A SURVEY OF DETERMINANTS OF US FOREIGN DIRECT INVESTMENT IN ASEAN-5 COUNTRIES

Dorothy Mehrens, Sam Houston State University Balasundram Maniam, Sam Houston State University James Bexley, Sam Houston State University

ABSTRACT

Since the early 1980's, the flow of US Foreign Direct Investment (FDI) has been an important source of private external finance for developing nations, contributing to their growth and stability. Although it is difficult to predict the destination of US foreign investment abroad due to the multiplicity of factors that influence the decision, numerous studies have examined host country determinants and their relationship to US FDI. The most documented and studied determinants of US FDI include the size of the host country's economy, growth rate of GNP, exports from both the host country and the US, exchange rate fluctuations, and inflation rates in the host country.

The purpose of this paper is to examine seven hypothesis-driven determinants of US Foreign Direct Investment, based on literature studies, and apply these to five of the ASEAN countries to access the significance of each determinant. Statistical data obtained from the years 1985 through 1999 on the following countries; Thailand, Singapore, Malaysia, Philippines, and Indonesia (ASEAN-5) was used in the study. Data analysis used multiple regression analysis to test hypotheses regarding some of the determinants that may influence US FDI. Results from this study show that size of the host country's economy, the host country's total exports, US exports to the host country, inflation rate, exchange rate fluctuations, composite risk index (including political risk, economic risk, and financial risk), and the perception of corruption in the host country serve as a useful model for predicting US FDI in Indonesia, Malaysia, Singapore, and Thailand. Although a few of these indicators weakly correlated with US FDI in the Philippines, the overall model was not useful for this country.

LITERATURE REVIEW

The increase in US FDI in developing countries since the early 1980's has laid the foundation for expansion of international production by multinational corporations throughout the world. Although industrialized countries continue to attract the greatest proportion of US FDI, their share is beginning to erode, as developing countries are becoming increasingly attractive targets for investment (Mallampally and Sauvant 1999). As US FDI flows to developing countries continue to grow, the effort to determine the factors that influence these flows has become an increasingly attractive area of research.

The theoretical foundation for evaluating factors that influence the flow of US FDI into developing countries can be found in the sizable body of existing literature. The Eclectic Theory of International Production developed by John Dunning identifies three categories of determinants that multinational corporations (MNC) must perceive as advantages before directly investing in a foreign country; 1) location advantage, 2) ownership advantage, and 3) internalization advantage (1980). First, the host country must possess some locational advantage that will attract investors. This is usually determined in the availability of natural resources, market size or potential market size, and lower costs. Second, the investing corporation must have an ownership advantage over competitors in the host country. This is usually in the areas of technology, marketing, or financial resources. Third, there must be an internalization advantage that would persuade companies to chose FDI over other strategies such as licensing, franchising, or exporting (Yue 1996).

Location advantage determinants

Econometric studies examining a variety of countries indicate a strong positive correlation between FDI and the size of the market (usually measured by GDP) as well as other characteristics that would determine market size, such as average income levels and growth rates (Marr 1997). However, some low-income countries with large markets may fail to attract large FDI flows. Given the questionable circumstances of achieving adequate product sales in a low-income country, other economic and political determinants may have a greater impact on FDI decisions in this situation.

However, domestic market factors are less important in export-oriented corporations. The relative size of the export sector in a host country may be a significant determinant of US FDI in that region. The export sector reflects an openness of the host country's economy that may be attractive to US companies that manufacture goods for export (Marr 1997).

Ownership advantage determinants

There is strong evidence in the literature that supports the importance of ownership advantages in FDI. Many of the ownership advantage determinants are microeconomic in nature and include firm size and multinational experience. According to Chandprapalert, firm size seemed to be the most significant factor in establishing an ownership advantage (2000). The determination of this relationship can readily be explained by the fact that larger corporations have a greater ability to absorb losses than smaller firms, so they tend to invest overseas and are less sensitive to uncertainty effects.

Other studies have also established a relationship between a firm's multinational experience and the extent of FDI, although, in the case of Thailand, this relationship was shown not to be statistically significant (Chandprapalert 2000). The reason for this discrepancy may be that Thailand is seen as a opportunity gateway to other neighboring countries, including Mynamar and Indonesia, that have a potential market of more than 120 million customers.

Internalization determinants

Inflation rate instability can influence FDI inflows into a host country. High levels of continually rising inflation will discourage multinational companies from investing in a host country due to the volatility and instability of prices. In the case of Brazil, higher levels of FDI were attainable once the country controlled its inflation rate (Ogier 2000).

The rapid rise of FDI over the past few decades has heightened interest in the relationship between FDI flows and exchange rates (Tomlin 2000). Numerous studies have established the exchange rate level as a vital determinant of FDI, however, exchange rate volatility has also been shown to have a deterrent effect on FDI (Campa 1993). Foreign currency exchange rate volatility in part aggravated the Asian crisis, as many of these nations financed their infrastructure development with short-term foreign currency debt. Since that time, Asian

governments have targeted long-term FDI as a way to build infrastructure without incurring short-term foreign debt (Gavieta 2001).

The use and evaluation of political risk as a US FDI determinant remains unclear. When the host country possesses abundant resources, no further incentive may be required (Marr 1997). As long as a company is able to operate profitably without any undue risk to its capital and personnel, the threat of political risk is minimized and may not be a factor at all. However, the importance of political and social stability is clearly demonstrated in the case of the Philippines. Political instability in the 1970's and 1980's contributed to the country being by-passed by foreign investors at a time when FDI inflows to the region surged (Yue 1996). However, investors became increasingly interested in the Philippines in the mid 1990's as political and social stability returned to the country.

Corruption may determine a country's ability to attract foreign capital. In studies done by Wheeler and Mody, there was no significant correlation between the size of FDI and the host country's risk factor, which included corruption among other variables (1992). However, other studies have shown a negative correlation between corruption and FDI in some countries (Lambsdorff 1999). Overall, no consensus of the impact of corruption on FDI, either negatively or positively, has been shown. The impact is more likely country specific and weighed in conjunction with other FDI determinants.

FDI TRENDS IN ASEAN-5

Over the last two decades, ASEAN-5 economies have experienced sustained FDI inflows, although the magnitude of the inflow has changed over time. From the mid 1970's to mid 1980's, FDI increased moderately, but from 1986 FDI increased rapidly with figures in 1996 more than eight times that of 1986 (Fan 2000). This trend was seen throughout Asia in the 1990's, as FDI jumped well beyond levels recorded in any other developing regions (Encarnation 1995). This increase in FDI inflows primarily represents the relaxation policies of the ASEAN-5 countries pertaining to manufacturing activities and trade. Several of these countries, including Indonesia and Malaysia have abundant natural resources, such as oil and minerals. Singapore and Malaysia were able to attract FDI by their stable macroeconomic conditions, high quality infrastructure, and the availability of a skilled workforce (Fan 2000). The continued political

unrest in the Philippines during the 1980's has served as a major deterrent to FDI inflows.

The Asian financial crisis in 1997 severely affected the economies of the ASEAN-5 countries. Despite this, the FDI inflows into these countries as a whole continued to grow although individual country's FDI varied. Indonesia and the Philippines saw a fall in FDI, while Singapore and Thailand increased FDI. Malaysia maintained its previous level of FDI inflows. Overall, FDI showed greater stability during the Asian financial crisis than other forms of investment and capital inflows (Fan 2000).

The Asian financial crisis also provided an opportunity for Asia-Pacific nations to examine and implement regulatory and institutional reform to help avert further crisis. The reform improved the overall business environment from an FDI perspective (Thompson and Poon 2000) and fostered a more liberal attitude toward FDI. In general, all of the Southeast Asian governments perceive the potential benefits of FDI to outweigh the potential costs. The financial and non-financial contributions of FDI are increasingly recognized as important elements in a nation's economic development and long-term growth. Foreign investment benefits many of the Southeast Asian nations by introducing new skills and technologies, generating new jobs, creating linkages with domestic firms, and providing competition for lackluster domestic firms (Yue et al. 1999). These benefits add value that is more attractive than borrowing as a means to access foreign capital for development purposes, in addition to promoting greater stability in their economic foundation.

Selection of Determinants for Analysis

The factors evaluated in this analysis are listed below according to potential advantage categories, as described by Dunning (1980). Since ownership advantage is more of a microeconomic (firm-specific) issue, determinants from this category were not selected for testing of this model. FDI data from 1985 to 1999 was collected from the Department of Commerce-Bureau of Economic Analysis. Data used for the determinants was obtained from Key Indicators of Developing Asian and Pacific Countries 2000 Volume XXXI, Transparency International, and the International Country Risk Guide (ICRG).

Location Advantage Determinants

First, is the size of host country's economy (GNP/C)- as measured by GNP per capita in this study. FDI is positively influenced by this factor (Dunning 1980) and is expected to have a positive sign. This is considered a long-term strategic factor, as the size of the economy is not altered too quickly (Zurawicki 1997). Second, is the US exports to the same country (USex) -This factor has been shown to be strongly correlated with FDI to a specific country (Lin et al. 2001, Gross and Trevino 1996) and is expected to be positive. Third, is the total exports from a specific country (COex) - Most studies have focused on comparing outward FDI with the total exports of a specific country. Typically, a higher outward FDI is associated with lower exports, resulting in a negative relationship. However, other studies have shown that the correlation is positive as other (El-Ostra 1996).

Internalization Factors

First, is the rate of inflation in host country (INFL) -This was shown to correlate negatively with FDI in previous studies (Schneider and Frey 1985) and would be expected to have a negative sign. Second, is the fluctuations in exchange rate (ER) - Lin et al showed that an appreciating exchange rate was an important determinant in the decision of a firm to invest overseas (2001). Fluctuations in exchange rate were important in influencing the volume of FDI in a particular country, but other factors relating to the structure of the economy could play a more significant role (Lin et al. 2001).

Third, is the composite risk index (CRI) - This index is based on the ICRG rating system of 0 to 100 with 50% based on political risk and 25% on financial and economic risk, respectively (Erb et al. 1996). This determinant may be expected to correlate negatively with FDI, in that a higher risk index number would potentially influence less FDI in a host country. The expected sign for this determinant is negative, however, this type of information is highly subjective and may not be applicable in some cases (Broadfoot 1998). Fourth, is the Corruption Perception Index (CPI) - (based on scale of 0 to 10 with 0 being highly corrupt and 10 being highly clean). The Internet Center for Corruption Research provides the Transparency Institutes Corruption Perception Index, a comparative assessment of a country's integrity performance. The CPI is a composite index that is determined using multiple sources compiled by the World Bank, Political & Economic Risk Consultancy, Institute for Management Development, IMD, Switzerland, PricewaterhouseCoopers, Economist Intelligence Unit, Freedom

House, and the World Economic Forum. This determinant would be expected to positively correlate with FDI since the lower number indicates high corruption and would be expected to lower FDI. Since there has been no consensus data on the correlation of CPI to FDI, this determinant is likely to be country specific and influenced be other determinants.

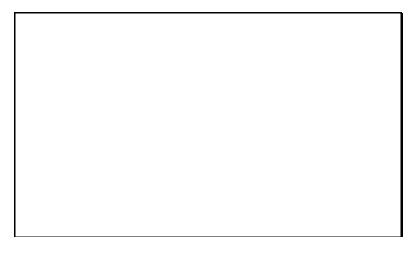
RESULTS AND ANALYSIS

As extensively discussed in the literature, US Foreign Direct Investment in the ASEAN-5 countries has been on the rise since the early 1980's. Figure 1 shows the total US FDI in the ASEAN-5 countries from 1985 to 1999. Figure 2 shows individual US FDI in each of the ASEAN-5 countries (Indonesia, Malaysia, the Philippines, Thailand, and Singapore). Most notable is the dramatic increase in US FDI in Singapore since 1990 compared to the other nations.



To examine the significance of each of the determinants, multiple regression analyses using the ordinary least square (OLS) was done. Equation 1 was used to test the hypothesis that GNP per capita, the host country's total exports, US exports to the host country, inflation rate, exchange rate fluctuations, composite risk index (including political risk, economic risk, and financial risk), and the perception of corruption in the host country have a significant effect on US FDI in Indonesia, Malaysia, Singapore, Thailand, and the Philippines. Table

1 provides the coefficients and their corresponding p-values (a =.05) for the testing period (1985 to 1999), as well as the R^2 value, F-statistics, and p-statistics



for each country in the model.

```
Equation 1:  \begin{aligned} & \text{FDI}_{\text{ US}} / \text{GDP}_{\text{CO}} = {}_{\_0} + {}_{\_1} (\text{GNP/C}) \, \underline{\hspace{0.5cm}}_{\_2} (\text{US}_{ex}) + {}_{\_3} \, \underline{\hspace{0.5cm}}_{\_4} (\text{INFL}) \\ & + {}_{\_5} (\text{ER}) + {}_{\_6} (\text{CRI}) + {}_{\_7} (\text{CPI}) + \underline{\hspace{0.5cm}}_{\_} \end{aligned}
```

Based on R² values, the model is a good fit for Indonesia, Malaysia, Singapore, and Thailand (see graphics Figure 3). This model is not a good predictor of determinants for US FDI in the Philippines. Only 45% of the variation in the model can be attributed to the determinants, based on R². Additionally, the p-statistic for this model is greater than alpha, which means that the model using these determinants in not useful in predicting US FDI in the Philippines. This finding is not entirely surprising as the Philippines has undergone significant socioeconomic turmoil throughout the 1980's and 1990's.

To evaluate the significance of each individual determinant to the overall contribution of the model, partial t-statistics were examined. Table 2 shows the partial t-statistics for each determinant in each country.

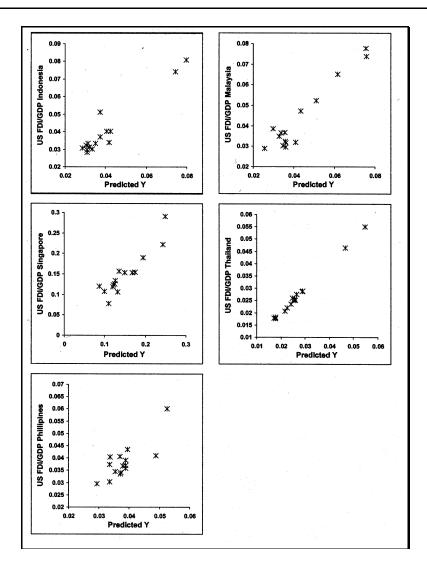
The average exchange rate was shown to be a significant determinant of US FDI in Malaysia and Thailand, while GNP per capita, US exports, inflation rate, and composite risk index were significant determinants of US FDI in

Thailand. Other individual determinants were not statistically significant based on partial t-statistics for the other countries in this model.

Table 1: Regression Analysis of the Determinants of US FDI in ASEAN-5 1985 to 1999 (p-values)					
Coefficients	Indonesia	Malaysia	Singapore	Thailand	Dhilinnings
					Philippines
_0	0.0798	0.2731	0.1333	0.3111	0.1522
_1	0.7395	0.2889	0.6175	0.0005	0.2045
_2	0.2840	0.8645	0.4518	< 0.0001	0.9071
_3	0.8341	0.5866	0.7763	0.2454	0.8815
_4	0.9336	0.2192	0.3315	0.0929	0.6199
_5	0.9038	0.0409	0.1482	0.0005	0.9716
_6	0.7328	0.4844	0.2131	0.0105	0.2057
_7	0.3665	0.4186	0.4302	0.0003	0.7693
R^2	0.82	0.82	0.84	0.95	0.45
Adjusted R ²	0.74	0.74	0.58	0.89	0.19
F-Statistics	11.35	11.47	5.24	236.70	1.83
P-Statistics	0.0024	0.0023	0.0220	< 0.0001	0.2216

Table 2: Regression Analysis of the Determinants of US FDI in ASEAN-5 1985 to 1999 (partial t-statistics)						
Coefficients	Indonesia	Malaysia	Singapore	Thailand	Philippines	
_0	2.048124*	-1.18932	-1.6983	-1.09163	1.606562	
_1	-0.34597	1.147375	0.522342	5.987625*	-1.39892	
_2	-1.16015	0.177004	0.796668	-8.33801*	0.121028	
_3	0.217391	-0.56978	-0.29533	1.267851	0.154652	
_4	-0.08639	-1.34947	-1.04329	-1.94497*	0.518726	

_5	0.125371	2.500909*	1.624757	6.068079*	0.036918	
_6	0.355298	-0.73812	1.369542	-3.46199*	1.395042	
_7	0.965457	0.859416	0.837067	6.608829*	0.304915	
* indicates significance at the 95% confidence level						



Since the overall model was determined to be useful (based on p values) and a good fit (based on R^2 values) for four countries, a correlation analysis was conducted to investigate which of the determinants correlated with US FDI. This analysis can provide additional information on the determinants that correlate with US FDI in these countries and may be useful for future studies and modeling. Table 3 shows the results of this analysis.

Table 3. Correlation Matrix of US FDI Determinants						
	US FDI/GDP Indonesia	US FDI/GDP Malaysia	US FDI/GDP Singapore	US FDI/GDP Thailand	US FDI/GDP Philippines	
US FDI/GDP	1.000	1.000	1.000	1.000	1.000	
GNP/capita (converted to US \$)	-0.439	0.489	0.692	0.200	0.168	
US exports to country	-0.407	0.680	0.728	0.291	0.452	
Total exports from country	0.346	0.757	0.716	0.569	0.548	
Rate of inflation (change in CPI)	0.788	0.249	-0.341	-0.184	0.023	
Exchange rate (average)	0.872	0.812	-0.464	0.893	0.595	
Composite Risk Index	0.093	0.579	0.649	0.263	0.449	
Corruption Perception Index	0.196	-0.205	0.154	0.740	0.419	

In the case of Indonesia, GNP per capita and US export were weakly negatively correlated. Although this is an unexpected result, the reason for this may be that there is little relationship between the decisions of US multinational corporations to invest in Indonesia to the size of the market. Indonesia is rich in natural resources and this may be a more attractive determinant than the actual size of the market, especially if companies are more apt to export their goods from Indonesia. The rate of inflation and average exchange rate in Indonesia were strongly correlated with US FDI. Apart from the years surrounding the Asian crisis, the inflation rate in Indonesia has remained fairly stable at a moderate rate of 6 to 9%. The average rate of exchange has fluctuated greatly over this time period, consistent with other studies that found fluctuations in this determinant to correlate with US FDI. Composite risks and corruption were not found to correlate with US FDI in Indonesia.

In Malaysia, there was a weak correlation between GNP per capita and US FDI. As with Indonesia, the market size may not be a relevant factor compared to other determinants that may attract FDI. However, export from the US, total exports from Malaysia, and average exchange rates were shown to be strongly correlated to US FDI. Again, these factors have been shown to correlate with FDI in other studies. The composite risk index for Malaysia was only weakly correlated with FDI. Corruption perception index and rate of inflation showed no relationship to US FDI in this country.

GNP per capita, exports from the US to Singapore, total exports from Singapore, and composite risk index were correlated to US FDI in this country. Singapore is considered a wealthy nation with little political, economic, or financial risk by Asian standards, thus explaining the correlation in these determinants. Other determinants tested for this model showed no or little correlation with US FDI in Singapore.

In the case of Thailand, total exports from the country were weakly correlated with US FDI, while the average exchange rate and corruption index perception were strongly correlated. Again, other studies have shown that fluctuations in exchange rates are correlated with FDI. The corruption perception index for Thailand averaged between two and three for the period measured, indicating little perceived corruption in this country. It is likely that perceived lower governmental corruption may positively influence US FDI, however, in cases where a company can operate without great fear of foreign government intervention, the corruption perception may not be a valid determinant.

Of the seven determinants tested for the Philippines, only five showed a weak correlation to US FDI in the country. The average exchange rate showed the highest correlation with a value of .595. The second determinant with the highest correlation to US FDI in the Philippines was total exports from the Philippines with a value of .548. Other weakly correlated determinants included composite risk index, corruption perception index, and US exports to the Philippines. Surprisingly, GNP per capita showed no correlation with US FDI in the country.

SUMMARY AND CONCLUSIONS

This paper tested seven hypothesized determinants of US FDI in the ASEAN-5 countries (Indonesia, Malaysia, Singapore, Thailand, and the Philippines). These determinants included the size of the host country's

economy, the host country's total exports, US exports to the host country, inflation rate, exchange rate fluctuations, composite risk index (including political risk, economic risk, and financial risk), and the perception of corruption in the host country. This model was tested using ordinary least square (OLS) regression. Overall, the model was shown to be a good predictor of US FDI in Thailand, Singapore, Malaysia, and Indonesia. However, the model was not a good indicator of US FDI in the Philippines. To investigate further each of the determinants, a correlation matrix was performed. Surprisingly, GNP per capita (as used as a measure of the market size) was only weakly positively correlated with US FDI in Singapore and Malaysia. This may be an interesting finding, as these are the two wealthiest countries (based on GNP per capita) in this study. US exports were moderately correlated with US FDI in Singapore and Malaysia, while total exports from these countries were more strongly correlated. The rate of inflation only correlated with US FDI in Indonesia while the rate of currency exchange was strongly correlated with US FDI in Indonesia, Malaysia, Thailand, and to a lesser extent, Singapore. The Composite Risk Index for each country only weakly, if at all, correlated with US FDI in these countries. The same is true with the Corruption Perception Index, except in the case of Thailand, where a strong correlation was seen with US FDI.

As previously discussed, investigating the determinants of US FDI in developing countries can have multiple outcomes. The decision of US companies to invest abroad depends on many factors. This paper sought to test a few of the determinants for US FDI in the ASEAN-5 countries and although there is no consensus on the importance of the individual factors that make up the model, the overall results indicate that the model is useful for four of the five countries tested. Further studies should focus on the use of alternative determinants for measuring the size of the market, as well as other location and internal determinants.

REFERENCES

- Broadfoot, R. (1998). The importance of political risk. *Political and Economic Risk Consultancy*, *Ltd.* http://www.asiarisk.com/library5.html
- Campa, J. M. (1993). Entry by foreign firms in the US under exchange rate uncertainty. *Review of Economics and Statistics*, 75:614-22.

- Chandprapalert, A. (2000). The Determinants of Foreign Direct Investment in Thailand: A Survey of Managerial Perspectives. *Multinational Business Review*, 8:82-9.
- Dunning, J. H (1980). Toward an eclectic theory of international production: some empirical tests. *Journal of International Business Studies*. 11:9-31.
- El-Ostra, B. & C.R. MacPhee (1996). International Trade, Foreign Direct Investment, and Domestic Market Performance. *Eastern Economic Journal*, 22:63-75.
- Encarnation, D. J. (1995) Regional Competition for Foreign Direct Investment? Asia and the Global Operations of Multinational Corporations. Paper presented at the High-Level Roundtable on Competition for Direct Foreign Investment- Implications for Asia and the Pacific. Bangkok, Thailand. http://www.ap.harvard.edu/papers/RECOOP/Encarnation/FIAS.html
- Erb, C. B.; Harvey, C. R. & T. E. Viskanta (1996). Political Risk, Economic Risk and Financial Risk. http://www.duke.edu/~charvey/Country_risk/pol/pol.htm
- Fan, X. & P. M. Dickie (2000). The contribution of Foreign Direct Investment to Growth and Stability: A Post-Crisis ASEAN-5 Review. *ASEAN Economic Bulletin*, 17:312-24
- Gavieta, R. C. (2001). Currency Exchange Rate and Financing Structure: A Southeast Asian Developing Country Perspective. *Journal of Project Finance*, 6:49-53.
- Grosse, Robert, Len Trevino (1996). Foreign direct investments in the United States: an analysis by country of origin. *Journal of International Business Studies*, 27:139-55.
- Key Indicators of Developing Asian and Pacific Countries. Volume XXXI. ADB Oxford University Press (China). 2000. http://www.adb.org/Documents/Books/Key_Indicators/2000/default.asp?p=ecnm#content

- Lambsdorff, J. G. (1999). Corruption in Empirical Research. Transparency International Working Paper, November. http://www.gwdg.de/~uwvw/icr.htm
- Lin, Y., Szenberg, M. & T. J. Webster (2001). Determinants of Foreign Direct Investment: Taiwain, 1965-1993. *Journal of Applied Business Research*, 17:15-28.
- Mallampally, P. & K. P. Sauvant (1999). Foreign Direct Investment in Developing Countries. *Finance and Development*, 36:1.
- Marr, A. (1997). Foreign Direct Investment Flows To Low-income Countries: A Review of the Evidence. http://www.odi.org.uk/briefing/3_97.htm
- Ogier, T. (2000). Brazil: FDI still on a roll. Business Latin America, 12/11
- Schneider, F. & B. S. Frey (1985). Economic and political determinants of foreign direct investment. *World Development*, 13:161-75.
- Thompson, E. R. & Jessie P.H. Poon (2000). ASEAN after the Crisis: Links between Foreign Direct Investment and Regulatory Change. *ASEAN Economic Bulletin*, 17:14.
- Tomlin, K. M. (2000). The effects of model specification on foreign direct investment models: An application of count data models. *Southern Economic Journal*, 67:460-9.
- Wheeler, D. and A. Mody (1992). International Investment Location Decisions: The Case of U.S. Firms. *Journal of International Economics*, 33:57-76.
- Yue, Chia Siow (1996). ASEAN strategies on Direct Foreign Investment and Prospects for ASEAN-India Investments. *Journal of Asian Economics*, 7:701-22.
- Yue, C. S. & Freeman, N. B. Bijit & S. Urata (1999). East Asia and Options for WTO 2000 Negotiations on Investment. Paper presented at the World

Bank-PECC Trade Policy Forum Conference on East Asia and Options for WTO 2000 Negotiations. Manilla July

Zurawicki, L. (1997). Fashion and Fancy in Foreign Direct Investment. http://www.mgmt.umb.edu/journal/fashionrev.htm