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Foreign Direct Investment and Export Performance in Thailand

by

Sutida Tambunlertchai

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Abstract

This research project aims to further shed light on the influences of FDI on firm-level export outcomes in Thailand. The goals of this paper are to identify the factors, particularly those related to FDI, that determine firms' export orientation, and to make policy recommendations with regard to facilitating MNCs export spillovers. Findings from this research indicate that firms' decisions to export are heavily influenced by the governments' export promotion policies and the presence of foreign direct investors. Secondary findings further suggest that the intensity of a firm's exports is increasing in the percentage of foreign ownership in the domestic firms.

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Contents

1 Introduction **1**
1.1 The Scope of Study 6
1.2 Structure of this Research Paper 8

2 Motives and Effects of Foreign Direct Investment **9**
2.1 Definitions and Types of Foreign Direct Investment 10
2.1.1 Types of FDI 11
2.2 Motives for Foreign Direct Investment 17
2.3 Effects of Foreign Direct Investment 22
2.4 Foreign Direct Investment and Export Expansion in LDCs 27

3 Thailand's Experience: Growth Records, Industrialization Experience, Trade, and Exports **30**
3.1 Thailand's Past Growth Records 32
3.2 Thailand's Trade and Export Structures 34
3.2.1 Trade Structure 35
3.2.2 Export Structure 36
3.3 Thailand's Foreign Direct Investment Experience 38
3.3.1 International Trade Development 39
3.3.2 Patterns of FDI in Thailand 42
3.3.3 Policies on FDI in Thailand 44
3.4 Thailand's Industrial Sector Overview and the Multinational Corporations 45
3.4.1 The Food Industry 46
3.4.2 The Textile and Clothing Industries 47
3.4.3 The Electrical Appliances and Electronics Industries . . . 48

4 Conceptual Framework and Data Description **50**
4.1 Conceptual Framework 51
4.2 The Models 54

4.2.1 Firm-Level Export Participation Decision 59
4.2.2 Firm's Level of Export Orientation 61
4.3 Data Description 62

5 Econometric Procedures, Results, and Discussion 71
5.1 Econometric Procedures 72
5.1.1 Firm-Level Export Decision 72
5.1.2 Firm-Level Export Orientation 75
5.2 Results and Discussions 76
5.2.1 Firm-Level Export Decision 76
5.2.2 Firm-Level Export Orientation 85

6 Conclusion 93

A Appendix A 102

B Appendix B 106

C 107

Chapter 1

Introduction

Foreign direct investment (FDI) is the process whereby residents of one country (the source country) acquire ownership of assets for the purpose of controlling the production, distribution, and other activities of a firm in another country (the host country); (Moosa, 2002). Foreign direct investment is an investment which involves a long-term relationship and reflects a lasting interest and control of a resident entity in one economy (foreign direct investor of foreign enterprise) in an enterprise resident in an economy other than that of the foreign direct investor (FDI enterprise, affiliate enterprise, or foreign affiliate); (UNCTAD, 1999). In general, three criteria characterize FDI (Caves, 1996):

i) The multinational enterprises (MNEs) show a long-term controlling interest over their subsidiaries' production and distribution process

ii) There are movements of productive factors other than capital—such as transfers of (skilled) labor to the host country, movements of knowledge and man-

agement techniques, etc.

iii) There is evidence of the non-rate of return motive to invest—which may include conducting FDI in order to expand profits and sales, to seek cheaper raw materials, labor, and market, etc.

Past literature on FDI and the host country suggests that FDI brings both positive and negative externalities to the host countries. Positive externalities include technology and knowledge spillovers, income and employment generation, export spillovers, etc., whereas negative externalities include adverse environmental impact, crowding out of domestic investments and financial resources, introduction to inappropriate consumption patterns, etc.

Existing literature also suggests that FDI influences the host countries' industrialization process by acting as a catalytic factor in the host economies' shift from being agricultural-based to being manufacturing-based. Thailand is an example where FDI has played an important role in shifting the country's main export bulk from resource-based products in the agricultural sector (in the 1950s and 1960s) to labor-intensive products which employ more advanced technologies and imported raw materials in the production process.

Besides FDI, export orientation has also been hailed as an engine of growth. The Newly Industrialized Economies' (NIEs: Singapore, Hong Kong, and Taiwan) successful economic development has been attributed to these economies' success in pursuing an export-led growth strategy (Kohpaiboon, 2007). Such success stories have prompted other developing economies to look to exports—especially manufactured exports—as a potential driving force for their economic

development. A well-planned export-led growth strategy can stimulate economic activities and induce more efficient resource allocation, generating income and employment and thus better quality of life outcomes for the country.

There is a strong and natural link between FDI and export-driven economic growth. Multinational corporations (MNCs, or multinational enterprises: MNEs) that engage in FDI have a key role in channeling products from host countries to the international markets through their global distribution networks. Multinational corporations, therefore, are considered amongst the important ingredients in an economy's exporting success. Aside from providing the export channels, MNCs also bring technologies and human capital to the host countries. Because of the global competition they face, MNCs generally emphasize research and development (R&D) in order to improve the quality of their products as well as the efficiency of their production process. Many MNCs, therefore, are owners of advanced production technologies, some of which are transferred to factories and plants in the host countries where they invest.

It is straightforward to see that the entrance of export-oriented MNCs helps generate export growth as well as induce local firms in the host country to make use of the technology spillovers and market linkages to export their own products. FDI inflows contribute to host countries' export expansion. In particular, owing to the MNCs superior technology, existing marketing channels, etc. the foreign firms create positive externalities on domestic producers' exporting decision—they induce local firms to export. This positive externality on local firms' exporting status is known as MNCs export spillover. Such spillovers, however, are not au-

tomatic, and will take place under suitable policy environments. In other words, effective spillovers are contingent upon appropriate strategies of the foreign investors and conducive trade policies of the host country. For example, lack of intellectual property laws may cause foreign investors to be more reluctant to share certain firm-specific assets such as production techniques, analytical tools, or ideas with partnering local firms.

As we can see, policies not only affect FDI by MNCs, but also determine the transmission of technology and knowledge from the MNCs to local firms and workers. Such spillover is important for the creation and sustainability of local export capacity, which in turn, is vital for long-term economic growth and competitiveness. A clear understanding of MNCs export spillovers—the channels through which FDI affects firm-level export capacity—will have direct implications on a country's trade and investment policies. Despite the importance of this understanding, however, the topic has not been widely explored and relatively little is known about factors that affect MNCs export spillovers (Kohpaiboon, 2007).

Among the few studies on the FDI and exports which exist, Aitken et al. (1997) and Kokko et al. (2001) present case studies of MNCs and exports in developing economies. Aitken et al. (1997) discuss the case of Mexico while Kokko et al. (2001) look at the case of Uruguay. These studies, although very informative, pertain to cases that are difficult to generalize to other developing economies. MNCs export spillovers in Mexico, for instance, are influenced by many country-specific factors. Mexico's special economic relationship with, as

well as its proximity to, the U.S. means that American MNCs account for much of the total FDI inflows to the country. This makes Mexico's circumstances more suitable for studying the role of American MNCs rather than the role of general MNCs export spillovers. On the other hand, Kokko et al.'s (2001) case study of Uruguay is difficult to generalize because the level of openness in trade and investment of Uruguay is relatively low compared to other developing countries like China, Hong Kong, Bangladesh, Thailand, etc. This coupled with the smallness of Uruguay mean that foreign investors' presence in the country is limited and only covers a few selected industries.

Studies of FDI and exports in the past five years have mainly focused on the causality of FDI on exports and firm efficiency, but not on how FDI impacts firms' export decisions (Clerides, Lach, and Tybout, 1998; Bernard and Jensen, 1999; Aw, Chung, and Roberts, 2000; Hahn, 2004). And while many studies in the International Marketing field (Toni and Nassimbeni, 2001) have focused on exports, they appear to not take FDI into consideration. In studying export growths in East and Southeast Asian countries, however, FDI cannot be ignored. Lipsey (1999) finds a clear evidence of the importance of MNCs on the export-led growth in these regions.

For these reasons, I hope that my work will contribute to a better understanding of the roles of FDI and MNCs on firms' export capabilities and thus their influences on a country's export performance. This paper uses Thailand as a case study for developing economies. I make use of firm-level cross-sectional data to empirically test for the presence of MNCs export spillover effects and to identify

the factors that promote such spillovers.

1.1 The Scope of Study

This research project aims to further shed light on the influences of FDI on firm-level export outcomes in Thailand. The goals of this paper are to identify the factors, particularly those related to FDI, that determine firms' export orientation, and to make policy recommendations with regard to facilitating MNCs export spillovers.

Thailand has always been referred to as a developing country which has been successful in pursuing an export-led growth strategy (World Bank, 1993; Krueger, 1995; Hahn, 2004; Brimble, 2002). Attracted to invest in Thailand by its investment promotion policies that encourage continuous, long-term investments from foreign investors, MNCs have had a crucial role in this country's industrialization experience over the past 50 years.

Thailand's trade policies over the past five decades have encouraged long-term foreign engagements in FDI, equity investments, and investment loans. Furthermore, the country's relative political stability, abundant resources, as well as low-cost skilled and unskilled labor make Thailand an ideal FDI location. FDI, therefore, exists in almost every economic sector in the country. Because of the continuity of FDI presence, Thailand provides an interesting case study for the topic of FDI and export spillovers.

Since the 1960s, Thailand has opened its economy to foreign investors—

first by adopting an import-substitution (IS) trade regime, then by transitioning to an export-promotion (EP) regime in the 1980s, after passing the Investment Promotion Law in 1977. The main sources of FDI to Thailand throughout the past five decades are Japan, the U.S., Hong Kong, and Taiwan. The economies which have been the main recipients of Thai exports are: the U.S., Japan, the European Union (EU) countries like Germany, the Netherlands, and the U.K., the newly industrialized economies (NIEs) such as China, Hong Kong, Taiwan, and ASEAN countries like Singapore.

In this research paper, I will conduct a literature survey and an empirical analysis of FDI and export spillovers in the manufacturing sector in Thailand. I will use firm-level cross-sectional data from the 2007 Industrial Census from the National Statistical Office of Thailand (NSO). Analyses will focus on the three main industries in Thailand—the food industry, the textiles and clothing industries, and the electronics and electrical appliances industries. These three industries are chosen to represent the three groups of industries categorized by factor intensity—labor-intensive, capital-intensive, and resource-intensive industries. The food industry is representative of a resource-intensive or a resource-based industry where there is heavy use of local resources, in this case, of agricultural goods. The textiles and clothing industries is representative of a labor-intensive industry, where there is low capital-labor (K/L) ratio when compared to other industries. Finally, the electronics and electrical appliances industries is representative of a capital-intensive industry where there is high capital-labor ratio. The division of industries is based on the 4-digit International Standard Industrial Classification's (ISIC) third revision grouping, with the food industry's first

two digits starting with 15, the textiles and clothing industries' first two digits starting with 17 and 18, and the electronics and electrical appliances industries first two digits starting from 30 up until 32.

1.2 Structure of this Research Paper

I will proceed with this research paper in the following manner. Chapter two will give a review of literature on the motives of FDI and its effects on the host economy with an emphasis on effects of FDI and export expansion. Chapter three provides a chronological background on Thailand's industrialization experience, growth records, from import substitution to export promotion, the food, textile, and electronics and electrical appliances industries, and finally the importance of foreign trade and investment in Thailand. This third chapter's discussion will also encompass FDI in Thailand—presenting the patterns of FDI in Thailand, government policies which have been implemented since the 1960s, as well as the trend in policies and FDI in Thailand. Facts and figures on the economic growth, FDI situation, and exports in Thailand will also be presented in this section. Chapter four will focus on the conceptual framework, the hypotheses, the dataset and the models studied in this research paper. Chapter five will be on the empirical analysis of my hypotheses. The empirical techniques, results, significance, implications, and estimation evaluations will be explained in this chapter. Finally, chapter six concludes the research project with the summary of the findings as well as the policy implications from the results.

Chapter 2

Motives and Effects of Foreign Direct Investment

This chapter provides a brief summary of existing theories on foreign direct investment (FDI). Section 2.1 presents a brief definition and an overview of the classifications of FDI. Section 2.2 is on the motives for FDI—this section will present theories which could be used to explain why FDI, multinational corporations (MNCs) and transnational corporations (TNCs) exist. In section 2.3, a summary of existing literature on the effects of FDI on the host economy is provided. Finally, in section 2.4, the topic of FDI and export expansion will be covered. As this research focuses on the case of Thailand—a developing economy in Southeast Asia, the discussion in section 2.4 will emphasize on FDI and export expansion in the case of developing countries and/or less-developed countries (LDCs). This is so that the discussion on FDI and exports in section 2.4 can be

more relevant to explaining the situation in Thailand—a discussion which will be covered in the next chapter.

2.1 Definitions and Types of Foreign Direct Investment

Foreign direct investment (FDI), as stated earlier in chapter 1 is an investment that is made to acquire a lasting interest in an enterprise operating in an economy other than that of the investor; the investor's purpose being to have an effective voice in the management of the enterprise (International Monetary Fund's *Balance of Payments Manual*). FDI occurs when a firm invests directly in production or other facilities, over which it has effective control, in a foreign country. It involves the direct control of the capital invested and, more importantly, a movement of factors of production other than capital such as skilled labor, technological knowledge and management.

The distinguishing feature of FDI, in comparison with other forms of international investment, is the element of control over management policy and decisions. The term 'control' in FDI, as Moosa (2002) defines it, implies that some degree of discretionary decision-making by the investor is present in management policies and strategy. FDI differs from portfolio investment in the sense that portfolio investors do not have direct control over their investments like foreign direct investors do. Moreover, portfolio investors do not portray a long-term investment interest; investing decisions are largely based on risk-return factors,

and thus, portfolio investors have a high turnover of their securities. FDI also differs from domestic investment in that a firm investing in a foreign country has to face environmental factors that are different from those in its own country.

2.1.1 Types of FDI

There are many categories which can be used to classify FDI. It can be classified from the host country's perspective, from the foreign investor's (the source country) perspective, from the intention of the investing firms, from the type of industries in which the investing firms setup production facilities, etc. For the purpose of this study, I use the following categorizations of FDI—from the host country's perspective, from the investor's perspective, from the intention of the investing firm, and from the modes of operation.

From the perspective of the host country, FDI can be divided into three groups: i) import-substituting FDI; ii) export-increasing FDI; and iii) government-initiated FDI. Moosa(2002) provides a good explanation for each group as follows:

i) Import-substituting FDI

Import-substitution refers to the process whereby domestic production replaces imports. Therefore, import-substituting FDI generally refers to situations in which an economy takes up the production of goods and services which were previously imported. Barriers to entry such as tariffs and quotas play an important part in bringing about this type of FDI—with high barriers to entry, foreign firms have the incentives to directly invest and to set up production plants in the

host country.

This type of FDI necessarily implies that imports by the host country and exports by the investing country will decline. Import-substituting (IS) FDI is likely to be determined by the size of the host country's market, transportation costs, and trade barriers (Moosa, 2002).

ii) Export-increasing FDI

Export-increasing or export-promoting FDI is motivated by the investing firms' desire to seek new sources of inputs such as raw materials or intermediate goods. Another motivation for this type of FDI could also be from the MNCs' intention of using the host country as a base to export their products to the host country's neighboring countries. This type of FDI is export-increasing in the sense that the host country's exports of raw materials and intermediate products to the investing country—as well as to other countries where the subsidiaries of the MNCs are located—generally increase as a result of such investments.

iii) Government-initiated FDI

Government-initiated FDI is triggered when a government offers incentives to foreign investors in an attempt to eliminate a balance of payments deficit.

The classification of FDI based on the investors' perspective is presented in Caves (1971). He categorizes FDI into three groups: i) horizontal FDI; ii) vertical FDI; and iii) conglomerate FDI. The explanation for each group is as follows:

i) Horizontal FDI

Horizontal FDI is undertaken for the purpose of horizontal expansion—to produce similar kinds of goods abroad as in the source country. This type of investment

is usually motivated by the drive for expansion of the firm and/or is influenced by protective tariffs in foreign markets. More generally, horizontal FDI is undertaken to exploit more fully certain monopolistic or oligopolistic advantages such as patents or differentiated products, particularly if expansion at home violate anti-trust laws. As horizontal FDI is normally conducted so as to exploit monopolistic and/or oligopolistic advantages, product differentiation is a critical element of this type of FDI.

ii) Vertical FDI

There are two subcategories within vertical FDI: backward vertical FDI and forward vertical FDI. Backward vertical FDI is the case where investors engage in FDI in order to exploit raw materials in the host country. Forward vertical FDI, on the other hand, is undertaken so that the investors could be nearer to the consumers through the acquisition of distribution outlets.

iii) Conglomerate FDI

Conglomerate FDI involves both horizontal and vertical FDI. A conglomerate MNC is a diversified company whose plants' outputs have traits of both vertically and horizontally integrated investments. This type of FDI brings about what is called diversified MNCs.

Chen and Ku (2000), on the other hand, categorize FDI using the investors' intention as a basis. Their two groups of FDI are: expansionary and defensive.

i) Expansionary FDI

The authors suggest that expansionary FDI seeks to exploit firm-specific advan-

tages in the host country. Such firm-specific advantages include: scale, research and development (R& D) intensity, profitability, and motives for technology acquisition. This type of FDI has the additional benefit of contributing to sales growth of the investing firm at home and abroad.

ii) Defensive FDI

In the case of defensive FDI, Chen and Ku (2000) suggest that this type of FDI seeks cheap labor in the host country with the objective of reducing the cost of production—somewhat similar to the case of backward vertical FDI. In Chen and Yang (1999) on the case of Taiwan, empirical evidence suggests that this type of FDI is motivated by cost reduction and production networks.

By using the modes of operation to classify FDI, Saggi (2000) proposes that FDI be divided into three groups: i) licensing FDI; ii) joint venture FDI; and iii) wholly owned subsidiary FDI. Saggi's division of FDI is beneficial for studying the role of FDI in knowledge and technological transfers as well as for understanding the motives of MNCs in choosing their modes of operation (Tambunlertchai, 2004). Markusen and Markus (1999) calls this type of FDI classification the **Knowledge-Capital Model** which sees factors of production and MNCs' proprietary assets as transferable and can be used in many locations at the same time. Saggi (2000) suggests that an MNC's decision to enter a foreign market through each mode of operation is determined by the MNC's incentives to protect their proprietary assets.

i) Licensing FDI

Licensing FDI is generally conducted when there is significant information asym-

metry between the source economy and the host economy—for instance, foreign investors may not know the supply-demand conditions of factors of production, the level of political stability, etc. and thus, would choose to reduce the risk of operation by licensing their businesses to local producers at first. This licensing mode of operation is pursued not only to reduce the risk in operation but also to collect information on the host country's market.

Through licensing, local firms which are licensees of the MNCs will benefit from their foreign affiliates' more advanced technology and knowledge. The spillover of knowledge and technologies as well as having the tools will put local licensees at an advantage when competing with other local firms without foreign counterparts.

However, in the long-run, foreign investing firms would generally not continue the licensing contract. This is because given firms' profit-maximizing and cost-reducing behavior, continuing to pay for the cost of licensing after having learned enough information about the market to start an operation on its own is not optimal. However, even though the contract is usually short-term, licensees stand to benefit greatly from the technology and/or knowledge transfer from their foreign counterparts. In most cases, they retain their advantage over other local firms even after the foreign affiliation expires. Thus, it can be said that licensing is beneficial for both the investing firm and the licensees.

ii) Joint venture FDI

Other than information asymmetry, MNCs can also be faced with the risk of having to pay a higher fixed cost of operation as well as the risk of incorrectly

predicting the host country's demands for its products. Under such circumstances, MNCs usually opt to engage in FDI through the form of joint ventures.

Joint venture FDI is beneficial to both the MNCs and its affiliates. The investing MNCs benefit from their affiliates' knowledge of the industry, the consumer networks, and the distribution channels in the host market. On the other hand, the MNCs' domestic affiliates also benefit from the source firm in the sense that they could learn managerial skills and marketing techniques, which would make the firm's operations more efficient, giving it an advantage over local firms in the same industry.

iii) Wholly owned subsidiary FDI

When MNCs fear that their proprietary assets might spillover and get adopted by their domestic affiliates in the foreign market, they would opt to enter the foreign market through creating a wholly owned subsidiary FDI. This is done so that the source firm can have full control over all operations and so that the values of the source firms' proprietary assets will not leak out.

MNCs which choose to setup wholly owned subsidiaries are generally protective of their proprietary assets. This is because the value of the MNCs' proprietary assets may depreciate if other firms adopt similar and/or the same assets. For example, Coca-Cola is an MNC which has the recipe for its beverage as a proprietary asset. Should another beverage firm get a hold of this recipe and produce similar drinks, Coca-Cola will have a competitor and lose its market share. Therefore, wholly owned subsidiary FDI are generally setup when there is need to protect the firms' proprietary assets as the firm would have full control over the operations of

its subsidiaries.

When categorizing FDI in terms of modes of operation (Saggi, 2000), we should keep in mind that there are constant changes to the modes of operations which an MNC may choose. For example, when a licensing MNC has gained enough information to startup a plant in the host country, it would generally opt out of continuing the license contract. Dynamics in modes of FDI operation exist and have yet to be clearly determined and developed.

2.2 Motives for Foreign Direct Investment

The surge of FDI in the late 20th century drew significant interest to the study of foreign investments—particularly to the study of what motivates the creation of MNCs and transnational corporations (TNCs). Owing to the fact that investing firms which engage in FDI must face additional costs due to operating at a distance as well as costs of uncertainty (as discussed earlier in section 2.1), many economists during the period were interested in questions about the main factors influencing decisions to invest in a foreign country, or why direct investment is preferred to portfolio investment, etc. Motives for FDI were the central topic of discussion in much of trade literature in the late 20th century.

At the early stages of FDI boom, many economists were interested in providing a satisfactory answer to the questions of why MNCs exist at all—why markets are not served by exports from foreign firms or by production by locally owned firms. The vast literature on MNCs arrives at a consensus on only a few

issues. Markusen (1995) states that: there is some—but not unanimous—support for John Dunning's (1977, 1981) *eclectic* view as to the necessary conditions under which a firm will undertake FDI. This theory is also known as the **Eclectic Theory of Foreign Direct Investment**. It states that FDI will occur only if the investing firm has the following three advantages: i) ownership advantage; ii) internalization advantage; and iii) location advantage. Possession of the three advantages will enable the foreign investing firm to out-compete other potential suppliers in the domestic market.

i) Ownership advantage

The theory on ownership advantage in Dunning's Eclectic Theory was highlighted in Hymer (1976). The theory suggests that the investing firm must have comparative advantage over other firms when conducting FDI because it is faced with competition from local producers who are more familiar with the market, the demand conditions, and the consumer group. Therefore, MNCs must have an advantage arising from their ownership of some proprietary assets or rights which can help them operate successfully in the host economy. This ownership of proprietary assets are called ownership advantages, which include things like the right to a particular technology, monopoly power and size, access to raw materials, and access to cheap financing.

ii) Internalization advantage

The foreign investing firm must also have an internalization advantage that leads the MNC to buy or create a foreign subsidiary rather than license production and/or distribution of a product to a firm in the host country. In other words,

it must be more beneficial for the firm to use the advantages which they have rather than sell or lease them. Such are internalization advantages that refer to the choice between accomplishing expansion within the firm and selling the rights to the means of expansion to other firms.

iii) Location advantage

The host country in which foreign investors are to engage in FDI must have a location advantage for production, such as low tariff or transport cost barriers to imports or low factor prices, which provide incentives for the MNC to produce in the host country rather than to service it via exports. In particular, it must be more profitable for the investing firm to use its ownership and internalization advantages in combination with at least some factor inputs located abroad in the host country. If this is not the case, then exports would suffice—there is no need to conduct FDI.

Another well-accepted theory of FDI is one developed by Hymer (1976). The theory emphasizes the monopolistic elements of FDI. It recognizes that operating in a foreign country entails additional costs due to operating at a distance as well as costs of uncertainty and misunderstanding. Therefore, for a firm to engage in FDI in a foreign country, it must possess some sort of advantages over existing or potential competitors in the host country. These advantages will allow the foreign investing firms to gain a higher stream of income from a given amount of capital when compared to that of the domestic firms'. This higher stream of income which foreign direct investors receive will compensate the investors for the additional costs. The advantages of foreign direct investors often lie in

the form of departures from perfect competition in goods and factor markets—including product differentiation, special marketing skills, superior technology, and economies of scale.

Kindleberger (1970) adds to Hymer (1976) that firms will be more likely to engage in FDI over exports if they are already operating at minimum costs at home — additional production for exports would move them into a segment of rising costs. Moreover, lower production costs abroad may be achieved because of the procurement of cheap raw materials, an efficient transportation network, superior managerial skills, non-marketable technology, and substantial investment in R & D in the host country.

Vernon (1966), on the other hand, puts forward his **Product Cycle Theory** which emphasizes the scientific advantage, product innovation, and the demand conditions abroad, all of which lead to the setting up of overseas producing capacity of MNCs. He explains that product innovations are likely to be made in a country with high income and large domestic market—such as the U.S. Once the product is developed and there is demand for the product in the overseas market, such demand will lead to export. Furthermore, if the product has a high income elasticity of demand, the demand will expand rapidly in the growing overseas markets. Once the market expands, the source country's entrepreneurs will be more likely to take the risk of setting up a local producing facility in a foreign country if cost conditions are favorable.

In the case of developing countries and LDCs, the **Product Cycle Theory** suggests that FDI is more likely to occur in industries with standardized products

that require significant inputs of labor. Such standardized products are usually goods with high price elasticity of demand and do not rely heavily upon external economies.

An alternative explanation for the motivation of FDI is the general quest for growth of the firm. Balassa, as cited in Melo and Sapir (1991), contends that the motives for FDI can be considered as part of the firm's market strategy in an attempt to improve or defend its position in both foreign and domestic markets. An oligopolistic firm will be motivated to invest in a foreign country if the effort of expansion in the domestic market tends to incite retaliation from other oligopolists. Despite all the additional costs the investing firm has to pay in order to conduct FDI, expansion into a foreign market may turn out to be a less costly means of satisfying the growth motive of the firm (Tambunlertchai, 1975).

In spite of all the theories which are developed to explain the motives for FDI, Caves (1971) points out that the motives for an MNC to engage in FDI may be different for different forms of direct investments. For example, horizontal FDI is motivated by the drive to expand the firm whereas vertical FDI is motivated by the desire for raw materials and control over input sources. It can be generally concluded, however, that the main motives for FDI and MNCs are the quest for new distribution channels and the ability to draw upon resources and market conditions in the host country such as availability of low cost inputs and existence of trade barriers. Successful FDI endeavors allow MNCs to achieve its objectives of increasing sales, protecting market shares, increasing profits, and

reducing costs.

2.3 Effects of Foreign Direct Investment

The effects of FDI on both the source and the host countries are wide-ranged—FDI impacts the economy, the industrial and trade structures, and export performances of the countries involved. A full discussion of all the effects of FDI is beyond the scope of this research paper. I will, however, focus on expositing the effects of FDI on export performance. This section discusses how FDI impacts the host country, confining its attention to economic rather than socio-political impacts of FDI.

In the economic sphere, FDI can affect the pattern of production, consumption and distribution in the host economy. In fact, it is difficult to make an undisputable classification of what qualifies as an economic effect of FDI and what does not. For example, the setting up of plants by foreign firms in the host country may cause pollution in that country. Pollution created by the foreign firm, in a way, can be considered an economic effect as it represents an adverse welfare effect to the people in the host country. The same argument also applies to the influence of the foreigners' way of life and the products they introduce in changing the consumption habits of the people in the host country. The discussion in this section, however, will concentrate on certain aspects of FDI that are generally considered to be economic effects in economic literature.

The discussion of economic effects of FDI to the host country in this section

pertains to the following topics:

i) Effects on income and employment

FDI helps generate employment and income in the host economy. More investments bring about more production of goods and services which would lead to a higher demand for labor. In response to the higher demand for labor, wages will increase, which in turn leads to higher spending power. Increased spending is beneficial to the host economy in the sense that it stimulates other economic activities, and contributes to other economic linkages such as the production of raw materials, improved logistics.

However, foreign investments do not always have positive effects on income and employment in the host economy. For instance, the entrance of MNCs may cause local firms to go out of business due to their inability to compete with the MNCs. This would decrease employment and income amongst certain groups in the host economy.

ii) Capital accumulation

Foreign direct investments lead to capital accumulation in the host economy. FDI inflows not only bring in foreign currencies, but also help the host economy accumulate physical capital from movement of factors of production such as capital, machinery, and (skilled) labor from the source country. This will contribute to the increase in the capital stock of the host economy.

iii) Efficient utilization of resource

With the MNCs' advanced technology and superior knowledge, the entrance of the firms to the host country could promote a more efficient utilization of re-

sources. Furthermore, MNCs could bring about new goods and services, which could introduce new uses of the host country's resources. More efficient resource extraction, lower levels of waste, and more ways to employ resources are amongst the benefits of FDI.

iv) Technology and knowledge spillovers

Despite the MNCs' reluctance to explicitly share their technologies and knowledge with their local affiliates, technology and knowledge transfers could still take place when there is FDI. Technology and knowledge spillovers can take place through direct and indirect training as well as through other channels such as: a) the demonstration effect; b) labor turnover; and c) backward linkages.

The demonstration effect occurs when the local affiliates try to emulate their foreign affiliates' techniques of operation. If the local affiliate has learned enough about the operations, they may be able to setup their own firm in the industry.

Spillovers through labor turnover takes place when workers in an MNC subsidiary transfer to a domestic firm or start their own business after having learned the technology, skills, and techniques from their former MNC employer.

Finally, knowledge spillovers through backward linkages generally take place in industries outside that of the investing foreign firm. The technology and knowledge transfer happens in industries upstream and downstream to the foreign firms' industries. This is because foreign direct investors depend on the host country's raw materials in production, and therefore, must control for the quality of their inputs. In doing so, the MNCs have to help firms in the upstream and downstream

industries generate quality inputs which result in technology and knowledge transfers.

v) Balance of trade and balance of payments effects

When MNCs set up plants in a host country and bring with them large amounts of capital, they have a positive effect on the host country's balance of payments. Over time, foreign investors may remit their profits and the effects of FDI on the country's balance of payments will subside. However, there are many other ways in which FDI can affect—both positively and negatively—the host country's balance of payments through the country's trade and service balance such as through imports, import-substitution, and exports.

When MNCs setup production plants in a foreign country, they have to import machinery and raw materials from other countries into the host country. This increase in imports from the entrance of the MNCs will lead to the host economy's loss of foreign currency. Import-substitution, on the other hand, helps the host economy save on foreign currency—which is beneficial for the country's balance of payments. Similarly, through the entrance of MNCs, local industries which were producing and exporting raw materials can produce and export more finished goods with the help of MNCs. The host economy's GDP per capital will, thus, increase.

As we can see, the effect which FDI has on the host country's balance of trade and balance of payments could be both positive and negative, depending on the situation and the behavior of the investing MNCs.

vi) Effects on the industrial structure

The effects which FDI has on the host economy's industrial structure include the introduction of new goods and services, new industrial clusters, structural changes in production and exports, and effects on an industry's competitive edge. In the case of an industry's competitive edge, the effects of MNCs vary—it may create positive or negative effects on the host country. Even though FDI could help generate income, employment, and better resource utilization, it could also force local firms to go out of business. For instance, if prior to the MNC's entrance, the existing firm in the industry is a monopoly, then the MNC will create competition upon entering the host country. If the MNC possesses superior technology and managerial skills, the entrance of the foreign firm may force the local firm out of business. Under such a circumstance, in the long run, the MNC will make the industry it is in less competitive. Therefore, the effects of FDI on the host economy's industrial structure could be good or bad, depending on the situation.

vii) Consumption pattern effects

With the MNCs' investments, more goods and services are introduced to the host economy. Although this may provide consumers with more choices—better quality at cheaper prices, it can, at the same time, bring in inappropriate spending habits. For instance, the entrance of fast food chains into the host country or the introduction of luxury goods to developing host countries may generate unsuitable dietary habits or overspending amongst the people.

2.4 Foreign Direct Investment and Export Expansion in LDCs

There is a widely shared view that FDI promotes exports by i) augmenting domestic capital for exports; ii) helping transfer of technology and new products for exports; iii) facilitating access to new and large foreign markets; and iv) providing training for the local workforce and upgrading technical and management skills. However, there is also a widely shared view that FDI may sometimes i) lower or replace domestic savings and investment; ii) transfer in technologies which are low level and/or inappropriate for the host country's factor proportions; iii) target primarily the host country's domestic market and in fact does not increase exports; iv) inhibit the expansion of indigenous firms that might become exporters; and v) not help develop the host country's dynamic comparative advantages by focusing solely on local cheap labor and raw materials (Zhang, 2006).

Zhang (2006) puts forward in his study of FDI and China's export performance that one of FDI's major potential growth-contribution is to promote host countries' exports. The United Nations Conference on Trade and Development (UNCTAD), similarly, points out that theoretically, the stimulative effects of FDI on exports of the host country derive from the additional capital, technology, and managerial know-how which the MNCs bring with them, along with access to global, regional, and especially home-country markets. Such resources which FDI brings allow the host country to build new export activities as well as improve their performance on existing ones. Zhang (2006) further suggests that FDI helps

exports by investing capital in the exploitation of the host country's comparative advantage. In the case of China, MNCs invest their capital in utilizing and improving the country's low-cost labor.

A host country may expand its exports by hosting FDI since MNCs are thought to carry advantages in entering world markets, such as established global marketing networks. MNCs also bring in new technologies that may be diffused among host country firms, making them more competitive abroad. In general, one may distinguish between direct and indirect effects of FDI on host exports. Direct effects refer to exports by foreign affiliates themselves (Zhang and Song 2000). The impact of FDI on export activities of local firms, on the other hand, makes up the indirect effects (Zhang, 2006; Caves, 1996; Helleiner, 1989).

In the discussion of the direct effects of FDI on host country exports, it is convenient to divide export activities of foreign affiliates into three categories according to production characteristics: i) local raw materials processing; ii) new labor-intensive final product exports; iii) labor-intensive processes and component specialization within vertically integrated international industries (Zhang and Song, 2000). MNCs may help developing country exporters to enter the world markets through special arrangements to provide links to final buyers.

As for the indirect effects of FDI on host country exports, it involves the influence of FDI on the competitiveness of host country firms and the diffusion of new technologies. With the MNCs firm-specific assets, MNCs may increase competition in host country markets and force existing firms to adopt more efficient methods. FDI thus may improve the efficiency of host country firms through the

diffusion of new technologies and management practices in host countries. The third indirect effect is related to the linkage structure between foreign and local firms.

Zhang and Song (2000) found that FDI is an important factor affecting export performance in the case of China. FDI can help channel capital into industries that have the potential to compete internationally, and the global linkages of MNCs can facilitate their access to foreign markets. FDI can also promote exports through the teaching of proper marketing strategies, methods, procedures, and channels of distribution.

While FDI has the potential to help host countries' exports, the benefits do not accrue automatically or uniformly across countries. National policies and host government bargaining powers relative to MNCs matter for attracting export-oriented FDI and for reaping its full benefits for exports.

Chapter 3

Thailand's Experience: Growth Records, Industrialization Experience, Trade, and Exports

Thailand's industrialization process took off around 1961 with the first Economic Development Plan. The 5-year Plan was issued by the Thai government and was aimed at initiating an import-substituting industrialization process with private investments taking the leading role. During this time, Thailands main exports were agricultural products, which accounted for almost 80 percent of total exports. Manufactures were mainly directed to local consumers. In the 1970s to 1980s, the Thai government shifted its focus from pursuing an import-substituting regime to

emphasizing and encouraging export-promoting FDI inflows to Thailand. FDI, and manufactured products have been rapidly growing since. In terms of shares of GDP, manufactures' share has grown from merely 12 percent in 1960 to 40 percent today, while agriculture's share has declined from 40 percent in 1960 to approximately 10 percent. Today, manufactured products account for more than 80 percent of Thailands export values while agricultural products contribution has decreased to only around 10 percent.

Thailand's change in export structure has been strongly attributed to foreign investments—particularly the expansion of FDI inflows to the country. The purpose of this chapter is to provide readers with a brief background of Thailand's economic development—particularly Thailand's industrialization experience, foreign trade and investment patterns, and policies, as well as an overview of the three industries studied in this research (food, textile, and electronics). This is done so that readers could understand the significance of foreign trade and investments on Thailand's economic development process. Discussions on the three industries will give an overview of their characteristics as well as their access to and dependence on the export markets, all of which will lend context to the ensuing chapter on empirical analysis. As the reader shall see, this chapter will illustrate why FDI has been credited for Thailand's economic development and export growth.

This chapter is organized as follows: section 3.1 will be about Thailand's growth records from the 1960s until present. The discussion will cover the country's economic timeline focusing on the trade, investment, and export trends over

time. Section 3.2 gives a brief summary of Thailand's trade and export structures. In section 3.3, a summary of Thailand's experience with foreign trade and investments will be provided. The patterns and policies concerning trade and foreign direct investments (FDI) will be the central issue of this section. Finally, in section 3.4 a brief explanation of the roles of MNCs in Thailand's manufacturing sector is discussed and the characteristics of the three industries—food, textiles, and electronics will be included.

3.1 Thailand's Past Growth Records

From 1960 to 1990, annual economic growth in Thailand averaged nearly 8 percent. During the decade from 1986 to 1996, Thailand was one of the fastest growing economies in the world, with annual growth averaging around 9.5 percent.

In 1996, export growth from Thailand started to decline sharply, and continued into 1997. Also, between 1995 and 1996, the country's current-account deficits had increased to more than 8 percent of the GDP. As a result of the country's falling exports and increasing deficits in current-account balances, businessmen—both domestic and foreign—speculated that the baht would soon be devalued. Speculative attacks to the currency ensued; and finally, on July 2nd, 1997, the Thai government decided to abandon the basket currency system and adopted the managed-float system. The Thai baht, which was pegged to the US dollar at 25 baht to a dollar at the time, consequently fell to 40 baht to a dollar (and at one

time, to 56 baht per dollar). An immediate impact of the devaluation of the baht was that the amount of foreign debts in each company almost doubled in size. This led to many cases of bankruptcy and foreclosures.

Worries about the instability of financial institutions—especially in commercial banks—worsened the country's economic situation. The fear led to massive withdrawals of capital from financial institutions, further weakening them. This, combined with the fall in the Thai baht, triggered a collapse of the economy. In August, 1997, the Thai government applied for a bailout package from the International Monetary Fund (IMF).

The financial crash in 1997 was followed by an economic recession the like of which the country had not experienced in decades (Tambunlertchai, 2002). Thailand's GDP declined for 2 consecutive years, by 1.4 percent in 1997 and by a further 10.5 percent in 1998. Although the depreciation of the baht was expected to benefit Thailand's export sector—as their products become more price-competitive, the devaluation of the baht also triggered other countries' currencies' devaluation and economic slowdown throughout the region. Thus, demands for Thai exports were weak and exporters did not benefit much from the depreciation of the baht as the government had expected. Moreover, as Thai industrial exporters generally have high import contents, the depreciation of the baht had an adverse effect on their costs of production and the exporters faced a liquidity crunch following the crash (Tambunlertchai, 2002).

From 1999 to 2001, the Thai economy slowly recovered. The country, once again, saw positive growth rates with 11.5 percent growth in 1999, 5.9 percent

in 2000, and 1.5 percent in 2001. However, growth in the manufacturing sector remained weak compared to the pre-crisis years.

3.2 Thailand's Trade and Export Structures

Thailand's economic development process throughout the three decades prior to the 1997 crisis is considered to be very successful when compared to other developing countries (Kohpaiboon, 2005). The country's real GDP from 1960-1996 was growing at an average rate of 7.7 percent annually and GDP per capita was increasing steadily throughout the period. The growth spurt in the Thai economy during such period can be attributed to the country's successful pursuit of an export-led growth strategy (Tambunlertchai, 2002; Kohpaiboon, 2007; Piamphongsant, 2007).

The rapid increase in exports from Thailand after the 1960s can be partially attributed to the movement of production facilities of MNCs to Southeast Asian countries. Owing to the depreciation of currencies from the Plaza Accord in 1985 (US dollar, yen, Deutsche mark), many export-oriented foreign investors decided to move their production base to Thailand.

Overall, favorable economic conditions and a focus on long-term economic goals have helped Thailand in its growth. In the following subsections, I shall discuss more specifically the different phases of Thailand's trade policies, patterns of FDI in the country, as well as FDI-specific policies.

3.2.1 Trade Structure

In the early 1950s to late 1960s, agricultural products as well as outputs from other resource-intensive industries such as those from the food, beverage, tobacco, and textiles industries accounted for the bulk of Thailand's exports (Tambunlertchai, 2002; Piamphongsant, 2007). Manufactured products in this period were mostly directed to local consumers and exports from the manufacturing sector were modest. As Thailand is a resource-abundant country, exports from the resource-intensive countries had low import contents and the raw materials needed in the production process could be found domestically.

Since the 1970s, however, the manufacturing sector in Thailand has clearly become more export-oriented and has been contributing high shares to the country's exports. With the help of FDI through MNCs setting up plants in Thailand as well as through the spillovers, linkages, and exports which have taken place in the process, at present, manufactured exports account for more than 80 percent of the nation's total export value (Tambunlertchai, 2002).

The Thai manufacturing sector relies heavily on imported materials. Products serving the domestic and the exporting markets both have high import contents. Manufactured goods that are aimed at serving the domestic market which has high import contents are breweries and dairy products, animal and vegetable oil, animal feed, tobacco, pharmaceuticals, iron, steel, and metal products. Exporting goods which rely on imported raw materials are mainly science-based products such as computer parts, integrated circuits, electrical appliances and electronics, and transport equipment. Only a few groups of exports from the

resource-intensive industries such as the canned foods, milled rice, and rubber industries have low import-contents.

The structure of Thailand's merchandise imports has also changed over the past five decades. The share of manufacturing imports have decreased—owing to the country's import-substitution policies—while intermediate and capital goods' shares of imports have been increasing visibly. Capital goods such as machinery and parts (electrical and non-electrical equipment) comprise almost half of Thailand's merchandise imports. Consumer goods, on the other hand, have seen declining import shares, although their values have been increasing. This might be because more luxury goods are being imported to the country. Sources of Thailand's imports are Japan, the US, ASEAN, the EU, and the Middle East.

3.2.2 Export Structure

As stated earlier in this chapter, the main recipients of Thailand's exports are the United States, Japan, the European Union, ASEAN countries, China, Hong Kong, and Taiwan. In the 1960s, exports from Thailand to these countries were dominated by agricultural products. It was also during that period that the Thai government initiated import-substituting industrialization policies. Foreign currencies which agricultural exports had generated were spent on importing capital goods which were used to help stimulate import-substituting industrialization activities.

The structure of Thai exports is different for each region the country exports to. Thai exports to the US are dominated by a mix of labor-intensive, resource-

intensive, and electronics products. The leading products to the US from Thailand are garments, televisions, integrated circuits, rubber, and seafood (canned and frozen).

Thai exports to the EU have changed significantly during the last decade (Piamphongsant, 2007). In the early 1990s, Thai exports to the EU were led by labor-intensive and resource-intensive products such as footwear, precious stones and jewelry, tapioca products, and canned seafood. However, shares of the products from these industries have been falling while scale-intensive and science-based products such as computer and integrated circuits exports have been expanding from the mid-1990s onwards.

Thai exports to Japan have also shifted towards scale-intensive and science-based products. In the early 1990s, Thai exports to Japan were dominated by labor-intensive and resource-intensive products. From the mid-1990s onwards, shares of products from these industries began to fall while the share of scale-intensive and science-based products began to rise. At present, share of computer, semiconductor devices, and motor vehicles exports to Japan are rising rapidly.

Exports from Thailand to the ASEAN markets are different from those to other countries. As ASEAN countries have similar factors of production and resources to Thailand, Thai exports to ASEAN markets have been dominated by electronics products. Besides electronics exports, leading exports from Thailand to other ASEAN countries include agricultural products or resource-intensive products such as rice and sugar.

Finally, the rise of science-based products and capital-intensive products in resource and scale-intensive industries (especially electronics, petroleum, and chemicals) can be seen in other regions such as China, South Korea, and Hong Kong. Motor vehicles, plastics in primary forms, and chemical products have also been dominating exports from Thailand to regions such as South Asia, the Middle East, Australia, Africa, and South America.

In short, export structure in the early stages of the country's international trade (1960s) was dominated by agricultural goods. Later in the 1970s to 1980s, the country's trade and export structures shifted from relying on resource-intensive products from the agricultural sector to manufactured goods which are intensive in both resource and labor. As Thailand's comparative advantage in cheap labor gets eroded, its leading exports have changed to the more science-based and scale-intensive products such as electronics, electrical appliances.

3.3 Thailand's Foreign Direct Investment Experience

The value of FDI inflows to Thailand (less the cases of mergers and acquisitions) have been significantly increasing since 1986, especially inflows to the manufacturing sector. In addition to the devaluation of foreign currencies from the Plaza Accord, factors that contributed to the rapid increase in FDI inflows to Thailand are: i) investment promotion policies which the Thai government had implemented through the Board of Investment of Thailand (BOI) ; ii) the cheaper labor wages

when compared to other developing countries (for example, Latin American countries); iii) the baht devaluation that occurred twice in the 1980s which resulted in more competitive prices of factors of production and labor wages; iv) favorable economic condition in Thailand, e.g, low and steady inflation rates relative to other developing countries during the few years prior to the Plaza Accord; and v) the tax exemption on the imports of capital and intermediate goods for MNCs imposed by the BOI.

Overall, favorable economic conditions and a focus on long-term economic goals have helped Thailand in its growth. In the following subsections, I shall discuss more specifically the different phases of Thailand's trade policies, patterns of FDI in the country, as well as FDI-specific policies.

3.3.1 International Trade Development

The history of Thailand's economic development is intricately linked to the trade policies the country has pursued. This is evident in the prominence of trade policies in the National Economic Development Plans. The trade history of the country comprises four main phases, each corresponding to the dominant trade policy at the time.

1950s-1960s: Import Substitution Trade Regime In the late 1950s, the Thai government started implementing policies which were aimed at preparing the country for the first Economic Development Plan in the 1960s. The first Economic Development Plan followed a traditional import-substitution strategy, imposing tariffs on imports, especially on finished products. Attention was given to nur-

turing the institutional systems which were necessary for industrial development (Brimble, 2002). Furthermore, to prepare domestic producers for opening the country in 1960, the government gradually reduced the role of state-owned enterprises while promoting the private sector's operations. Therefore, investments which fuelled economic growth in this decade were mainly the government's investments in infrastructure and the private investments in import substitution industries.

In the 1960s, investments in the manufacturing sector expanded rapidly, especially in the import-substitution industries. This trend was so strong that despite the energy crisis in the 1970s, the Thai economy continued on a strong expansion path.

1970s-1980s: Export-Promotion At the beginning of the 1970s, Thailand started seeing balance of payments problems which were attributed to the import substitution policy (Brimble, 2002). In response to the problems, the Thai government started looking into export promotion policies. The Thai government passed a new Investment Promotion Law which allowed the Board of Investment of Thailand (BOI) to have more power to provide investment incentives to foreign investors.

There were large foreign investment inflows along with other forms of capital to Thailand in the second half of the 1980s. Thailand saw substantial surpluses in the country's balance of payments while also experiencing an expansion in exports and foreign-exchange receipts from tourism.

By the late 1980s, Thailand was amongst the fastest growing economies

in the world. Between 1988 and 1990, Thailand's economic growth accelerated to double-digit levels. It was also during this period that newly industrialized economies (NIEs) started to outsource their productions to Southeast Asia. A large number of Japanese and NIEs-based firms relocated their operations to Thailand owing to the appreciation of the source countries' currency. There were large inflows of export-oriented and manufacturing related industries. At the same time, domestic investments in manufacturing, real-estate, and stock markets expanded to unprecedented levels (Tambunlertchai, 2002).

1990s: Financial System's Liberalization The inefficiencies of high protection were realized by the policy makers during the 1970s; and in the late 1980s and early 1990s, there were attempts to promote more openness and competitiveness. These attempts came at a time of a global trend in financial liberalization, and policies during this time were strongly shaped by this trend. Policies during this period were focused on facilitating capital flows and making the Thai markets more internationally accessible. In 1990, the Thai government accepted the International Monetary Fund's Article 8 of the *IMF Articles of Agreement* [1]. The acceptance of this Article resulted in the liberalization of the country's current-account transactions. Furthermore, within the next following years, the Thai government proceeded further to liberalize capital movements, foreign exchange controls, and other financial measures. There were constitutive capital inflows in terms of short-term loans and portfolio investment after the capital liberalization.

The Thai government during this decade continued to encourage export

[1] http://www.imf.org/external/pubs/ft/aa/aa.pdf

expansion. The Thai economy grew and exports from Thailand grew rapidly during this period. In 1997, Thailand experienced a severe financial crisis and the Thai currency depreciated much after 1997.

2000s Until Present The Thai economy has been gradually recovering from the 1997 economic crisis. Average growth rates of the Thai economy, although positive, are still lower than that in the pre-crisis years. The Thai government is still pursuing export-promotion policies. However, Thailand is faced with intense competition in the world market as other emerging economies like China and Vietnam which have lower wage rates are also keen on promoting their manufactured exports.

3.3.2 Patterns of FDI in Thailand

As discussed in the previous subsection on Thailand's trade policies, import substitution strategy in the 1960s and 1970s attracted FDI inflows which were mainly channeled to import-competing industries. FDI inflows, however, began in earnest in the 1980s in export-oriented industries. This increase was mainly due to policy shifts in the mid-1970s towards export promotion and FDI promotion in export-oriented industries. These shifts also coincided with the realignment of major world currencies, particularly the rapid appreciation of the Japanese yen.

Thailand benefited greatly from the rapid appreciation of the yen as the appreciation brought about a massive relocation of industries from Japan to the Southeast Asian countries including Thailand. Much of these inflows were channeled to export industries, and to intermediate and capital goods industries such

as automotive and electronic parts and components. These kinds of FDI have been the main drivers of the rapid growth in manufactured exports as well as the deepening of the industrial structure in Thailand (Tambunlertchai, 2002).

FDI trends in the 1990s were influenced by financial liberalization policies and punctuated by the economic crisis of 1997. In Thailand's balance of payments statistics, FDI includes equity investment and direct investment loans or loans by foreign companies which have investments in Thailand. Historically, equity investment accounted for a significant proportion of FDI inflows to Thailand. However, after the financial liberalization in 1990, the share of investment loans in the country's balance of payments increased. It was also during the 1990s that the share of FDI in Thailand's capital and financial accounts—a portion of the balance of payments—decreased, despite the continual growth in value of FDI inflows and significant increases in other forms of capital flows.

Following the depreciation of the baht in 1997, FDI inflows increased dramatically in both baht and dollar terms (Brimble, 2002)—FDI inflows in 1997 increased to over 3.6 billion USD from approximately 2 billion USD in previous years. This high level of FDI maintained throughout the next decade.

The growth of FDI in the post-crisis period was characterized by a dramatic increase in mergers and acquisitions (M& A) as foreign firms took over Thai companies that faced severe debt and liquidity problems (Brimble, 2002). Other factors which contributed to the rise in FDI subsequent to the crisis are: i) the Thai government's policy to encourage foreign investments in the financial and banking sector by loosening conditions and regulations; ii) the recapitalization in

joint ventures by foreign partners; iii) the takeover by foreign firms or the selling of local businesses to MNCs (Tambunlertchai, 2002).

In terms of source countries of FDI that have historically been important, the countries which have contributed the most to Thailand's FDI inflows are Japan, the US, Hong Kong, and Taiwan respectively. Other important source countries include EU members like the UK, Germany, and the Netherlands; while the most important ASEAN source country is Singapore. In these past few years, however, FDI inflows to Thailand from South Korea and China have also been increasing in value and importance.

3.3.3 Policies on FDI in Thailand

The Thai government has been pursuing private-sector-led industrialization and FDI-friendly policies for the past six decades. Attention on private investment began in the late 1950s, resulting in the establishment of the Board of Investment (BOI) of Thailand in 1959 to overlook investment promotion programs under the government's investment promotion law. In 1960, the investment law was promulgated. Since then, it has been revised many times and is still in use today.

The BOI's main responsibilities are to attract and facilitate foreign investors while ensuring their confidence in Thailand's economic and political situation. So far, the investment promotion programs issued by the BOI have included strategies like tax incentives, reduction of restrictive trade measures, liberal terms on the remittance of profits and other foreign exchange payments, and assurance to foreign investors that there will be no nationalization of private businesses.

After the financial crisis, the BOI provided some short-term measures to encourage new investment and to expand existing investments. Over the last decade, the BOI revised Thailand's investment incentives to be more in line with WTO regulations (Tambunlertchai, 2002).

3.4 Thailand's Industrial Sector Overview and the Multinational Corporations

Studies (Akira, 1989; Kohpaiboon, 2006b; Kohpaiboon, 2007) indicate that the increase of FDI inflows to Thailand is consistent with the degree of openness to international trade policies in Thailand. The Thai government has been implementing tax incentive policies to encourage foreign investors since the 1980s; and as a result, investing MNCs have shifted their focus of production from import-substitution to being more export-oriented in accordance with the government's policies. From existing literature (see, for example, Balasubramanyam et al., 1996; Kohpaiboon, 2003, 2006a, 2006b) on MNCs and developing countries, it is proposed that in the case of developing countries, export-oriented FDI are more beneficial for the host country than import-substituting FDI.

Thailand's 1997 industrial census (information on 1996) exhibit the significance of MNCs in Thailand's industrial sector in terms of production and exports. Particularly, MNCs contributed to almost 50 percent of the total value of exports and value-added in Thailand's manufacturing sector in 1996. Furthermore, when considering Thailand's export-output ratio in 1996, it can be seen that MNCs'

export-output ratio was as high as 60 percent. This indicates that MNCs in Thailand are more likely to export than local firms with no foreign affiliates.

3.4.1 The Food Industry

The 2-digit level ISIC code—a coding system used for classifying industry types created by the United Nations Industrial Development Organization (UNIDO)—for the food industry is 15. At the 4-digit level ISIC, the food industry runs from 1511-1549; covering products such as meat products, fisheries, fruits, vegetables, processed meat, processed fruits, grains, dairy products, sugar products, etc.

Owing to Thailand's abundant natural resources, cheap labor, and geographical conditions suitable for agriculture, the food industry is one of the biggest industries in the country. Firms within this industry in Thailand vary in size. The industry consists of both large business conglomerates like the Charoen Pokphand group as well as small and medium enterprises (SMEs) that are dispersed all over the country.

The food industry is an extremely important source of employment and income in the Thai economy. The industry is also interconnected with many other industries and sectors such as the agricultural sector, the packaging industry, the transportation industry, etc. Importantly, this industry produces enough to satisfy domestic consumption as well as supply to export markets.

The food industry in Thailand has been continually growing over the past ten years. The industry has seen a significant amount of FDI as many MNCs

have come in and setup production plants in order to make use of Thailand's abundant resources. Exports from this industry have also been steadily growing. In 2008, the value of food industry exports from Thailand was as high as 21 billion USD.

3.4.2 The Textile and Clothing Industries

The 2-digit ISIC codes for the textile and clothing industries are 17 and 18 respectively. The products in these two industries include textile fibers, finishing of textiles, carpets and rugs, knitted and crocheted articles, dressing and dyeing of fur, rope, twine, wearing apparel (except fur), etc.

The textile and clothing industries, like the food industry, have historically been important for the Thai economy. The two industries are labor-intensive and are interconnected with many other supporting industries. Furthermore, the textile and clothing industries have been major contributors to the high growth rate of Thai exports since the 1960s; and at present, both industries rank among Thailand's top five leading export industries (Piamphongsant, 2007).

FDI has played an important role in the development of the textile industry in Thailand since the 1960s. Foreign firms provided capital, technology, and management. At the early stages of Thailand's export-oriented era (1980s-1990s), many MNCs established their plants in the textile and clothing industries in Thailand. It was also during this period that Thailand saw its textile and clothing industries gain competitiveness and an expansion in exports (Piamphongsant, 2007). The textile and clothing industry saw a prolonged spell of growth, even

after the 1997 economic crisis since the depreciation of the baht made for favorable export conditions. In the past decade, however, the expansion of both industries has been very limited. The textile and clothing industries in Thailand have been losing their competitiveness as a result of increasing labor wages due to the appreciation of the Thai baht and the intensified competition from emerging countries like China, Pakistan, and Bangladesh. Moreover, WTO Agreements have conditioned Thailand to open up many industries including the textiles and clothing industries. As a result, producers and exporters in the industries have been adversely affected with higher price competition.

But despite the slowdown, these two industries remain important for Thailand. Outputs in the textile and clothing industries are intended for both domestic consumers and the international market. The main recipients of textiles and clothing exports from Thailand are: the US, Japan, and the UK.

3.4.3 The Electrical Appliances and Electronics Industries

The electrical appliances and electronics industries comprise both capital-intensive and labor-intensive sectors. This is because the two industries have high-technology components as well as a large degree of manual checks and machine operation. The industry's ISIC codes are 30, 31, and 32; and the products range from consumer appliances and computer equipment to electronic components and industrial equipments.

The electrical appliances and electronics industries have contributed greatly to Thailand's manufactured exports expansion since the mid-1980s. In 2005, the

value of exports from the two industries altogether accounted for more than 40 percent of total manufactured exports from Thailand (Piamphongsant, 2007).

The electrical appliances and electronics industries grew rapidly in the late 1980s owing to the Plaza Accord—which resulted in the rapid appreciation of the Japanese Yen after 1985. Furthermore, the devaluation of the Thai baht twice in the 1980s made labor and land costs in Thailand even cheaper. The influx of Japanese firms during this period brought in many new technologies and production plants. These two industries therefore have had a big role in the technology and knowledge transfer in Thailand.

Although the electrical appliances and electronics industries in Thailand have high exporting rates, most of the exporting firms are those with foreign affiliates or are MNCs themselves. Local firms in the industries have the capacity to compete domestically, but they still lack the kind of technology and capital needed to produce high-quality goods to compete in the international markets (Tambunlertchai et al., 1998).

The main recipients of exports from Thailand's electronics appliances and electronics industries are: the US, Japan, and China.

Chapter 4

Conceptual Framework and Data Description

In this chapter, I will elaborate on the conceptual and empirical frameworks for the analyses of firm-level export decision and export orientation. Formulation of the models, hypotheses, and the data used in support of the empirical findings in the next chapter are discussed here. The chapter proceeds in the following manner: section 4.1 discusses the conceptual framework of the (possible) determinants of firm-level export decision and the characterization of firms' export orientation. Section 4.2 illustrates the formulation of the models to be studied in chapter 5. Finally, section 4.3 provides information on the dataset used in this research. This last section includes the description of the dataset, data source, and the criteria used in the data cleaning process in this research paper.

4.1 Conceptual Framework

Exports are believed to be a driving force for a country's economic growth and industrialization process (Kohpaiboon, 2007; Lipsey, 1999; Krueger, 1995; World Bank, 1993). Although classical trade theories on comparative advantage and factor abundance can be used to explain nation-level export decisions (Feenstra, 2004), studies of factors which characterize firm-level export participation and export orientation have been inconclusive (Bernard and Jensen, 1995, 1997, 1999, 2004; Aitken et al., 1997; Roberts and Tybout, 1997; Kokko et al., 1997; Kneller and Pisu, 2007).

Existing literatures on the topic of firm-level export participation and export orientation agree on the existence of sunk costs associated with export market entry (Baldwin, 1988; Dixit, 1989; Baldwin and Krugman, 1989; Kneller and Pisu, 2007). Such costs include the establishment of distribution and logistics channels, product compliance and regulations, market research to acquire information about consumers' tastes and market structure in foreign countries. However, there are still mixed views on what characterizes a firm's decision to export and what determines the share of a firm's exports to total sales.

Kneller and Pisu (2007) propose that firm-level variables which significantly influence domestic firms' export market participation decision are the size of the firm and the quality of workers in the firm. They further suggest that MNCs, especially export-oriented ones, appear to generate positive export spillovers—export-oriented MNCs significantly increase the probability of exporting for domestically-owned firms operating in the same industry. However, when taking foreign owner-

ship into account in their empirical analysis, Kneller and Pisu (2007) discover that the export decision of domestic firms does not seem to be significantly affected by contacts they may have with MNCs. Furthermore, Kneller and Pisu (2007), from their empirical analysis, also find that for the share of exports (to total sales), the size variable is (now) insignificant while firm-level characteristics such as efficiency remain positive and significant.

Bernard and Jensen (2004), on the other hand, conclude in their research that large, productive plants, plants which are owned—partially or wholly—by US MNCs, and/or plants with high labor quality all have higher probabilities of exporting and a higher propensity to export. The two authors' findings are consistent with Aitken et al. (1997), and Roberts and Tybout's (1997) works. In particular, Roberts and Tybout (1997) propose that plant characteristics such as plant size, plant age, and the structure of ownership are positively related to the propensity to export of local firms. Similarly, in Aitken et al. (1997), the study's findings put forward that the presence of export-oriented MNCs in the same industry increases the probability of exporting by Mexican firms. Furthermore, in Aitken et al. (1997), empirical results also show that plant size, wages, and especially foreign ownership are all positively related to local firms' decision to export.

Literatures on what constitutes a firm's propensity to export and/or export orientation, similarly, present mixed views on the topic. As quoted in Kneller and Pisu (2007), Bleaney and Wakelin (1999), for the case of the UK and Wagner (2004), for the case of Germany, report evidence of significant relationship between

size and export shares. Greenaway et al. (2004), in the same way, used the UK as a sample to study factors which characterize UK firms' export decision and export orientation. The outcomes of the study, although not very statistically significant, suggest that the likelihood of firm's export shares is increasing in foreign presence. Greenaway and Kneller (2004) provide evidence supporting Greenaway (2004). The work puts forth that for domestic firms, the probability of export and the export intensity have been found to be increasing in the size and productivity of firm.

Barrios et al. (2003) studied the case of Spain. However, contrary to Greenaway et al.'s (2004) findings, Barrios et al. (2003) found no evidence of export spillovers to local firms from the existence of MNCs. Ruane and Sutherland's (2004) findings through using the case of Ireland agrees with Barrios et al.'s findings that there appears to be no evidence of export spillovers from MNCs to local firms in Ireland.

Other industry-level factors such as the industry's comparative advantage in labor or capital (capital-labor ratio) and BOI promotion are also considered to be influential to a domestic firm's export decision and orientation (Kneller and Pisu, 2007; Kohpaiboon, 2007). For a firm to be successful in exporting to a foreign market, there are many other procedures involved other than firms being able to sell their products at world market prices—especially in the case of manufactured goods such as processed foods from developing countries to developed countries. Exporting producers must also know the international market demands, which may be very different from that of their domestic markets, the legal procedures,

and the recipient countries' regulations on trade and imports (Aitken et al., 1997). Additionally, exporting firms are faced with higher risks of operation if the firms' exports are products which have little to no demand for in the domestic market (Roberts and Tybout, 1997; Kohpaiboon, 2007).

In short, given the existence of sunk costs associated with all firms' export participation and other procedures involved in successfully exporting to foreign markets, it is logical to hypothesize that firms which are more capable of taking on the necessary sunk costs and additional risks are firms that will be more inclined to export. Owing to the contradicting views presented and the lack of literatures on the case of developing economies, this research paper seeks to provide information on the topic of firm-level export status by focusing on Thailand—a developing economy.

4.2 The Models

The models studied in this research are extensions of Roberts and Tybout's (1997) model which was used to explain a Colombian chemical firms' export decision. In Roberts and Tybout (1997), the authors present that sunk entry costs for plants breaking into foreign markets are substantial; and consequently, producers will not initiate exports unless the present value of their expected future export profit stream is large.

In other words, if we let R_i^X and R_i^D be firm i's expected returns on producing for the domestic market and the export market respectively, firm i will only opt

to export their products and take on the sunk costs and additional risks if and only if

$$R_i^X - R_i^D > 0 \tag{4.1}$$

If we let X_i be the binary-value variable representing firm i's export decision (X_i= 1 when firm i decides to export and $X_i = 0$ if otherwise), we can then say:

$$X_i = \begin{cases} 1, & \text{if } R_i^X - R_i^D > 0 \\ 0, & \text{otherwise} \end{cases} \tag{4.2}$$

Entering the export market is a means for firms to increase their sales and expand their profits. However, owing to the existence of sunk costs and additional risks associated with such procedures, the net gain of exporting their goods is not necessarily positive for all firms.

Once a firm decides to export, the question of how much should the firm export arises. Past studies on what constitutes a firm's export decision and export orientation (Athukorala et al., 1995; Roberts and Tybout, 1997; Bernard and Jensen, 1997; Kohpaiboon, 2007), conclude that influential factors include:

i) Firm size

Owing to the existence of sunk costs and additional risks which are associated with export market participation, it is hypothesized that bigger firms are

more likely to be more prepared to take on the prerequisites of entering the foreign markets (Bernard and Jensen, 1995, 1997, 1999; Roberts and Tybout, 1997; Aitken et al., 1997; Kohpaiboon, 2007; Kneller and Pisu, 2007). Furthermore, because bigger firms are more capable of producing at bigger scales, it is also theorized that bigger firms are more likely to export more of its output (Bernard and Jensen, 2004; Kneller and Pisu, 2007).

In this research paper, my hypothesis is that firm size is positively related to the firm's decision to export and to the firm's export-orientation. Therefore, the coefficients on firms' size variables in the two models will be positive.

ii) Firm age

Firm age is considered a relevant factor to firms' export decision and export status. This is because firms which have been in the industry for a long time usually have more experience and better knowledge which allow them to take up the additional risk of producing for the export market. Studies and surveys which mention the importance of firm age in firms' decision to export include Roberts and Tybout (1997), Berndt (1991). Furthermore, it is also believed that firms which have been around for longer have a broader distribution network—locally and/or internationally. Therefore, the age variable will be included in both firm-level export decision and firm-level export orientation models. The relationships between the firm's age and the firm's export decision and export orientation are hypothesized to be positive; therefore, the coefficients on age are expected to be positive.

iii) Firm efficiency

The issue of whether or not firm efficiency influences firms' decision to export is still debatable, especially in the direction of causality-efficient firms export more (self-selection hypothesis) or export participation makes firms more efficient (learning process hypothesis). However, for the purpose of this research, the efficiency of the firm should also be accounted for because efficiency is a factor which may influence firms' export decisions as well. The coefficients on the efficiency variables, which will be presented in chapter 5, may be able to provide further evidence on the causality debate—whether or not the self-selection hypothesis could be rejected.

In this research, value added per worker or labor productivity will be used as an indicator of efficiency. I will hypothesize that firms with higher efficiencies are more likely to export than firms with low efficiency in production—thus, the predicted signs for the coefficients of efficiency variables on export decision and export orientation are positive. For this purpose, value-added per labor will be used as a proxy for efficiency.

iv) Firm ownership

As stated earlier in section 4.1, much of the literature on the topic of export participation decision suggests that firm ownership significantly impacts firms' decision to export (Aitken et al., 1997; Kokko et al., 1997; Roberts and Tybout, 1997; Bernard and Jensen, 2004). This is because foreign affiliates have access to the source firms' global distribution networks as well as the advanced technology which the source firm possesses. However, this may not necessarily be the case. The relationship between a firm's decision to export and the structure of ownership

of the firm also depends on the foreign affiliate's intention when entering the host economy—for import-substituting or for export-expanding purposes. Therefore, it is difficult to specify *ex ante* whether the relationship between the firm's ownership structure and its decision to export will be positive or negative.

v) Research and development expenditure

Past studies on the topic of firm-level export decision and export orientation—such as Barrios et al. (2003), Greenaway et al. (2004)—suggest that research and development expenditure should be included into firms' export decision models as well. However, in the developing countries' framework, such as in the case of Thailand, R&D expenditure in developing countries is usually spent on making the production process more efficient rather than for innovation purposes. In other words, for developing countries, R&D expenditure will result in increased firm efficiency (Kohpaiboon, 2007). As the efficiency variable already captures the effects of firm efficiency on export decisions and export orientation, adding R&D expenditure into the model will be of excess. Therefore, the variable on R&D expenditure will not be included into the models.

vi) Capital-labor ratio

The capital-labor ratio reflects the industry's intensity of capital and/or labor usage. In the case of Thailand—as well as other developing countries—the country's comparative advantage lies within the abundant labor at relatively cheap wages. Therefore, it is hypothesized that firms in industries with low capital-labor ratio are more likely to export than firms with high capital-labor ratio in developing countries with cheap labor—predicted signs on the capital-labor ratio's

coefficients are negative for export decision and export orientation.

vii) BOI Promotion

As stated earlier in chapter 3, the Thai government has put much emphasis on export promotion policy. The Board of Investment of Thailand (BOI) has given high priority to export-oriented firms and exporting firms are receiving extra-privileges compared to domestically-oriented firms. For example, firms with more than 80 percent of their export sales are allowed full promotional privileges while domestically-oriented firms will receive BOI promotion only if they meet certain conditions such as their plants must be located in areas outside of Bangkok in order to be qualified for the promotion policies. Therefore, it is logical to hypothesize that BOI promotion policies could influence a firm's export-orientation (for both Thai and foreign firms).

The predicted signs on the coefficients of BOI promotion in both firm-level export decisions and firms' export orientation are hypothesized to be positive.

Let X_i be a binary-valued variable representing firm i (in industry j)'s export decision (X_i= 1 when firm i decides to export and X_i = 0 if otherwise). Then given the factors above, firm-level decision to export and firms' intensity of exports could be modeled as follows:

4.2.1 Firm-Level Export Participation Decision

$$X_i = F(size_i, age_i, FDI_i, (\frac{VA}{L})_i, (\frac{K}{L})_i, BOI_i) \tag{4.3}$$

As discussed above, a firm's decision to export is hypothesized to be influenced by firm-level characteristics—$size_i$, age_i, FDI_i, $(\frac{VA}{L})_i$, $(\frac{K}{L})_i$, BOI_i. Bigger firms which have more experience and higher efficiencies are theorized to be more likely to export. It is also hypothesized that Thai firms which receive FDI, BOI promotion, and firms that leverage on Thailand's comparative advantage of cheap labor, have higher tendencies to export.

In summary, the predicted coefficients on the independent variables are as follows:

Variable Name	**Description**	**Predicted Signs**
X_i	binary-valued variable on firms' decision to export; 1 being the firm decides to export, and 0 in other cases	
$size_i$	size of firm i; measured by the number of employees in the firm	(+)
age_i	period of firm i's operation (in years)	(+)
FDI_i	binary-valued variable; 1 if firm has foreign investments, and 0 if otherwise	(+/-)
$(VA/L)_i$	firm i's efficiency; measured by the firm's value-added per unit labor	(+)
$(K/L)_i$	capital-labor ratio of firm i measuring the firm's comparative advantage—hypothesized to be negative because of Thailand's comparative advantage in low cost labor; capital is measured by the value of the firm's fixed assets, while labor is the total amount of workers in the firm	(-)
BOI_i	binary-valued variable; 1 if firm receives BOI promotion in promoting exports, and 0 if otherwise binary-valued variable measuring BOI promotion in export-promotion—taking on the value 1 if there is government help in the industry; and zero if otherwise	(+)

4.2.2 Firm's Level of Export Orientation

$$ExportShares = G(ownership_i, size_i, age_i, (\frac{VA}{L})_i, (\frac{K}{L})_i, BOI_i) \tag{4.4}$$

Besides firms' decision to export, this research further studies the effects of the same set of independent variables on firm-level export-orientation. In other words, the study of how $ownership_i$,$size_i$, age_i,$(\frac{VA}{L})_i$, $(\frac{K}{L})_i$,BOI_i influences the firms' percentage of exports is included in this research as well.

Different firms have different capabilities and tendencies to export. Therefore, empirical tests are conducted to see how firms' export orientation (export/total sales ratio) could be influenced by $ownership_i$, $size_i$, age_i, $(\frac{VA}{L})_i$, $(\frac{K}{L})_i$, BOI_i. In this equation, however, the percentage of foreign ownership shares ($ownership_i$) is used instead of the binary-valued variable for FDI (FDI_i). The hypothesis is that firms with a higher percentage of foreign ownership shares are likely to export a higher proportion of their outputs owing to the MNCs' global distribution network. However, as stated earlier, the existence of MNCs' may not have such an effect on firms' export orientation if they are not export-oriented MNCs. Therefore, the predicted sign of the coefficient on foreign shares in this model is still unclear.

Note: The signs in the parentheses are the expected signs on the coefficients.

Note: information on how some variables are calculated is in Appendix B.

4.3 Data Description

This research's empirical analysis uses data from the 2007 Industrial Census which is gathered by the National Statistical Office of Thailand (NSO). The Industrial Census is a survey which is conducted every 10 years to gather information on

Variable Name	**Description**	**Predicted Signs**
$exportshares_i$	exports from firm i as percentage of its total output	
$size_i$	size of firm i; measured by the number of employees in the firm	(+)
age_i	period of firm i's operation (in years)	(+)
$ownership_i$	the percentage of the share of foreign ownership	(+/-)
$(VA/L)_i$	firm i's efficiency; measured by the firm's value-added per unit labor	(+)
$(K/L)_i$	capital-labor ratio of firm i measuring the firm's comparative advantage—hypothesized to be negative because of Thailand's comparative advantage in low cost labor; capital is measured by the value of the firm's fixed assets, while labor is the total amount of workers in the firm	(-)
BOI_i	binary-valued variable; 1 if firm receives BOI promotion in promoting exports, and 0 if otherwise binary-valued variable measuring BOI promotion in export-promotion—taking on the value 1 if there is government help in the industry; and zero if otherwise	(+)

distribution and performance of the manufacturing establishments in Thailand during a given year. The newest industrial census is the 2007 Industrial Census which is the third in the series—the first one was conducted in 1964 and the second one in 1997. This 2007 census surveyed 34,625 establishments in 2006 (January 1st – December 31st). The information obtained in the 2007 NSO census is the newest and most extensive set of industrial census data available in Thailand so far.

The main reason for using the 2007 Industrial Census is the comprehensiveness and the firm-level nature of the information. Moreover, the industrial census has been used in many studies on Thailand's industries throughout the past two decades—for example, Ramstetter (2004) in the Journal of Asian Economics, Ito (2004) in the Journal of Asian Economics, and in Kohpaiboon (2006a) in the World Bank's World Development Report.

Below is a tabulated summary statistics of the three industries which will be used in this research:

The Food Industry

Variable	Obs	Mean	Std. Dev.	Min	Max
Export Sales	9799	11900000	130000000	0	4750000000
age	5814	3	10	0	99
All Labor	9799	40	193	1	10532
Foreign Shares	9799	1	8	0	100
Efficiency	9799	109476	488174	44	38400000
K-L Ratio	9799	109364	303358	0	8188767

	Foreign Share Present		
Xi	**0**	**1**	**Total**
0	9,197	54	9,251
1	426	122	548
Total	9,623	176	9,799

boi	**Freq.**	**Percent**	**Cum.**
0	9,374	95.66	95.66
1	425	4.34	100
Total	9,799	100	

The Textiles and Clothing Industries

Variable	Obs	Mean	Std. Dev.	Min	Max
Export Sales	9799	11900000	130000000	0	4750000000
age	5814	3.336945	9.590631	0	99
All Labor	9799	40.37698	193.4621	1	10532
Foreign Shares	9799	0.8992754	7.728975	0	100
Efficiency	9799	109475.7	488174	44.44444	38400000
K-L Ratio	9799	109364.4	303358	0	8188767

	Foreign Share Present		
Xi	**0**	**1**	**Total**
0	9,197	54	9,251
1	426	122	548
Total	9,623	176	9,799

boi	**Freq.**	**Percent**	**Cum.**
0	9,374	95.66	95.66
1	425	4.34	100
Total	9,799	100	

The Electronics and Electrical Appliances Industries

Variable	Obs	Mean	Std. Dev.	Min	Max
Export Sales	933	493000000	3420000000	0	82800000000
Age	656	11	19	0	94
All Labor	933	281	827	1	9643
Foreign Shares	933	22	38	0	100
Efficiency	933	683503	2092360	1500	37800000
K-L Ratio	933	366694	933660	0	14800000

	Foreign Share Present		
Xi	**0**	**1**	**Total**
0	599	75	674
1	64	195	259
Total	663	270	933

boi	**Freq.**	**Percent**	**Cum.**
0	681	72.99	72.99
1	252	27.01	100
Total	933	100	

Generally, in the case of primary data, there is a high chance of coming across observations which are improbable and/or duplicated—for instance, firms with

negative value-added or firms with unlikely fixed assets values. These improbable values are results of errors and miscalculations in the survey procedures, and thus, must be rectified before using such dataset. The 2007 Industrial Census is a primary dataset obtained through the NSO; therefore, before using this dataset for empirical analysis purposes, a few data cleaning procedures were performed. Improbable and duplicated observations were eliminated from the dataset.

The following criteria are used to clean the dataset:

i) Remove duplicates

The 2007 Industrial Census is a plant-level dataset. As this research paper sets out to examine factors which characterize firm-level export decision and export orientation, data cleaning procedures to remove duplicated observations which suggest that the observations are collected from the establishments of the same multi-plant firm were performed.

Observations belonging to the same 4-digit ISIC group which had the same values of sales and registered capital were flagged. The overlap in the three categories means the observations likely come from the same firm. Duplicates are then removed, leaving on one observation to be used in the analysis.

ii) Recalculation of fixed assets values [1]

If the value of the firm's fixed asset per worker have unlikely values—e.g., implausibly low (less than 100 baht—equivalent to 2.82 USD) or implausibly high

[1] The NSO census, fixed assets value are recorded as book value and many firms which have already written off their fixed asset depreciation value would record the fixed asset value as zero. Some of these firms may hire thousands of workers so the fixed assets for these firms are highly underestimated and need imputation.

(more than 10 billion baht—equivalent to 282 million USD), an imputation of a new value of the fixed assets will be provided and will replace the unlikely values:

a. Add up the fixed asset value of all firms in the same 4-digit ISIC code

b. Add up the number of all workers in the same 4-digit ISIC code

c. Divide the obtained total fixed asset (a) by the obtained total number of workers (b)

d. For firms with fixed asset values more than 282 million USD or less than 2.82 USD, multiply the amount obtained in (c) by the number of workers in the firm. This will yield the imputed firm's fixed asset value used in the analysis.

iii) Remove firms with negative value-added

If the firm's production value is less than the value of the raw materials used in production—which is likely to be impossible—these firms with negative value added will be deleted.

iv) Remove firms with improbable values of production per unit labor

Firms with unlikely values of production per unit labor (VP/L) were removed. In particular, unlikely (VP/L) values are firms with more than 1 billion baht (28.22 million USD) or firms with (VP/L) less than 100 baht (2.28 USD).

After eliminating the duplicates in the three industries studied in this research—food, textiles and clothing, and electronics and electrical appliances—we are left

with 24,631firms; 13,899 of which were of the food industry (2,502 plants in the industry were removed), 9799 of which were of the textiles and clothing industries (3636 plants in the industries were removed), and 933 of which were in the electronics and electrical appliances industries (564 plants in the two industries were removed).

The next chapter proceeds to report the empirical findings of the above model specification.

Chapter 5

Econometric Procedures, Results, and Discussion

In the previous chapter, hypotheses and models for firm-level export decision and export orientation were discussed. Recall that in the first model on firm-level export decision, the dependent variable is binary-valued; therefore, in testing the hypotheses for the first model, logit and probit econometric techniques are employed. In the second model on firms export orientation, the export percentage of outputs is the dependent variable and is assumed to be linearly related with the independent variables; therefore, ordinary least squares (OLS) techniques are used to test the hypotheses associated with this second model.

This chapter discusses the econometric procedures employed and the results obtained from the empirical analysis. The organization of the chapter is as follows: section 5.1 gives the overview of the econometric procedures used to test the

hypotheses on the two models specified in chapter 4; and section 5.2 discusses the results obtained from the empirical analyses.

5.1 Econometric Procedures

5.1.1 Firm-Level Export Decision

$$X_i = F(size_i, age_i, FDI_i, (\frac{VA}{L})_i, (\frac{K}{L})_i, BOI_i) \qquad \text{(model (1))}$$

The null hypothesis is that characteristics [such as: $size_i$, age_i, FDI_i, $(\frac{VA}{L})_i$, $(\frac{K}{L})_i$, BOI_i] do not affect firms export decision—H_0: β_i=0, where β_i is a vector of coefficients on the above characteristics.

The model representing firms export decision has a binary-valued dependent variable ($\mathcal{X}_i$); therefore, using ordinary least squares methods (OLS) to estimate the equation will not be fitting. This is because when estimating the equation using OLS estimation methods, the predicted dependent variables values will often be fractions, or lie below 0 or above 1, which are not the possible values for $\mathcal{X}_i$-- possible values for $\mathcal{X}_i$ are 0 and 1.

Another issue which may occur from using OLS estimation methods to estimate equations with binary-valued dependent variables is that OLS estimation methods will assume a linear relationship between the dependent ($\mathcal{X}_i$) and independent variables [$size_i$, age_i, FDI_i, $(\frac{VA}{L})_i$, $(\frac{K}{L})_i$, BOI_i]. Such an assumption, in the case of estimating the export decision model, appears to be illogical. For

instance, it seems unreasonable, under the OLS assumption, that an increase in firm As labor (an increase in the size of firm A) from 10 to 100 will have the same impact on As export decision as when there is an increase in labor from 10,000 to 100,000. Instead, it should be the case that firm A will export only when its size is big enough to undertake the sunk costs and risks of entering foreign markets—provided that firm size does have significant influence on firms export decision. In other words, an arbitrary increase in firm size should not always linearly increase the probability of a firms export decision.

To accommodate the two issues stated above, the empirical analysis of the first model on firms export decision will make use of the logit and probit models, which allow for binary outcomes. However, as reference, the results obtained from OLS estimations will also be presented in the results table in the appendix.

Logit and probit estimation methods are different from OLS estimation methods in that logit and probit methods do not assume a linear relationship between the dependent and independent variables. Instead, the dependent variables in the logit and probit models are assumed to be an increasing, possibly nonlinear, function F(.) of the independent variables, which take on values between 0 and 1 ($0 \leq F(.) \leq 1$).

For the logit model, F(.) is assumed to be the logistic cumulative distribution function :

$$F(.) = \frac{e^z}{1 + e^z} \tag{5.1}$$

while the probit model assumes F(.) to be the standard normal cumulative distribution function which is expressed as an integral:

$$F(.) = \Phi(Z) = \int_{-\infty}^{Z} \phi(v)dv. \tag{5.2}$$

where $\phi(z)$ is the standard normal density:

$$\phi(z) = (2\pi)^{-\frac{1}{2}} exp(-\frac{z^2}{2}) \tag{5.3}$$

Therefore, the model can now be rewritten as:

$$X_i = F(Z); \tag{5.4}$$

$$F(Z) = \begin{cases} Z, & \rightarrow \text{ OLS} \\ \dfrac{e^z}{1+e^z}, & \rightarrow \text{ Probit} \\ \Phi(Z) = \int_{-\infty}^{Z} \phi(v)dv, & \rightarrow \text{ Logit} \end{cases} \tag{5.5}$$

where:

$$Z_i = \beta_0 + \beta_1 size_i + \beta_2 age_i + \beta_3 FDI_i + \beta_4 (\frac{VA}{L})_i + \beta_5 (\frac{K}{L})_i + \beta_6 BOI_i \tag{5.6}$$

5.1.2 Firm-Level Export Orientation

As discussed in Chapter 4, in the second model firms level of export orientation is modeled as:

$$ExportShares = G(ownership_i, size_i, age_i, (\frac{VA}{L})_i, (\frac{K}{L})_i, BOI_i) \quad \text{(model (2))}$$

where the dependent variable is the firms exports as percentage of output with the values of the observations being within the 0 to 100 range—0 meaning that the firm did not export and 100 being the firm exported all of its goods. In estimating this equation, OLS estimation methods are used. This is because a linear model seems to approximate well the relationship between the independent variables and *ExportShares*—for instance, firm B's export shares are likely to linearly increase as firm B's efficiency $(\frac{VA}{L})_B$ increase.

Therefore, we use the following specification in the second model on firms level of export orientation:

$$ExportShares = \gamma_0 + \gamma_1 ownership_i + \gamma_2 size_i + \gamma_3 age_i + \gamma_4 (\frac{VA}{L})_i + \gamma_5 (\frac{K}{L})_i + \gamma_6 BOI_i + \epsilon \tag{5.7}$$

where ϵ represents the error term.

5.2 Results and Discussions

5.2.1 Firm-Level Export Decision

$$X_i = F(size_i, age_i, FDI_i, (\frac{VA}{L})_i, (\frac{K}{L})_i, BOI_i) \qquad \text{(model (1))}$$

Using logit or probit depends on the functional form assumption, and therefore there is little theoretical motivation for distinguishing between the two models. Before statistical analysis packages were developed and made accessible to econometricians, the choice between the two estimation methods were made based on the ease of data collection and data manipulation (Kennedy, 2003). At present, with the existence of statistical analysis packages, it is common practice for studies of binary outcome to report both logit and probit estimation results. This paper will also present and discuss results for both the logit and probit models.

To reiterate the predicted signs of the coefficients, the table of variables, its meaning, and its predicted relationship to the dependent variable is presented below:

Variable Name	**Description**	**Predicted Signs**
$size_i$	size of the firm measured by total labor	(+)
age_i	the time which the firm has been operating	(+)
FDI_i	"binary-valued variable; 1 if firm has foreign investments and 0 if otherwise"	(+/-)
$(VA/L)_i$	proxy for firm efficiency measured by value-added per labor	(+)
$(K/L)_i$	measuring firm's utilization of comparative advantage: capital-intensive or labor-intensive	(-)
BOI_i	"binary-valued variable; 1 if firm receives BOI promotion in promoting exports and 0 if otherwise"	(+)

**Note: The detailed tabulated results are in Appendices section of this paper.*

Because different factor intensities are likely to affect firms export behavior differently, this paper looks at export decisions for three separate groups of firms: the resource-intensive (food) firms export decision, the labor-intensive industry (clothing and textiles) firms export decision, and the capital-intensive industry (electronics and electrical appliances) firms export decision.

Logit Estimations

(See logit estimation results for model (1) in tables A.1, A.2, and A.3 in

Appendix C)

(See marginal effects for logit estimates in tables B.1, B.2, and B.3 in Appendix C)

The Food Industry

The logit estimation of model (1) for the food industry shows that the signs on the independent variables coefficients are consistent with the predicted signs shown in Table 5.1 above. The estimated model also suggests that, for the food industry, firms probability of export is significantly increasing in firm age, firm efficiency, and the reception of BOI promotion (1 percent significance level). The binary-valued variable for FDI in the food industry positively impacts firms export decision at a 10 percent significance level. The pseudo R-squared for the logit estimation using data from the food industry is 0.843.

The variable on firm size, from the logit estimation, is not significant. This is not consistent with past studies (Kneller and Pisu, 2007; Kohpaiboon, 2007) that firms probability to export should be increasing in firm size. However, in the case of Thailand, there exist many firms in the food industry which are small in size, but are still able to export such as small firms which produce confectionery, preserved fruits and vegetables, fish sauce, etc. Furthermore, many of the firms in the food industry in Thailand are family-owned and a portion of the firms labor may be from family members who are not reported in the Census. Therefore, the result on the firm size variable may not be significant as a result of these characteristics of Thailands food industry.

The coefficient on the K/L ratio variable is with the right sign, but the

coefficient is not statistically significant. This could be explained by the fact that the food industrys firms are small. Although there are labor intensive activities, but as the number of workers is small, the K/L ratio for some firms could be quite high.

The estimation of the marginal effects (dy/dx) of the logit equation is then conducted so as to see the change in the probability for an infinitesimal change in each independent, continuous variable. The marginal effects of the statistically significant variables suggest the following: i) an increase in one year of the firms age (*ceteris paribus*) will result in a 0.083 percent increase in the firms probability of export; ii) a unit increase in firms efficiency (VA/L), *ceteris paribus*, will increase the probability of firms export participation by 0.14 percent; iii) if the domestic firm receives FDI, the chances of the firm participating in the export market increases by 3.4 percent; and finally, iv) if the firm receives BOI promotion in export promotion, the probability of the firm exporting will increase by 97.78 percent.

The Textiles and Clothing Industries

The logit estimations for model (1) of the textiles and clothing industries also yield results which are consistent with the predicted signs of the coefficients on the independent variables. The estimated model (1) in the textiles and clothing industries indicate that the firms probability of export is increasing in firm age, firm efficiency, firms reception of FDI, and BOI promotion—all the variables positively impact firms export decision and are significant at the 1 percent level. The pseudo R-squared for the logit estimation of model (1) in the textiles and

clothing industries is 0.713.

The marginal effects estimates on the significant independent variables, *ceteris paribus* could be interpreted as follows: i) an increase in the firms period of operation by one year increases the probability of the firms export participation by 0.16 percent; ii) if the domestic firm receives FDI, the probability that the firm will export will increase by 19.63 percent; iii) an increase in the firms efficiency will lead to an increase the probability of the firm exporting by 4.35 percent; and iv) if the firm receives BOI promotion, the probability of the firm switching to exporting its goods will be 96.4 percent.

The Electronics and Electrical Appliances Industries

Finally, the results for the logit estimation of model (1) in the electronics and electrical appliances industries are different from what we have predicted. The logit estimated coefficients on firm age and firm efficiency are negative, while the coefficient on the capital-labor ratio is positive. The only significant coefficient on the independent variable is the binary-valued variable for BOI promotion (BOI_i) which is positive and significant at the 1 percent level. All other estimated coefficients in this equation are not statistically significant. The pseudo R-squared measuring of the estimation is 0.885.

This deviation from the predicted signs on the coefficients may be explained by the limited number of observations on the dataset, and/or by the unique trait of the electronics and electrical appliances industries. And although the signs of the coefficients on age, firm efficiency, and firms capital-labor ratio appear to be contrary to the predicted signs, the coefficients are not statistically significant.

The results of the marginal effects estimation for the electronics and electrical appliances industries suggest that when the firm receives BOI promotion (BOI_i = 1), the probability of firms exporting their products will increase by 96.62 percent.

In summary, from the logit estimation results of the three industries, BOI promotion appears to be statistically significant in all three industries. When firms receive BOI promotion, the firms probability of exporting will increase on average by 95 percent. Furthermore, in the food and textiles and clothing industries, firm age, firm efficiency, and firm reception of FDI are significant and positively influence firms export decision.

Probit Estimations

(See probit estimation results for model (1) in tables A.1, A.2, and A.3 in Appendix C)

(See marginal effects after probit estimates in tables C.1, C.2, and C.3 in Appendix C)

The Food Industry

Probit estimation of model (1) for the food industry shows that the signs of the coefficients on the independent variables are consistent with our prediction. The estimation also indicates that the firms probability of export is increasing in firm age and BOI promotion at a 1 percent significance level, and is increasing in firm efficiency at a 10 percent significance level. The pseudo R-squared for the probit estimation of model (1) in the food industry is 0.844, similar to that of the

logit estimation.

When looking at the marginal effects after probit of each significant independent variable, *ceteris paribus*, we can conclude that: i) if the firms age increases by 1 year, the probability of the firm exporting its products will also increase by 0.131 percent; ii) with the existence of BOI promotion, a firms probability to export will increase by 97.56 percent; and iii) with a unit increase in firm efficiency, the firms probability to export will increase by 0.24 percent.

The Textiles and Clothing Industries

The sign of the coefficients on the probit-estimated model (1) of the textiles and clothing industries are consistent with the predicted signs. The estimation suggests that firms probability of export is increasing firm age, firm efficiency, firm reception of FDI, and BOI promotion—all at a 1 percent significance level. Furthermore, the estimated model also indicate that the textiles and clothing industries utilize Thailands comparative advantage of (relatively) cheap labor—the coefficient on the capital-labor ratio has a negative sign and is statistically significant at the 5 percent level. Exporting firms tend to be those that have lower capital-labor ratios. The pseudo R-squared for this model is 0.717.

Estimating the marginal effects of the statistically significant variables in model (1) of the textiles and clothing industries, we see that: i) an increase in firm age by 1 year results in an increase in the probability of the firms exports by 0.2 percent, *ceteris paribus*; ii) a change from not receiving FDI to receiving FDI will increase a firms chances in exporting its products by 19.71 percent; iii) a unit increase in firm efficiency will bring the probability of the firms export

participation up by 4.7 percent; iv) the reception of BOI promotion will increase the firms probability to export by 95.82 percent; and finally, an additional unit of labor added to the production process will increase the firms probability to export by 1.6 percent.

The Electronics and Electrical Appliances Industries

In the case of the electronics and electrical appliances industries, the probit estimation coefficients have signs which are inconsistent with the predicted values. In the probit-estimated model (1) of the electronics and electrical appliances industries, the relationship between firm age, firm efficiency, and firm utilization of the countrys comparative advantage in cheap labor appears to have opposite signs from what was predicted. However, this departure from the predicted signs is not statistically significant and can be explained by the limited amount of observations and/or by the industry-specific characteristics of the electronics and electrical appliances industries in Thailand. The only significant coefficient on the independent variable in this estimated model is BOI promotion—significant at the 1 percent level.

When looking at the marginal effects estimation, we see that once the firm receives BOI promotion (BOI_i =1), the firms probability to export will increase by 96.54 percent.

Comparing Logit and Probit Estimation Results

(Tabulated comparative statistics are in tables D.1, D.2, D.3, and E.1, E.2, E.3)

The Food Industry

For the logit and probit estimations of model (1) in the food industry, when comparing the McFaddens R-squared and the Counted R-squared of the two models (these two statistics could be found in tables D.1 and E.1 for the logit and probit estimations respectively), we find that the probit estimation has a higher McFaddens R-squared value than the logit-estimated model—0.844 and 0.843 correspondingly. On the other hand, when we look at the Counted R-squared value of the two estimated equations, we will see that the Counted R-squared for logit estimation (0.993) is higher than that of the probit estimation (0.992). However, the difference in values for the two estimation techniques is miniscule (0.001) and therefore the two methods of estimation appear to fit the equation in model (1) equally well.

The Textiles and Clothing Industries

In the case of the textiles and clothing industries, the McFaddens and Counted R-squared values for the logit estimation are 0.713 and 0.976 respectively. For probit, on the other hand, the values of the McFaddens R-squared is 0.717 and the Counted R-squared is 0.977. The higher values in the McFaddens R-squared and the Counted R-squared for the probit method suggest that probit estimation methods better fit the textiles and clothing industries model (1). Note, however, that the magnitude of the difference is small and estimation results do not seem to suggest major differences between the logit and probit methods.

The Electronics and Electrical Appliances Industries

As for the electronics and electrical appliances industries, the McFaddens

R-squared is 0.884 and the Counted R-squared is 0.985. In the case of the probit-estimated model, the McFaddens R-squared is 0.885 and the Counted R-squared value is the same as the Counted R-squared value of the logit estimation. Therefore, for the electronics and electrical appliances industries, both logit and probit models fit the model well.

5.2.2 Firm-Level Export Orientation

Recall that in model (2) will use OLS to estimate firm-level export orientation:

$$ExportShares_i = G(ownership_i, size_i, age_i, (\frac{VA}{L})_i, (\frac{K}{L})_i, BOI_i) \tag{5.8}$$

Variable Name	**Description**	**Predicted Signs**
$size_i$	size of the firm measured by total labor	(+)
age_i	the time which the firm has been operating	(+)
FDI_i	"binary-valued variable; 1 if firm has foreign investments and 0 if otherwise"	(+/-)
$(VA/L)_i$	proxy for firm efficiency measured by value-added per labor	(+)
$(K/L)_i$	measuring firm's utilization of comparative advantage: capital-intensive or labor-intensive	(-)
BOI_i	"binary-valued variable; 1 if firm receives BOI promotion in promoting exports and 0 if otherwise"	(+)

As stated in chapter 4, the possible problem of reverse causality between firms exports and firm-level efficiency is still debatable—whether there is self-selection or a learning process. This causality problem may create an endogeneity bias in the OLS coefficient. To address this problem, the method of instrumental variable (IV) can be employed. Candidate instrumental variables are those that are correlated to the potentially endogenous regressor—the efficiency variable $(VA/L)_i$ in our model—but not correlated to the error term of the OLS specification. Among the available variables in the dataset, waste management expenditure per worker may be a reasonable candidate instrument. This variable is likely to be (inversely) correlated to efficiency of the firm since more efficient

firms should have less waste. The variable is also unlikely to be correlated to be correlated to the error term, i.e., the variable is likely to be exogenous.

Because of this potential endogeneity problem, the empirical analysis of this model is divided into two stages: the first stage is checking for endogeneity in the firm-efficiency variable ($(VA/L)_i$); and in the second stage, estimated model (2) by using OLS estimation methods—and fixing the endogeneity problem if necessary.

In the first stage, I checked for endogeneity by regressing the potentially endogenous variable, $(VA/L)_i$, on all exogenous variables including the instrumental variable—(reg.1). Then, to test for endogeneity of $(VA/L)_i$, I include the predicted error from this regression in the original OLS model specification—(reg.2). If the coefficient on the predicted error in (reg.2) is statistically significant, then there are endogeneity problems and the IV estimation method must be introduced to fix the problem. However, after testing for endogeneity, the results in (reg.2) appear to indicate that the coefficient on the predicted error (from reg.1) is not statistically significant. Therefore, this model is unlikely to suffer from endogeneity problems and will not need to be instrumented (Table IV in Appendix C reports the results obtained from reg.2).

To further verify that endogeneity is not a problem, I also performed the Hausman test using the Stata statistical package to compare the OLS model and the IV model. The test shows no statistical difference between the two methods. This, along with the test for endogeneity above, gives us confidence to proceed with the OLS specification.

It should also be noted that, the error terms on the independent variables in this model—model (2)—are heteroskedastic. Although heteroskedasticity does not make the OLS estimators biased, it still affects the standard error of the coefficients estimated—giving incorrect values of the standard errors. Therefore, to correct for heteroskedasticity in model (2), robust-OLS estimation methods are used for model (2).

After having verified that endogeneity is unlikely to be a problem, we, then, proceed to the next stage of the analysis—using OLS to estimate firms export intensity. The analysis in this section, similar to that for model (1), divides firms into the three industry groups—the food industry, the textiles and clothing industries, and the electronics and electrical appliances industries.

The food industry

(Food industry robust OLS results can be found in Table F, column 1, in Appendix C)

The adjusted R-squared from the OLS (Robust) estimation of model (2) is 0.6591. The signs of the coefficients on age_i, $ownership_i$, $(VA/L)_i$, and $(K/L)_i$ are consistent with predictions (Table 5.2)—age_i, $ownership_i$, and $(VA/L)_i$ have positive coefficients, and $(K/L)_i$ has a negative one. However, the coefficient on the size variable $size_i$ is the reverse of our prediction.

We predicted that firms export orientation should be increasing in firm size, and therefore, the coefficient on firm size should be positive. However, in the case of the food industry, the coefficient on firm size is negative and is statistically significant at the 1 percent level. This implies that more workers in firms in

the food industry decrease the intensity of export of the firms. This negative coefficient on firm size in model (2) for the food industry may be explained by the fact that firms in the food industry in Thailand are resource-intensive rather than size-intensive. Moreover, the negative coefficient could be due to diminishing returns to labor. In other words, in a resource-intensive industry such as the food industry, more labor in the firm could bring about diminishing returns to labor productivity, resulting in the negative relationship between number of workers and export intensity. This is consistent with previous discussion in chapter 3 (section 3.4), which stated that firms in this industry are generally small and medium-sized enterprises (SMEs).

Additionally, as the size variable is with an unexpected sign, but the K/L ratio is significant with an expected sign and is significant. It is probable that for increasing export intensity, the comparative advantage in labor input is significant.

Other statistically significant variables in the OLS estimation of model (2) in the food industry are: $ownership_i$, age_i, $(K/L)_i$, and BOI_i. The estimated coefficients on all four variables are positive and significant at the 1 percent level.

In sum, results for firms in the food industry shows that firms export intensity—or firms level of export orientation—are increasing in foreign shares in the firm, firm age, firm utilization of labor, and BOI promotion. Furthermore, in the case of the food industry, firm-level export intensity seems to be decreasing in firm size.

The textiles and clothing industries

(Textiles and clothing industries Robust OLS results can be found in Table F, column 2 in Appendix C)

Results of the robust OLS estimation of model (2) in the textiles and clothing industries show that the signs of the estimated coefficients are consistent with predictions. The factors which appear to be statistically significant in firm-level export intensity for the textiles and clothing industries are percentage of foreign ownership ($ownership_i$), firm age (age_i), firm efficiency ($(VA/L)_i$), BOI promotion (BOI_i), and firm utilization of [cheap] labor ($(K/L)_i$). The adjusted R-squared of the estimated model (2) for this industry is 0.5787

Firm-level export intensity is increasing in the percentage of foreign ownership in the firm ($ownership_i$), the firm age (age_i), the level of the firms efficiency ($(VA/L)_i$), and BOI promotion (BOI_i). The coefficients on $ownership_i$, age_i, $(K/L)_i$, and BOI_i are significant at the 1 percent level, while the coefficient on $(VA/L)_i$ is significant at the 5 percent level. In the case of the textile and clothing industry, the null hypotheses that percentage of foreign ownership, firm age, firm efficiency, BOI promotion, and firm utilization of [cheap] labor do not affect firms level of export orientation can all be rejected at a 95 percent confidence interval.

The results obtained from the robust OLS estimation of model (2) for the textiles and clothing industries are consistent with the industries labor-intensive characteristic. In other words, the negative and statistically significant coefficient on $(K/L)_i$ is consistent with the fact that the textiles and clothing industries are labor-intensive.

The electronics and electrical appliances industries

(Electronics and electrical appliances industries robust results can be found in Table F, column 3 in Appendix C)

Looking at the results on the estimated coefficients which are significant in the model, we find that firm-level export orientation is increasing in firm size ($size_i$), firm age (age_i), percentage of foreign share in the firm ($ownership_i$), and BOI promotion (BOI_i). In particular, the robust OLS estimated model (2) indicates that firm size and BOI promotion positively influence firms level of export intensity at a 1 percent significance level; and that the percentage of foreign ownership shares ($ownership_i$) and firm age (age_i) positively impacts the firms level of export orientation at a 5 percent significance level. Therefore, the null hypotheses that firm size, firm age, firm ownership, and BOI promotion do not affect the level of firms export intensity can be rejected at a 95 percent confidence interval.

The adjusted R-squared for the estimated robust OLS model (2) in the electronics and electrical appliances industries is 0.6385. The signs on the coefficients of the independent variables are mostly consistent with the predicted signs; only firm efficiency ($(VA/L)_i$) in the estimated equation appears to have a reverse sign from what was predicted—the estimated coefficient on $(VA/L)_i$ is negative. This reversal of sign on the coefficient could be due to the fact that the stages of production in these two industries in Thailand do not use very advanced technologies and still rely much on imported raw materials (Tambunlertchai, 2002). Therefore, the value added produced is not high.

We had also predicted the coefficient on the capital-labor ratio variable to be negative—owing to Thailands abundant and cheap labor. The estimated results, however, yields a positive coefficient on the capital-labor ratio for the electronics and electrical appliances industries. Despite the sign reversal, a positive coefficient on the capital-labor ratio in two industries is consistent with the industries capital-intensive characteristic. In particular, in the electronics and electrical appliances industries in Thailand, even though the stages of production do not employ much advanced technology, the investment in capital equipment for firms with a high percentage of export sales could still be quite heavy. Nonetheless, the coefficient on capital-labor ratio in this estimated equation is not significant.

In conclusion, it can be said that in the case of firm-level export intensity—or export orientation—the percentage of foreign ownership in the firm ($ownership_i$) and BOI promotion (BOI_i) are important factors which positively contributes to firms level orientation. For the food industry and the textiles and clothing industries, firm age (age_i) and firm-level capital-labor ratio ($(K/L)_i$) also positively impact firms export intensity; whereas in for the electronics and electrical appliances industries, firm size ($size_i$) and BOI promotion (BOI_i) play more important roles in contributing to firms exports than the share of foreign ownership of the firm.

In the following chapter, I will conclude this research with a summary of the results obtained as well as with the policy implications which can be drawn from the study.

Chapter 6

Conclusion

The Thai government, like many other developing economies' government in the world, has been pursuing an export-led growth policy. For this reason, the study of what determines firms' exports is important for understanding the kinds of policies needed to promote export growth. This thesis studies the influences of foreign direct investment (FDI) on firm-level export outcomes in Thailand. In particular, the goals of this thesis are to identify factors along with FDI that determine firms' export orientation, and to make policy recommendations with regard to facilitating MNCs export spillovers. With such goals in mind, I conducted empirical studies in an attempt to determine factors which contribute to firms' export participation and to identify the elements which influence firms' export intensity.

Because different factor intensities are likely to affect firms' export behavior differently, this paper looks at export decisions for three separate groups of firms:

the resource-intensive (food) firms' export decision, the labor-intensive industry (clothing and textiles) firms' export decision, and the capital-intensive industry (electronics and electrical appliances) firms' export decision.

Findings from this study show that BOI promotion (BOI_i), the existence of FDI in a firm (FDI_i), and firm experience (age_i) are all significant factors which positively influence firms decision to export. Model (1)'s estimations reveal that BOI promotion, on average, increases the probability of a firm's export participation by as much as 95 percent across all three industries studied. This shows that the government has had a big role in the promotion of firms' export in Thailand. The existence of FDI in a firm, usually hypothesized to have a key role in firms' export participation, appears to only (positively) impact the resource-intensive (food) and labor-intensive (textiles and clothing) firms' export decision. This result may be explained by Thailand's comparative advantage in being resource-abundant and having relatively cheap labor wages. These advantages in the country not only enable the manufacturing sector to prosper, but also attracts foreign direct investors in these industries to choose Thailand as a production base.

The results obtained from estimating model (1) firm-level export decision-suggest that firm size is not a significant element in determining firms' decision to export across all three industries. Such results are inconsistent with past studies (Bernard and Jensen, 1995, 1997, 1999; Roberts and Tybout, 1997; Aitken et al., 1997; Kohpaiboon, 2007; Kneller and Pisu, 2007) that suggest that firms which are bigger will be more likely to participate in the export market; this divergence

from previous results can be explained by differences in data and the Thai government's more recent policies on export. In the past decade, the Thai government has been implementing export-promotion policies on firms of all sizesbig, small, and medium-sized enterprises (SMEs). As a result of such policies, small firms in Thailand have been able to export their products as well. This study uses more recent data from the 2007 Industrial Census, which reflect the outcome of these policies. Therefore, in the case of Thailand today, it can be concluded that firm size may not be a significant element which contributes to firms' decision to export.

Secondary findings from this study on the characterization of firms' export intensity (model (2)) suggest that the intensity of foreign ownership within a firm, firm age, and BOI promotion all influence the level of the firm's export orientation. Results indicate that across all three industries, the higher the shares of foreign ownership in a firm, the higher the share of exports to output from the firm. BOI promotion is also statistically significant across all industries in this second modelindicating its importance for both the firms' likelihood of export as well as their export intensity.

This thesis' findings provide a strong support that BOI promotion is a key determinant of firm-level export decision as well as the level of export orientation in Thailand. Although foreign direct investment within the firm contributes positively to firms' likelihood of export, its effects are not very significant and occurs only in some industries. The effect of foreign ownership shares in the firm, on the other hand, has a noteworthy positive impact on firms' export intensity across all

industries. This seems to suggest that while firms may not need FDI to enter the export market, the presence of FDI in exporting firms does contribute to their success in the export market. This study has shown that the Thai government has been quite successful in its export promotion effort. To continue to promote exports in Thai firms, the government may look into expanding BOI promotion to non-exporting firms looking to enter the export market in addition to pursing policies which encourage foreign direct investors to choose Thailand as a host country for their investments.

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Appendix A

Appendix A

Table A.1: Net Flow of Foreign Direct Investment to Thailand Classified by Country

	2008 p	2007 p	2006	2005	2004	2003	2002	2001
Japan	2555.49	3135.72	2576.42	2926.51	2749.93	2297.67	1892.41	1955.12
USA	1162.72	570.06	165.78	750.48	540.42	336.23	182.34	395.01
EU (15) 4/	685.26	1561.89	955.41	335.02	697.31	607.55	-216.12	282.91
EU 5/	717	1581.21	960.11	334.95	700.8	609.62	-215.13	281.84
Austria	20.04	-13.76	53.14	25	12.26	0.75	18.21	9.27
Belgium	45.27	70.76	51.78	111.84	93.34	-1.94	55.65	-34.17
Germany	-269.9	90.76	331.21	314.62	275.58	210.09	70.58	97.94
Denmark	80.6	58.18	32.06	13.97	22.17	13.41	10.14	9.61
Spain	43.36	59.68	40.83	-30.55	0.89	0.71	0.79	2.45
Finland	19.38	9.81	-72.91	-54.16	39.4	8.82	45.58	0.58
France	116.36	109.67	24.54	41.08	-180.15	9.53	9.23	108.81
UK	313.22	303.59	212.91	-90.87	264.88	8.49	259.12	288.99
Greece	6.43	1.03	-0.04	-0.01	0.09	0.67	0.09	0.18
Ireland	26.08	-26.13	11.39	62.78	-42.15	6.95	52.59	49.79
Italy	13.06	12.41	-0.56	1.9	18.38	7.56	7.82	6.02
Luxembourg	31.19	12.82	-3.97	24.71	5.16	10.91	-14.16	-18.43

Table A.2: Net Flow of Foreign Direct Investment to Thailand Classified by Country

	2008	2007	2006	2005	2004	2003	2002	2001
Netherlands	227.06	758.08	262.25	-94.72	166.52	284.7	-757.2	-308.58
Portugal	0.37	0.28	0	-0.05	0.26	0.3	0.19	0.19
Sweden	12.68	114.69	12.77	9.47	20.63	46.52	25.21	70.21
Cyprus	12.77	7.64	0.08	-0.06	0.55	0.19	0	0.06
Czech Republic	2.12	0.25	0	0	0.92	0.48	0.35	-1.49
Estonia	2.01	1.32	0	0	0.05	0.08	0.15	-0.01
Hungary	0.97	1.83	0.01	0	0.28	0.05	0.27	0.08
Latvia	8.68	5.22	0	0	0.85	0.76	0.09	0
Lithuania	1.42	2.25	0	0	0.01	0	0	0
Malta	0.29	-1.51	4.2	0	0.72	0.14	0.1	0.08
Slovakia	0.7	0.36	-0.12	0	0.04	0.08	0	0
Poland	0.67	1.27	0.53	0	0	0.26	0	0.18
Slovenia	0.66	0.14	0	0	0.02	0	0	0
Bulgaria	0.02	0	0	0	0.04	0	0	0
Romania	1.36	0.51	-0.01	0	0	0	0	0
ASEAN (5) 6/	2545.86	2560.17	4597.15	1107.34	683.37	1053.86	1403.52	1709.95

Table A.3: Net Flow of Foreign Direct Investment to Thailand Classified by Country

	2008	2007	2006	2005	2004	2003	2002	2001
ASEAN 7/	2537.36	2566.92	4626.5	1101.32	688.68	1060.44	1408.29	1710.68
Brunei	-3.55	-3.92	2.2	4.71	2.09	0.07	0.1	0
Indonesia	7.89	6.1	-6.35	1.06	5.87	6.72	7.43	2.81
Malaysia	63.85	21.3	321.82	38.36	147.31	41.24	-32.55	10.66
Philippines	25.86	7.1	-0.46	-5.54	182.96	5.43	-0.41	2.88
Singapore	2451.79	2529.58	4279.94	1068.74	345.12	1000.38	1428.95	1693.59
Cambodia	1.1	1.32	0.03	0.02	3.41	5.54	1.44	0.65
Laos	0.1	-0.06	38.68	-6.06	0	0.07	0	0.05
Myanmar	1.07	1	0.08	-0.07	0.39	0.61	1.2	-0.01
Vietnam	-10.79	4.47	-9.44	0.09	1.5	0.34	2.12	0.03
Hong Kong	273.65	390.37	-77.84	7.16	141.4	613.08	86.25	150.58
Taiwan	93.04	91.5	-94.55	29.24	124.2	75.25	103.7	156.83
South Korea	142.03	75.33	79.48	29.51	93.53	23.83	93.22	50.64
China	69.04	73.71	49.87	11.55	-3.82	23.83	20.9	-2.5
Canada	26.77	25.52	7.06	-11.22	28.53	21.17	15.04	5.9
Australia	96.06	69.36	11.18	-1.09	99.85	32.47	-0.42	0.56
Switzerland	523.61	172.37	153.9	99.81	167.3	124.12	48.07	55.34
Others	1614.58	1446.98	2021.78	1224.89	-374.87	-52.75	-223.71	287.94
Total	9811.39	10199.09	10479.74	6503.16	4956	5165	3411	5048

Table A.4: Exports Classified by Product Group (Millions of USD

	2008 p	2007 p	2006	2005	2004	2003	2002	2001
Industry	4477.65	3651.17	4068.87	3429.86	3785.98	2408.58	1844.53	2960.26
Food sugar	239.56	120.62	118.13	-24.76	337.32	265.14	21.28	155.06
Textiles	60.18	71.18	-7.88	77.87	37.95	64.46	43.29	105.56
Metal & non metallic	514.46	507.51	354.65	221.43	480.07	255.75	259.82	378.35
Electrical appliances	401.20	380.53	1080.91	908.29	797.01	327.44	214.93	981.29
Machinery& transport equipment	1274.13	1236.34	1402.81	1369.98	1280.34	653.10	644.45	578.81
Chemicals	417.25	-141.95	173.95	472.39	387.34	295.90	334.09	167.77
Petroleum products	632.37	378.58	332.18	-72.60	22.49	95.25	-50.16	179.93
Construction materials	17.55	31.42	7.85	21.66	45.05	-7.89	31.37	0.18
Others	920.93	1066.92	606.25	455.58	398.36	459.39	345.42	413.27
Financial institutions	2002.89	1882.23	2490.21	1550.89	221.65	-24.52	67.34	-186.17
Trade	1001.23	602.79	787.97	295.19	182.91	817.88	682.21	1069.13
Construction	-22.81	46.33	-86.00	29.89	70.67	42.98	19.32	4.53
Mining & quarrying	715.27	808.43	206.05	-110.99	192.29	270.62	146.61	759.32
Agriculture	8.83	3.19	-1.94	12.60	5.72	28.22	3.20	-4.22
Services	782.71	1055.78	711.19	330.94	303.27	362.23	740.64	155.90
Investment	-820.98	321.81	2133.33	173.64	-236.66	374.70	-655.97	-33.69
Real estate	1342.26	1207.13	262.64	43.34	-343.96	126.40	67.58	70.88
Others	425.23	620.19	-92.60	747.77	774.10	757.88	495.50	252.04
Total	9912.32	10199.09	10479.74	6503.16	4956.00	5165.00	3411.00	5048.00

Table A.5: Net Flow of Foreign Direct Investment Classified by Sector (Millions of USD)

	2008 p	2007 p	2006	2005	2004	2003	2002	2001
Industry	4477.65	3651.17	4068.87	3429.86	3785.98	2408.58	1844.53	2960.26
Food sugar	239.56	120.62	118.13	-24.76	337.32	265.14	21.28	155.06
Textiles	60.18	71.18	-7.88	77.87	37.95	64.46	43.29	105.56
Metal/non metallic	514.46	507.51	354.65	221.43	480.07	255.75	259.82	378.35
Electrical appliances	401.2	380.53	1080.91	908.29	797.01	327.44	214.93	981.29
Machinery transportation	1274.13	1236.34	1402.81	1369.98	1280.34	653.1	644.45	578.81
Chemicals	417.25	-141.95	173.95	472.39	387.34	295.9	334.09	167.77
Petroleum products	632.37	378.58	332.18	-72.6	22.49	95.25	-50.16	179.93
Construction materials	17.55	31.42	7.85	21.66	45.05	-7.89	31.37	0.18
Others	920.93	1066.92	606.25	455.58	398.36	459.39	345.42	413.27
Financial institutions	2002.89	1882.23	2490.21	1550.89	221.65	-24.52	67.34	-186.17
Trade	1001.23	602.79	787.97	295.19	182.91	817.88	682.21	1069.13
Construction	-22.81	46.33	-86	29.89	70.67	42.98	19.32	4.53
Mining quarrying	715.27	808.43	206.05	-110.99	192.29	270.62	146.61	759.32
Agriculture	8.83	3.19	-1.94	12.6	5.72	28.22	3.2	-4.22
Services	782.71	1055.78	711.19	330.94	303.27	362.23	740.64	155.9
Investment	-820.98	321.81	2133.33	173.64	-236.66	374.7	-655.97	-33.69
Real estate	1342.26	1207.13	262.64	43.34	-343.96	126.4	67.58	70.88
Others	425.23	620.19	-92.6	747.77	774.1	757.88	495.5	252.04
Total	9912.32	10199.09	10479.74	6503.16	4956	5165	3411	5048

Appendix B

Appendix B

Value Added per Labor $(VA/L)_i$

VA = Value of production (VP) Value of Raw materials (VR

VP = Sales of goods producedWorking in progress*Finished goods*+Working in Progress**+Finished Goods**

VR = Cost of materials and components+ Materials and components*Materials and components**

* In inventory at the beginning of 2006

**In inventory at the end of 2006

Capital-Labor Ratio $(K/L)_i$

K = Total Fixed Asset ValueLand Value

Appendix C

A1	logit	probit	OLS
	b/se	b/se	b/se
age	0.067***	0.033***	0.001**
	[0.02]	[0.01]	[0.00]
size	0	0	0
	[0.00]	[0.00]	[0.00]
FDI	1.340*	0.457	0.018
	[0.76]	[0.35]	[0.01]
val	0.110*	0.059*	0.002**
	[0.06]	[0.03]	[0.00]
kl	-0.018	-0.01	0
	[0.11]	[0.05]	[0.00]
boi	9.120***	4.565***	0.964***
	[0.53]	[0.20]	[0.01]
Constant	-5.100***	-2.531***	0.006***
	[0.16]	[0.06]	[0.00]
Obs	6749	6749	6749
R-sqr	0.843	0.844	0.8937

A2	logit	probit	OLS
	b/se	b/se	b/se
age	0.048***	0.025***	0.003***
	[0.01]	[0.01]	[0.00]
size	0.077	0.049	0.001
	[0.06]	[0.03]	[0.00]
FDI	2.205***	1.081***	0.081**
	[0.34]	[0.18]	[0.03]
val	1.345***	0.583***	0.075***
	[0.22]	[0.08]	[0.02]
kl	-0.409	-0.206	-0.018**
	[0.31]	[0.14]	[0.01]
boi	7.999***	4.075***	0.876***
	[0.60]	[0.22]	[0.01]
Constant	-4.361***	-2.282***	0.009***
	[0.12]	[0.05]	[0.00]
Obs	5814	5814	5814
R-sqr	0.713	0.717	0.7594

A3	logit	probit	OLS
	b/se	b/se	b/se
age	-0.003	-0.001	0
	[0.03]	[0.01]	[0.00]
size	0.03	0.013	0
	[0.09]	[0.04]	[0.00]
FDI	0.653	0.263	0.012
	[0.74]	[0.30]	[0.02]
val	-0.01	-0.004	0
	[0.15]	[0.07]	[0.00]
kl	0.08	0.039	0.001
	[0.40]	[0.17]	[0.00]
boi	8.278***	4.278***	0.964***
	[0.88]	[0.34]	[0.01]
Constant	-4.103***	-2.140***	0.017**
	[0.43]	[0.17]	[0.01]
Obs	656	656	656
R-sqr	0.885	0.885	0.9368

B.1. variable	dy/dx	Std. Err.	z	P>z	95% C.I.		X
age	0.0008626	0.00025	3.41	0.001	0.000366	0.001359	1.68203
size	-2.46E-06	0.00001	-0.28	0.776	-0.000019	0.000014	50.375
FDI*	0.0341909	0.03344	1.02	0.307	-0.031351	0.099732	0.019855
val	0.00142	0.00084	1.69	0.091	-0.000226	0.003066	0.291007
kl	-0.0002267	0.00136	-0.17	0.867	-0.002883	0.00243	0.282777
boi*	0.9778093	0.0077	127.05	0	0.962725	0.992894	0.067862

B.2 variable	dy/dx	Std. Err.	z	P>z	95% C.I.		X
age	0.0015692	0.00037	4.21	0	0.000839	0.002299	3.33695
size	0.0024925	0.00183	1.36	0.172	-0.001088	0.006073	0.651679
FDI*	0.1963196	0.05805	3.38	0.001	0.082553	0.310086	0.028552
val	0.0435479	0.0075	5.81	0	0.028856	0.05824	0.145026
kl	-0.0132554	0.01011	-1.31	0.19	-0.033064	0.006554	0.10342
boi*	0.9639427	0.00997	96.67	0	0.944398	0.983487	0.071379

B.3 variable	dy/dx	Std. Err.	z	P>z	95% C.I.		X
age	-0.0007451	0.00673	-0.11	0.912	-0.013934	0.012443	11.375
size	0.0067281	0.02104	0.32	0.749	-0.034509	0.047965	3.94837
FDI*	0.1496662	0.17141	0.87	0.383	-0.186289	0.485622	0.397866
val	-0.0022955	0.03397	-0.07	0.946	-0.068875	0.064284	0.77213
kl	0.0182241	0.09071	0.2	0.841	-0.15956	0.196008	0.411311
boi*	0.9661868	0.0125	77.28	0	0.941683	0.99069	0.375

C.1 variable	dy/dx	Std. Err.	z	P>z	95% C.I.		X
age	0.0013107	0.00035	3.76	0	0.000628	0.001994	1.68203
size	-9.49E-07	0.00001	-0.09	0.93	-0.000022	0.00002	50.375
FDI*	0.0292453	0.03322	0.88	0.379	-0.035868	0.094359	0.019855
val	0.0023684	0.00136	1.75	0.081	-0.00029	0.005027	0.291007
kl	-0.0003961	0.00191	-0.21	0.835	-0.004131	0.003339	0.282777
boi*	0.9755615	0.00835	116.77	0	0.959187	0.991936	0.067862

C.2 variable	dy/dx	Std. Err.	z	P>z	95% C.I.		X
age	0.0020191	0.0005	4.06	0	0.001045	0.002993	3.33695
size	0.0039868	0.00246	1.62	0.105	-0.000837	0.008811	0.651679
FDI*	0.1971745	0.05459	3.61	0	0.090183	0.304166	0.028552
val	0.0474889	0.00686	6.93	0	0.034049	0.060928	0.145026
kl	-0.0167654	0.01132	-1.48	0.139	-0.038953	0.005423	0.10342
boi*	0.9582725	0.0118	81.19	0	0.93514	0.981405	0.071379

C.3 variable	dy/dx	Std. Err.	z	P>z	95% C.I.		X
age	-0.0002565	0.00453	-0.06	0.955	-0.009138	0.008625	11.375
size	0.0046787	0.01428	0.33	0.743	-0.023317	0.032675	3.94837
FDI*	0.0984212	0.114	0.86	0.388	-0.125023	0.321865	0.397866
val	-0.0013696	0.02416	-0.06	0.955	-0.048726	0.045987	0.77213
kl	0.0143842	0.06421	0.22	0.823	-0.111469	0.140238	0.411311
boi*	0.9653782	0.01292	74.72	0	0.940056	0.9907	0.375

D.1			
Log-Lik Intercept Only:	-1782.274	Log-Lik Full Model:	-279.61
D(6742):	559.22	LR(6):	3005.329
		Prob > LR:	0
McFadden's R2:	0.843	McFadden's Adj R2:	0.839
Maximum Likelihood R2:	0.359	Cragg & Uhler's R2:	0.876
McKelvey and Zavoina's R2:	0.676	Efron's R2:	0.894
Variance of y*:	10.147	Variance of error:	3.29
Count R2:	0.993	Adj Count R2:	0.9
AIC:	0.085	AIC*n:	573.22
BIC:	-58886.003	BIC':	-2952.426

D.2			
Log-Lik Intercept Only:	-1790.548	Log-Lik Full Model:	-513.762
D(5807):	1027.523	LR(6):	2553.572
		Prob > LR:	0
McFadden's R2:	0.713	McFadden's Adj R2:	0.709
Maximum Likelihood R2:	0.355	Cragg & Uhler's R2:	0.773
McKelvey and Zavoina's R2:	0.69	Efron's R2:	0.761
Variance of y*:	10.628	Variance of error:	3.29
Count R2:	0.976	Adj Count R2:	0.745
AIC:	0.179	AIC*n:	1041.523
BIC:	-49307.693	BIC':	-2501.564

D.3			
Log-Lik Intercept Only:	-436.934	Log-Lik Full Model:	-50.479
D(649):	100.959	LR(6):	772.909
		Prob > LR:	0
McFadden's R2:	0.884	McFadden's Adj R2:	0.868
Maximum Likelihood R2:	0.692	Cragg & Uhler's R2:	0.94
McKelvey and Zavoina's R2:	0.85	Efron's R2:	0.937
Variance of y*:	21.865	Variance of error:	3.29
Count R2:	0.985	Adj Count R2:	0.96
AIC:	0.175	AIC*n:	114.959
BIC:	-4108.56	BIC':	-733.992

E.1			
Log-Lik Intercept Only:	-1782.274	Log-Lik Full Model:	-277.607
D(6742):	555.214	LR(6):	3009.335
		Prob > LR:	0
McFadden's R2:	0.844	McFadden's Adj R2:	0.84
Maximum Likelihood R2:	0.36	Cragg & Uhler's R2:	0.877
McKelvey and Zavoina's R2:	0.63	Efron's R2:	0.893
Variance of y*:	2.701	Variance of error:	1
Count R2:	0.992	Adj Count R2:	0.896
AIC:	0.084	AIC*n:	569.214
BIC:	-58890.009	BIC':	-2956.432

E.2			
Log-Lik Intercept Only:	-1782.274	Log-Lik Full Model:	-277.607
D(6742):	555.214	LR(6):	3009.335
		Prob > LR:	0
McFadden's R2:	0.844	McFadden's Adj R2:	0.84
Maximum Likelihood R2:	0.36	Cragg & Uhler's R2:	0.877
McKelvey and Zavoina's R2:	0.63	Efron's R2:	0.893
Variance of y*:	2.701	Variance of error:	1
Count R2:	0.992	Adj Count R2:	0.896
AIC:	0.084	AIC*n:	569.214
BIC:	-58890.009	BIC':	-2956.432

E.3			
Log-Lik Intercept Only:	-1790.548	Log-Lik Full Model:	-506.541
D(5807):	1013.083	LR(6):	2568.012
		Prob > LR:	0
McFadden's R2:	0.717	McFadden's Adj R2:	0.713
Maximum Likelihood R2:	0.357	Cragg & Uhler's R2:	0.776
McKelvey and Zavoina's R2:	0.654	Efron's R2:	0.762
Variance of y*:	2.894	Variance of error:	1
Count R2:	0.977	Adj Count R2:	0.747
AIC:	0.177	AIC*n:	1027.083
BIC:	-49322.133	BIC':	-2516.004

IV	b/se
forshare	0.123***
	[0.02]
labor100	-0.005***
	[0.00]
yr	0.444***
	[0.02]
kl_adjust	-0.589***
	[0.13]
boi	48.929***
	[0.56]
instr	-0.164
	[0.13]
Constant	0.174
	[0.13]
Obs	6749
R-sqr	0.6591

F:	1	2	3
	OLS	OLS	OLS
	b/se	b/se	b/se
ownership	0.125***	0.184***	0.080**
	[0.02]	[0.02]	[0.03]
size	-0.005***	0.133	0.657***
	[0]	[0.10]	[0.10]
age	0.443***	0.301***	0.148**
	[0.02]	[0.03]	[0.05]
val	-0.164	1.944**	-0.484
	[0.13]	[0.64]	[0.43]
kl	-0.510***	-2.693***	0.262
	[0.15]	[0.56]	[0.95]
boi	49.007***	50.669***	43.281***
	[0.57]	[0.82]	[2.23]
constant	0.193	0.529**	-1.15
	[0.13]	[0.20]	[1.13]
obs.	6749	5814	656
R-squared	0.6591	0.5787	0.6385