<td>136.37</td>
<td>871.18</td>
<td>2,003.90</td>
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<tr>
<td>1996</td>
<td>523.49</td>
<td>429.45</td>
<td>168.16</td>
<td>275.32</td>
<td>874.19</td>
<td>2,270.61</td>
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<tr>
<td>1997</td>
<td>1,348.02</td>
<td>780.73</td>
<td>360.04</td>
<td>270.68</td>
<td>867.32</td>
<td>3,626.79</td>
</tr>
<tr>
<td>1998</td>
<td>1,484.69</td>
<td>1,283.31</td>
<td>912.30</td>
<td>541.97</td>
<td>919.91</td>
<td>5,142.18</td>
</tr>
<tr>
<td>1999</td>
<td>488.35</td>
<td>641.22</td>
<td>1,368.46</td>
<td>538.10</td>
<td>525.62</td>
<td>3,561.75</td>
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<tr>
<td>2000</td>
<td>869.86</td>
<td>617.57</td>
<td>509.59</td>
<td>355.68</td>
<td>460.55</td>
<td>2,813.25</td>
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<td>2001</td>
<td>1,955.12</td>
<td>395.01</td>
<td>282.91</td>
<td>1,693.59</td>
<td>721.37</td>
<td>5,048.00</td>
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<tr>
<td>2002</td>
<td>1,892.41</td>
<td>182.34</td>
<td>-216.12</td>
<td>1,428.95</td>
<td>123.42</td>
<td>3,411.00</td>
</tr>
<tr>
<td>2003</td>
<td>2,297.67</td>
<td>336.23</td>
<td>607.55</td>
<td>1,000.38</td>
<td>923.17</td>
<td>5,165.00</td>
</tr>
<tr>
<td>2004</td>
<td>2,749.93</td>
<td>540.42</td>
<td>697.31</td>
<td>345.12</td>
<td>623.22</td>
<td>4,956.00</td>
</tr>
<tr>
<td>2005</td>
<td>2,926.51</td>
<td>750.48</td>
<td>335.02</td>
<td>1,068.74</td>
<td>1,422.41</td>
<td>6,503.16</td>
</tr>
<tr>
<td>2006</td>
<td>2,576.42</td>
<td>165.78</td>
<td>955.41</td>
<td>4,279.94</td>
<td>2,502.19</td>
<td>10,479.74</td>
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<tr>
<td>2007</td>
<td>3,154.84</td>
<td>623.92</td>
<td>1,671.61</td>
<td>2,447.66</td>
<td>2,374.63</td>
<td>10,272.66</td>
</tr>
<tr>
<td>2008</td>
<td>2,002.90</td>
<td>-214.50</td>
<td>301.34</td>
<td>210.29</td>
<td>5,242.68</td>
<td>7,542.71</td>
</tr>
<tr>
<td>2009</td>
<td>2,713.61</td>
<td>-339.37</td>
<td>980.05</td>
<td>575.71</td>
<td>564.89</td>
<td>4,494.89</td>
</tr>
</tbody>
</table>

Source: Bank of Thailand (BOT)

Remarks: 1/ The table cover investment in non-bank sector only.
2/ Direct Investment = Equity Investment plus loans from related companies.

Since 2001, 'Reinvested earnings' has been incorporated into direct investment as well.

From table 1.1 above, it can be clearly see that Japan had been the country which had the highest Outward Foreign Direct Investment (OFDI) in Thailand, followed by the United States, EU and Singapore. As a result, many previous studies are belonging to the field of determinants of Japanese FDI in Thailand. However, most of studies reached the conclusion that Thailand’s large domestic market size is the most vital factor that attracts Japanese FDI in Thailand. While the other factors such as Exchange Rate and Wage Rate were also employed to analyze but be different in each study.

Surprisingly, Singapore which is the smallest country among others nations and it is one of the Association of Southeast Asian countries (ASEAN) which had the highest rate of OFDI in
Thailand. To make it clear, let’s observe the table and figure which illustrate the proportion of Thailand FDI inflows among ASEAN countries, below

**Table 1.2:** ASEAN countries which are the main investors in Thailand Classified by Projects in the Year 2009

<table>
<thead>
<tr>
<th>Rank</th>
<th>Number of Projects</th>
<th>Value of Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Country</td>
<td>Number</td>
</tr>
<tr>
<td>1</td>
<td>Singapore</td>
<td>31</td>
</tr>
<tr>
<td>2</td>
<td>Malaysia</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>Indonesia</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Burma</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Philippines</td>
<td>1</td>
</tr>
</tbody>
</table>

*Source: The Board of Investment of Thailand (BOI)*

**Figure 1.2:** ASEAN countries which are the main investors in Thailand by percentage in the Year 2009

![Pie chart showing the percentage of ASEAN countries' investments in Thailand.](chart)

*Source: The Board of Investment of Thailand (BOI)*

However, when we observe deeply in Singapore Foreign Direct Investment in Thailand, it can be classified by size, and also value of investment projects as table 1.3

**Table 1.3:** Singaporean Investment Projects in Thailand (approved by the Board of Investment of Thailand) between the years 2006-2009

<table>
<thead>
<tr>
<th>Year</th>
<th>Small-sized Enterprises</th>
<th>Medium-sized Enterprises</th>
<th>Large-sized Enterprises</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Projected Approved</td>
<td>Value (millions Baht)</td>
<td>Projected Approved</td>
</tr>
<tr>
<td>2006</td>
<td>32</td>
<td>1,087.4</td>
<td>21</td>
</tr>
<tr>
<td>2007</td>
<td>40</td>
<td>1,300.6</td>
<td>28</td>
</tr>
<tr>
<td>2008</td>
<td>39</td>
<td>1,013.5</td>
<td>19</td>
</tr>
<tr>
<td>2009</td>
<td>34</td>
<td>907.1</td>
<td>10</td>
</tr>
</tbody>
</table>

*Source: The Board of Investment of Thailand (BOI)*
From illustrations above, it can say that *Direct Investment* from Singapore in Thailand plays the most important role when compare to other ASEAN countries. But, only few of previous studies had been observed the factors which have an influence on Singaporean investors’ decisions to invest in Thailand. Besides, Singapore is referred as a prosperous city-state economy and also some of Singaporean MNEs have evolved to the main players in the world economy over the period. As a result, according to these reasons, I am going to observe deeply in trend and determinants of Singaporean FDI in Thailand in this research.

1.2 Objectives of the Study

The overall purposes of this study are to observe the determinants of Singapore’s FDI in Thailand over the years 1981 to 2009 and answer the thesis hypotheses. While, the specific objectives are

- To review economic theories as well as previous studies of FDI so as to generate the empirical models to analyze the determinants of Singapore’s FDI in Thailand during the years 1981-2009.
- To estimate the empirical models of the determinants of Singapore’s FDI in Thailand between the years 1981 and 2009 by employing appropriate econometric approach.
- To observe the long-run relationship between all relevant variables as well as the adjustment of variable when it moves apart from its long-run equilibrium.

1.3 Methodology

- **Data Collection**

Quantitative approach has been applied during this study for the analysis of influencing factors on Singaporean FDI in Thailand. During this study, I relied on secondary data that is accessible in the form of official reports issued by international organizations, which are The World Bank and International Monetary Fund (IMF) as well as departments of the Thai government; those are Bank of Thailand (BOT) and The Board of Investment of Thailand (BOI).
• **Hypotheses Testing**

The following hypotheses will be tested:

1. \( H_0 \): The determinants of Singaporean FDI in Thailand get along with the eclectic theory of Dunning and Aliber’s currency area theory.
   
   \( H_1 \): The determinants of Singaporean FDI in Thailand do not get along with the eclectic theory of Dunning and Aliber’s currency area theory.

2. \( H_0 \): The most important determinant of Singaporean FDI is Thai domestic market which is the same as the most vital determinant of Japanese FDI in Thailand.
   
   \( H_1 \): The most important determinant of Singaporean FDI is not Thai domestic market.

With the intention of testing the hypotheses, quantitative approach will have been employed. Those are using Ordinary Least Square method (OLS) and factors analysis which are consist of the Growth rate of Thailand’s GDP (GRGDP), the Real Wage Rate of Thailand (RWAGE), the Exchange Rate factors (EXR, RER), the Relative Price Level (PTS) and the dummy variable of the Asian crisis (AC). In addition, this study also applies the Johansen cointegration test to analyze there is whether the long-run relationship between the variables. If the cointegrating relationship exists, ECM will be employed to analyze the adjustment of variable when it apart from its long term equilibrium.

**1.4 Research Structure**

The research comprises of five chapters. Chapter 1 indicates the introduction to topic, background of study, objectives and methodology of the research. In Chapter 2, it demonstrates theoretical framework and review of literatures regarding the entire topic for generating the empirical models. Chapter 3, it presented Singaporean OFDI structure as well as push factors of Singapore’s FDI in Thailand by employing descriptive approach. In Chapter 4, I put forward econometric analysis to observe the key determinants (pull factors) of Singaporean FDI in Thailand. In Chapter 5, conclusion and recommendation are defined on the basis of analysis. Lastly, in the end, References are referred to indicate the authenticity of the data and Appendices are also demonstrated.
Chapter 1: Introduction

Chapter 2: Theoretical Framework and Review of Literatures

Chapter 3: The Description of Singaporean OFDI

Chapter 4: Methodology and Empirical Results

Chapter 5: Conclusion and Recommendation

References and Appendices
CHAPTER 2

THEORETICAL FRAMEWORK AND REVIEW OF LITERATURES

To analyze what are the factors which are determinants of Singaporean FDI in Thailand, theoretical framework is required. In this chapter, it is divided into two parts. The first part is theoretical framework analysis. The second part is the review of some previous researches which are relevant.

2.1 Theoretical Framework Analysis

In order to review theories which appoint FDI, it can be categorized into two main sections. Those are mainstream theories of FDI and Aliber’s Currency Area Theory, as below.

2.1.1 Mainstream Theories of FDI

As Multinational Enterprise (MNE) has associated with international production, some mainstream theories of FDI had developed progressively from international trade theory. Those are Classical School International Trade Theory and Neo-classical School Theory.

Classical School International Trading Theory

- Absolute Advantage Theory

In 1776, Adam Smith, who is regarded as the father of modern economics, presented the idea of “Absolute Advantage”. Under this idea, all countries would gain concurrently if they accomplished free trade and concentrated on the concept of absolute advantage approach. That is a nation which is denoted as having an absolute advantage in the production has to use smaller amount of real resources to manufacture good and service when compare to the another country. Homogeneously, using the equal amount of factors of production, the nation can produce more product and service also.

Table 2.1: Productivity table as an example of absolute advantage theory

<table>
<thead>
<tr>
<th>Country</th>
<th>Computers</th>
<th>Clothes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Thailand</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>
From table 2.1, to show the concept of absolute advantage, if Singapore produces one clothes less, the frees up twelve units of labors can be utilized to produce four units more of computers which is the opportunity cost of one cloth production in Singapore. As a result, Singapore has now produced one cloth less and four units of computers more. If Singapore wants to consume clothes at the same amount as the past, it must import one unit of cloth from Thailand. In the other hand, to produce this cloth in Thailand, it is required eight units of labors which come from computers production sector. By doing this, two units of computers dropped in Thailand. The total amount of clothes in the world economy has been constant, while the total production of computers has gone up two units. These further units of computers indicate the probable gains from specialization if both of Singapore and Thailand concentrate on the concept of absolute advantage.

- **Comparative Advantage Theory**

In 1816, David Ricardo issued the law of “comparative advantage” to make adjustment to the “absolute advantage” idea of Adam Smith. Ricardo presented it is nonessential that to end up with more goods in the world economy, one nation has to be more productive in producing one good, while one nation has to be more productive in producing another. Although one country can manufacture both of goods at the lower cost than the other, total world output (both of goods) could be still risen if they concentrate on comparative advantage concept.

**Table 2.2: Productivity table as an example of comparative advantage theory**

<table>
<thead>
<tr>
<th>Country</th>
<th>Units of labor needed to produced one unit of output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Computers</td>
</tr>
<tr>
<td>Singapore</td>
<td>2</td>
</tr>
<tr>
<td>Thailand</td>
<td>10</td>
</tr>
</tbody>
</table>

From table 2.2, it is suitable for Singapore to produce computers, and Thailand to produce clothes. That is Singapore can attain one cloth at a cost of two labors by producing computer and then trading, rather than four units of labors if Singapore produces one cloth on its own. In the other hand, Thailand can obtain one computer at a cost of five units of labors by trading, rather than ten units of labors by producing computer by itself. Consequently, not only the total amount of computers but also clothes in the world
economy have increased. These further units of both goods illustrate the possible gains from specialization if both of Singapore and Thailand concentrate on the concept of comparative advantage.

However, Classical School Theory cannot be used to explain the causes of FDI in a straight line. Because of their assumptions those are labor is the only factor of production and labor cannot be moved between countries (Complete International Immobility of Factors of Production). But at least, these theories can indicate the relationship between trading and investment that it follows the concept of comparative advantage approach.

**Neo-classical School International Trading Theory**

- **The Heckscher-Ohlin Theory**

Eli Heckscher (1919) and Bertil Ohlin (1993) developed the international trade theory which its name is the Heckscher-Ohlin or Factor Endowment Theorem. That is each country has the difference in “Factor Endowment or Factor Abundance”. As a result, it leads to generate difference goods and services which is the cause of international trade between countries. However, to explain it more, a country will produce and export product which its production needs relatively great amounts of resource that the country is relatively well capable. In the other hand, the country will import goods which it has not the comparative advantage in producing or the goods which do not require the country’s abundant factor of production.

Nonetheless, the H-O theory assumes that, firstly, there are two factors of production those are labor and capital which cannot be moved between countries. Secondly, countries have the same technology that means their production functions are similar. Moreover, countries also have identical aggregate preferences and the difference in countries’ factor abundant is the only thing which is varying across countries.

Afterwards, the H-O theory has been criticized that its assumptions abstracted from reality. In order to accurate the weakness of the H-O theory, the Neo-Factor and the Neo-Technology Theories were generated, below
• The Neo-Factor Theories

The Neo-Factor Theories not only increased further factors such as human capital and natural resources but also made adjustment in the convention H-O model assumptions that is the quality in inputs is different, particularly labor. Nevertheless, dissimilarity in human capital and natural resources in each country are factors which appoint “Location-Specific Endowments” or “Location Advantage”. Or it can be said that these factors have an influence on MNE’s location.

• The Neo-Technology Theories

The Neo-Technology Theories accepted the ideas of difference in firm’s production function (or difference in technologies) as well as imperfect competition in the market. It focused not only on the country’s factor abundant but also on the firm’s private proprietorship of assets which can indicate “Firm-Specific Advantage” or “Ownership Advantage”. To make it clear, there are some country’s specific advantages that all enterprises can utilize similarly. But some of them may be some firms’ specific advantages because managerial and technologies are different across firms.

However, Neoclassical School Theories are also not accepted widely to use to explain MNEs’ behavior. Afterwards, Stephen Hymer (1960) appended the “Theory of Industrial Organization” to analyze MNEs’ businesses. That is, according to Hymer, FDI is treated as such a firm which maintains to control over production outer its national boundaries. Or FDI’s process is an international expansion of industrial organization approach (Dunning and Rugman, 1985). To be precise, MNE is caused by “Market Imperfections”. It has the competence to remove competition for accomplishing monopolistic power. It takes advantage of benefits in country by using its knowledge advantages, credit advantages, and also economies of scale. MNE will transfer its intermediate assets such as technology across countries to reduce risks and take completely returns at the given certain skills. To be exact, MNEs must own unique advantage in order to prevail over the extra cost of investment in a foreign country, and also to offset the disadvantages which are caused by competition with local firms in the host country. However, regrettably, Hymer fails to refer the characteristic of transaction and his idea can not be used to explain why MNEs prefer FDI instead of exporting and licensing.
Subsequently, there was the progress upon the MNEs’ theory. Buckley and Casson (1976) analyzed the MNE’s structure based on the initiate work of Ronald Coase (1973). They presented a long-run theory that is “Internalization Theory” which focuses on the idea that firms desire to maintain their monopolistic powers because there are transaction cost and market imperfection (internalization process). To explain it more, imperfect competition is caused by imperfection in intermediate product market which includes knowledge, skills, human capital and so on. When this takes place across country boundaries, it leads to generation of MNEs. Nevertheless, because of imperfection in intermediate product market, firms will estimate the price of intermediate good difficultly which leads to high transaction cost. As a result, to reduce cost and enhance profit, enterprises decide to use administration rather than purchasing them in the market. However, internalization dose not refer to the reason of overseas investment of MNEs.

Until the late of 1970s, John Dunning presented the new theory by synthesizing several internalization theories. Its name is the “Eclectic Theory” or the “Eclectic Paradigm” which is denoted as the comprehensive one is successful to explain the MNEs’ entry mode structure and also addressable the question that why some MNEs decide to invest in foreign country rather than exporting and licensing.

However, as said by Dunning, an enterprise must own three advantageous conditions which consist of, firstly, Ownership specific advantages or Firm specific advantage. Secondly, Location advantages which are apprehensive about resources commitment, the existence and cost of factors of production. Lastly, Internalization advantages which support an enterprise to internalize operation rather than make use of markets in order to reduce transaction cost or cost of integration.

To be exact, ownership advantages (OA or FSA) is developed from Hymer’s idea of monopolistic advantages of firm. It is denoted as firm-specific capabilities (Dunning, 1988). That is when an enterprise enter to overseas market, it has to employ these advantages such as skills, knowledge and production technique to conquer the costs of operating. It can be said that assets which are possessed by firm can be utilized in production without decreasing in efficiency in any location.

Location advantages (LA or CSA), the differnce in location advantages among host countries is the key factor which influence on the MNEs’ investment decision. However, location
advantages or the country specific advantages (CSAs) depends on not only supply or cost factors but also demand or market factors. Let’s take for example

**Supply or Cost Factors**

- **Availability and Cost of Input**

According to the Location Theory, each country has different in factor endowment. As a result, cost of factors of production is also dissimilar among nations. However, it cannot be argue against the fact that foreign investors have to choose the country where they decide to invest base on the cost of production. Therefore, nation where has abundant resources, which leads to the lower cost of acquiring factor of production, usually be selected to be the host country of FDI. For example, investors in developed countries have to face the higher labor cost when compare to developing countries. As a result, some of them decide to invest in the country which has low wage rate in order to minimize the cost as well as maximize their profit.

- **Trade Barriers**

Trade policies in each host country have an influence on foreign investors’ decision. To be precise, they are the cause of overseas investors’ decide to either export or direct investment. For the example, if the government forms the various of trade barriers such as limited of quota for importing of product and high tariff rate, foregin investors will prefer to direct investment in the host country rather than export. Because the higher level of barriers of trade means the higher cost of exporting.

- **Government – Policies Factors**

Government policies in both of host and home countries are one of the determinants of FDI. In terms of the host nation, the government may generate the policies which be the incentive of foregin investors such as providing source of finance to overseas investors and tax privileges in order to reduce the cost of investment. In addition, policies which create political stability and infrastructures can also attract FDI because it leads to enchance the confidence in doing the business of foreign investors in the host nation.
**Demand or market factors**

- Marketing Factor

Marketing factor such as size and the growth rate of domestic market in the host country is denoted as the major determinants of FDI in a large number of previous researches. Because, the large size of domestic market leads to the economies of scale of production. However, market size can be measured by using Gross Domestic Product (GDP) or Gross National Product (GNP). The higher rate of GDP or GNP, the higher opportunity to make profit of overseas investors.

*Internalization Advantages* (IA), internalization will occur when external intermediate product markets’ functions are poor. Consequently, it leads to high level of transaction cost. To be precise, under this circumstance, firm will decide to transfer its specific advantages across countries within its organization in order to reduce the cost as well as increase its economic rent. (Dunning,1988). However, internalization advantages plays a vital role in high-technology firms which require high knowledge-base assets.
Figure 2.1: The development of the eclectic paradigm

Source: Suvinai Pornavalai, 2540, pp.125
2.1.2 Aliber’s Currency Area Theory (The Exchange Rate Risk Theory)

Aliber (1970, 1971) explained FDI’s behaviour in form of the relative strength of different currencies. The main idea of this theory is the firms in countries with stronger currencies tend to be sources of FDI, while countries with weaker currencies tend to be host nations. All of these, under this theory, firms which are the sources of FDI have an advantage over local firms in the capital markets. Because MNEs can capitalize “the same stream of earnings at a higher rate than host country firms” (L. Gordon, 1995). The difference rate in capitalization is caused by “a premium” which be required for offsetting the uncertainly of exchange rate. To explain it more, the firms from nation whose currency command a premium have an incentive to invest overseas. Because it can earn at a higher rate when compare to firms in host country. However, the crucial assumptions of this theory are there is a bias in capital market and the market prefer to occupy assets which have stronger currencies.

2.2 Literatures Review

2.2.1 Brief Review of Other Researches

A large number of previous studies have been conducted to focus on FDI; most of these researches are belong to the field of determinants which influence on FDI flows into developing countries and some of them focused on the host country’s competitiveness. For example, Schneider and Frey (1985), Shamsudden (1994), Ismail and Yussof (2003), Campos and Kinoshita (2003), Nonnemberg and Mendonca (2004), Chulerat Kongruang, Krist, Pornapa and Manop (BOT, 2009), and also Marson and Shahbudin (2010) etc.

- **Schneider and Frey (1985)**

In keeping with the study of Schneider and Frey, the econometric model was employed to observe the economic determinants of FDI for 54 LDCs in the years 1976, 1979 and 1980. The results presented that all explanation variables were significant. But, the independent variables which had the most influence on Net Foreign Direct Investment per Capita (PCFDI) were Real Capita per GNP (PCGNP), and also the Balance of Payments Deficit (DBOP). Nonetheless, there was the positive relationship between PCFDI and PCGNP. That is the higher level of PCGNP, the better of MNEs’ expectations that they are going to be profitable. As a result, it leads to the attraction of FDI inflows. In the other hand, the relationship between PCFDI and DBOP was in the negative direction. To be precise, the larger deficit in
BOP illustrates the more difficult in profit transfer of MNEs. Consequently, it is the obstacle of FDI inflows to host country inevitably.

In addition, Growth of Real GNP (GGNP), Inflation Rate (INFLATION), Wage (WAGE) and Skill of Labor (SKILL) were also being economic determinants of FDI. Those are both of GGNP and SKILL had the positive relationship with PCFDI. While, for INFLATION and WAGE, there were the negative relationship with PCFDI.

- **M. Shamsuddin (1994)**

Consistent with Shamsuddin’s study, LDCs attempted to exert a pull on FDI inflows. Because international flows, in form of direct investment, is denoted as the factor which is the main cause of economic growth. That is IFDI has leaded to transfer not only technology but also resources across nations. Therefore, host countries have to identify the main factors which are important determinants of FDI.

Shamsuddin scrutinized the determinants of FDI in point of economic approach by applying the econometric model which used cross-sectional data for 36 LDCs in the year 1983. The explanatory variables were categorized into three gathering. Those are market factors, cost factors and the investment climate.

Along with the econometric analysis, all explanatory variables were statistically significance. But, Per Capita GDP (PGDP) was the most vital variable in deciding Per Capita Foreign Direct Investment (PFDI). To be exact, the higher PGDP in host countries, the more attractive of FDI flows into them. However, other variables are also economic determinants of FDI. Those are Wage Rate per Day (WAGE), Per Capita Debt (PDEBT) and Per Capita Aid (PAID). These factors illustrated the negative signs with PFDI according to the result of regression, except PAID which had the opposite result.

- **Ismail and Yussof (2003)**

Through their study, it analyzed whether competitiveness of labor market had an influence on FDI inflows in ASEAN-3 economies which are Malaysia, Philippines and Thailand. These three nations have been moving to reach the position of newly industrialize countries. As a result, they have to depend on FDI as a vital source of finance for enhancing their technological potential.
However, the simple regression model with time series data on FDI flows between the years 1985 and 1999 was applied to analyze in this study. The model concentrated on variables which strongly linked to labor market issues, for instance cost of labor, skills and technological support. In addition, the country’s GDP, the R&D expenditure and the price of capital, which was measured by the interest rate, were also included in the model.

In the conclusion of the study, in case of concentration on Thailand, the manufacturing wage rate (WM) had insignificant coefficient. It can say that overseas investors did not recognize that rising in wage will be the cause of increasing in cost of production because wage rate still be relatively low in Thailand. Conversely, coefficient of labor force (LABOUR) was significant. That is the larger supply of labor, the more amount of main factor of production. Consequently, labor force had a positive impact on FDI. Further, for coefficient of Gross Domestic Product Level (GDP) which illustrates market capability was not significant. While, the degree of country’s openness of the economy was reverse. Lastly, for the interest rate, it had the negative direction with FDI. To be precise, if the rate of interest rises, it means the higher cost of firm’s production. Thus it is the obstacle of FDI inflows.

- **Campos and Kinoshita (2003)**

Based on their research, the econometric model with panel data analysis for 25 transition countries between the years 1990 and 1998 was employed. They argued whether institutions, factor endowments and agglomeration of economies impacted on FDI inflows across the region. Campos and Kinoshita reached the conclusion that FDI inflows among countries are determined by location advantages, macroeconomic policies and institutions. To be exact, in terms of location advantages, natural resources (NATRES) were the major determinants of FDI inflows especially for Commonwealth of Independent States (CIS) such as Azerbaijan, Kazakhstan, Uzbekistan and Russia. Apart from that, the coefficient of nominal wage rate (WAGEN) was also significant in negative sign with FDI that means FDI inflows were certainly attracted by the low wage of labor, which is widely denoted as the most important factor of production.

In terms of macroeconomics, the coefficient of real per capita GDP (RGDPCH), which indicated the size of domestic market, was insignificant in the GMM technique. However, for institutional factors, the coefficient of Rule of Law (RULELAW) was positive significant, while for Quantity of Bureaucracy (BUROQUAL) it was opposite. It illustrated that countries
with good legal system will draw FDI inflows. Conversely, countries with poor quality of bureaucracy will have the low rate of foreign direct investment.

• **Nonnemberg and Mendonca (2004)**

Purpose of their study was estimation the major factors which affect on FDI in developing countries. However, in term of theoretical literature, the OLI paradigm was applied to analyze. Whereas, in terms of econometrics, the model based on panel data was used in their study.

According to econometrics approach, it can be concluded that all independent variables were demonstrated to be significant. To be precise, Gross Domestic Product (LGDP), which indicates the size of economy, and the Level of Schooling (SCHOOL) were strong positively affect the FDI inflows (LFDI). Further, not only the degree of openness (OPENNESS) but also DOWJONES, which illustrates the growth of capital markets in developed countries, had the positive relationship with LFDI as well.

Conversely, RISK and Inflation (INFLATION), which is an indicator of macroeconomic stability, exhibited a negative relationship with LFDI. However, for INFLATION, it was significant only in large and complete sample of data.

• **Chuleerat Kongruang**

The purpose of Chuleerat’s study was to observe the determinants of foreign investment from developed countries, which are the United States, Japan and EU, to Thailand. She scrutinized that FDI from vary sources replied differently to economic determinants. Those are domestic market size, cost of production and exchange rate. However, the set of time series data between the years 1970 and 1996 was applied in econometrics approach. It reached the conclusion that, according to AEG test, there were long-run relationships between IFDI and all independent variables. To explain it more, market size, cost of production and exchange rate were important determinants of FDI from developed countries to Thailand. However, in terms of short-run relationships, the Error Correction model (ECM) was applied. The result which was obtained from the ECM was similar as the long-run outcomes.
• **Sangiam (2006)**

The main objective of Sangiam’s study was to examine the trends, patterns and determinants of Japan’s FDI to Thailand between the years 1970 to 2003. Moreover, she also analyzed the impact of Thailand’s policies on Japan’s FDI inflows and suggested the assistances to the Thai government to generate appropriate policies and strategies in order to attract more Japanese FDI in Thailand.

In Sangiam’s study, the three regression models with Thailand annual time series data, over the years 1997 to 2003, were employed. The first model used “total real foreign direct investment from Japan to Thailand (JTFDI)” as the dependent variable. While, real foreign direct investment from Japan to Thai manufacturing sector (JFDIM) and Thai services sector (JFDIS) were the dependent variables in the second model and the third model. But, in this study, only the model which JTFDI was treated as the dependent variable is considered.

Although all variables had not become stationary in the first different form, Sangiam decided to not give up estimating of the long-run effects. She prefers to comprise the variables in both the difference and level forms in the models. To be exact, Sangiam used the unrestricted error correction modeling procedure (UECM) for estimating the model. The UECM procedure minimizes the likelihood of reaching at spurious relationships while maintaining the long-run information.

However, Sangiam reached the conclusion that Japan’s total FDI to Thailand increases as the market size of Thailand expand. Conversely, it decreased as Thailand’s tariff rate and wage rise up.

• **Krist, Pornapa and Manop (BOT, 2009)**

This study is one of BOT discussion papers. It aimed to verify the trend of private investment which consisted of domestic investment and foreign investment. However, in terms of domestic investment, its proportion to GDP was smaller than consumption proportion. While, it is widely accepted that foreign investment is the major cause of Thailand economic growth, and also be the most vital source of capital flows in Thailand.

In order to make the conclusion, the data was employed to observe the determinants of private investment were in the form of quarterly time series data. It covered the period of
quarter 1, 1996 to quarter 2, 2008. However, along with the econometrics approach, it can be said that private investment in Thailand had been determined by not only economic factors but also institution factors.

- *Marson and Shahbudin (2010)*

Through Marson and Shahbudin study, in the past, FDI of Japanese tended to flow into the First Tier Newly Industrializing Economies (NIEs) such as Singapore and Hong Kong. But, after these NIEs had restructured their economies, FDI leaned to flow into Malaysia, Thailand and Indonesia which are denoted as the Second Tier NIEs.

Marson and Shahbudin would like to observe the long-run relationships among variables. The data which employed in their study were collected from World Development Indicators (World Bank, 2009) and IMF. It covered the years from 1980 to 2006 and concentrated on Malaysia and Thailand. However, along with the test for long-run relationships (the Cointegrating Vector), all coefficients of variables were statistically significant. But, GDP which indicated domestic market size played the most important role to determine FDI. It was followed by IFDI, labor cost and country’s openness level, respectively.

2.2.2 Comparison of Other Researches

Table 2.3 illustrates not only the difference but also the similarity of previous researches which are referred in this paper. However, each table comprises of five parts. Those are, firstly, the name of authors with the year of article and the dependent variable. Secondly, it is theoretical framework, followed by methodology and explanatory variables with expected signs in the third and the fourth columns. While, the final part, it indicates the conclusion of the previous studies.

Nevertheless, as said by review of researches, it can be clearly see that there are several studies which analyzed the determinants of FDI inflows to developing countries. Some of them were specific Thailand as the host nation. However, the OLI paradigm or the eclectic theory of Dunning was employed in the majority of studies.
Table 2.3: Previous researches which studied the determinants of FDI inflows to developing countries

<table>
<thead>
<tr>
<th>Author/ Year/ Dependent Variable</th>
<th>Theoretical Framework</th>
<th>Methodology</th>
<th>Explanatory Variables (+)/(-)</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schneider and Frey (1985)</td>
<td>Location Theory</td>
<td>Analyzed four models of multiple regression by the OLS estimation</td>
<td>PCGNP (+) GGNP (+) SKILL (+) DBOP (-) INFLATION (-) WAGE (-)</td>
<td>Both of political and economic factors were determinants of FDI flows into developing countries. But, in terms of economic factors, GNP per capita (PCGNP) was the most important determinant. It had the positive sign with FDI inflows. Followed by the Balance of Payment deficit (DBOP) which had the strongly significant negative direction with FDI</td>
</tr>
<tr>
<td>Abul F.M. Shamsuddin (1994)</td>
<td>Portfolio Theory and the Eclectic Theory</td>
<td>Using a single-equation econometric model based on cross-section data. The OLS technique was applied to estimate.</td>
<td>PGDP (+) GGDP ( +) PVAR (-) WAGE (-) ENGY (-) PAID (-) PDEBT (+)</td>
<td>This study scrutinized all explanatory variables, with the exception of energy availability, were statistically significant along with the expected signs. The per capita GDP (PGDP) in the host country was the most vital economic determinant of FDI inflows. Followed by wage cost (WAGE), per capita debt (PDEBT), per capita inflow of public aid (PAID) and volatility of prices, respectively.</td>
</tr>
<tr>
<td>Author/ Year/ Dependent Variable</td>
<td>Theoretical Framework</td>
<td>Methodology</td>
<td>Explanatory Variables (+)/(-)</td>
<td>Conclusions</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-----------------------</td>
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<td>-------------</td>
</tr>
<tr>
<td>Ismail and Yussof (2003) Y = lnFDI</td>
<td>Factor Proportion Theory and the Eclectic Theory</td>
<td>Applying three Simple regression models, according to three countries (Malaysia, Philippines and Thailand). The OLS technique was employed to estimate in these models.</td>
<td>lnWM (-) lnLABOUR (+) lnGDP (+) lnPROFTEC (+) lnRDEX (+) lnINT (-) lnT (Year)</td>
<td>This conclusion will concentrate on only Thailand. It was observed that the labor force (lnLABOUR) coefficient was statistically significant in positive sign with FDI inflows, while manufacturing wage rate (lnWM) had an insignificant negative direction. However, surprisingly, the quantity of professional workers (lnPROFTEC) coefficient was significant in the negative impact on FDI inflows and GDP (lnGDP) was statistically insignificant although its sign was positive.</td>
</tr>
<tr>
<td>Nonnemberg and Mendonca (2004) Y = lnFDI</td>
<td>The Eclectic Theory</td>
<td>Using the econometric model based on panel data and estimated by - OLS (polling) - Random-Effect - Fixed-Effect</td>
<td>LGDP (+) G5GDP (+) ESCOL (+) OPENNESS (+) DOWJONES (+) RISK (-) INFLATION (-) GGDPOECDC (-)</td>
<td>The coefficients of GDP (LGDP), the average rate of GDP (G5GDP), the level of schooling (ESCOL), the degree of trade openness (OPENNESS) and DOWJONES index were statistically significant in positive signs with FDI inflows. Conversely, for risk rating (Risk) and INFLATION, they were significant in negative relationship with FDI</td>
</tr>
</tbody>
</table>
Table 2.3: (Continued) Previous researches which studied the determinants of FDI inflows to developing countries

<table>
<thead>
<tr>
<th>Author/ Year/ Dependent Variable</th>
<th>Theoretical Framework</th>
<th>Methodology</th>
<th>Explanatory Variables (+)/(-)</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campos and Kinoshita (2003) Y = Per Capita of Current FDI Stock</td>
<td>The Eclectic Theory (Ownership and Location Advantages)</td>
<td>Analyzed the regression model by using the fixed-effected model and the generalized method of moments (GMM)</td>
<td>$Y_{t-1}$ (+) RGDPCH (+) WAGEN (-) EDU (+) NATRES (+) DISB (-) TELEPHONE (+) INFAV (-) CLTE (+) RULELAW (+) BUROQUAL (-)</td>
<td>According to Campos and Kinoshita, institutions, factor endowments and agglomeration of economies are the important determinants of FDI inflows. They reached the conclusions that - Institutions: The coefficient of the rule of law (RULELAW) was significant in positive sign with FDI inflows, while, for the quality of bureaucracy’s (BUROQUAL), it was significant in negative sign. - Macroeconomic Variables and Factor Endowments: The coefficient of per capita GDP (RGDPCH) was insignificant. It was the same as coefficients of secondary education enrollment (EDU) and TELEPHONE, although their signs were positive. However, natural resources (NATRES) and nominal wage rate (WAGEN) were strongly significant in expected sign with FDI inflows. - Agglomeration of economies: In this study, it included agglomeration effects by containment of a lagged dependent variable (Cheng and Kwan, 2000)</td>
</tr>
</tbody>
</table>
Table 2.3: (Continued) Previous researches which studied the determinants of FDI inflows to developing countries

<table>
<thead>
<tr>
<th>Author/ Year/ Dependent Variable</th>
<th>Theoretical Framework</th>
<th>Methodology</th>
<th>Explanatory Variables (+)/(-)</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chuleerat Kongruang</td>
<td>Location Advantages</td>
<td>The regression model was used time series data. Both of the long-run and the short-run relationships were analyzed by using the AEG test and the ECM test, respectively.</td>
<td>LGDP (+) LTRW (-) LTUC (-) LRER (+)</td>
<td>According to the AEG and the ECM test, all explanatory variables were statistically significant corresponded with their expected signs. To be exact, Thai GDP (LGDP), the average monthly earning in Thailand (LTRW), the long-term lending rate in Thailand (LTUC) and the relatively exchange rate (LRER) are determinants of IFDI not only the long-run but also the short-run. Nevertheless, GDP was denoted as the most important determinant of FDI to Thailand.</td>
</tr>
<tr>
<td>Sangiam (2006)</td>
<td>The Eclectic Theory and Aliber’s Currency Theory</td>
<td>Employ the model with time series data. The UECM estimation was employed to observe the relationship between the dependent and explanatory variables in both of long term and short term.</td>
<td>LGDP (+) LGR (+) LTAR (+,-) LEXPJT (+) LEXR (+) LINT (+,-) LWAGE (-) LELEC (+) LSCH (+) PLK (-) AC (+)</td>
<td>The coefficient of Thailand’s GDP was positive significant in the short run but not the long run. Conversely, Thailand tariff rate was also significant but in the negative relationship. However, wage rate was negative significant in both of the short run and the long run.</td>
</tr>
</tbody>
</table>
Table 2.3: (Continued) Previous researches which studied the determinants of FDI inflows to developing countries

<table>
<thead>
<tr>
<th>Author/ Year/ Dependent Variable</th>
<th>Theoretical Framework</th>
<th>Methodology</th>
<th>Explanatory Variables (+)/(-)</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Krist, Pornapa and Manop (BOT, 2009)</td>
<td>Y = Real Private Investment</td>
<td>Using the model with Thailand quarterly time series data.</td>
<td>GDP (+) RER (+) GDE (-) CAPU (+) CRISIS (-) POL (-)</td>
<td>In keeping with this research, private investment in Thailand has been determined by not only economic factors but also institution factors. Those are Real GDP (GDP), Real Exchange Rate (RER), Growth of Debt to Equity Ratio (GDE), Capacity Utilization (CAPU), Crisis (CRISIS) and Political Instability (POL).</td>
</tr>
<tr>
<td>Marson and Shahbudin (2010)</td>
<td>Y = Outward Foreign Direct Investment (OFDI)</td>
<td>Push and Pull Factors Analysis</td>
<td>To test the long-run relationships among variables by applying time series data.</td>
<td>GDP (+) LC (-) IFDI (+) OPEN (+)</td>
</tr>
</tbody>
</table>
2.2.3 Variables Employed in Related Previous Researches

According to table 2.3, it explains the dependent variable and explanatory variables which were employed to analyze in each study. However, in terms of explanatory variables, they can be divided into five important classifications. Those are size of domestic market, the growth of domestic market size, inflation rate, labor cost and the exchange rate.

- **Size of domestic market**

**Table 2.4:** The related direction between size domestic market variable and the dependent variable

<table>
<thead>
<tr>
<th>Authors</th>
<th>Variables</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schneider and Frey (1985)</td>
<td>Real Gross National Product per Capita (PCGNP)</td>
<td>+</td>
</tr>
<tr>
<td>Abul F.M. Shamsuddin (1994)</td>
<td>Per capita Gross Domestic Product (PGDP)</td>
<td>+</td>
</tr>
<tr>
<td>Ismail and Yussof (2003)</td>
<td>Annual Gross Domestic Product in Logarithm Term (lnGDP)</td>
<td>0</td>
</tr>
<tr>
<td>Campos and Kinoshita (2003)</td>
<td>Real per Capita Gross Domestic Product (RGDPCH)</td>
<td>0</td>
</tr>
<tr>
<td>Nonnemberg and Mendonca (2004)</td>
<td>Gross Domestic Product in Logarithm Term (lnGDP)</td>
<td>+</td>
</tr>
<tr>
<td>Chuleerat Kongruang</td>
<td>Thailand Gross Domestic Product in Logarithm Term (LGDP)</td>
<td>+</td>
</tr>
<tr>
<td>Krist, Pornapa and Manop (BOT,2009)</td>
<td>Real Gross Domestic Product (GDP)</td>
<td>+</td>
</tr>
<tr>
<td>Marson and Shahbudin (2010)</td>
<td>Gross Domestic Product (GDP)</td>
<td>+</td>
</tr>
</tbody>
</table>

Consistent with table 2.4, it can be clearly see that Abul F.M. Shamsuddin (1994), Ismail and Yussof (2003), Campos and Kinoshita (2003), Nonnemberg and Mendonca (2004), Chuleerat Kongruang, Sangiam (2006), Krist, Pornapa and Manop (BOT,2009), Marson and Shahbudin (2010) measured size of domestic market by applying host countries’ GDP. The coefficients
of GDP variables in their studies, with the exception of Ismail and Yussof (2003) as well as Campos and Kinoshita (2003) were significant in the positive direction of FDI inflows.

In the other hand, for Schneider and Frey (1985), they employed GNP to illustrate the size of market. However, its coefficient was significant in the positive way of FDI as well.

- *The growth of domestic market size*

**Table 2.5**: The related direction between the growth of domestic market size variable and the dependent variable

<table>
<thead>
<tr>
<th>Authors</th>
<th>Variables</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schneider and Frey (1985)</td>
<td>Growth of Real Gross National Product (GGNP)</td>
<td>+</td>
</tr>
<tr>
<td>Abul F.M. Shamsuddin (1994)</td>
<td>Growth Rate of Gross Domestic Product (GGDP)</td>
<td>0</td>
</tr>
<tr>
<td>Nonnemberg and Mendonca (2004)</td>
<td>The Average Rate of Gross Domestic Product over the last five years (G5GDP)</td>
<td>+</td>
</tr>
<tr>
<td>Sangiam (2006)</td>
<td>Growth Rate of Gross Domestic Product (LGDP)</td>
<td>0</td>
</tr>
</tbody>
</table>

Along with table 2.5, not only Abul F.M. Shamsuddin (1994) but also Nonnemberg and Mendonca (2004) used the growth of GDP to indicate the growth of domestic market size. But, the coefficient of it was significant with positive sign with FDI in Nonnemberg and Mendonca’s study. While, for Abul F.M. Shamsuddin’ study, the coefficient was not significant from preliminary regression. Consequently, they decided to omit this variable because it did not have the impact on the result of regression (Reuber, 1973). To be precise, the per capita of FDI inflows was more related with GDP than the growth of GDP (Abul F.M. Shamsuddin (1994)).

For Schneider and Frey (1985), they employed GNP to measure the growth of domestic market size. Its coefficient was significantly in positive relationship with FDI inflows.
• *Inflation Rate*

**Table 2.6:** The related direction between the inflation rate variable and the dependent variable

<table>
<thead>
<tr>
<th>Authors</th>
<th>Variables</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schneider and Frey (1985)</td>
<td>Percentage Rate of GNP Deflator one year lag (INFLATION)</td>
<td>-</td>
</tr>
<tr>
<td>Abul F.M. Shamsuddin (1994)</td>
<td>Variance of the Price Level estimated from CPI data (PVAR)</td>
<td>-</td>
</tr>
<tr>
<td>Campos and Kinoshita (2003)</td>
<td>The Annual Average Inflation Rate (INFAV)</td>
<td>+</td>
</tr>
<tr>
<td>Nonnemberg and Mendonca (2004)</td>
<td>The Rate of Inflation (INFLATION)</td>
<td>-</td>
</tr>
</tbody>
</table>

As said by table 2.6, the coefficients of the inflation rate in all existed studies were statistically significant in negative sign with FDI inflows, however, with the exception of Campos and Kinoshita study. This result may be caused by hidden endogeneity. That is it may strongly relate to other policy factor (Campos and Kinoshita (2003)).

• *Wage Rate*

**Table 2.7:** The related direction between wage rate and the dependent variable

<table>
<thead>
<tr>
<th>Authors</th>
<th>Variables</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schneider and Frey (1985)</td>
<td>Wage Cost per Worker Employed one year lag (WAGE)</td>
<td>-</td>
</tr>
<tr>
<td>Abul F.M. Shamsuddin (1994)</td>
<td>Wage Rate per Day (WAGE)</td>
<td>-</td>
</tr>
<tr>
<td>Ismail and Yussof (2003)</td>
<td>Manufacturing Wage Rates (lnWM)</td>
<td>0</td>
</tr>
<tr>
<td>Campos and Kinoshita (2003)</td>
<td>Gross Nominal Wage (WAGEN)</td>
<td>-</td>
</tr>
<tr>
<td>Chuleerat Kongruang</td>
<td>The Average Monthly Earning in Thailand (LTEWC)</td>
<td>-</td>
</tr>
<tr>
<td>Sangiam (2006)</td>
<td>Real Wage Rate of Thailand Relative to Japan (LWAGE)</td>
<td>-</td>
</tr>
<tr>
<td>Marson and Shahbudin (2010)</td>
<td>Labor Cost (LC)</td>
<td>-</td>
</tr>
</tbody>
</table>
In line with table 2.7, it can be clearly see that labor cost (wage) had the negative relationship with FDI inflows, nevertheless, with the exception of Ismail and Yussof (2003) who’s the coefficient of lnWM was insignificant. However, they argued that this result may be caused by relatively low wage rate in Thailand. As a result, increasing in wage rate did not have large impact on the cost of production (Ismail and Yussof (2003)).

- *The Exchange Rate*

**Table 2.8:** The related direction between the exchange rate variable and the dependent variable

<table>
<thead>
<tr>
<th>Authors</th>
<th>Variables</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chuleerat Kongruang</td>
<td>The Relatively Exchange Rate (LRER): An Average Value of Home Country’s Currency against the Thai Baht</td>
<td>+</td>
</tr>
<tr>
<td>Krist, Pornapa and Manop (BOT,2009)</td>
<td>Real Effective Exchange Rate Indices (1994=100) (RER)</td>
<td>+</td>
</tr>
</tbody>
</table>

From table 2.8, as said by Chuleerat Kongruang and Krist, Pornapa and Manop (BOT,2009), the exchange rate was economic determinant of FDI inflows. To be exact, the coefficients of LRER as well as RER were significant in the positive direction with the net FDI inflows (LFDI) and Private Investment (I), respectively.
CHAPTER 3

THE DESCRIPTION OF SINGAPOREAN OUTWARD FOREIGN DIRECT INVESTMENT

3.1 Analytical Framework

In chapter 3, it is going to analyze the characteristics of Singaporean OFDI as well as observe push factors or home country’s factors which have an influence on FDI from Singapore to Thailand. However, the descriptive approach will be occupied to study and analyze in order to reach the conclusions.

3.2 Singaporean Outward Foreign Direct Investment

As it is broadly agreed, the major cause of Singapore rapid economic growth has been Inward Foreign Direct Investment. Over the years 1961 to 1990, Singapore had drawn 42.7 percent of ASEAN total FDI inflows. Moreover, in the year 1996, World Trade Organization (WTO) ordered Singapore into one of the top countries which obtained the highest IFDI per capita.

However, it can not be argued against the fact that IFDI has leaded to large amounts of benefits to Singapore. But, in order to sustain the economic growth and keep its level of growth to the future, only IFDI is not enough. Consequently, Singapore has initiated to concentrate on OFDI. To be exact, many Singaporean enterprises have located operations overseas where cost of production is relatively low. By doing this, since the year 1995, the amount of Singaporean OFDI have increased significantly.

Figure 3.1: Singapore’s investment abroad (all sectors) in millions dollars between the years 2002-2008

Source: Singapore’s Investment Abroad, Singapore Department of Statistics
3.2.1 Singaporean OFDI’s Main Characteristics

Ever since the year 1990, the proportion of Asian newly industrializing countries’ OFDI to the world average has increased continuously. Some of them have become to the vital sources of FDI. To be exact, it is clearly to see that Hong Kong has been the greatest source of Asian FDI, followed by Taiwan Province of China, while Singapore had been ranked in the third (UNTAD, 2007).

Figure 3.2: The proportion of Asian newly industrializing countries’ OFDI to the world average OFDI by percentage

![Graph showing OFDI proportion](image)

Source: UNCTADSTAT

Figure 3.3: Direct investment abroad for Asia and selected Asia countries between the years 1980 and 2006 (millions US dollars)

![Graph showing direct investment](image)

Source: UNCTAD 2007

However, when we focus on Singapore’s OFDI structure, it can be observed that Singaporean OFDI always concentrates on the Asia region. That is 57 percent of Singapore’s direct investment in the year 1996 was in Asia. While in the year 2008, the rate decreased slightly but still being high at 53 percent of Singapore’s total OFDI. However, three ASEAN
countries which are Malaysia, Indonesia and Thailand are accounted for the greatest part of Singapore’s OFDI, followed by China (Goldstein and Pananond).

In any case, there are some important aspects of Singaporean OFDI when it is compared to the main investor countries. Those are, firstly, the focus of Singaporean FDI in Asia is similar as FDI from Germany and Britain which focus on Europe. Secondly, the concentration on Asia is very strong in manufacturing sector of Singapore’s FDI. That is more than 90 percent of Singaporean FDI in manufacturing sector was located within Asia in the year 2003 (Ellingsen, Likumahuwa and Nunnenkamp, 2006). Lastly, developing economies which their economies less developed than Singapore, host more than 80 percent of Singaporean FDI stock, compared to less than one-third in the case of United States (Ellingsen, Likumahuwa and Nunnenkamp, 2006).

**Figure 3.4:** Singapore’s total direct investment abroad classified by region between the year 1996 and 2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Asia</th>
<th>Europe</th>
<th>The United States</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>57%</td>
<td>4%</td>
<td>35%</td>
<td>5%</td>
</tr>
<tr>
<td>2008</td>
<td>51%</td>
<td>4%</td>
<td>35%</td>
<td>5%</td>
</tr>
</tbody>
</table>

**Sources:** Singapore’s Investment Abroad, Singapore Department of Statistics

### 3.2.2 Push Factors of Singaporean OFDI

As it is known broadly, Singapore has ever been one of the dominant recipients FDI in Asia and it is able to utilize MNEs as an efficient tool for enhancing the country’s economic development. However, afterward, Singapore has evolved to become the country which is denoted as the important source of OFDI especially in the Asia Pacific region. The reasons for transforming in Singapore’s FDI structure are not perplexing to conceive. To be precise, firstly, the problem of a limited Singapore’s domestic market which leads to the lack of market growth. Consequently, many Singaporean investors are forced to expand their business abroad in order to find consistent with their market-driven motivations. Besides, fast
changing in the Singaporean comparative advantages also compels investors to locate their productions overseas. This reason is caused by revolution in structure as well as the industrial upgrading that are the essential things of flourishing Singapore’s economic development. To explain it more, changing in the Singaporean relative factor endowments is the cause of transforming in Singapore industrial structure. For example, with the intention of maintaining competitiveness in labor-intensive industries, Singaporean investors have to move their productions to the locations where have the lower land and labor cost. Thus, it cannot be argued against that less developed countries with dissimilar comparative advantages are a solution for Singaporean investors in this case (Aggarwal and Agmon 1990, p. 167; Lecraw 1985; Sithathan 2002).

Furthermore, with the purpose of securing the international competitiveness of the state, the Singaporean government has played the vital role to support Singapore’s OFDI. That is, after the recession (the mid-1980s), the Singaporean government initiated to pay the attention on country’s OFDI. The International Direct Investment (IDI) Programme was approved in the year 1988. Along with this programme, a number of incentives for direct investors have been adopted such as an “overseas tax incentive” which permits firms to cut their losses through tax as well as a “tax exemptions” which for investors’ income repatriated to Singapore (Okposin, 1999). Moreover, in 1993, the Committee to Promote Enterprise Overseas was founded to suggest measures in order to assist Singaporean firms venturing abroad. Investible obstacles were recognized and the different incentives were studied, as well as the feasible catalytic role of the Singaporean government (Tan, 1995).

3.3 Conclusions

In this chapter, an effort of observing the Singaporean OFDI characteristics and also analyzing push factors of Singapore’s direct investment in Thailand is made. The result indicates that over the last few decades, Singapore’s FDI structure had changed that is OFDI has played much more important role than IFDI in the Singapore’s economy. It can be clearly seen that the amount of Singaporean OFDI has increased continuously over the time and a great deal of direct investment has the Asian countries, including Thailand, as its target. However, in terms of push factors or home country’s factors, not only a small domestic market of Singapore and changing in the Singapore’s comparative advantages but also the
government policies which support Singaporean investors to invest abroad are the important determinants of Singapore’s Direct Investment in Thailand.
CHAPTER 4

METHODOLOGY AND EMPIRICAL RESULTS

4.1 Theoretical Framework of Studying

According to review of theories in chapter 2, it can be clearly see that the Eclectic Paradigm of Dunning is the comprehensive one which can be used to explain the determinants of Singaporean FDI in Thailand. In order to make an investible decision, not only home country's factors (or push factors) but also host country’s factors (or pull factors) are employed to analyze. Nonetheless, in terms of push factors, it has been referred in chapter 3. While, in chapter 4, pull factors are studied under quantitative approach.

However, when we concentrate on the Eclectic Paradigm which comprises of Location Theory, Theory of Industrial Organization and Transaction Cost Economics, it can be observed that, Location Theory or Location Advantages is the appropriate one which should be employed to scrutinize the host country’s factors. As a result, in this study, the explanatory variables, which are generated in the models, will be base on Location Theory and Aliber’s Currency Area Theory.

4.2 Methodology

4.2.1 The Econometric Models

This sector indicates the econometric models which will be employed to analyze the determinants of FDI from Singapore to Thailand. The selection of the variables in the models is based on the Location Theory and Aliber’s Currency Area Theory which have been mentioned in part 4.1. However, to be precise, the variables that have been chosen in the models are as follows. $RFDI$ is treated as the dependent variable for the models and it is expected to be determined by the following explanatory variables which are $GRGDP$, $RWAGE$, $PTS$, $EXR$, $RER$ and $AC$. 
Figure 4.1: Theoretical framework which is applied to analyze the determinants of FDI from Singapore to Thailand

To make it clear, the regression models which are used to observe the determinants of FDI from Singapore to Thailand are

\[ RFDI_t = \beta_0 + \beta_1 \text{GRD}_t + \beta_2 \text{WAGE}_t + \beta_3 \text{PTS}_t + \beta_4 \text{EXR} + \beta_5 \text{AC} + u_{1t} \]  \hspace{1cm} (1)

\[ RFDI_t = \beta_6 + \beta_7 \text{GRD}_t + \beta_8 \text{WAGE}_t + \beta_9 \text{RER} + \beta_{10} \text{AC} + u_{2t} \]  \hspace{1cm} (2)

Whereas; \( RFDI_t \) is The Amount of Foreign Direct Investment from Singapore to Thailand in Real Term

\( \text{GRD}_t \) is The Real Growth Rate of Thailand’s Gross Domestic Product

\( \text{WAGE}_t \) is The Real Minimum Wage Rate of Thailand
\( PTS_t \) is The Relative Thailand and Singapore Price

\( EXR_t \) and \( RER_t \) is The Nominal Relative Exchange Rate of Thailand and Singapore and the Real Realative Exchange Rate of Thailand and Singapore, respectively

\( AC \) is The dummy variable for the Asian crisis

(AC= 0 if there is no Asian crisis and AC =1 in the crisis period, 1997-1999)

However, in conclusion, the expected signs of the coefficients are \( \beta_1, \beta_8, \beta_9 > 0 \) and \( \beta_2, \beta_5, \beta_{10} < 0 \)

### 4.2.2 Data and Analysis

With the purpose of observing the determinants of Singaporean FDI in Thailand, the econometric models (section 4.2.1) are subjected to a multiple regression analysis. The set of time series data for two countries, which are Thailand and Singapore, between the years 1981 and 2009, is occupied in this paper. However, in order to study the regression models, OLS technique is applied to estimate. Further, this study also employs the Johansen cointegration test to observe the long-run relationship between the variables as well as the ECM to show the adjustment of variable when it moves apart from its long run equilibrium.

**Table 4.1:** The set of data of variables which employed in two regression models

<table>
<thead>
<tr>
<th>Year</th>
<th>RFDI (Millions Baht)</th>
<th>GRGDP (%)</th>
<th>RWAGE (Baht)</th>
<th>PTS (1995=100)</th>
<th>EXR (Bah/1SGD)</th>
<th>RER (Bah/1SGD)</th>
<th>AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981</td>
<td>4608.065</td>
<td>5.907</td>
<td>105.1143</td>
<td>0.788409</td>
<td>10.2966</td>
<td>8.117927</td>
<td>0</td>
</tr>
<tr>
<td>1982</td>
<td>4651.988</td>
<td>5.353</td>
<td>104.7324</td>
<td>0.796399</td>
<td>10.7433</td>
<td>8.555955</td>
<td>0</td>
</tr>
<tr>
<td>1983</td>
<td>5962.555</td>
<td>5.581</td>
<td>104.1529</td>
<td>0.796683</td>
<td>10.8743</td>
<td>8.663365</td>
<td>0</td>
</tr>
<tr>
<td>1984</td>
<td>5897.295</td>
<td>5.76</td>
<td>103.223</td>
<td>0.802342</td>
<td>11.0686</td>
<td>8.880806</td>
<td>0</td>
</tr>
<tr>
<td>1985</td>
<td>1775.751</td>
<td>4.642</td>
<td>106.9133</td>
<td>0.831136</td>
<td>12.3319</td>
<td>10.24948</td>
<td>0</td>
</tr>
<tr>
<td>1986</td>
<td>1771.184</td>
<td>5.534</td>
<td>105.0226</td>
<td>0.858972</td>
<td>12.07</td>
<td>10.3678</td>
<td>0</td>
</tr>
<tr>
<td>1987</td>
<td>1658.746</td>
<td>9.519</td>
<td>106.8624</td>
<td>0.894171</td>
<td>12.21</td>
<td>10.91782</td>
<td>0</td>
</tr>
<tr>
<td>1988</td>
<td>3746.437</td>
<td>13.288</td>
<td>102.9517</td>
<td>0.894052</td>
<td>12.5571</td>
<td>11.2267</td>
<td>0</td>
</tr>
<tr>
<td>1989</td>
<td>5548.721</td>
<td>12.194</td>
<td>101.7196</td>
<td>0.909042</td>
<td>13.1667</td>
<td>11.96909</td>
<td>0</td>
</tr>
<tr>
<td>1990</td>
<td>14863.71</td>
<td>11.622</td>
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<td>8.083</td>
<td>132.0315</td>
<td>0.955624</td>
<td>15.5803</td>
<td>14.85774</td>
<td>0</td>
</tr>
<tr>
<td>Year</td>
<td>RFDI (Millions Baht)</td>
<td>GRGDP (%)</td>
<td>RWAGE (Baht)</td>
<td>PTS (1995=100)</td>
<td>EXR (Baht/SGD)</td>
<td>RER (Baht/SGD)</td>
<td>AC</td>
</tr>
<tr>
<td>------</td>
<td>----------------------</td>
<td>-----------</td>
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<td>1994</td>
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<td>1995</td>
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<td>17.5635</td>
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<td>1.026351</td>
<td>17.9578</td>
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<td>1997</td>
<td>26849.26</td>
<td>-1.371</td>
<td>140.453</td>
<td>1.060901</td>
<td>20.9447</td>
<td>22.22025</td>
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<td>1998</td>
<td>34563.03</td>
<td>-10.511</td>
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<td>1.179731</td>
<td>24.6583</td>
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<td>1999</td>
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<td>1.195259</td>
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<td>2000</td>
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<td>2001</td>
<td>141174.2</td>
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<td>1.211871</td>
<td>24.8023</td>
<td>30.05718</td>
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</tr>
<tr>
<td>2002</td>
<td>153629.8</td>
<td>5.318</td>
<td>131.041</td>
<td>1.23462</td>
<td>23.9886</td>
<td>29.61681</td>
<td>0</td>
</tr>
<tr>
<td>2003</td>
<td>147868.6</td>
<td>7.1394</td>
<td>131.8395</td>
<td>1.264532</td>
<td>23.8087</td>
<td>30.10687</td>
<td>0</td>
</tr>
<tr>
<td>2004</td>
<td>114395.9</td>
<td>6.3443</td>
<td>129.0582</td>
<td>1.248753</td>
<td>23.7893</td>
<td>29.70697</td>
<td>0</td>
</tr>
<tr>
<td>2005</td>
<td>101805.3</td>
<td>4.605</td>
<td>127.0848</td>
<td>1.289881</td>
<td>24.1553</td>
<td>31.15746</td>
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</tr>
<tr>
<td>2006</td>
<td>261545.7</td>
<td>5.1459</td>
<td>127.6987</td>
<td>1.333406</td>
<td>23.8362</td>
<td>31.78333</td>
<td>0</td>
</tr>
<tr>
<td>2007</td>
<td>99850.25</td>
<td>4.93</td>
<td>129.6496</td>
<td>1.290567</td>
<td>22.9073</td>
<td>29.56341</td>
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<td>2008</td>
<td>72894.87</td>
<td>2.463</td>
<td>130.6511</td>
<td>1.318993</td>
<td>23.5545</td>
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<tr>
<td>2009</td>
<td>40664.18</td>
<td>-2.248</td>
<td>133.7128</td>
<td>1.363097</td>
<td>23.5715</td>
<td>32.13024</td>
<td>0</td>
</tr>
</tbody>
</table>

4.3 The Hypothesis of the Study

1. The Real Growth Rate of Thailand’s Gross Domestic product (GRGDP)

GRGDP can be employed to anticipate the host country’s domestic market potentiality. The higher level of GRGDP presents the higher growth rate of the domestic market which means people’s purchasing power. Thus, foreign investors surmise they have an opportunity to do profitable business in the host nation. By doing this, it is expected that GRGDP has a positive impact on RFDI.

2. The Real Wage of Thailand (RWAGE)

The lower RWAGE indicates the decrease in the cost of production. Consequently, foreign investors prospect the more profitable opportunity. Thus, there is a negative relationship between RWAGE and RFDI.
3. The Relative Thailand and Singapore Price (PTS)

Although an increase in the general level of prices of product or inflation presents the corrosion in the purchasing power of money, it also has the positive effect. To be precise, if inflation is generated by demand side, it will encourage investment in non-monetary capital projects. Because investors will expect to have an opportunity of making profit which is they can sell more goods and services because of demand pull. Therefore, PTS is expected to have a positive impact on RFDI.

4. The Nominal Relative Exchange Rate of Thailand and Singapore (EXR) and The Real Realative Exchange Rate of Thailand and Singapore (RER)

If baht currency depreciate, it illustrates that to obtain 1 SGD, we have to use more baht currency (increasing in EXR and RER). As a result, it causes of expanding Singapore FDI to Thailand. Therefore, EXR and RER are supposed to have a positive relationship with RFDI.

5. The Dummy Variable for the Asian Crisis (AC)

The dummy variable (AC) is included to account for the adverse impact of the Asian Crisis on Singaporean FDI to Thailand. A negative relationship between AC and RFDI is expected.

4.4 Econometric Procedures – Theoretical Issues

4.4.1 A Test of Stationary

It is commonly accepted that most economic time series variables carry the unit root problem. And the use of times series variables which are non-stationary in OLS technique can be the cause of spurious regression. Consequently, detecting and correcting a non-stationary problem in the regression model are required. However, in order to detect the unit root problem, the ADF test is employed as the equations below

\[ \Delta Y_t = \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon_i \quad \text{(random walk process)} \]

\[ \Delta Y_t = \beta_1 + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon_i \quad \text{(random walk with drift)} \]

\[ \Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon_i \quad \text{(random walk with drift + linear time trend)} \]
4.4.2 A Test of Multicollinearity

Multicollinearity is the fact that there is a linear relationship between the independent variables. The higher level in this dependency illustrates the greater of the standard errors of variables’ estimators. As a result, not only estimators have become unstable but also the confidence intervals become wider and test on parameters for these explanatory variables are more likely not significant (Guido L & Sayan Chakrabarty, 2006).

However, in order to detect multicollinearity problem, the approach of the direct measurement of the correlation between an explanatory variable and all other explanatory variables is employed. To be precise, the Tolerance (TOL) and the Variance Inflation Factor (VIF) are used to observe the problem in this study. A small value of TOL presents that the independent variable is highly correlate to the rest of independent variables. Conversely, for VIF, a large value of it indicates the presence of multicollinearity problem in the regression model.

To make it clear, with the aim of accepting that there is no multicollinearity problem in the model, TOL should be greater than 0.1, while VIF should be less than 10.

4.4.3 A Test of Autocorrelation

Autocorrelation is the problem that the errors in one time period are correlated with their own values in other periods (University of Portsmouth). However, if there is autocorrelation problem in the model, the standard errors and also t-values will be affected. To explain it more, if the regression model comprises of positive autocorrelation, the standard errors will be underestimated and the t-values will biased upwards. Further, not only the variance of the error term will also be underestimated but also $R^2$ values will be exaggerated. As a result, OLS estimation has been become inefficient.

Nonetheless, with the intention of detecting the autocorrelation problem, the Durbin-Watson test statistic is occupied. To be precise, the Durbin-Watson test is a statistic that presents the likelihood that the deviation values for the regression consists of a first-order autoregressive component. However, the regression model is assumed that the error deviations are uncorrelated.
4.4.4 A Cointegration Test

The concept of cointegration is the idea that if two variables are related according to economic theory, they will not part away in the long run. To be precise, the variables may move apart in the short run because of some reasons such as policies reason but they still be have a long-term equilibrium between variables.

In order to test of cointegration in this study, the Johansen multivariate test (1991, 1995) is employed. According to the Johansen test, the numbers of cointegrating vectors are observed by employing the maximum likelihood based on trace statistics and max statistics. The improvement of this test is that it uses test statistic that can be utilized to evaluate cointegrating relationship among two or more variables. It means that the Johansen cointegration test is an advanced test as it can observe more than one cointegrating vector in the model.

Before the Johansen had been tested of cointegrating vectors, the likelihood ratio (LR) tests are realized to decide the lag length of the vector autoregressive system. And the Johansen test involves the identification of rank of the $n \times n$ matrix $D$ in the specification (Emmy, Baharom, Radam and Yacob, 2009).

However, the Johansen cointegration test is based on the equation which is

$$y_t = A_1 y_{t-1} + \ldots + A_p y_{t-p} + Bx_t + \varepsilon_t$$

**Whereas;**

- $y_t$ is a $k$-vector of nonstationary $I(1)$ variables
- $x_t$ is a vector of deterministic variables
- $\varepsilon_t$ is a vector of innovations

On the way to make the conclusion about the number of cointegrating relationships, *Trace Statistics* and *Maximal Eigen value statistics* are observed. These two statistics test for the hypotheses which are
Trace Statistics

$H_0$: At most $r$ cointegrating vectors

$H_1$: $r$ or more cointegrating vectors

While, Maximal Eigen Value statistics

$H_0$: At most $r$ cointegrating vectors

$H_1$: $r+1$ cointegrating vectors

Trace statistics and maximal eigen value statistics are measured up to the critical values tabulated by MacKinnon-Haug-Michelis (1999) p-values.

4.4.5 An Error Correction Mechanism (ECM)

If there exists a long-run relationship between variables, $(Y_t = \beta_1 + \beta_2 X_t + u_t)$, it means in the short-run there may me disequilibrium. As a result, one can treat the error term, $u_t$, as the “equilibrium error”. And this error term can be employed to tie the short-run behavior of $Y$ (the dependent variable) to its long-run value. However, the error correction mechanism (ECM) has become popular by Engle and Granger corrects for disequilibrium. To be precise, according to the Granger representation theorem, if two variables $Y$ and $X$ are cointegrated, the relationship between them can be presented as ECM. For example,

$$\Delta Y_t = \alpha_0 + \alpha_1 \Delta X_t + \alpha_2 u_{t-1} + \varepsilon_t$$

Where, $\Delta$ denoted as the first difference

$\varepsilon_t$ is random error term

$u_{t-1}$ is the one-period lagged value of the error from the cointegrating regression

Since $\alpha_2$ is expected to be negative, it means $\alpha_2 u_{t-1}$ is also negative. Therefore, if $Y_t$ is above its equilibrium value, it will start decreasing in the next period to correct the equilibrium error. Homogenously, if $u_{t-1}$ is negative (Y is below its equilibrium value), $\alpha_2 u_{t-1}$ will be positive. This leads to rise in $Y_t$ in period t. However, the value of $\alpha_2$ indicates how quickly the equilibrium is restored.
4.5 The Regression Results

In order to examine the hypothesis in section 4.3, OLS technique is employed to estimate the variables’ coefficients. However, in this paper, the models are classified into two cases of study (two econometric models).

4.5.1 Estimated Model 1 of Singaporean FDI in Thailand

In the model 1, the Relative Thailand and Singapore Price (PTS) is sepearated from the Nominal Relative Exchange Rate of Thailand and Singapore (EXR). The mutiple regression model which is empolyed to analyze is

\[ RFDI_t = \beta_0 + \beta_1 GRDP_t + \beta_2 RWAGE_t + \beta_3 PTS_t + \beta_4 EXR_t + \beta_5 AC + u_t, \]

- A Test of Stationary of Model 1

The variables which are tested for the unit root problem are

- The Amount of Foreign Direct Investment from Singapore to Thailand in Real Term (RFDI)
- The Real Growth Rate of Thailand’s Gross Domestic Product (GRGDP)
- The Real Wage of Thailand (RWAGE)
- The Relative Thailand and Singapore Price (PTS)
- The Nominal Relative Exchange Rate of Thailand and Singapore (EXR)

Table 4.2: The result of unit root test at level of model 1

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number of Lag(s)</th>
<th>AIC</th>
<th>ADF-statistics</th>
<th>MacKinnon Critical Value</th>
<th>The result</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFDI</td>
<td>0</td>
<td>24.40354</td>
<td>-2.232228</td>
<td>-2.971853</td>
<td>Nonstationary</td>
</tr>
<tr>
<td>GRGDP</td>
<td>0</td>
<td>5.618287</td>
<td>-2.258791</td>
<td>-2.971853</td>
<td>Nonstationary</td>
</tr>
<tr>
<td>RWAGE</td>
<td>1</td>
<td>5.814025</td>
<td>-1.576848</td>
<td>-2.976263</td>
<td>Nonstationary</td>
</tr>
<tr>
<td>PTS</td>
<td>0</td>
<td>-4.340192</td>
<td>-2.627084</td>
<td>-3.580623</td>
<td>Nonstationary</td>
</tr>
<tr>
<td>EXR</td>
<td>0</td>
<td>3.161265</td>
<td>-1.311778</td>
<td>-3.580623</td>
<td>Nonstationary</td>
</tr>
</tbody>
</table>
Table 4.3: The result of unit root test at the first difference of model 1

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number of Lag(s)</th>
<th>AIC</th>
<th>ADF-statistics</th>
<th>MacKinnon Critical Value</th>
<th>The result</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(RFDI)</td>
<td>0</td>
<td>24.52461</td>
<td>-6.786201*</td>
<td>-3.699871</td>
<td>Stationary</td>
</tr>
<tr>
<td>D(GRGDP)</td>
<td>0</td>
<td>5.837210</td>
<td>-5.105344*</td>
<td>-3.699871</td>
<td>Stationary</td>
</tr>
<tr>
<td>D(RWAGE)</td>
<td>0</td>
<td>5.838530</td>
<td>-3.218378**</td>
<td>-2.976263</td>
<td>Stationary</td>
</tr>
<tr>
<td>D(PTS)</td>
<td>0</td>
<td>-4.061733</td>
<td>-5.285146*</td>
<td>-4.339330</td>
<td>Stationary</td>
</tr>
<tr>
<td>D(EXR)</td>
<td>0</td>
<td>3.265359</td>
<td>-5.235843*</td>
<td>-4.339330</td>
<td>Stationary</td>
</tr>
</tbody>
</table>

Remarks:  
- \( D \) is the first difference, * is 1% level critical values and ** is 5% level critical values.

According to table 4.2, the dependent variable (RFDI) and four of explanatory variables (GRGDP, RWAGE, PTS, and EXR) are non-stationary at the level. However all of them become stationary in the first difference form (I(1)) along with table 4.3. By doing this, the model 1 which be occupied to analyze the determinants of Singaporean FDI in Thailand is

\[
D(RFDI_t) = \beta_0 + \beta_1 D(GRGDP_t) + \beta_2 D(RWAGE_t) + \beta_3 D(PTS_t) + \beta_4 D(EXR_t) + \beta_5 AC + u_t
\]

- A Test of Multicollinearity of Model 1

Table 4.4: The result of multicollinearity test (model 1)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>TOL</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(GRGDP)</td>
<td>0.309</td>
<td>3.238</td>
</tr>
<tr>
<td>D(RWAGE)</td>
<td>0.788</td>
<td>1.286</td>
</tr>
<tr>
<td>D(PTS)</td>
<td>0.631</td>
<td>1.584</td>
</tr>
<tr>
<td>D(EXR)</td>
<td>0.270</td>
<td>3.699</td>
</tr>
<tr>
<td>AC</td>
<td>0.555</td>
<td>1.803</td>
</tr>
</tbody>
</table>

In accordance with table 4.4, all independent variables have TOL values which are greater than 0.1, while for VIF values, they are less than 10. As a result, the model 1 has no multicollinearity problem.
• A Test of Autocorrelation of Model 1

Along with Durbin-Watson Statistic value of model 1 ($d = 2.367286$), it is not in the zone that we can accept the null hypothesis of no autocorrelation problem. By doing this, model 1 may consist of autocorrelation problem. It leads to the using of the autoregressive error model in order to correct this problem.

• Ordinary Least Squares (OLS) Estimation of Model 1

The regression result of the factors which determine FDI from Singapore to Thailand in case of PTS variable is separated from EXR variable (model 1) can be presented as equation:

$$D(RFDI_t) = -18850.25 + 6434.041 D(GRGDP_t) - 508.7915 D(RWAGE_t) + 914632.2 D(PTS_t) + 20098.10 D(EXR_t) - 54154.30 AC + u_t$$

<table>
<thead>
<tr>
<th>Std. Error</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>(11350.70)</td>
<td>(-1.660713)</td>
</tr>
<tr>
<td>(3711.637)</td>
<td>(1.733478)***</td>
</tr>
<tr>
<td>(2039.719)</td>
<td>(-0.249442)</td>
</tr>
<tr>
<td>(430125.2)</td>
<td>(2.126433)**</td>
</tr>
<tr>
<td>(14815.82)</td>
<td>(1.356529)</td>
</tr>
<tr>
<td>(35900.56)</td>
<td>(-1.508453)</td>
</tr>
</tbody>
</table>

Remarks: *** is 10% level critical values and ** is 5% level critical values

The explanation of model 1

1. The coefficient of D(GRGDP) is positive as expected. It is 6434.041 and significant at a 10% level that means if D(GRGDP) changes by 1 percent, while other factors are constant, D(RFDI) will change in the same direction as D(GRGDP) that is 6434.041 millions bath.

2. The coefficient of D(PTS) is positive as expected. Its value is 914632.2 and significant at a 5% level that means if D(PTS) changes by 1 unit, while other factors remain constant, D(RFDI) will change in the same direction as D(PTS) that is 914632.2 millions bath.

3. Although the coefficients of D(RWAGE), D(PTS) and AC have signs as expected, they are statistically insignificant.
4.5.2 Estimated Model 2 of Singaporean FDI in Thailand

In the model 2, the Relative Thailand and Singapore Price (PTS) as well as the Nominal Relative Exchange Rate of Thailand and Singapore (EXR) are combined to be the Real Relative Exchange Rate of Thailand and Singapore (RER = PTS*EXR). The multiple regression model which is employed to analyze is

\[ RFDI_t = \beta_6 + \beta_7GRDP_t + \beta_8RWAGE_t + \beta_9RER_t + \beta_{10}AC + u_{1t} \]

- A Test of Stationary of Model 2

The variables which are tested for the unit root problem are

- The Amount of Foreign Direct Investment from Singapore to Thailand in Real Term (RFDI)
- The Real Growth Rate of Thailand’s Gross Domestic Product (GRGDP)
- The Real Wage of Thailand (RWAGE)
- The Real Relative Exchange Rate of Thailand and Singapore (RER)

Table 4.5: The result of unit root test at level of model 2

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number of Lag(s)</th>
<th>AIC</th>
<th>ADF-statistics</th>
<th>MacKinnon Critical Value</th>
<th>The result</th>
</tr>
</thead>
<tbody>
<tr>
<td>RER</td>
<td>0</td>
<td>3.918629</td>
<td>-2.016840</td>
<td>-3.580623</td>
<td>Nonstationary</td>
</tr>
</tbody>
</table>

Table 4.6: The result of unit root test at the first difference of model 2

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number of Lag(s)</th>
<th>AIC</th>
<th>ADF-statistics</th>
<th>MacKinnon Critical Value</th>
<th>The result</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(RER)</td>
<td>0</td>
<td>4.107047</td>
<td>-5.244161*</td>
<td>-4.339330</td>
<td>Stationary</td>
</tr>
</tbody>
</table>

Remarks:  \(D\) is the first difference and \(^*\) is 1% level critical values

According to table 4.5, the dependent variable (RFDI) and three of explanatory variables (GRGDP, RWAGE and RER) are non-stationary at the level. However all of them become...
stationary in the first difference form \((I(1))\) along with table 4.6. By doing this, the model 2 which be occupied to analyze the determinants of Singaporean FDI in Thailand is

\[
D(RFDI_t) = \beta_6 + \beta_7 D(GrGDP_t) + \beta_8 D(RWAGE_t) + \beta_9 D(RER_t) + \beta_{10} AC + u_{2t}
\]

- A Test of Multicollinearity of Model 2

**Table 4.7:** The result of multicollinearity test (model 2)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>TOL</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(GrGDP)</td>
<td>0.354</td>
<td>2.825</td>
</tr>
<tr>
<td>D(RWAGE)</td>
<td>0.783</td>
<td>1.277</td>
</tr>
<tr>
<td>D(PTS)</td>
<td>0.302</td>
<td>3.317</td>
</tr>
<tr>
<td>AC</td>
<td>0.571</td>
<td>1.753</td>
</tr>
</tbody>
</table>

In accordance with table 4.7, all independent variables have TOL values which are greater than 0.1, while for VIF values, they are less than 10. As a result, the model 2 has no multicollinearity problem.

- A Test of Autocorrelation of Model 2

Along with Durbin-Watson Statistic value of model 2 \((d = 2.501040)\), it is not in the zone that we can accept the null hypothesis of no autocorrelation problem. By doing this, model2 may consist of autocorrelation problem. It leads to the using of the autoregressive error model in order to correct this problem.

- Ordinary Least Squares (OLS) Estimation of Model 2

The regression result of the factors which determine FDI from Singapore to Thailand in case of PTS variable and EXR variable are combined to be RER variable (model 2) can be presented as equation:

\[
D(RFDI_t) = -15262.84 + 8214.383 D(GrGDP_t) + 140.4192 D(RWAGE_t) + 28942.15 D(RER_t) - 54773.04 AC + u_{1t}
\]

**Std. Error**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9963.701</td>
<td>3546.783</td>
</tr>
<tr>
<td>1923.159</td>
<td>10201.46</td>
</tr>
<tr>
<td>34227.89</td>
<td></td>
</tr>
</tbody>
</table>

**t-statistic**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-1.531884</td>
<td>2.316039*</td>
</tr>
<tr>
<td>-0.073015</td>
<td>2.837060*</td>
</tr>
<tr>
<td>-1.600246</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:** ** is 5% level critical values and * is 1% level critical values
**The explanation of model 2**

1. The coefficient of D(GRGDP) is positive as expected. It is 8214.383 and significant at a 5% level that means if D(GRGDP) changes by 1 percent, while other factors are constant, D(RFDI) will change in the same direction as D(GRGDP) that is 8214.383 millions bath.

2. The coefficient of D(RER) is positive as expected. Its value is 28942.15 and significant at a 1% level that means if D(RER) changes by 1 bath/SGD, while other factors remain constant, D(RFDI) will change in the same direction as D(RER) that is 28942.15 millions bath.

3. Although the coefficients of D(RWAGE), and AC have signs as expected, they are statistically insignificant.

**4.5.3 Cointegration Test (The Johansen Test)**

The finding that involving variables, which are RFDI, GRGDP, RWAGE, PTS, EXR and RER, are integrated of the same order (I(1)) advocates that a cointegration test should be concerned to test whether the long-run relationship between the variables presents. In this study, the Johansen test will be occupied to test the degree of variables’ integration. This test allows more than one cointegrating relationship and includes the fact that all involving variables are referred as endogenous variables.

- **A Test of Cointegration of Model 1**

**Test of cointegration for all variables (Model 1)**

Table 4.8: The results of Johansen cointegration test for all variables of model 1

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Trace Statistics</th>
<th>5% Critical Value</th>
<th>Maximal Eigen Value Statistics</th>
<th>5% Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>r = 0</td>
<td>104.5534**</td>
<td>88.80380</td>
<td>38.30821</td>
<td>38.33101</td>
</tr>
<tr>
<td>r ≤ 1</td>
<td>66.24521**</td>
<td>63.87610</td>
<td>28.82253</td>
<td>32.11832</td>
</tr>
<tr>
<td>r ≤ 2</td>
<td>37.42268</td>
<td>42.91525</td>
<td>19.45094</td>
<td>25.82321</td>
</tr>
<tr>
<td>r ≤ 3</td>
<td>17.97173</td>
<td>25.87211</td>
<td>14.13462</td>
<td>19.38704</td>
</tr>
<tr>
<td>r ≤ 4</td>
<td>3.837117</td>
<td>12.51798</td>
<td>3.837117</td>
<td>12.51798</td>
</tr>
</tbody>
</table>

Remarks: ** is 5% level critical values
Lag lengths were choosed by using LR statistic.
Critical values for the Trace and Maximal Eigen value test were attained from MacKinnon-Haug-Michelis (1999) p-values
According to table 4.8, there is a conflict between trace statistics and maximal eigen value statistics. Since the trace statistics takes into consideration all of the smallest eigen values, it owns more power than the maximal eigen value statistics (Kasa, 1992; Serletis and King, 1997). Further, Johansen and Juselius (1990) advised the use of the trace statistic when there is a conflict between trace statistics and maximal eigen value statistics. By doing this, we reach the conclusion that there are two cointegrating equations in the model 1.

However, according to this study, only the cointegrating equation which RFDI is treated as the dependent variable is concentrated on. In order to make it more understandable, analyzing the normalized cointegrating coefficients in the VECM presents how the indices adjust in the long run. The results are presented in table 4.9

**Table 4.9:** Normalized the cointegrating coefficients of model 1

*(Standard errors in parentheses) [t - statistic in blankets]*

<table>
<thead>
<tr>
<th>RFDI</th>
<th>GRGDP</th>
<th>RWAGE</th>
<th>PTS</th>
<th>EXR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0000</td>
<td>-5589.264</td>
<td>1207.074</td>
<td>538107.4</td>
<td>-29319.55</td>
</tr>
<tr>
<td></td>
<td>(2072.77)</td>
<td>(599.793)</td>
<td>(187780)</td>
<td>(7362.55)</td>
</tr>
<tr>
<td>[-2.69652]**</td>
<td>[2.01249]</td>
<td>[2.86562]**</td>
<td>[-3.98225]**</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:** ** is 5% level critical values

Due to the normalization process, the signs are reversed to enable proper interpretation (Daneil and Robert, 2009). All variables, with the exception of PTS, have signs as expected and the coefficients of GRGDP, PTS and EXR are statistically significant at 5% critical value. However, as said by the t-statistic, the coefficients can be interpreted as follows

- A 1 % increase in GRGDP leads to a 5589.264 millions bath increase in RFDI in the long- run.
- A 1 unit increase in EXR leads to a 29319.55 millions bath increase in RFDI in the long- run.
- Although the coefficient of PTS is statistically significant, its sign is not as expected.
A Test of Cointegration of Model 2

Test of cointegration for all variables (Model 2)

Table 4.10: The results of Johansen cointegration test for all variables of model 2

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Trace Statistics</th>
<th>5% Critical Value</th>
<th>Maximal Eigen Value Statistics</th>
<th>5% Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( r = 0 )</td>
<td>50.88667**</td>
<td>47.85613</td>
<td>27.13546</td>
<td>27.58434</td>
</tr>
<tr>
<td>( r \leq 1 )</td>
<td>23.75120</td>
<td>29.79707</td>
<td>18.70641</td>
<td>21.13162</td>
</tr>
<tr>
<td>( r \leq 2 )</td>
<td>5.044795</td>
<td>15.49471</td>
<td>3.783656</td>
<td>14.26460</td>
</tr>
<tr>
<td>( r \leq 3 )</td>
<td>1.261139</td>
<td>3.841466</td>
<td>1.261139</td>
<td>3.841466</td>
</tr>
</tbody>
</table>

Remarks: ** is 5% level critical values
Lag lengths were choosed by using LR statistic.
Critical values for the Trace and Maximal Eigen value test were attained from MacKinnon-Haug-Michelis (1999) p-values

According to table 4.10, trace statistics indicate that there is one cointegrating equation in the model 2. However, in order to make it clear in the cointegrating relationship, analyzing the normalized cointegrating coefficients in the VECM makes us to recognize how the indices adjust. The results are presented in table 4.11

Table 4.11: Normalized the cointegrating coefficients of model 2

(Standard errors in parentheses) [t-statistic in blankets]

<table>
<thead>
<tr>
<th>RFDI</th>
<th>GRGDP</th>
<th>RWAGE</th>
<th>RER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00000</td>
<td>-5298.074</td>
<td>-98.49064</td>
<td>-6210.466</td>
</tr>
<tr>
<td></td>
<td>(1721.92)</td>
<td>(459.594)</td>
<td>(830.727)</td>
</tr>
<tr>
<td></td>
<td>[-3.07685]**</td>
<td>[-0.21430]</td>
<td>[-7.47595]**</td>
</tr>
</tbody>
</table>

Remarks: ** is 5% level critical values

From table 4.11, the results are normalized on the RFDI and all variables with the exception of RWAGE have signs as expected. The coefficients of GRGDP and RER are statistically significant at 5% critical value. It can be interpreted according to the t statistic as below
• A 1% increase in GRGDP leads to a 5298.074 millions bath increase in RFDI in the long-run.
• A 1 unit increase in RER leads to a 6210.466 millions bath increase in RFDI in the long-run.

4.5.4 Error Correction Mechanism (ECM)

According to section 4.5.3, the Johansen test estimates of cointegrating relationships in model 1 and model 2. It implies that the long-run equilibrium exists in both of models. However, in order to observe the correction of variable when it moves apart from its long-run equilibrium, ECM is required to analyze. The results of two models are indicated as below

The results of ECM estimation of model 1

\[
D(RFDI_t) = -6941.215 + 1770.942 D(GRGDP_t) - 113.262 D(RWAGE_t) + 498401.6 D(PTS_t) - 164.8058 D(EXR_t) - 0.77358 u_{t-1} + \varepsilon_t
\]

\begin{align*}
\text{Std. Error} & \quad (10649.34) & \quad (3049.644) & \quad (320509.7) & \quad (12409.53) & \quad (0.227047) \\
\text{t-statistic} & \quad (-0.651798) & \quad (0.580705) & \quad (-0.067302) & \quad (1.555028) & \quad (-3.407158) * \\
\end{align*}

\[
R^2 = 0.5089 \quad \text{Adjusted } R^2 = 0.397
\]

Durbin-Watson Stat = 1.829438

Remarks: * is 1% level critical values

According to Durbin-Watson stat, it indicates that there is no evidence of serial correlation. And the results of estimated ECM of model 1 present that the coefficient of \( u_{t-1} \) is statistically significant at 1% critical values and has the negative sign. It implies that RFDI cannot drift too far apart and convergence is attained in the long-run. More specifically, -0.77358 is the estimated speed of adjustment to disequilibrium. It presents how fast equilibrium is restored or approximate time of RFDI to converge to its long-run equilibrium. Or it can be said that in the short run, there is a fluctuation-type relationship exists. But the adjustment will take place within the following time periods, meaning the system settles down rapidly.
The results of ECM estimation of model 2

\[ D(RFDI_t) = -6021.272 + 4149.776 D(\text{GRGDP}_t) + 182.3975 D(\text{RWAGE}_t) + 11614.55 D(\text{RER}_t) - 0.774223 u_{2t-1} + \epsilon_t \]

<table>
<thead>
<tr>
<th>Std. Error</th>
<th>(10002.45)</th>
<th>(2810.013)</th>
<th>(7542.040)</th>
<th>(0.235043)</th>
</tr>
</thead>
<tbody>
<tr>
<td>t-statistic</td>
<td>(-0.601979)</td>
<td>(1.476782)</td>
<td>(0.106753)</td>
<td>(1.539973)</td>
</tr>
</tbody>
</table>

\[ R^2 = 0.484612 \quad \text{Adjusted } R^2 = 0.3949780 \]

Durbin-Watson Stat = 1.871177

Remarks: * is 1% level critical values

Along with Durbin-Watson stat, there is no evidence of serial correlation. And the coefficient of \( u_{2t-1} \) is also statistically significant at 1% critical values as well as it has the negative sign. This can be interpreted that in the short run, there is a fluctuation-type relationship but the adjustment will take place. For example, when \( RFDI \) goes higher than the equilibrium, \( RFDI \) will be accurate automatically by lowering the actual \( RFDI \). However, the speed of adjustment is -0.774223, indicating that most of the discrepancy between the actual and the long-run equilibrium values of \( RFDI \) is eliminated in the following year.

4.6 Conclusions

4.6.1 OLS Estimation of Two Models

Although all estimated coefficients’ signs as expected, not all coefficients are statistically significant. More specifically, the estimated result illustrates that Singaporean FDI in Thailand is stimulated by the growth rate of Thailand domestic market size (GRGDP), the relative Thailand and Singapore price (PTS) and the real relative exchange rate of Thailand and Singapore (RER), respectively.

To explain it more, the coefficient for the GRGDP is as expected, positive, and significant. This indicates that Singaporean FDI in Thailand increases as the growth rate of Thailand market size expands, and vice versa. It corresponds with Schneider and Frey (1985) as well as Nonnemberg and Mendonca (2004) studies. Further, the coefficients of the PTS and RER are also as expected, positive, and statistically significant. That means the amount of FDI from Singapore to Thailand enhances as not only the raise of the relative price of Thailand and Singapore (PTS) but also the increase in the real relative exchange rate of these two countries (RER). To be exact, it suggests that Thai currency depreciation in leads to a more
FDI from Singapore to Thailand. This result is along the lines of the research of Chuleerat Kongruang also Krist, Pornapa and Manop (BOT, 2009).

On the other hand, although the rest of coefficients’ signs are as expected those are the coefficients for the RWAGE and the AC are negative, but the coefficient for the EXR is positive, they are statistically insignificant. To make it clear, in terms of RWAGE; it could be caused by the relative low wage rate that continued to exist in Thai labor market. Therefore, foreign investors have not observed that the rise in wage rates would strongly affect their production costs because Thai wage rates are relatively low. In addition, secondly, it can be clearly see that Singaporean investors pay the attention on the real relative exchange rate (RER) more than the nominal exchange rate (EXR). Therefore, EXR has no influence on Singaporean investors’ decision about investment in Thailand. Lastly, for the Asian crisis (AC), though the crisis took place in the years 1997 to 1999 had the negative effect on Thai economy, it is not significant. This may be caused by, in the crisis period; the Thai government had employed the various policy reforms which promoted and attracted FDI to Thailand. By doing this, the crisis situation was disregarded by Singaporean investors (Sangiam, 2006).

4.6.2 Test of Cointegration and ECM

According to the Johansen cointegration test, these results are presented. Those are, in the model 1, the trace statistics indicate the existence of two cointegrating equations at 5% significant level. It means that two linear combinations exist among the variables in the model 1. While, for the model 2, the trace statistics and maximal eigen statistics present only one of cointegrating equation at 5% significant level.

When we focus on the cointegrating equation or the long run relationship equation which RFDI is treated as the dependent variable, it can be clearly see that in the model 1, all estimated coefficients’ signs with the exception of the sign of PTS are as expected. It reaches the conclusion that in the long run, Singaporean FDI in Thailand is stimulated by the growth rate of Thai domestic market (GRGDP) and the Thai currency depreciation (EXR). While for the model 2, it reaches the same conclusion as the model 1 that in the long run, Singapore’s FDI in Thailand has been attracted by GRGDP and RER.
In terms of ECM, RFDI in both of models can be volatile to movement in general economic conditions. Although RFDI in each model can overshoot its equilibrium, it finally converges back to its fundamental. The reversion back to the long-run equilibrium can be observed from the speed of adjustment parameters which are -0.773587 and -0.774223 in model 1 and model 2, respectively.
CHAPTER 5

CONCLUSIONS

5.1 Conclusions

Over the years, the amount of Singaporean FDI in Thailand has increased continuously. It is caused by not only home country’s factors (or push factors) but also host country’s factors (or pulls factors). In terms of push factors, descriptive approach is used to analyze. It reaches the important points those are, firstly, Singapore has a limited domestic market. And the second is Singapore had to face with fast changing in the Singaporean comparative advantages which is the result of Singapore’s economic development. By doing this, in order to find consistent with market-driven motivations and maintain the competitiveness, Singaporean investors are forced to expand their businesses overseas especially in ASEAN including Thailand.

On the other hand, with the intention of finding pull factors or Thailand’s factors, quantitative approach is employed in this study. The data which is applied to analyze is the set of time series data collected from the year 1981 to 2009. Nevertheless, for variables in the models, they are generated under the location theory of Dunning and Aliber’s currency area theory which comprise of 1) Marketing factor (GRGDP) 2) Cost of production factor (RWAGE) 3) Factor of climate of investment (PTS) and 4) The exchange rate factors (EXR and RER).

However, in this research, OLS technique is occupied to observe the determinants of Singaporean FDI in Thailand. In addition, the Johansen test and ECM are also applied to analyze the long run-relationship among the variables and the adjustment of the variable to its long-equilibrium, respectively. The summary of results are indicated in table 5.1 and 5.2 as below
Table 5.1: The summary of testing results of model 1 and model 2

<table>
<thead>
<tr>
<th>Testing</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) A Test of stationary (ADF test)</td>
<td>- No variables stationary at the level</td>
<td>- No variables stationary at the level</td>
</tr>
<tr>
<td></td>
<td>- D(RFDI), D(GRGDP), D(RAWGE), D(PTS), D(EXR)</td>
<td>- D(RFDI), D(GRGDP), D(RAWGE), D(RER)</td>
</tr>
<tr>
<td>- Stationary at the level</td>
<td>- Stationary at the first difference</td>
<td>- Stationary at the first difference</td>
</tr>
<tr>
<td>- Stationary at the first difference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) A Test of multicollinearity</td>
<td>- No multicollinearity problem</td>
<td>- No multicollinearity problem</td>
</tr>
<tr>
<td>- TOL and VIF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) A Test of autocorrelation</td>
<td>- Autocorrelation problem may exist in model 1</td>
<td>- Autocorrelation problem may exist in model 2</td>
</tr>
<tr>
<td>- The Durbin-Watson test statistic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Testing</td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td>---------</td>
<td>---------</td>
<td>---------</td>
</tr>
</tbody>
</table>
| 4) A Test of cointegration  
  (The Johansen test)  
  - All variables in the model | - Two cointegrating relationships in model1  
  - Concentrate on only cointegrating equation which RFDI is treated as the dependent variable | - One cointegrating relationship in model2 |
| 5) The result of OLS estimation  
  - $R^2$  
  - Variables are significant with their signs | - $R^2 = 0.3602$  
  - $D(\text{GRGDP})^{***} (+), D(\text{PTS})^{**} (+)$ | - $R^2 = 0.3692$  
  - $D(\text{GRGDP})^{**} (+), D(\text{RER})^{*}(+) $ |

Remarks: *** is 10% level critical values, ** is 5% level critical values and * is 1% level critical values
Table 5.2: The result of determinants of Singaporean FDI in Thailand over the years 1981 to 2009 by using OLS estimation

<table>
<thead>
<tr>
<th>Variables</th>
<th>Hypothesis</th>
<th>The result of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(GRGDP)</td>
<td>(+)</td>
<td>- The coefficient’s sign of D(GRGDP) is as expected in both of model 1 and model 2. And it is statistically significant at 10% critical values in model 1 and 5% percent critical values in model 2. This result suggests that the higher growth rate of Thai domestic market leads to the higher of the amount of Singaporean FDI in Thailand, and vice versa.</td>
</tr>
<tr>
<td>D(RWAGE)</td>
<td>(-)</td>
<td>- Although the coefficient of D(RWAGE) is as expected, it is not significant in model 1 and model 2. The reason may be the relative low wage rate that continued to take place in Thai labor market. As a result, Singaporean investors have not observed that increasing in wage will have a strongly effect on their production cost.</td>
</tr>
<tr>
<td>D(PTS)</td>
<td>(+)</td>
<td>- The coefficient of D(PTS) is as expected that is positive and also significant at 5% critical values in model 1. It suggests that increasing in relative price between Thailand and Singapore leads to rise in the amount of FDI from Singapore to Thailand, and vice versa.</td>
</tr>
</tbody>
</table>
### Table 5.2: (Continued) The result of determinants of Singaporean FDI in Thailand over the years 1981 to 2009 by using OLS estimation

<table>
<thead>
<tr>
<th>Variables</th>
<th>Hypothesis</th>
<th>The result of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(EXR)</td>
<td>(+)</td>
<td>The coefficient of D(EXR) is positive but insignificant in model 1. It presents that nominal relative exchange rate between Thai bath and SGD has no influence on Singaporean investors’ decisions to make the investment in Thailand.</td>
</tr>
<tr>
<td>D(RER)</td>
<td>(+)</td>
<td>The coefficient of D(RER) is positive and statistically significant at 1% critical values in model 2. It suggests that Singaporean investors pay more attention on real relative exchange rate (bath/SGD) when compare to nominal relative exchange rate (bath/SGD)</td>
</tr>
<tr>
<td>AC</td>
<td>(-)</td>
<td>The coefficient of AC has sign as expected, negative, but it is not significant in both of model 1 and model 2. These can be caused by in the crisis period; the Thai government had applied the various policies in order to attract more FDI to Thailand. Consequently, Singaporean investors did not pay attention on this problem strongly.</td>
</tr>
</tbody>
</table>
Nevertheless, apart from OLS estimation, this study also observes the long-run relationship among the variables by applying the Johansen cointegration test. In order to recognize how the indices adjust in the long run, analyzing the normalized cointegrating coefficients in the VECM is required. The results present that, in the long run, Singaporean FDI in Thailand is stimulated by GRGDP, EXR and also RER. While for vector error correction model, the results indicate that RFDI in each model can move apart from its equilibrium. But, it will converge back to its fundamental lastly.

However, according to the empirical tests in chapter 4, they lead to the answers of thesis’s hypotheses which are mentioned in chapter 1. Those are, firstly, we cannot reject the first null hypothesis of the determinants of Singaporean FDI in Thailand get along with the eclectic theory of Dunning in terms of marketing factor (GRGDP), climate of investment factor (PTS) and Aliber’s currency area theory which is presented by RER. While, in form of the second hypothesis, we can reject the null hypothesis of the most important determinant of Singaporean FDI is Thai domestic market (GRGDP) is the same as the vital determinant of Japanese FDI in Thailand. Because, according to OLS estimation, the coefficient of GRGDP is not the strongest significance when compare to the coefficient of PTS in model 1 and RER in model 2. It can be clearly see that GRGDP, PTS and RER are the determinants of Singaporean FDI in Thailand, but PTS and RER have more influence on Singaporean investors’ decisions than GRGDP.

5.2 Suggestions for Further Study

1. During the conduct of this research, there are only the eclectic theory of Dunning (Location theory) and Aliber’s currency area theory are followed. Therefore, other interesting theories are possible to include in the further thesis in order to make it more comprehensive.

2. In this research, I observe the determinants of Singaporean FDI in Thailand. Thus, it can be adapted to observe the determinants of others countries’ FDI in Thailand.
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Books


Dissertations


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APPENDICES

Appendix 1

The regression result of the factors which determine FDI from Singapore to Thailand in case of PTS variable is separated from EXR variable (model 1)

```
Dependent Variable: D(RFDI)  
Method: Least Squares  
Date: 04/27/11  Time: 22:09  
Sample (adjusted): 1983 2009  
Included observations: 27 after adjustments  
Convergence achieved after 9 iterations  

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-18850.25</td>
<td>11350.70</td>
<td>-1.660713</td>
</tr>
<tr>
<td>D(GRGDP)</td>
<td>6434.041</td>
<td>3711.637</td>
<td>1.733478</td>
</tr>
<tr>
<td>D(RWAGE)</td>
<td>-508.7915</td>
<td>2039.719</td>
<td>-0.249442</td>
</tr>
<tr>
<td>D(PTS)</td>
<td>914632.2</td>
<td>430125.2</td>
<td>2.126433</td>
</tr>
<tr>
<td>D(EXR)</td>
<td>20098.10</td>
<td>14815.82</td>
<td>1.356529</td>
</tr>
<tr>
<td>AC</td>
<td>-54154.30</td>
<td>35900.56</td>
<td>-1.508453</td>
</tr>
<tr>
<td>AR(1)</td>
<td>-0.218981</td>
<td>0.239491</td>
<td>-0.914359</td>
</tr>
</tbody>
</table>

R-squared      0.360189  Mean dependent var  1333.785  
Adjusted R-squared 0.168245  S.D. dependent var  50823.40  
S.E. of regression 46351.24  Akaike info criterion  24.54430  
Sum squared resid 4.30E+10  Schwarz criterion  24.88026  
Log likelihood  -324.3480  Hannan-Quinn criter.  24.64420  
F-statistic  1.876536  Durbin-Watson stat  2.028798  
Prob(F-statistic)  0.134924  

Remarks: *** is 10% level critical values and ** is 5% level critical values
```
The regression result of the factors which determine FDI from Singapore to Thailand in case of PTS variable and EXR variable are combined to be RER variable (model 2)

<table>
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<th>Coefficient</th>
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<th>t-Statistic</th>
<th>Prob.</th>
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<td>D(RWAGE)</td>
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<td>D(RER)</td>
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Remarks: ** is 5% level critical values and * is 1% level critical values
## Appendix 2

### The Variable of FDI from Singapore to Thailand

(1981-2009)

<table>
<thead>
<tr>
<th>Year</th>
<th>FDI S(^1/) (Millions Baht)</th>
<th>GDP DEFLATED(^2/) (1995=100)</th>
<th>Real FDI S(^3/) (Millions Baht)</th>
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<tbody>
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Explanation and Source of Data

1/ FDI S (Millions Baht) : Singapore’s Direct Investment to Thailand
   Source : Bank of Thailand (BOT)

2/ GDP DEFLATORT : Thailand GDP Deflator (1995=100)
   Source : International Monetary Fund (IMF)

3/ Real FDI S (Millions Baht): Singapore’s Direct Investment to Thailand in Real Term
   Source : Real FDI S = FDI S / GDP DEFLATORT (1995=100)
The Variables of Thailand Real GDP and the Growth Rate of Thailand Real GDP (1981-2009)

<table>
<thead>
<tr>
<th>Year</th>
<th>GDP at market price(^1) (Billions Baht)</th>
<th>GDP Deflator(^2) (1995=100)</th>
<th>Real GDP at 1995 price(^3) (Billions Baht)</th>
<th>Growth Rate of Real GDP(^4) (%)</th>
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Explanation and Source of Data

1/ GDP at market price (Billions Baht) : Thailand Gross Domestic Product at market price
   Source : International Monetary Fund (IMF)

2/ GDP DEFLATOR : Thailand GDP Deflator (1995=100)
   Source : International Monetary Fund (IMF)

3/ Real GDP at 1995 price: Thailand Real GDP at 1995 price
   Source : GDP at market price / GDP Deflator (1995=100)

4/ Growth Rate of Real GDP (%) 
   Source : 
   
   Growth Rate of Real GDP = [(Real GDP_t – Real GDP_{t-1})/Real GDP_{t-1}] * 100
## The Variable of Relative Real Average Wage between Thailand and Singapore (1981-2009)

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<th>Year</th>
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<th>CPIT(^2) (1995=100)</th>
<th>RWAGE(^3) (Baht)</th>
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Explanation and Source of Data

1/ WAGET (Baht) : Thailand Minimum Wage Rate per day
   Source : The Thai Board of Investment (BOI)

2/ CPIT : Thailand Consumer Price Index (1995=100)
   Source : International Monetary Fund (IMF)

3/ RWAGE : Thailand Minimum Wage Rate per day in Real Term
   Source : RWAGET = WAGET/ CPIT (1995=100)
The Variable of Relative Price between Thailand and Singapore
(1981-2009)

<table>
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<th>GDP Deflator S (1995=100)</th>
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Explanation and Source of Data

I/ GDP Deflator S  : Singapore GDP Deflator (1995=100)

Source  : International Monetary Fund (IMF)
The Variables of Exchange rate and Real Exchange Rate between Thailand Singapore (1981-2009)

<table>
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Explanation and Source of Data

1/ EXR : Exchange Rate (Baht/1SGD)
   Source : The Bank of Thailand (BOT)

2/ RER : Real Exchange Rate (Baht/1SGD)
   Source : RER = EXR * PTS
The Variables of Asian Crisis (Dummy Variable)

(1981-2009)

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Note; AC =0 if there is no crisis and AC =1 in the crisis period (1997-1999)