FOREIGN DIRECT INVESTMENT AND ENVIRONMENTAL DEGRADATION IN ASEAN-7

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FOREIGN DIRECT INVESTMENT AND ENVIRONMENTAL DEGRADATION IN ASEAN-7

By

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ABSTRAK

Aliran utama menunjukkan kesan alam sekitar semakin buruk sebagaimana yang dapat dilihat pada dekad-dekad yang lepas. Kajian ini bertujuan untuk meneroka hubungkait diantara pencemaran alam sekitar dan pelaburan terus dari luar (FDI) bagi tujuh buah negara ASEAN iaitu Malaysia, Singapua, Indonesia, Thailand, Filipina, Vietnam dan Laos bagi tempoh bermula dari 1995 hingga 2002. Kajian ini dijalankan untuk menyiasat samaada aktiviti FDI dan syarikat luar memberi kesan terhadap penurunan kualiti alam sekitar di dalam wilayah ini.

Selain daripada FDI, pelaburan domestik, perbelanjaan kerajaan dan keluaran dalam negara kasar juga diambil kira, dengan tujuan untuk memastikan yang manakah mengakibatkan pencemaran alam sekitar.

ABSTRACT

All major trends of environmental degradation acceleration have been seen especially in the past decade. This study attempts to explore the relationship between environmental pollution and Foreign Direct Investment (FDI) for seven ASEAN nations consist of Malaysia, Singapore, Indonesia, Thailand, The Philippines, Vietnam and Lao PDR for the period covered from 1995 to 2002. This study is conducted to investigate whether the activities of FDI and foreign companies do in fact contribute to the deterioration of environmental quality in the region.

Besides FDI and foreign firms, domestic investment and government spending are also taken into consideration, to find what is primarily responsible for increases in pollution, and analyzing the potential similarities, differences, and relationships among the factors.

Chapter 1

INTRODUCTION

1.1 Introduction

This chapter consists of seven sections to give an overview of the outline of this study. The first three sections introduce the background of the study, discuss the problems and explain the objectives of the study. The following sections state the research questions, the significance of the study and definition of key terms used in the study. The last section provides an overall view to the organization of the remaining chapters.

1.2 Background of the Study

Many developing countries have a strong orientation towards economic development and industrialization. In order to achieve high economic growth the governments normally welcome foreign investments. The importance of foreign investment for developing countries striving to boom and industrialize their economies is therefore undeniable. Also, multinational corporations (MNCs) are seen by the governments of developing countries as an important source of offering employment opportunities, creating business opportunities for local business-people and transferring of advanced technologies to the local communities.

The Association of Southeast Asian Nations (ASEAN) has investment cooperation agreements to promote an attractive investment destination and to contribute to stimulate foreign direct investments (FDIs) by multinational corporations (MNCs) into

this region. Over the last decade, though FDI inflow to ASEAN countries fluctuated tremendously, the upward FDI inflow trend for ASEAN was demonstrated in several years. That may be because the strength of ASEAN cooperation reinforces this region to be a source of competitiveness in production costs and advantage in access to a customer base (Uttama, 2005).

However, there are also negative consequences that followed economic development brought in by foreign investment. The increase in environment pollution is one of these (Fumitaka**,** & May Chiun LO, 2005).

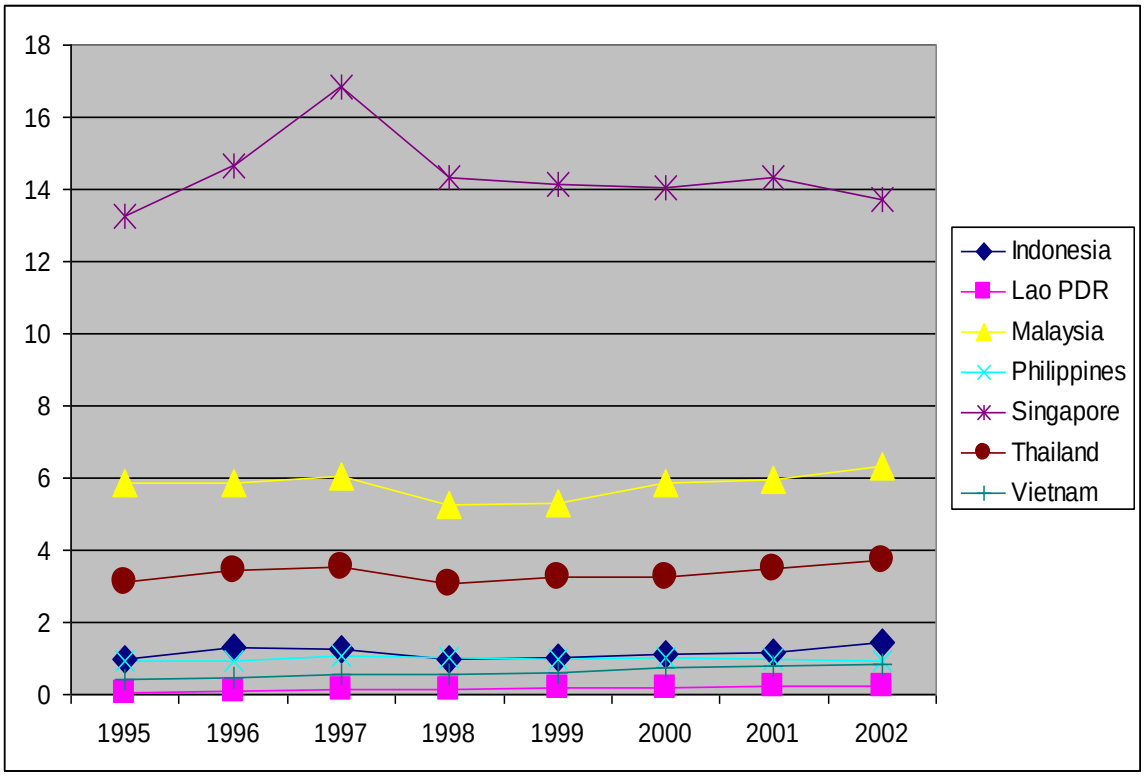

Figure 1.1: CO2 emissions in ASEAN nations from 1995 to 2002.

Figure 1.1 above illustrates the carbon dioxide (CO2) emissions in all the seven ASEAN nations for the period, 1995 to 2002. In general, Singapore suffered the most serious CO2 emissions, followed by Malaysia, Thailand, Indonesia, The Philippines, Vietnam and Lao PDR. It indicates that between the higher income and lower income countries, it is evident that higher income countries suffered a higher level of environmental degradation than those lower income countries.

Yasmine et al (2007) revealed that carbon dioxide emissions are on the rise in the ASEAN nations. This trend is expected to persist in the future if no extra efforts are made to improve the prevailing situation. Indeed, not only is carbon dioxide increasing but its increasing trend parallels the increasing FDI trend in the ASEAN nations. Therefore, it warrants an examination of the relationship between FDI and the greenhouse gas. This is even more significant since the reduction of carbon dioxide emissions metric tons per capita is an indicator adopted by the United Nations for its Millennium Development Goals (MDGs) to measure environmental sustainability. In addition, the United Nations advocates the integration of the principles of sustainable development into country policies and program to mitigate the environmental deterioration and to reverse the loss of environmental resources. As such, the ASEAN nations are expected to be given specific targets to reduce CO2 emissions eventually.

The facts that rapid economic development is often accompanied by the deterioration of the environment and that some MNCs make use of the often relatively lenient or lax standards of environmental control in the host countries are often either

underestimated or overlooked. The strong developmental orientation and the pursuit of industrialization in developing countries inevitably cause environmental deterioration in their countries and unwittingly open the doors for the 'export of pollution'.

On the other hand, the Organization for Economic Co-operation and Development (OECD) (1999) claimed that in fact FDI contribute significantly on the positive environmental effects in the countries they invested. FDI flows are increasingly important particularly in non-OECD countries in providing the resources and capacity which are necessary in environmental and infrastructure challenges. Indeed, the development impact of FDI is not only in money terms but also its positive effect including the transfer of modern environmentally friendly technology and management practices in the host countries.

Malaysia has undeniably been one of the leading industrial economies in the Southeast Asia in the past decade. The success has largely been due to government policies and FDI from many MNCs that have resulted in tremendous economic growth However, the success also brought with it an environmental problem-industrial waste pollution (Kadaruddin & Azilah, 2002).

Malaysian domestic businesses, which are mostly less endowed in terms of capital and not used to strict environmental regulations, may have contributed to the environment pollution as well. The purpose of this study is to provide an insight and understanding of the possibility of the deterioration of environmental quality which are caused by MNCs or the local businesses. The government proactive environmental

protection actions that are related to industries and foreign investment will also be highlighted. Finally, the study discusses several strategies to reduce or alleviate the environment deterioration.

1.3 Problem Statement

All major trends of environmental degradation acceleration such as greenhouse gas emissions, deforestation, loss of biodiversity have been prominent especially in the past decade. To a large extent, these kind of environmental damages have been caused by increased economic activity, to which FDI is an increasingly significant contributor. The last decade has seen not only a rapid proliferation in FDI and related trade flows, but also unprecedented environmental destruction and depletion. Flows of natural resource-based commodities and investments are predicted to continue to rise faster than economic output. It is therefore critical to understand the environmental effects of FDI and to identify appropriate responses.

In the study of Zarsky (1999), the relationship between FDI and the environment focuses on the 'pollution havens' hypothesis (PHH). It leads to the fear of the 'race to the bottom', as in the developed world the costs of complying with environmental regulations appear to be expensive, the foreign companies will move operations to developing countries to take advantage of less stringent environmental regulations. It was predicted, then, that this would result in those FDI where the activities are related particularly in the pollution-intensive industries to more countries with lax environmental standards. It is also sometimes assumed that many developing countries may intentionally undervalue their environment standards in order to attract new investments. Anyhow, it is

clear that both ways would lead to excessive levels of pollution and environmental degradation in developing countries.

The alternative view of FDI is that foreign firms by entering into these developing countries, they will raise the production quality standards of domestic firms, the using newer, cleaner technology and better environmental management systems, and the resulting so-called 'pollution-halo effect'(Zarsky, 1999) will lead to better environmental quality.

This study extends from Zarsky (1999) to examine the relationship between environmental pollution and FDI for seven ASEAN nations consist of Malaysia, Singapore, Indonesia, Thailand, The Philippines, Vietnam and Lao PDR for the period covering 1995 to 2002. This study is conducted to investigate whether FDI and the activities of foreign companies do in fact contribute to the deterioration of environmental quality in the region.

In addition, even if FDI is not driven by lower environmental regulations in the host country, it is possible that the environmental quality of developing countries will be undermined locally by their own domestic investments due to the lack of capital and technology resources. Therefore, the possibility of pollution caused by the domestic events is explored as well. Given that domestic firms are more knowledgeable about country specific operations it is possible that they would operate more according to the PHH. Therefore besides FDI and foreign firms, domestic investment and government spending are also taken into consideration, to find what is primarily responsible for

increases in pollution, and to analyze the potential similarities, differences, and relationships among the factors.

1.4 Objective of the Study

The main objective of this study is to provide an empirical evidence whether the FDI contribute adversely to the environmental quality of ASEAN-7 or otherwise. Specifically this study has the following objectives.

1. To examine the impact of FDI on environment degradation of the region.
2. To determine whether domestic investments have contributed to the deterioration of the environmental quality.
3. To determine whether the government spending has an impact on environmental quality.

1.5 Research Questions

Three research questions have been developed to investigate on the FDI and the environmental quality in the ASEAN countries:

1. Do the activities of FDI in the region affect the level of environmental quality?
2. Do domestic investments contribute to the deterioration of environmental quality?
3. Does government spending have an impact on environmental quality?

1.6 Significance of Study

1.6.1 Practical Approach

This study will contribute to the society in the following practical areas:

- To serve as a reference for any parties who are interested to understand the environmental quality that might be influenced by the business investment activities especially Foreign Direct Investments (FDIs).
- To provide some background analysis on the environmental effect particularly related to the ASEAN countries and Malaysia.

1.6.2 Academic Approach

This study will make contributions to the academic field as follows:

- Contribute to Malaysian literature in the area of environmental quality where thus far no published studies were found.
- To increase understanding on the corporate social responsibility phenomenon by focusing on environmental issue.

1.7 Definition of Key Terms

The following key terms are defined to provide a common understanding in this study:

1. Foreign Direct Investment (FDI)
    i. It occurs when foreign investors establish businesses inside a foreign country. There are three forms of FDI: (1) Greenfield investments, (2) cross-border merger and acquisition type of investment and (3) brownfield investments (Abenaa A. & Oti-Prempeh, 2003).
    ii. Foreign investment can be defined as the investment outside the boundary of the investing side's home country to the host countries. (Hakan, Selim & Onur, 2004).

iii. As Lipsey (2002) mentioned, FDI can be classified according to the objectives, such as horizontal FDI and vertical FDI. The main purpose of horizontal FDI is to serve foreign customers. This type of investment is known as market-seeking FDI. In contrast, for vertical FDI uses natural resource and emphasizes on export-orientation. It also includes non-market seeking FDI, where goods are produced in the host country and sold abroad. Furthermore, production platform-seeking FDI provides the platform for production and sales to serve regional export markets and resource-seeking FDI which possesses distinct dynamics such as obtaining access to relatively scarce or low priced natural resources can also be considered within this category of vertical FDI.

2. Pollution Haven Hypothesis (PHH)

   The potential existence of pollution havens which are related to lax environmental standards imposed in the host countries and their affect on foreign direct investment. As globalization increases many suspect that multinational corporations will relocate to such places with less stringent environmental regulations (John Barbieri, 2005).

1.8 Organization of Chapters

This study is organized as follows. Chapter one provides an introduction and overview of the study which includes background of the study, problem statement, objectives, significance of the study, definition of key terms and organization of chapters.

Chapter two presents the literature review that has been undertaken with regards to foreign direct investments and environmental issues. The theoretical framework and formulation of propositions are also discussed in this chapter. Chapter three explains the research methodology which includes research design, sample collection, measurement of variables and the data employed in the analysis. Chapter four reports and discuses the empirical results and findings. Finally, Chapter five provides the summary, discussion, implications and conclusions of the study. In addition, the limitation of the study and suggestions for future research is included in Chapter 5.

Chapter 2

LITERATURE REVIEW

2.1 Introduction

Globalization undoubtedly has a major influence on the economies and trade of countries. The concept of globalization has created a new phenomenon of worldwide integration, where strategical interactions between countries are necessary. It is a combination of free exchange and transfer of goods, services and capital globally. It focuses not only on the economy but also it has significant influences on environment, legislation, development planning, governance and quality of life. For instance, developing countries were in a position, striving to draw the formers' attention, in a way of offering varied promotions (Hakan, Selim & Onur, 2004), whereas developed countries might seek for suitable circumstances for foreign market access to get rid of any obstacles affecting their competitive advantage in their own market.

Therefore, for developed countries, there was a serious competition for access to the markets in the developing countries in order to carry on their production through a cost, internal market and ownership-specific (factor endowments) advantages. On the other hand, developing countries were also competing among themselves to attract developed countries' attention, due to their sources inefficiency and also lack of the knowledge and experience both on production processes and on global market rules. Developing countries which are rich in natural resources but generally have long live under poverty, find that the only way to prosper is to open up their economies and speed

up industrialisation processes through foreign investments (Kadaruddin A. & Azilah K., 2002).

In this increasingly integrated world, issues of using environmental matter as trade barriers have dominated discussion in international forum since the 1980s. The last three decades have been characterised by both a consistently decrease in global trade barriers and a steadily increase in environmental regulation, primarily in the developed world. Declining trade barriers and increasing trade liberalization indicate that the role of environmental regulations play in shaping a country's comparative advantage is greater than ever. The effect of trade liberalisation especially on the natural environment is therefore the subject of intense debate among academics and policy makers (Azhar & Robert, 2007).

Developing countries that attempt to develop their economies and attract Foreign Direct Investment (FDI) to boost their industrialisation process have been labelled as 'pollution haven' for Transnational Corporations (TNCs) or Multinational Corporations (MNCs). The term 'pollution haven' described by Zarsky (1997, 1999) has the implication that developing countries have the intention to lower and relax their environmental regulation to attract inward investments. This has led to fears that pollution-intensive industries in the developed countries will relocate to developing regions where environmental regulations may be less stringent.

There are two parties either to support or oppose the statement. Both parties have their own agenda and argument. Despite the predictions of many theoretical studies and evidence, a number of reasons have been proposed to explain why little or no empirical verification for the existence of industrial flight and pollution havens hypotheses have been found.

2.2 Globalization and Environmental Protection

The activities of free trade and transfer of capital across transnational would definitely have an effect on the environment. That is why the environmental protection issues have been brought out widely and globally through international standards and Multilateral Environmental Agreement (MEAs) (Kadaruddin A. & Azilah K., 2002). They have been designed basically to meet four major objectives (Brack 1997):

- To restrict markets for hazardous products or goods produced which would make harmful to the environmental unsustainably;
- To increase the coverage of the agreement by encouraging governments to join and to comply with the MEAs;
- To prevent free riding;
- To ensure the effectiveness of the MEAs by preventing leakage from other non-participants countries.

Most of the FDI from MNCs came from the developed countries and there is pressure for them to combine their business need as well as environmental protection in

developing countries. This is a challenge for MNCs especially when they want to carry out the business operation in developed countries especially in the European Union (EU) where the environmental matter is an important requirement to trade. There are, restriction based on environmental considerations and EU have very strict standards on recycling, packaging and life cycle analysis. In fact, most of the MNCs have already started steps to fulfill the stringent requirements.

In addition, the MEAs and voluntary standards are taken seriously by the governments and also MNCs. It might be a crucial consideration of survival and to remain competitive in the global market. Japanese MNCs for example, is very proactive in gaining environmental recognition, as they knew that it is the way to maintain and expand their product market. It should be noted that Japanese MNCs have the most numbers of firms that certified with ISO 14001 including in Malaysia (Brack, 1997).

2.3 Fundamentals of FDI

Foreign investment can be defined as the investment outside the boundary of the investing side's home country to the host countries. Foreign investments contain three subgroups: foreign direct investments (FDI), indirect foreign investments and official loans (Hakan, Selim & Onur, 2004). The general meaning of FDI suggests a special form and arrangement of capital flow of tangible assets, direct transferring technology, as well as transferring intangible assets like managerial management skills to developing countries. FDI can alternatively be defined as a form of international inter-firm

cooperation controlling host country enterprises. Therefore, also as Lipsey (2002) mentioned, there are two broad categories of FDI. One is particular form of the flow of capital across international boundaries from home countries to host countries, and the other is a set of economic activities or operations carried out in a host country by firms fully or partially controlled by home country.

FDI occurs when foreign investors establish businesses inside a foreign country. There are three forms of FDI: (1) Greenfield investments, (2) cross-border merger and acquisition type of investment and (3) brownfield investments (Abenaa A. Oti-Prempeh, 2003).

Greenfield investments create new assets or facilities by setting up new companies, or joint ventures where the foreign investor takes a controlling stake in the companies equity. The cross-border merger and acquisition type of investment occurs when a foreign company acquires the assets of an existing foreign company or enters into a merger agreement with the country to form a new legal entity. A brownfield investment occurs when foreign investors acquire an existing local company and completely replace all plant and equipment of the former company.

FDI can also be classified according to the objectives, such as horizontal FDI and vertical FDI. The main purpose of horizontal FDI is to serve foreign customers. In addition, large and growing markets provide incentives for investors since they can sell in countries where they invest in. This type of investment is known as market-seeking

FDI, or horizontal FDI. For vertical FDI, natural resource using and export-orientation are the main considerations. It also includes non-market seeking FDI, where goods are produced in the host country and sold abroad. Furthermore, production platform-seeking FDI provides the platform for production and sales to serve regional export markets while resource-seeking FDI possesses distinct dynamics such as obtaining access to relatively scarce or low priced natural resources can also be considered within this category of vertical FDI.

A finding by Fredriksson et al. (2003) mentioned that the scale of global FDI had increased rapidly in the last two decades. In addition, OECD and UNCTAD data had indicated that FDI figures for OECD countries including both funds from inflows and outflows had accelerated tremendously.

Since the volume of international investment flows has been reached to unprecedented levels in the last two decades, FDI related issues, such that the interplay between trade and FDI, the trade-off between output and pollution as well as environmental regulations with their consequences should therefore be widely investigated.

The classical explanation of FDI is based on capital arbitrage phenomenon. That is, capital circulates across the countries due to marginal return to capital differentials among countries such that capital flows out of a country with a low rate of return to the countries yielding high marginal return. As Carius (2002) amply emphasized, factors

influencing the destination of FDI are mainly political and economical. Political considerations generally refer to political stability, environmental regulatory framework, administrative capacities, political consistency and profit repatriation, whereas economical considerations comprise the economic indicators and fundamentals, such as GDP growth, real income, trade policies and macroeconomic stability, the degree of segmentation and structure of the specific market, size and commodity reserves of market, cost and specialization of production, and infrastructure possibilities. For instance, from the market-size hypothesis perspective, due to scale economies, FDI will not flow into the country until its market approaches a certain size. This size can be characterized as the necessary size to implement the production technology efficiently.

The popularity of FDI may be because it has the propensity to create positive economic benefits by providing employment of labours and stimulating general economic growth of the developing countries. In addition, a positive effect of FDI on developing countries is the international recognition gained as a result of their business interactions with developed countries. In order to attract investors to a country, most countries, especially developing countries, therefore offer all kinds of incentives to the prospective investors.

Alongside with the political and economical considerations already mentioned above, promotions offered by developing nations have also played an essential role to attract direct investment. According to Blomström and Kokko (2003), due to insufficient factor endowments in production processes, developing countries compete with each

other through varied promotions in order to attract more FDI. Promotions can take the form of tax incentives, exemptions from the strict regulations imposed to the domestic firms and some other privileges. Those developing countries suffering economically due to various reasons may strive to attract the international capital, attempting to use funds from FDI as a magic tool to achieve their distinct targets particularly in the economic growth.

Consequently, the growth of foreign investment had reflected the rise in competitiveness of foreign multinationals (Lipsey 2002). To put differently, multinationals struggle with each other to increase their competitiveness relative to their rivals through accessing the developing nations' markets and taking the advantage of promotions, privileges offered by them, and economic circumstances such as low wages and high profits provided by the imperfect markets in those developing countries.

2.4 FDI and Environment

Organisation for Economic Co-operation and Development (OECD) claimed that an overwhelming part of the research on environmental effects of FDI highlighted the effects are largely positive and foreign investors contribute significantly to ensuring that the positive effects are realised. FDI flows are increasingly important in providing the resources and capacity necessary to address environmental and infrastructure challenges, particularly in non-OECD countries. Indeed, the development impact of FDI is not only its monetary value but also its positive effect on production including the transfer of

modern environmentally-friendly technology and know how, and the spread of efficient management practices.

It is claimed that foreign investors more often meet the environmental standards of the countries in which they operate than domestic companies do. Many investors have introduced state of the art environmental technologies and management practices in their host country production facilities. Increased international investment flows result in increases in the rate at which environmentally sound technologies are introduced into markets world-wide.

2.5 FDI in ASEAN Countries

Many developing countries seem to believe that economic growth cannot be solely obtained from dependence on their own assets. Hence foreign investment is the answer to many economic problems among developing countries. Anyhow, there is a general misconception that all developing countries are extremely poor. Note that though some countries may be classified as developing, they are more advanced than others.

As can be seen from the above findings, it is therefore clear that FDI is one of the most reliable components of capital flows and is widely regarded as having a stronger positive impact on economic development and growth. The direct effects of FDI on the host economy include job creation, capital accumulation, technology transfers, and trade flows. Its indirect effects - the technological externalities - include higher productivity gains for domestic firms. The United Nations Conference on Trade and Development

(UNCTAD) World Investment Report 2006 revealed that global FDI inflows rose substantially by 29% to US$916bil in 2005, while South, East and South-East Asia saw a 19% rise to US$165bil during the same year, which was itself a new high.

Likewise, Uttama (2005) has revealed that FDI is recognized to contribute to benefits of economic and social development. The governments in developing country therefore attempt to promote investment and create a sound investment climate that attracts foreign investors to their countries. As a result, FDI inflows are regarded as vital complements to development efforts. The Association of Southeast Asian Nations (ASEAN) takes into account to conduct investment cooperation agreements for ASEAN to function as an attractive investment destination and to contribute special conditions for multinational enterprises (MNEs) to stimulate the surge of FDI into this region. Over the last decade, though FDI inflow to ASEAN countries fluctuated tremendously, the upward FDI inflow trend for ASEAN was demonstrated in several years. That may be because the strength of ASEAN cooperation reinforces this region to be a source of competitiveness in production costs and advantage in access to a large customer base.

This section describes the trend in FDI inflow of the selected seven ASEAN countries which consist of Malaysia, Philippines, Indonesia, Singapore, Thailand, Vietnam and Loas in more details. ASEAN's FDI inflow fluctuated as a result of the Asian financial crisis in 1998, the economic slowdown in US and Europe and the recession in Japan in 2001. FDI inflow recovered after the crisis, and it reached US$ 20,304 million in 2003. As foreign investors have been using ASEAN countries as a site

for making profits, cost effectiveness and global competitiveness, the pattern and sources of FDI into ASEAN remained largely unchanged.

The ASEAN Investment Area (AIA) agreement was used to stimulate the surge of FDI into ASEAN member countries. It was aimed to enhance FDI inflow by making ASEAN as a region of competitiveness and attractiveness for investment and business operations. In addition to the effectiveness in engaging the establishment of free trade area (AFTA), the advance in functioning as a single common market and production base by 2020 of ASEAN Economic Community (AEC) and the strength of expanding and pursuing deeper economic integration are important factors that will encourage and influence future FDI inflows to this region.

2.6 FDI and Environmental Pollution in ASEAN

The authorities in ASEAN in charge of environmental administration were established in the 1970s. An exceptionally early example is the Philippine National Water and Air Control Commission established in 1964, followed by the Indonesian National Environmental Committee (it was later changed to the Ministry of Development and Environment), and the Singaporean Ministry of Environment, which were both established in 1972, the Malaysian Ministry of Science, Technology, and Environment in 1974, and the Thai National Environmental Committee in 1975. Air-monitoring systems were introduced relatively early in the Philippines and Singapore, in 1970 and 1971, respectively. In other ASEAN countries like Indonesia, Malaysia and Thailand these systems were also introduced sometime in the 1970s.

Singapore and Malaysia followed the American standards for their air pollution control, and regarding the standards for vehicle exhaust, Singapore followed the Japanese standards, whereas Thailand and Malaysia followed the European.

Yasmine et al. (2002) have investigated the impact of FDI on pollution for five significant FDI recipients countries in ASEAN, namely Malaysia, Thailand, Indonesia, Singapore, and the Philippines for the last three decades. The findings from using time-series analyses which employing the Autoregressive Distributive Lag (ARDL) technique suggest that FDI adds to pollution in Malaysia, Thailand, and the Philippines but not in Indonesia where FDI is inversely related to pollution, and in Singapore where it proved insignificant.

The studies carried out by Zarsky (1999) and Goldenman (1998) were undertaken to examine the impact of FDI on the physical environment. Neo-liberal proponents argue that FDI is positively good for the environment. As the developing countries are usually facing with problems of local technologies and regulatory capability, FDI is the best way to diffuse best practice production techniques. However, FDI critics postulate that the neo-liberal FDI has differential environmental regulations which influence the level of firm or industry location decisions or what is known as the PHP.

The study from Yasmine et al. (2002) indicates that CO2 emissions are on the rise in all the five ASEAN nations. This trend is prevalent in all five nations from 1970 through 2001 and is expected to persist in the future if no efforts are made to improve the

prevailing situation. Not only is CO2 increasing but its increasing trend in line with the increasing FDI trend in all theses five countries. As such, it warrants an examination of the relationship between FDI and the greenhouse gas. This is significant and meaningful as the reduction of CO2 emissions metric tons per capita is an indicator adopted by the United Nations for its Millennium Development Goals (MDGs) to measure environmental sustainability. The United Nations advocates the integration of the principles of sustainable development into country policies and program to reverse the loss of environmental resources. The establishment and ratification of Kyoto Protocol as law in 2005 (Greenpeace, 2005) to limit emissions of greenhouse gases lends further significance to this study since the ASEAN-7 nations are expected to be given specific targets to reduce CO2 emissions eventually.

Toru Iwami (2005) has concluded that despite rapid economic growth in ASEAN, sulfur dioxide (SO2) pollution in south-east Asia is less serious than it was in developed countries like Japan in the earlier days. Administrative authorities in these countries took the initiative in environmental protection and firms succeeded in reducing SO2 emissions by raising energy efficiency and employing alternative sources of energy. These initiatives reflect efforts to learn from the experiences of developed countries, so that the developing countries would take the advantage of not to repeating the same mistakes that were made by developed countries.

Toru Iwami also brings out that whether the study of SO2 reduction gives any hints for CO2 case. Some researchers argue that the inverted U-shaped curve is found

also for CO2 emissions. An understanding of the SO2 case would definitely help to understand the prerequisites for reducing CO2. If developed countries actually succeed in creating abatement technology for CO2, this will surely affect the development policy in developing countries.

2.7 FDI Improves Environmental Performance in Host Countries

The study by Azhar & Robert (2007) revealed two competing hypotheses that emerged regarding the impact of trade openness on future levels of environmental quality. First, the capital-labour hypothesis (KLH) predicts that pollution-intensive goods are relatively capital-intensive (Antweiler et al. 2001 and Cole & Elliott 2003, 2005). It is assumed that pollution-intensive (or called 'dirty') industries will relocate their production from countries which are relatively labour abundant to countries which are relatively capital abundant as a result of trade liberalisation. Second, the pollution haven hypothesis (PHH), on the other hand, is derived from changes in environmental legislation that in turn can distort existing patterns of comparative advantage.

In the developed world the costs of complying with environmental regulations appear to be expensive. Since the stringency of environmental regulations increases with income and economic development (Dasgupta et al. 1995) the PHH assumes that developing countries possess a comparative advantage in pollution-intensive production. The concept of the PHH, which is directly in conflict with the KLH, argued that dirty industries may relocate from the developed world to developing countries. Even if foreign direct investment (FDI) is not driven by lower environmental regulations in the