Exporting and Financial Health:

A Developing Country Perspective

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Abstract

This paper examines the relationship between firms' characteristics and their decision to participate in export markets, using the annual survey of manufacturing firms in Thailand during 2001 and 2004. The main highlight of this paper is that we emphasise the importance of financial variables as a proxy for sunk entry costs. We find that liquidity (or leverage) significantly determines the decision to export because it explains a firms' capacity to invest in sunk entry costs in order to enter export markets. When we make the distinction between domestic and foreign firms which we assume to have different access to investment funding, we find that only domestic firms' export decisions depend on financial factors. This indicates that the investment decision depends on their internal financial health. Financial factors also influence the elasticity of export sales particularly for foreign firms. Other firm characteristics such as structure of ownership, productivity, firm size, R&D and training are also important factors in determining the probability of exporting and the elasticity of export sales.

1. Introduction

Export promotion policies are adopted by both developed and developing countries as a means to encourage growth through trade. Many studies have tried to investigate and answer the question of whether firms should self-select into export markets or not. However, in practice we observe that not every firm exports, perhaps because firms have different specific characteristics and performance. As a result, it can be concluded that the export entry decision is determined by various factors (see e.g. Roberts and Tybout 1997, Bernard and Jensen 1999, 2004, Kimura and Kiyota 2006). The majority of studies have concentrated on developed rather than developing countries. Recently, developing countries, especially the new industrialised countries (NICs), have managed to grow rapidly through an openness to trade strategy (World Bank 1993, and Edwards 1993 and 1998). It is therefore interesting to focus on the factors that influence the export strategies of developing countries.

For the new Asian Tigers (Malaysia, Thailand, the Philippines, and Indonesia), there are a limited number of studies that examine export activities and the probability of exporting (see e.g. Hallward-Driemeier *et al.* 2002 for East Asia, Sjöholm 2003, Blalock and Gertler 2004, Blalock and Roy 2007 for Indonesia).[1] Some studies try to answer whether exporters become good firms by investigating the effect on productivity after firms export. For evidence of learning-by-exporting, productivity or output or both should increase after firms export (see for example Clerides *et al.* 1998, Van Biesebroeck 2005, Alvarez and López 2005, Kimura and Kiyota 2006).

Apart from firm-specific characteristics, sunk entry costs are considered to be one of the important factors that determine the decision to enter export markets due to the fact that sunk entry costs are arguably a barrier to the entry (Cabral and Ross, 2008). Melitz (2003) also argues

[1] Traditionally, the Asian Tigers were thought to consist of the countries of South Korea, Hong-Kong, Singapore and Taiwan. The new Asian Tigers are considered to be Malaysia, Thailand, the Philippines and Indonesia. Together, the "new" and "old" Asian Tigers are characterised by export-driven economic development and industrial policies aimed at encouraging inward foreign direct investment.

that firms must pay the variable and sunk entry costs of exporting in order to enter export markets. Such costs that are faced by firms prior to export are considered as a form of investment. However, because of imperfect capital markets, firms are likely to face credit constraints. Therefore, the investment decision arguably depends upon internal finance. Therefore, one may argue that the financial balance sheet and financial variables will have a significant impact on the capability of firms' investment.

From a developed countries perspective, Greenaway *et al.* (2007) investigate the relationship between financial factors and firms' investment in the UK. However, the nature of developed countries is different from developing countries, for example they may have different stages of financial market development or financial sector reform. Since financial markets are the sources to obtain external funding for investment, we can therefore assume that the investment behaviour of firms and the factors affecting the probably of exporting are likely to be different in countries with different levels of development. In addition, if we consider the relationship between the structure of ownership and access to funding, domestic firms may face some obstacles to obtain external funding as they rely only on borrowing from domestic financial markets. In contrast, foreign owned firms are less likely to face a credit constraint problem because they are typically large and tend to receive support from their parent company.

This paper is the first to take a developing country perspective on how the financial health of a firm relates to its export decision. We examine the factors that affect a firm's entry decision into export markets using a detailed manufacturing survey of Thailand between 2001 and 2004. Different specific characteristics such as the structure of ownership, productivity, wage, firm size, etc. are included in our estimations. We include financial variables in our estimations because they indicate a firm's ability to invest in order to enter and operate in export markets. We assume that the financial balance sheet and investment are linked.

We find that the entry decision into export markets depends upon various factors. Foreign ownership positively affects a firm's decision to enter export markets. Large firms are more likely to export compared to small firms. Productivity also increases the probability of exporting. Most importantly for this paper, the financial health of a firm is found to have a significant effect on the decision to export. Firms that have a high liquidity ratio are more likely to become exporters. In contrast, if we measure firm's financial health by the leverage ratio, high leveraged firms are less likely to export. After firms export, we find some evidence that financial health affects their production capacity. Other firm characteristics also determine the elasticity of export sales. These findings for Thailand are potentially important for government policy not only in the implementation of entry-promotion and export promotion policies but also in signalling about the financial market development and the importance of financial sector reform.

The remainder of this chapter is organised as follows. Section 2 provides an overview of Thai economy and export performance. Section 3 summarises the theoretical and empirical literature. Section 4 outlines and discusses the empirical model, variables and data sources. Section 5 provides the discussion of the estimated results. Section 6 concludes.

2. Overview of Thailand

2.1 Financial Crisis and Thai Economy

In the mid-1980s, the Thai government attempted to reform the financial sector and started to liberalise the financial system by relaxing capital controls. At the start of 1990 capital controls were lifted altogether which meant funds could flow in and out of the country freely. Thus, banks and financial institutions borrowed funds from abroad and lent out to local customers. However, during that time loans from abroad were used for different reasons i.e. channelled into

less productive sectors and to finance long-term projects using short-term lending. In addition, the Thai currency (the Baht) was pegged to a basket of currencies and most loans from abroad were unhedged against currency fluctuations (Bhaopichitr, 1997).

Bhaopichitr (1997) argues that the bubble actually started in 1995 when goods and wages in real estate and finance sectors were highly overvalued. Thailand faced a deficit problem in the current account. This was mainly because the value of exported goods was less than that of imported goods. Krongkaew (1999) argues that one other factor that contributed to the financial crisis is a decline in the country's export performance. An increase in wage rates and an overvalued Thai currency caused a slowdown in Thai exports as the country lost competitiveness in the world market. In addition, the exported goods were expensive relative to other countries. There was also speculation against the Thai Baht which led to its depreciation. The Bank of Thailand attempted to maintain the fixed exchange rate and manage the excess supply of Baht by using foreign reserves until July 1997. At this point in time, the Bank of Thailand no longer had sufficient foreign reserves to defend the Baht against the dollar and the exchange system was changed to that of a managed float.

One of the lessons learnt from the financial crisis was that banks and financial institutions should allocate loans to highly productive sectors only. One of the tools that helped the country to recover from the economic crisis was the export-led growth scheme where the Thai government emphasised policies that encouraged the new entry of exporters and the enhancement of export sales among existing exporters.

2.2 Export Performance

According to the ASEAN Statistical Yearbook (2005), Thailand has been the third largest exporter from the Southeast Asian region in the last 10 years. As an ASEAN member Thailand

shares in the benefits of the ASEAN Free Trade Area which aims to eliminate tariff and non-tariff barriers in both manufacturing and agricultural sectors among member countries.[2] As a result, the ASEAN region has been one of the major markets of Thailand. From Table 1, we observe that ASEAN replaced the US as Thailand's largest export market after 2001 with an export share to ASEAN in 2007 of 21.3% of total exports, with 12.6% and 12.8% to the US and the EU-15, respectively.

During 1999 and 2000, the growth rate of exports recovered from the negative growth rates experienced since the economic crisis, but in 2001 total exports were lower than they were in 2000. For each trading partner, in 2004 exports to the US grew about 14.02% compare with only 0.64% in 2003. This is because of the expansion of the global economy in 2004. In 2007, the Baht appreciated against the dollar. As the US is one of Thailand's major export markets, exporters suffered because of the increase in the price of Thai goods.

[Table 1 about here]

Table 2 illustrates the level of exports for a selection of Thai industries. Sectors with large export volumes tend to be high-technology products such as computers (and parts), automobiles (and parts) and integrated circuits. The production of computers and parts has been Thailand's leading industrial export sector for many years accounting for 11.35% of the country's total exports in 2007. The second leading export industry is the automotive industry with numerous foreign automotive manufacturers from Japan, the US and Europe using Thailand as an export platform to sell their products worldwide. In 2007, some industries have shown outstanding progress, i.e. the growth rates of machinery (and components) industry and electrical appliances industry were 64.46% and 45.98%, respectively. Other prominent export sectors include more

[2] Attempts at organised regional co-operation between South-East Asian countries dates to August 1967 when ASEAN was established with original members Indonesia, Malaysia, the Philippines, Singapore and Thailand. Expansions to ASEAN were Brunei in 1984, Vietnam in 1995, Myanmar and Laos in 1997 and Cambodia in 1999.

labour-intensive products such as gems, jewellery and garments.[3] In 2007, the exports of gems and jewellery increased by 46.72% compared to the previous year but the export value of garments decreased slightly.

[Table 2 about here]

The manufacturing sector plays a significant role in the Thai Economy of which manufacturing exporting goods accounted for 78% of total exports in 2007. Since Thailand has been using export driven policies that would help the country to recover from the economic crisis and lead to sustained development, it is therefore important to have an understanding at the micro level of the factors that influence a firm's decision to participate in the export market and also a firm's export sales. It is also important to find out whether those factors differ from other developed and developing countries. The findings may influence government decisions whether to implement the right policies to encourage new entry into export markets and enhance the country's export value.

3. Literature Review

3.1 Firm Characteristics and the Decision to Export

A firm's decision to export is determined by number of factors. Theoretically, Roberts and Tybout (1997) explain the model of export market participation as firstly each firm *i* has to maximise its revenue subject to the current information available to firm *i*. The current profit function $(\hat{\pi}_{it})$ therefore is a combination of the current revenue (R_{it}) and the difference in the

[3] After 2004 export growth from the textile industry fell as a result of the elimination of quota restrictions in early 2005 and increased competition in the garment sector from China, Vietnam and India (Bank of Thailand, 2006).

expected value of maximise revenue if a firm exports and if not. Thus the function can be defined as,

$$\hat{\pi}_{it} \equiv R_{it} + \delta\Big[\Big[E_t(V_{i(t+1)}(\Omega_{i(t+1)}) \mid Y_{it} = 1)\Big] - \delta\Big[E_t(V_{i(t+1)}(\Omega_{i(t+1)}) \mid Y_{it} = 0)\Big]\Big] \tag{1}$$

where Y_{it} is the export status, δ is the discount rate, $V_{i(t+1)}$ is the maximise expected payoff value. $\Omega_{i(t+1)}$ is the future information set of firm *i*. E_t is the expected value at a given the information set.

Once a firm is able to indentify its expected profit and revenue then a firm can decide whether or not to enter the export market or even decide to exit conditional upon the following equation,

$$Y_{it} = \begin{cases} 1 \text{ if } \hat{\pi}_{it} > c_{it} + S_i * (1 - Y_{i(t-1)}) \\ 0 \text{ otherwise} \end{cases} \tag{2}$$

From equation (2), firm *i* at time *t* chooses to export if the expected gross profit and revenue $(\hat{\pi}_{it})$ is greater than the current period cost (c_{it}) together with sunk entry costs (S_i).

Roberts and Tybout (1997) point out that a firm's export decision not only depends upon its profit and revenue but also depends upon differences in firm characteristics (Z_{it}). Therefore, the estimated model can be specified as,

$$Y_{it} = \begin{cases} 1 \text{ if } \beta Z_{it} - S_i * (1 - Y_{i(t-1)}) + \varepsilon_{it} > 0 \\ 0 \text{ otherwise} \end{cases} \tag{3}$$

In the empirical analysis, Roberts and Tybout (1997) use data for Columbian firms from 1981 to 1989. They include sunk entry costs and firm characteristics such as wage, firm size, age, etc. in a vector Z. Sunk entry costs are positive and significantly determine a firm's decision to export in

Columbia. Large firms and old firms are more likely to become exporters. Such findings lead to the implication of entry-promotion policies which reduce the entry costs faced by firms.

Many empirical studies are based on the framework of Roberts and Tybout (1997) and extend the model to investigate firm level characteristics and other factors that would influence the export decision in both developed and developing countries (see for instance, the US (Bernard and Jensen 1999, 2004); the UK (Greenaway and Kneller 2004, Kneller and Pisu 2004); Germany (Bernard and Wagner 2001); Spain (Fariñas and Martín-Marcos 2007); Taiwan (Aw *et al.* 2000, 2007); Japan (Kimura and Kiyota 2006)). López (2005), Wagner (2007), and Greenaway and Kneller (2007) present detailed surveys of the empirical literature on exporting and firm heterogeneity.

Bernard and Jensen (1999 and 2004) try to identify factors that affect the probability of becoming an exporter using US manufacturing firm-level data. Various firm characteristics such as firm size, productivity, wage, etc. are included. All independent variables are lagged by one year in order to alleviate any possible endogeneity problems. One and two years lagged are used as proxies for sunk entry costs. Both studies found that past export experience or sunk entry costs have positive and significant effects on a firm's entry decision. Similar positive and significant results are also found for the coefficients of firm size, productivity wage and product changed. Bernard and Jensen (2004) include additional factors such as structure of ownership (foreign owned or domestic owned), government subsidies and spillovers. Being foreign owned increases the probability of exporting. Spillover effects from export activities are negligible. Export promotion subsidies have no impact on the probability of exporting.

Greenaway and Kneller (2004) also perform an empirical analysis of the determinant of a firm's decision to export in the UK. Other than firm characteristics, they include additional factors capturing industrial and geographical agglomeration in the model. The results for sunk entry costs, firm size, productivity and wage are consistent with the findings of the US with positive

and significant coefficients. Industrial and geographical agglomerations also influence the entry decision. Kneller and Pisu (2004) extend the decision to export model by emphasising the importance of structure of ownership and origin of ownership. Foreign owned firms are more likely to export. The positive significance of some origins suggests that the findings are consistent with the export-platform FDI hypothesis.

Another UK study by Girma *et al.* (2004) applies matching and difference-in-differences techniques to investigate the link between exporting and firm performances. Girma *et al.* (2004) find that exporters and non-exporters typically differ in size and productivity. Exporters are larger and more productive than non-exporters. They also find evidence to support the hypothesis that firms self-select into export markets and learn by exporting whereas productive firms are more likely to export and their productivity tends to be further increased after firms export. Greenaway *et al.* (2005), and Arnold and Hussinger (2005) also employ similar techniques to Girma *et al.* (2004) to examine exporting and firm performance in Sweden and Germany, respectively. For Sweden, there is no evidence of learning-by-exporting since productivity pre- and post-entry do not differ. For Germany, Arnold and Hussinger (2005) find that more productive firms self-select into export markets. This evidence supports the self-selection hypothesis which is consistent with the findings in the previous studies of German firms by Bernard and Wagner (1997 and 2001). However, firm productivity does not improve after the entry into export markets (Arnold and Hussinger, 2005).

Kimura and Kiyota (2006) employ a random probit model to identify factors that affect the decision to export and to engage in FDI in Japan between 1994 and 2000. They find that the coefficient for sunk entry costs, FDI dummy, foreign ownership dummy, TFP, firm size and R&D are all positive and significant. These findings support the statement that good firms become exporters.

Delgado *et al.* (2002) examine firm productivity and exporting of the Spanish manufacturing firms. Their results support the hypothesis that highly-productive firms self-select into export markets. A recent study of Spanish firms by Fariñas and Martín-Marcos (2007) find that exporters differ from non-exporters in size, productivity, wages and innovation. They find evidence of firms self-selecting into, and out of, export markets.

Campa (2004) investigates the relationship between the fluctuation of exchange rates and a country's trade balances. The rise and fall in exchange rates affect a country's trade balance through the export and import behaviour of individual firms. Campa (2004) examines Spanish manufacturing firms to explain the relationship between the changes in exchange rates and the export participation of each firm for the entry decision and the level of output exported. Sunk costs are found to be one of the important factors determining the entry into or exit from export markets. However, the results show that sunk costs are not related to the exchange rate. As the exchange rate changes, only the volume of output alters, meaning firm respond to the changes by adjusting quantities of exports rather than number of exporting firms (Campa, 2004).

For developing countries studies, Alvarez and López (2005) test the existence of both the self-selection and the learning-by-exporting hypothesis using Chilean plants. Productivity, firm size, foreign capital, foreign licences, ratio of skill labours, age and investment are significant factors that affect the probability of beginning to export. Apart from age, all variables are more likely to increase the probability of beginning to export. Such findings support the self-selection hypothesis. In addition, Alvarez and López (2005) also find the evidence of learning-by-exporting for the new entrants where productivity is further increased after firms export.

Blalock and Roy (2007) emphasise the effect of the financial crisis on the export behaviour of Indonesian firms. They find that the rate of entry into and exit from export markets increased significantly. The financial crisis and the devaluation of the Indonesian currency had an effect on firms' liquidity constraints so some exporters may have chosen to exit the market. In the mean

time, some firms may find the depreciation of the exchange rate to be profitable and therefore decide to enter the export markets. Foreign owned firms in the pre-crisis that invested in R&D and training were more likely to continue exporting. Surprisingly, the productivity in the pre-crisis period has no impact on the decision to continue exporting.

In summary, heterogeneous firms have different specific characteristics hence the decision of each firm to enter export markets is different. Various factors are used to examine a firm's entry decision into export markets. The results for both developed and developing countries are broadly consistent with sunk entry costs, productivity, structure of ownership, size, etc. being important factors in determining the entry decision. Next, we provide the summary of the literature emphasising financial factors and explain how they are linked to investment and exporting.

3.2 Firm Level Investment and Financial Constraints

A numbers of financial constraints or financial variables have been studied and investigated with regard to their links with different types of a firm's investment such as fixed investment and inventory investment. In the case of imperfect capital markets, it is difficult for financially constrained firms to obtain external sources of funds. Therefore, investment should depend positively on internal finance especially liquid assets such as cash flow. Inventory investment is arguably more sensitive to financial variables than fixed investment because of its high liquidity and can be adjusted more easily at low costs (Carpenter *et al.* 1994 and Guariglia and Mateut 2005). For that reason, recent studies place more emphasise on the relationship between inventory investment and financial constraints.

Bond and Meghir (1994) investigate the importance of a firm's investment that relates to the accessibility of internal funds in the UK. The assumption of the hierarchy of finance model is

different from the standard neoclassical model because it assumes that an investment funded by internal finance costs less than using external sources of funds. An empirical result from an estimation of dynamic investment models using GMM estimation technique reveals that a firm's investment in the UK is sensitive to internal funds (Bond and Meghir 1994)

Many empirical studies have found that cash flow only proxies the shift in demand for investment but does not sufficiently capture financial constraints. Fazzari and Petersen (1993) try to fill in the gap by emphasising the role of working capital as a measure of liquidity in order to investigate the effect of financial constraints on fixed investment. They found evidence that working capital investment is sensitive to fluctuations in cash flow. Therefore, when firms face financial constraints, they tend to use working capital as a source of funds to smooth fixed investment relative to cash-flow shocks (Fazzari and Petersen 1993).

Rather than focus only on the explanation of fixed investment, a few studies have tried to examine the effect of internal finance on inventory investment. Kashyap *et al.* (1994) try to explain the movement of inventory investment particularly during the tight monetary policy period (1981-1982) in the US. They found evidence that financial factors affected the change in inventory investment within firms.

Similar results are found in the study of Carpenter *et al.* (1994) using quarterly panel data of US manufacturing firms. They explain that the fluctuation of internal finance has a direct impact on inventory investment. Because of imperfect capital markets, the shock in internal finance leads to an adjustment in investment (Carpenter *et al.* 1994 and Hubbard 1998). Carpenter *et al.* (1994) found that fixed investment of financially constrained firms decreases proportionally less than a reduction in inventory investment because inventory investment can be adjusted at lower cost relative to others.

Guariglia (1999) also finds a significant relationship between internal finance and inventory investment in the UK. During recessions, financial constrained firms tend to suffer more and therefore reduce their inventory investment especially of work-in-process and raw material inventories. In addition, Guariglia and Mateut (2005) employ augmented error-correction inventory investment equations to examine the evidence of financial constraints, firm's investment and global engagement status in the UK using micro-level panel data between 1993 and 2003. They found that inventory investment is significantly affected by financial variables of which the level of the effect depends upon the possibility of facing financial constraints. If firms participate in global activities, they are less likely to face financial constraints problems as they have greater access to both domestic and international financial markets. Therefore, the inventory investment of those firms is less sensitive to financial variables than is the case for domestic firms. The findings from the study of Guariglia and Mateut (2005) suggest that trade openness is good for a country because trade helps to reduce the level of financial constraints faced by firms and stimulates investment.

In other European countries, Vermeulen (2002) investigates the relationship of financial accelerator and investment using data for Germany, France, Italy and Spain between 1983 and 1997. The evidence shows that a financial accelerator affects a firm's investment spending. Financial health and firm size also matter such that the investment spending of small firms that have a weak balance sheet is affected the most. Another European study by Konings *et al.* (2003) examines the link between investment and financial constraints in transition economies, Poland, the Czech Republic, Bulgaria and Romania from 1994 to 1999. Firms' investment decisions in Poland and the Czech Republic are more sensitive to internal finance constraints than in Bulgaria and Romania. This can be explained by the soft budget constraints that occur in the two least advanced transition economies, Bulgaria and Romania, which means that firms in these two countries cannot operate under liquidity constraints conditions (Konings *et al.* 2003).

Bond *et al.* (2003) use financial factors to explain a firm's investment behaviour in Belgium, France, Germany and the UK with the aim to distinguish whether different financial systems in each country have different impacts on financial constraints and investment. For UK firms, internal finance seems to be an important source of investment. If the desired investment could not be funded by internal finance, firms are likely to face investment constraints. Such a finding is clearly explained by the structure of the market-oriented financial system in the UK, which does not perform very well in channelling investment funds compared to the continental European financial system.

Harrison and McMillan (2003) examine the Ivory Coast's direct foreign investment and domestic credit constraints by using an augmented Euler investment model that includes the proxies for financial distress, i.e. debt to asset ratio and the interest coverage ratio. Since domestic credit constraints are one of the obstacles for future investment of firms, the inflow of direct foreign investment would alleviate domestic credit constraints. The finding from the Ivory Coast suggests that overall domestic firms suffer more from the domestic credit constraints than foreign firms. In addition, Harrison and McMillan (2003) split the sample into public and private firms. For domestic public firms, the investment decisions do not depend upon the debt to asset ratio and interest coverage. However, for domestic private firms, their investment decisions are more likely to be affected by credit constraints compared to foreign firms.

In summary, there are a growing number of studies that examine the impact of financial factors on investment decisions. Based on the assumption of imperfect capital markets, some firms may face obstacles to external finance. Therefore, their investment decision depends upon the internal finance or financial health of firms. Empirical results from the literature support the hypothesis that investment such as inventory and fixed investment is sensitive to internal finance. In the next section, we summarise the literature that studies the relationship between

financial factors and a firm's investment in sunk entry costs and variable costs in order to start exporting and to remain in the export markets.

3.3 Financial Factors and Firm's Export Behaviour

In order to enter export markets, a firm faces a form of investment known as sunk entry costs (Melitz 2003, Roberts and Tybout 1997, Bernard and Jensen 2001, 2004 and Chaney 2005). Such investment will be influenced by the financial health or financial constraints of a firm. Many studies have considered both directly and indirectly the relationship between financial factors and the decision to export.

A study by Campa and Shaver (2002) considers the indirect link and focuses on the liquidity constraint and capital investment of exporters and non-exporters. They expected that multi-nation exporters should receive more stable income through the diversification of export destinations than single nation exporters. Using Spanish manufacturing sector data for 9 years, they show that exporters receive more stable cash flows and have more stable capital investment compared to non-exporters. In addition, exporters are likely to have fewer liquidity constraint problems. In contrast, non-exporters seem to suffer more than exporters during the domestic business cycle.

Chaney (2005) emphasises the effect of currency devaluation on the trade balance and develops a model of international trade where liquidity constraints are one of the essential determinants of being an exporter. In international trade, firms need to pay fixed costs including sunk entry costs in order to enter export markets. This indicates that firms' financial health is very important in determining export behaviour. Firms that are able to generate sufficient liquidity seem to enter export markets while liquidity constrained firms are unable to export as they do not have adequate funds to cover sunk entry costs. However, when the exchange rate appreciates, it

means there is an increase in domestic assets in term of foreign price so some of those firms that have liquidity constraints are able to start exporting during that period.

More recent studies consider the impact of financial factors on the decision to export. Greenaway *et al.* (2007) find evidence for the UK that the financial health of exporters is better than non-exporters. Among exporters, continuous exporters have a healthier financial balance sheet than starters. The results also show that financial factors of firms such as liquidity and leverage determine firms' likelihood to export. Greenaway *et al.* (2007) find that liquidity has a positive and significant effect on the decision to export while leverage has a negative and significant effect. In addition, once a firm participates in export markets, it helps to improve the firm's financial health. For other firm characteristics, foreign ownership and subsidiaries have positive and significant effects on the decision to export. Firm sizes that are very small, small, medium and large have negative and significant coefficients. The results of TFP are mixed with insignificant coefficients.

Another recent study by Garcia-Veg and Guariglia (2007) focuses on the explanation of income volatility on financial constraints that affects the probability of exporting. Garcia-Veg and Guariglia (2007) build a model by assuming that each firm has to borrow from external sources in order to operate in the market. In addition, the model also assumes that each particular firm faces a normally distributed income shock. Garcia-Veg and Guariglia (2007) try to link firms' productivity and volatility to the ability of firms to access external sources of borrowing. They explain that more productive and less volatile firms are able to acquire cheaper loans while less productive and more volatile firms are more likely to face a higher cost of borrowing. It can be concluded that the cost to obtain external funds depends positively upon the degree of volatility.

When a country is open to trade, exporting firms are likely to face two possible contrasting effects. First, if firms are able to pay sunk entry costs and enter export markets, their financial constraints are likely to decrease. Second, an increase in competition in export markets causes an

increase in the probability to exit or to go bankrupt for some firms, which therefore raises the difficulty to gain access to external sources of funds. Using UK data, Garcia-Veg and Guariglia (2007) find empirical evidence that more volatile firms are more likely to go bankrupt so in order to continue to operate in the market they have to be more productive, and therefore are more likely to become exporters.

From these empirical studies we found that financial factors and investment in the entry decision to export are linked as each firm faces sunk entry costs prior to export. If firms can afford to pay such costs, they thus enter the export markets. In the next section, we build a model to investigate whether financial factors and firm characteristics actually affect a firm's export decision.

4. Model Specification, Variables and Data

4.1 Model

In this section, our empirical model includes factors based on guidance from the previous theoretical and empirical literature. Thus, in addition to the standard firm specific characteristics we also include measures of a firm's financial health. A firm's financial status or financial health is considered to be an indicator of a firm's ability to pay sunk entry costs in order to enter export markets and also the capacity to export for the existing exporters. We lag all independent variables by one year to control for possible endogeneity problems. Thus, our model is given by;

$$\begin{aligned} EX_{it} = {} & \beta_0 + \beta_1 LIQUIDITY_{i(t-1)} / LEVERAGE_{i(t-1)} + \beta_2 FOREIGN_{i(t-1)} \\ & + \beta_3 TFP_{i(t-1)} + \beta_4 SMALL^{A}_{i(t-1)} + \beta_5 LARGE^{A}_{i(t-1)} + \beta_6 VLARGE^{A}_{i(t-1)} \\ & + \beta_7 wage_{i(t-1)} + \beta_8 SKILL_{i(t-1)} + \beta_9 TRAIN_{i(t-1)} + \beta_{10} RDPRODUCT_{i(t-1)} \\ & + \beta_{11} RDPROCESS_{i(t-1)} + \sum_{r=1}^{5} \beta_r REGION_r + \varepsilon_{it} \end{aligned} \tag{4}$$

where EX is a dummy for export status of firm i.

$LIQUIDITY$ is a firm's liquidity ratio.

$LEVERAGE$ is a firm's financial leverage ratio.

$FOREIGN$ is a dummy variable to indicate the structure of ownership whether it is foreign or domestic owned.

TFP is total factor productivity of a firm.

$SMALL^A$ is a dummy variable to represent a small firm.

$LARGE^A$ is a dummy variable to indicate whether the firm is large.

$VLARGE^A$ is a dummy variable to represent a very large firm.

$wage$ is the log of wages per employee.

$SKILL$ is a ratio of skilled labour to total labour.

$TRAIN$ is a dummy variable for both in-house and outside training.

$RDPRODUCT$ is a dummy variable to specify whether firm carries out R&D in product.

$RDPROCESS$ is a dummy variable to specify whether firm perform R&D in production process.

$REGION$ is a vector of five regional dummies which indicate the regional location of a firm.[4]

ε is the error term.

Our model is estimated using pooled probit estimation. There are several alternative estimation techniques suggested by the previous empirical literature such as fixed and random effects probit, a linear probability model and a GMM first differences estimator. Due to our relatively short panel compared to other studies, the implementation of these alternative estimation

[4] See Table A1 of appendix for details definition of each region dummies. According to the 2002 Gini coefficient and gross regional per capita of 2006 from Office of the National Economic and Social Development Board, the Northeast region is the poorest region of Thailand and is omitted from the model.

techniques is not possible. For example, Arellano and Bond (1991) state that the GMM first differences estimator requires two or more lags of all the right-hand-side variables and instruments while Bernard and Jensen (2004) point out that fixed effects estimator produces biased and inconsistent results because of the lagged dependent and independent variables.

Apart from region dummies, we also include twenty-two 2-digit industry and two year dummies to control for unobserved industry and time varying effects. Additionally, we allow for robust clustering at 2-digit industry level. The robust variance estimation alleviates the problem of heteroscedasticity in the error terms and the clustering helps to relax the independence assumption and requires only that the observations are independent across industries.

4.2 Variables

For financial variables, which represent the financial health of a firm, we use different proxies with different definitions of the financial ratio, i.e. liquidity and leverage, based on previous studies of financial constraints (see e.g. Fazzari and Petersen 1993, Chaney 2005, Greenaway *et al.* 2007). First, liquidity is used to measure a firm's ability to invest as a proxy of the capacity of a firm to pay sunk entry costs in order to start exporting. In this paper, we define liquidity ratio ($LIQUIDITY_{i(t-1)}$) follow Greenaway *et al.* (2007) and measured as the current assets less liabilities divided by total assets. Second, two alternative definitions are used to classify the financial leverage ratio. In our first definition ($LEVERAGE1_{i(t-1)}$) is the current liabilities divided by current assets while our second definition ($LEVERAGE2_{i(t-1)}$) is total liabilities divided by total assets. We expect that the liquidity ratio will have a positive effect on a firm's decision to export. Firms that have a high liquidity ratio are more likely to export. In contrast, the leverage ratio would be expected to have a negative effect on the export decision.

Foreign ownership ($FOREIGN_{i(t-1)}$) captures the structure of a firm's ownership. We define a firm as foreign owned if at least 10% of its shares belong to foreigners. Therefore, we generate a dummy equal to 1 if a firm is foreign owned and 0 otherwise. We also define our foreign ownership dummy at 25% and 50% levels ($FOREIGN25_{i(t-1)}$ and $FOREIGN50_{i(t-1)}$) in our sensitivity analysis. Foreign firms invest in a home country for different reasons, for example as an export-platform or resource seeking FDI or market seeking FDI. The estimated sign of coefficient for this variable would reveal the incentive for investment. Since we know that foreign firms tend to have more advanced technologies and a higher ratio of skilled labour than domestic firms, such advantages would therefore enhance the productivity of foreign owned firms. We therefore expect a positive relationship between foreign ownership and the export decision.

Total factor productivity ($TFP_{i(t-1)}$) is an indicator of a firm's capability in the production process. We use a semi-parametric approach following Levinsohn and Petrin (2003) that takes account of unobserved firm-specific productivity shock ($TFP^{LP}_{i(t-1)}$). We also use other alternative techniques to measure TFP in the sensitivity analysis. First, an R&D estimator of TFP ($TFP^{BUETTNER}_{i(t-1)}$) by Buettner (2003) is the estimation of a semi-parametric and nonlinear least square regression that accounts for endogenous R&D. Second, $TFP^{LABPROD}_{i(t-1)}$ is the simple labour productivity which is defined as the log of value added divided by total labour. The existing empirical evidence suggests that highly productive firms are more likely to enter export markets (Bernard and Jensen 1999, 2004, Greenaway and Kneller 2004, Kneller and Pisu 2004, Fariñas and Martín-Marcos 2007). Therefore, we expect TFP to have a positive effect on a firm's decision to export.

Firm size is considered as one of the important factors that determine export decisions. It also represents the ability of a firm to export. We believe that large firms are more likely to export

than small firms because large firms tend to have higher production capacity. We classify firm size into different groups, i.e. small, medium, large and very large according to total capital stock. For small firm $(SMALL^{A}_{i(t-1)})$, a dummy variable equals 1 if the total capital stock in firm i at time $t-1$ falls in the first quartile distribution of the capital stock for all firms operating in the same two-digit International Standard Industrial Classification (ISIC) level (Revision 3) as firm i at time $t-1$. For medium $(MEDIUM_{i(t-1)})$, large $(LARGE^{A}_{i(t-1)})$ and very large firm $(VLARGE^{A}_{i(t-1)})$, we use the same method as we classify small firm, total capital stock of firm i at time $t-1$ falls in the second, third and forth quartile of the total capital stock distribution respectively. In the analysis, we omit *MEDIUM* firms.

Wage $(wage_{i(t-1)})$ is an indicator of the quality of the workforce. Wage is defined as the log of wages per employee where wages per employee are the ratio of total wage payments to total workers less owners who do not receive wages. Employees who receive high wages tend to be the skilled and professional workers whereas low wage employees tend to be unskilled workers. It can be concluded that the quality of the workforce has a positive effect on wage income. Therefore, firms that pay high wages, that means firms have high quality of labour, are expected to have higher probability of exporting.

For training $(TRAIN_{i(t-1)})$, a dummy is equal to 1 if employees within a firm receive formal training either in-house or outside training or both at least once, and 0 otherwise. Workers who receive training tend to have had an increase in their working expertise and competence. Training is expected to be positively correlated with the probability of exporting.

Product R&D $(RDPRODUCT_{i(t-1)})$ represents an enhancement in the quality of existing products and new product lines. A dummy equals 1 if a firm carries out R&D in products and 0 otherwise. Firms that invest in product R&D are more likely to export as such investment is

expected to improve the quality of products to meet the qualify standard of exporting. Production process R&D ($RDPROCESS_{i(t-1)}$) is an improvement in production technology to produce a higher quality of product at a lower cost of production. A dummy equals 1 if a firm carries out R&D in the production process and 0 otherwise. Firms that perform production process R&D are also more likely to export as they are assumed to have lower costs of production.

4.3 Data

We use an unbalanced panel of firm-level data during the period 2001 and 2004 from the annual survey of Thailand's manufacturing industries by the Office of Industrial Economics (OIE), Ministry of Industry, Thailand. The survey includes all size of establishments (small, medium, and large firms) which covers 79 types of manufacturing activities at 4-digit ISIC level in 23 industries at 2-digit ISIC.[5] The sampling is representative of the Thai manufacturing sector as value added of firms included in the survey accounts for 95% of total GDP in the manufacturing sector (OIE, 2001). The questionnaire includes twenty-five questions that cover different aspects of a firm's characteristics and performance as well as balance sheet information. In order to control for possible outliers, we exclude the small number of firms for which their mean of total sales exceeds US$ 1 billion. Our final unbalanced panel comprises 15,115 observations for the period 2001 to 2004.[6]

The data includes information on standard firm characteristics for example exports, output, productivity, structure of ownership, R&D, employment, training as well as financial balance

[5] For example in 2001, a questionnaire was sent out to 6,735 firms. The response rate was around 60%. Roughly, 35% of firms were small, 32% medium and 33% large firms.

[6] Each year, there are some firms that do not respond or even shut down which causes our data set to have an unbalanced structure. To compensate for the closure or none response of some firms in 2004 the sampling was extended and data collected for additional plants (OIE, 2004). Unfortunately we do not have specific data on firm deaths.

sheet information that allows us to generate our financial ratio variables. All nominal monetary values are converted in to US dollars using the market exchange rate from International Financial Statistics (IFS). In addition, the current price values are deflated into the constant price values of 2001 using inflation rate data from IFS (2005) CD-Rom. Details of definitions and descriptive statistics are presented in Table A1 and A2 of the appendix. Table A3 presents the raw correlations which match our expected signs in the model except for the relationship between export status and the ratio of skilled labour which is negative.

Table 3 provides summary statistics of a firm's characteristics including financial ratio variables that proxy the financial health in the firm's balance sheet. We report the means and standard deviations for different groups; total sample, non-exporting firms and exporting firms. For exporting firms, we divide the sample into two sub-samples. The first sub-sample is firms that export in the current year. The second sub-sample is firms that export in the current period but did not export in the previous year.

In term of output, sales, assets, capital stock and employment, exporting firms are larger than non-exporting firms. However, exporting firms that do not export in the previous year are slightly smaller than firms that export in the current period $(EX_{it} = 1)$. These findings and figures are consistent with the stylised facts from developed countries such as the US (Bernard and Jensen 1999, 2004), the UK (Greenaway and Kneller 2004 and Greenaway *et al.* 2007) and Germany (Arnold and Hussinger 2005) and developing countries such as Indonesia (Blalock and Gertler 2004).

For productivity using Levinsohn and Petrin (2003)'s method, exporting firms are more productive than non-exporting firms. In addition, employees who work in exporting firms receive higher wages compared to those working in non-exporting firms. The number of foreign owned exporters is also greater relative to foreign non-exporters.

If we look at the financial variables, we find that exporters have a slightly higher liquidity ratio compared to non-exporters. A higher liquidity ratio indicates a greater ability to invest. If we proxy financial health using the leverage ratio, different definitions of leverage reveal similar results. Exporters seem to have a lower leverage ratio than non-exporters. This indicates that non-exporters are relatively illiquid and are more likely to face a high debt to asset ratio.

Different groups of sample have different characteristics. Large, highly productive firms with high liquidity or low leverage ratio seem to enter export markets. Such specific characteristics including a firm is financial health may influence a firm's decision to participate in export markets. We now econometrically investigate this link and present results in the next section.

[Table 3 about here]

5. Results

The summary statistics in the previous section suggest a link between financial ratios and export status. Before providing our econometric results, Table 4 presents the mean values of financial variables for non-exporters and exporters in the full sample and different sub-samples according to the quartile distribution of capital stock. We also provide the test statistics for whether there is any difference in the financial variables between non-exporters and exporters within each individual group.

In Table 4, the mean values show that exporters overall have higher liquidity ratio and lower leverage than non-exporters. For the liquidity ratio of small, large and very large firms, the t-statistic results suggest that exporters are significantly different from non-exporters. If we consider the leverage ratio rather than liquidity, we also find the differences between dissimilar groups in all samples especially in the definition of leverage1.

[Table 4 about here]

We now report the empirical results that affect the entry of a firm into export market in Tables 5 and 6. Finally, we present the estimated results of factors that affect the elasticity of a firm's export sales in Tables 7 and 8. Results reported in Table 5 are from the marginal effect estimations calculated at the mean of the independent variables (except for dummy variables). Three different financial variables are included for the purpose of our sensitivity analysis. Column (1) includes a measurement of liquidity based on the definition of Greenaway *et al.* (2007). Columns (2) and (3) use different definitions of leverage denoted by $LEVERAGE1$ and $LEVEAGE2$.

The results show that the financial health of a firm has a significant influence on a firm's export decision. When we use liquidity to measure a firm's financial health, the positive and significant coefficient indicates that financial liquidity in the previous period increases the probability of exporting in the current period by 3.7%. In contrast to liquidity, the coefficient for the leverage ratio has a negative and significant effect for both measures. In Columns (2) and (3), the results show that leverage decreases the probability of exporting by 1.4% and 1.9% respectively.

Considering our other independent variables, we observe that foreign ownership has a positive and significant effect on the decision to export across all specifications. Being foreign owned increases the probability of exporting by an average value of 0.24. As expected, the results for TFP are positive and significant. This means the higher the TFP, the higher the probability of a firm to become an exporter. In Columns (1) to (3), an increase in TFP by one unit increase the probability of exporting by 5.4, 5.9, 5.7 percentage points, respectively.

Another important factor that determines a firm's decision to export is the size of a firm. We classify size into different groups and the results show that different groupings have different outcomes. The coefficient for small firms is negative and significant while large and very large

firms have positive and significant results. Small firms are less likely to export. However, as firm size increases so does the likelihood of becoming an exporter.

Wage and the ratio of skilled labour have negative coefficients but neither is significant. Because both variables are proxies of the quality of labour, the negative outcome may imply that Thailand specialises in exporting labour intensive goods rather than capital intensive goods. In addition, we find that the training variable is positive and significant. It is known that Thailand is abundant with unskilled labour so training becomes another important factor that determines the export entry decision. If workers within a firm receive training, the probability of a particular exporting firm increases by an average value of 0.10.

In all three columns, product R&D has a positive and significant impact on a firm's decision to export. Firms that invest in product R&D to develop and improve quality of goods are more likely to export. Production process R&D also has positive coefficients but only column (2) is significant. The investment in production process R&D helps firms to develop advanced technology that permits efficiency in the production process and results in a reduction in production costs. Therefore, if firms carry out production process R&D, their probability of exporting is increased by 0.06.

[Table 5 about here]

For further analysis, we split our sample according to structure of ownership using 10% of foreign owned shares as a cut-off point between foreign and domestic. The marginal effect estimations from the pooled probit are presented in Table 6.

The liquidity coefficient in both groups is positive but not significant. For our other financial ratio, leverage has a negative coefficient but only *LEVERAGE*1 in the domestic sample is significant. Hence, an increase in the leverage of domestic firms causes a reduction in the probability of exporting by 0.01. This finding implies that the entry decision of domestic firms

into export markets depends upon their financial health. Financially constrained firms especially those that are domestically owned may find it difficult to obtain external finance to invest in exporting. We find that the financial health of foreign owned firms does not have any significant effect on the export entry decision.

The relationship between productivity and the decision to export is positive and significant across all specifications. Productivity of domestic firms causes an increase in the probability of exporting by an average of 0.07 which is greater than the coefficient of foreign firms. In both samples, small firms are less likely to export whilst large and very large firms are more likely to export. Wage has a negative coefficient except for Column (2) and significant only in foreign firms sample. This negative and significant result may possibly imply that foreign firms invest in Thailand to seek cheap labour that provides a low cost of production. Therefore, a unit increase in the wage rate of foreign firms decreases the probability of exporting by 7 percentage points. The ratio of skilled labour in domestic and foreign firms also has a negative effect on a firm's decision to export but neither is significant.

Firms carry out training because it permits workers to improve their working skills and perform more efficient works. For both domestic and foreign firms, training has positive coefficient. For domestic firms, all three columns are significant meaning that workforces that are trained increase the probability of exporting by an average value of 0.11. For foreign firms, only Column (2) is significant.

For R&D, product R&D has a positive coefficient and is significant only for domestic firms. The results for production process R&D of domestic firms are also positive and insignificant except in Column (2). For production process R&D of foreign firms, the results are mixed. The implication of such a finding is that domestic firms should invest more in R&D especially in products in order to improve their product quality up to the standard level so they are able to enter export markets.

[Table 6 about here]

The next stage was to investigate how various factors affect export intensity among exporters by replacing the export status dummy in equation (4) with the log of export sales. Tables 7 and 8 present the estimated results obtained using an OLS estimation technique.

Table 7 shows that the liquidity ratio has a positive and significant effect on a firm's export sales. This indicates that a higher liquidity ratio results in higher export sales. In contrast, our leverage ratios have negative coefficients but are insignificant. Foreign ownership, productivity and size are consistent with the determinants of export status results in Table 5 where foreign owned and high productive firms are more likely to increase their export sales. In addition, the elasticity of export sales increases further due to the increase in firm size.

Wage has a negative and significant impact on the elasticity of export sales. An increase in the wage rate means a firm's production costs are also increased. Thus, a firm may reduce the amount of goods exported which causes a decrease in a firm's export sales revenue. Training and product R&D positively influence a firm's export sales. If firms engage in product R&D, their elasticity of export sales is likely to increase. However, production process R&D has the opposite effect.

[Table 7 about here]

Finally, we split our sample into domestic and foreign firms using the 10% of foreign owned shares as a cut-off point. Results are presented in Table 8. For our financial ratios, liquidity has positive coefficients whilst leverage has negative coefficients but only in the foreign sample are either of them significant. In both groups, Productivity, training, large and very large firms have positive and significant effects on firms' export sales. Thus, small firms are likely to decrease their elasticity of export sales.

The negative and significant result of the wage variable in Table 8 is now explained by the dominant effect of foreign owned firms rather than domestic firms. R&D of domestic firms is also important in determining the export sales. If domestic firms carry out product R&D, their elasticity of export sales is likely to increase by 38%. However, if domestic firms engage in production process R&D, their elasticity of export sales is likely to decrease by an average of 26%. For foreign sample, R&D does not have any significant effect on the elasticity of export sales.

[Table 8 about here]

In a sensitivity analysis, we use different measures of TFP ($TFP^{BUETTNER}$ and $TFP^{LABPROD}$) and use alternative cut-off points for foreign ownership (25% and 50%). The results can be found in Appendix B and are broadly consistent with the results discussed in Table 5 to Table 8.

6. Conclusion

This paper emphasises the importance of financial variables that are used to proxy for a firm's financial health and links them with the decision to enter export markets using firm-level data for Thai manufacturing firms between 2001 and 2004. We base our hypothesis on the assumption that investment and a firm's internal finance are related. Since exporting is also considered as a form of investment, i.e. investment in sunk entry costs and variable costs, the entry decision into exports market should be connected with a firm's financial health as well.

Financial ratios are used to represent sunk entry costs. We also include other firm specific characteristics in the regression and use different financial ratios to test for robustness. In general, liquidity is positive whilst leverage is negative and both ratios are significant. Firms that

have high liquidity are more likely to export. In contrast, firms with high leverage are less likely to become exporters. For TFP, we find positive and significant results but this evidence from Thailand is in contrast with the findings of the UK by Greenaway *et al.* (2007). Other firm characteristics such as foreign ownership, firm size, training and R&D are also important in determining the entry decision into export markets. The significant results for the foreign ownership variable support the findings in Guariglia (1999) that if firms are involved in global activities, they are less likely to face financial constraints and are therefore more likely to enter export markets.

For export intensity, firm characteristics are used to test the effects on the size of exports. Financial health is found to be important as it reveals a firm's capability to produce goods for export. Foreign ownership, size differences, wage, training and R&D also have significant effects on the elasticity of firms' export sales.

In sum, the entry decision of a firm into export markets is determined by various firm characteristics and performance. Financial ratios provide a partial explanation for a firm's ability to invest in sunk entry costs in order to enter export markets. If firms face liquidity constraints, it means that firms have no sufficient funds to afford to pay sunk entry costs in order to enter export markets. Once firms enter export markets, financial health also affects the elasticity of export sales because firms' financial status indicates how much firms can actually afford to produce in order to supply the markets.

The finding for Thailand leads to the suggestion that governments should develop financial markets and the financial sector so some currently constrained firms can gain greater access to external funding in order to invest and be able to enter export markets. The government should also highlight entry-promotion as well as export promotion policies because the entry-promotion policies help to reduce sunk entry costs faced by firms so some financial constrained firms can afford the costs that would encourage new entry while export-promotion policies favour existing

exporters to stimulate their export sales. In addition, the Thai government should promote policies that attract FDI inflows as foreign ownership is one of the significant factors that determine the entry decision into export markets and the elasticity of export sales.

Table 1: Major Export Markets

Export Markets	Value : US$ million								
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
ASEAN	10,871.61	13,482.22	12,599.12	13,568.90	16,486.03	21,238.38	24,390.42	27,021.71	32,522.37
EU-15	9,828.66	11,001.28	10,551.89	10,214.62	11,747.73	13,810.60	14,293.81	16,874.60	19,502.36
Japan	8,261.32	10,232.38	9,945.38	9,949.98	11,356.20	13,491.63	15,089.85	16,385.90	18,118.59
US	12,654.27	14,870.11	13,199.62	13,509.42	13,596.16	15,502.86	16,996.64	19,449.60	19,216.66
Others	16,847.59	20,038.24	18,887.22	20,913.39	26,853.87	32,459.35	40,166.93	49,988.63	63,117.62
World	58,463.44	69,624.23	65,183.23	68,156.31	80,039.98	96,502.82	110,937.66	129,720.43	152,477.58

Source: Department of Trade Negotiations, Ministry of Commerce

Table 2: Fifteen Major Export Commodities in Thai Manufacturing Sector during 1999-2007.

Rank		Product	Value : US$ million								
2007	2003		1999	2000	2001	2002	2003	2004	2005	2006	2007
1	1	Computer machinery, parts and accessories	8,121.57	8,739.55	7,947.47	7,430.35	8,189.69	9,185.45	11,848.66	14,876.39	17,305.06
2	4	Automobile, parts and accessories	1,902.26	2,419.36	2,655.03	2,919.71	3,965.53	5,495.24	7,745.44	9,524.19	12,040.69
3	2	Integrated circuits	2,944.55	4,484.03	3,512.25	3,307.99	4,624.57	4,902.78	5,950.64	7,029.98	8,053.38
4	5	Gems and Jewellery	1,766.30	1,741.85	1,837.16	2,169.28	2,514.47	2,645.59	3,232.66	3,668.29	5,382.20
5	7	Plastic pellets	1,215.31	1,865.63	1,615.02	1,775.24	2,148.43	3,104.60	4,198.45	4,498.43	5,214.07
6	8	Iron and steel products	954.29	1,399.16	1,091.43	1,249.69	1,687.20	2,477.84	2,895.63	3,528.61	4,596.01
7	22	Machinery and components	613.87	801.45	860.96	930.22	1,244.97	1,670.14	2,111.26	2,655.15	4,366.64
8	9	Chemicals	908.00	1,248.11	1,015.12	1,192.97	1,581.36	2,059.06	2,646.08	3,434.34	3,922.64
9	24	Electrical appliances	545.13	901.09	873.57	905.66	967.930	1,839.57	2,208.78	2,514.18	3,670.14
10	12	Rubber products	875.05	1,060.37	1,095.07	1,260.31	1,556.44	1,943.68	2,351.20	3,082.00	3,661.26
11	10	Air Conditioning machine and parts	895.52	1,079.62	1,160.50	1,108.35	1,430.29	1,997.74	2,201.41	2,287.50	3,191.59
12	6	Radio, television and parts	1,346.48	1,964.87	1,692.77	2,094.58	2,501.77	3,224.46	3,141.84	3,457.34	3,095.18
13	3	Garments	2,915.63	3,132.68	2,914.40	2,721.50	2,760.19	3,089.23	3,150.21	3,198.83	2,991.88
14	17	Plastic products	758.13	894.23	860.32	954.44	1,236.20	1,410.21	1,774.70	1,883.99	2,273.27
15	47	Reciprocating internal combustion engine and components	187.69	327.40	286.97	345.98	547.82	1,245.04	1,379.96	1,567.92	1,732.21
		Total 15 products	25,949.78	32,059.40	29,418.04	30,366.27	36,956.86	46,290.63	56,836.92	67,207.14	81,496.22
		Total Others	32,513.66	37,564.83	35,765.19	37,790.04	43,083.12	50,212.19	54,100.74	62,513.29	70,981.36
		Total	58,463.44	69,624.23	65,183.23	68,156.31	80,039.98	96,502.82	110,937.66	129,720.43	152,477.58

Source: Department of Trade Negotiations, Ministry of Commerce

Table 3: Summary Statistics

	Total Sample	Non-Exporting Firms	Exporting Firms	
		$EX_{it} = 0$	$EX_{it} = 1$	$EX_{it} = 1$ and $EX_{i(t-1)} = 0$
Output	184.427	80.714	252.876	133.042
	(534.93)	(335.61)	(623.63)	(394.12)
Sales	225.100	103.614	305.281	172.416
	(628.46)	(402.76)	(729.70)	(504.66)
Assets	206.514	99.936	276.854	178.211
	(701.417	(397.51)	(836.75)	(500.18)
Capital stock	91.816	37.253	127.828	105.375
	(421.73)	(166.67)	(523.13)	(366.11)
Labour	454.638	174.025	639.839	372.725
	(884.72)	(333.94)	(1067.49)	(899.45)
Productivity	9.512	9.259	9.679	9.757
	(1.92)	(1.84)	(1.95)	(1.78)
Wage	30.508	27.606	32.424	36.254
	(47.45)	(58.19)	(38.65)	(31.63)
Foreign	0.335	0.150	0.457	0.261
	(0.47)	(0.36)	(0.50)	(0.44)
Liquidity	0.080	0.077	0.082	0.043
	(0.52)	(0.66)	(0.40)	(0.48)
Leverage1	1.187	1.385	1.057	1.197
	(4.34)	(6.51)	(1.82)	(1.92)
Leverage2	0.778	0.838	0.738	0.771
	(2.56)	(1.05)	(3.18)	(0.77)
Observation	9,945	3,954	5,991	138

Notes: Standard deviations are reported in parentheses. Capital stock is a firm's total fixed assets. Labour is total employment including owners. Productivity is obtained from the estimation technique of Levinsohn and Petrin (2003). Wage is the ratio of total labour costs to total employment less owners who do not receive wage. Liquidity is the ratio of a firm's current asset less current liabilities over total assets. Two definitions of leverage ratio are used; leverage1 is defined as the ratio of current liabilities over current assets, and leverage2 is defined as the ratio of total liabilities to total assets. Output, sales and capital stock are measured in hundreds of thousands of US Dollars while wage is measured in hundred of US Dollars.

Table 4: Mean of the Financial Ratios for Different Groups of Sample

	Liquidity	Leverage1	Leverage2	Observation
Entire Sample				
Non-Exporters	0.076	1.383	0.839	4,153
Exporters	0.082	1.055	0.737	6,250
Coefficient	0.007	-0.332***	-0.128**	
t-statistic	(0.67)	(-3.63)	(-2.39)	
Small Firms				
Non-Exporters	0.183	0.942	0.908	1,162
Exporters	0.210	0.852	0.805	451
Coefficient	0.097**	-0.268)**	-0.148**	
t-statistic	(2.08)	(-2.13	(-2.24)	
Medium Firms				
Non-Exporters	0.114	1.272	0.825	1,264
Exporters	0.124	0.957	0.776	1,190
Coefficient	0.021	-0.490**	-0.045	
t-statistic	(0.84)	(-2.18)	(-1.05)	
Large Firms				
Non-Exporters	-0.024	1.479	0.870	1,041
Exporters	0.096	1.017	0.688	1,897
Coefficient	0.109***	-0.409***	-0.167***	
t-statistic	(5.52)	(-4.95)	(-4.50)	
Very Large Firms				
Non-Exporters	-0.043	2.302	0.712	638
Exporters	0.030	1.168	0.747	2,627
Coefficient	0.053	-0.904	0.080	
t-statistic	(2.75)***	(-3.31)***	(0.40)	

Notes: Tables reports the mean values of liquidity and leverage ratios for non-exporters ($EX_{it}=0$) and exporters ($EX_{it}=1$) in different groups according to the quartile distribution of capital stock for all firms operating in the same 2-digit industry. Small firms is defined as if the observations fall in the first size quartile while medium, large and very large firms are defined as if the observations fall in the second, third and forth quartile, respectively. The row labelled *coefficient* and *t-statistic* present the coefficient and t-statistic of export status (EX_{it}) in a regression of financial ratio on export status, region, 2-digit industry and time dummies, i.e.

$LIQUIDITY_{it} \,/\, LEVEARGE_{it} = \alpha_0 + \alpha_1 EX_{it} + \sum_{r=1}^{5} \alpha_r REGION_r + \sum_{j=1}^{22} \alpha_j INDUS_j + \sum_{t=1}^{3} \alpha_t T_t + \varepsilon_{it}$. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5: The Determinants of a Firm's Decision to Export (Dep. Var. is EX_{it})

	(1)	(2)	(3)
$LIQUIDITY_{i(t-1)}$	0.037*		
	(1.92)		
$LEVERAGE1_{i(t-1)}$		-0.014***	
		(2.74)	
$LEVERAGE2_{i(t-1)}$			-0.019*
			(1.73)
$FOREIGN_{i(t-1)}$	0.239***	0.244***	0.240***
	(10.14)	(10.94)	(10.33)
$TFP^{LP}_{i(t-1)}$	0.054***	0.059***	0.057***
	(2.90)	(3.32)	(3.16)
$SMALL^{A}_{i(t-1)}$	-0.189***	-0.192***	-0.182***
	(4.78)	(4.83)	(4.72)
$LARGE^{A}_{i(t-1)}$	0.126***	0.137***	0.123***
	(3.81)	(4.43)	(3.78)
$VLARGE^{A}_{i(t-1)}$	0.254***	0.264***	0.248***
	(5.41)	(5.61)	(5.38)
$wage_{i(t-1)}$	-0.050	-0.035	-0.054
	(0.95)	(0.66)	(1.03)
$SKILL_{i(t-1)}$	-0.018	-0.033	-0.017
	(0.54)	(0.97)	(0.49)
$TRAIN_{i(t-1)}$	0.101***	0.113***	0.096***
	(2.83)	(3.46)	(2.65)
$RDPRODUCT_{i(t-1)}$	0.117***	0.116***	0.117***
	(6.50)	(6.35)	(6.47)
$RDPROCESS_{i(t-1)}$	0.031	0.059*	0.032
	(0.86)	(1.80)	(0.89)
Observations	6961	7939	6973

Note: Robust z statistics in parentheses. Standard errors are adjusted for clustering at 2-digit industry. Region, 2-digit industry and time dummies are included. All the dependent variables are lagged one year. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6: The Determinants of a Firm's Decision to Export for Domestic and Foreign Firms Only (Dep. Var. is EX_{it})

	Domestic Firms			Foreign Firms		
	(1)	(2)	(3)	(4)	(5)	(6)
$LIQUIDITY_{i(t-1)}$	0.038			0.023		
	(1.41)			(1.26)		
$LEVERAGE1_{i(t-1)}$		-0.012**			-0.012	
		(2.16)			(1.49)	
$LEVERAGE2_{i(t-1)}$			-0.012			-0.024
			(0.82)			(1.38)
$TFP^{LP}_{i(t-1)}$	0.063***	0.070***	0.068***	0.034**	0.031*	0.034**
	(2.96)	(3.52)	(3.29)	(2.17)	(1.85)	(2.19)
$SMALL^{A}_{i(t-1)}$	-0.183***	-0.176***	-0.175***	-0.109*	-0.133**	-0.101*
	(4.15)	(4.06)	(4.01)	(1.90)	(2.29)	(1.90)
$LARGE^{A}_{i(t-1)}$	0.136***	0.141***	0.131***	0.080**	0.088***	0.077**
	(3.58)	(4.19)	(3.52)	(2.45)	(2.58)	(2.31)
$VLARGE^{A}_{i(t-1)}$	0.245***	0.249***	0.237***	0.182***	0.192***	0.176***
	(5.17)	(5.38)	(5.19)	(3.61)	(3.80)	(3.57)
$wage_{i(t-1)}$	-0.007	0.006	-0.013	-0.071**	-0.065*	-0.074**
	(0.10)	(0.09)	(0.18)	(2.37)	(1.77)	(2.42)
$SKILL_{i(t-1)}$	-0.006	-0.021	-0.004	-0.016	-0.025	-0.015
	(0.14)	(0.48)	(0.09)	(0.51)	(0.74)	(0.48)
$TRAIN_{i(t-1)}$	0.109***	0.111***	0.103***	0.067	0.090*	0.061
	(3.17)	(3.53)	(3.00)	(1.22)	(1.72)	(1.08)
$RDPRODUCT_{i(t-1)}$	0.166***	0.155***	0.167***	0.030	0.030	0.029
	(6.10)	(6.18)	(6.07)	(1.06)	(1.00)	(1.05)
$RDPROCESS_{i(t-1)}$	0.048	0.082**	0.051	-0.004	0.002	-0.006
	(1.20)	(2.27)	(1.27)	(0.13)	(0.06)	(0.16)
Observations	4626	5461	4638	2335	2478	2335

Note: Robust z statistics in parentheses. Standard errors are adjusted for clustering at 2-digit industry. Region, 2-digit industry and time dummies are included. All the dependent variables are lagged one year. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7: The Determinants of a Firm's Export Sales

	(1)	(2)	(3)
$LIQUIDITY_{i(t-1)}$	0.227*		
	(1.73)		
$LEVERAGE1_{i(t-1)}$		-0.062	
		(1.63)	
$LEVERAGE2_{i(t-1)}$			-0.101
			(1.20)
$FOREIGN_{i(t-1)}$	0.425***	0.438***	0.425***
	(4.52)	(4.71)	(4.60)
$TFP^{LP}_{i(t-1)}$	0.720***	0.730***	0.723***
	(11.49)	(12.12)	(11.96)
$SMALL^{A}_{i(t-1)}$	-0.952***	-0.941***	-0.932***
	(5.14)	(5.29)	(5.11)
$LARGE^{A}_{i(t-1)}$	0.751***	0.718***	0.736***
	(9.08)	(8.80)	(8.98)
$VLARGE^{A}_{i(t-1)}$	1.898***	1.862***	1.864***
	(10.26)	(11.00)	(10.42)
$wage_{i(t-1)}$	-0.441***	-0.416***	-0.445***
	(2.95)	(2.76)	(2.94)
$SKILL_{i(t-1)}$	0.035	-0.012	0.041
	(0.27)	(0.09)	(0.31)
$TRAIN_{i(t-1)}$	0.414**	0.387***	0.431**
	(2.27)	(2.75)	(2.38)
$RDPRODUCT_{i(t-1)}$	0.277**	0.253**	0.273**
	(2.43)	(2.36)	(2.44)
$RDPROCESS_{i(t-1)}$	-0.221**	-0.166*	-0.218**
	(2.29)	(1.78)	(2.22)
Observations	4217	4559	4219

Note: Robust t statistics in parentheses. Standard errors are adjusted for clustering at 2-digit industry. Region, 2-digit industry and time dummies are included. All the dependent variables are lagged one year. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 8: The Determinants of a Firm's Export Sales for Domestic and Foreign Firms Only (Dep. Var. is $EXSALES_{it}$)

	Domestic Firms			Foreign Firms		
	(1)	(2)	(3)	(4)	(5)	(6)
$LIQUIDITY_{i(t-1)}$	0.077			0.333**		
	(0.53)			(1.96)		
$LEVERAGE1_{i(t-1)}$		-0.026			-0.135**	
		(0.72)			(2.11)	
$LEVERAGE2_{i(t-1)}$			-0.063			-0.079
			(0.56)			(0.95)
$TFP^{LP}_{i(t-1)}$	0.756***	0.774***	0.750***	0.634***	0.628***	0.653***
	(7.67)	(8.73)	(7.42)	(6.57)	(6.92)	(6.97)
$SMALL^{A}_{i(t-1)}$	-0.948***	-0.947***	-0.947***	-0.989***	-0.991***	-0.971***
	(4.31)	(4.27)	(4.15)	(3.58)	(3.80)	(3.44)
$LARGE^{A}_{i(t-1)}$	0.610***	0.602***	0.603***	0.998***	0.936***	1.007***
	(5.44)	(5.81)	(5.61)	(8.06)	(7.74)	(7.79)
$VLARGE^{A}_{i(t-1)}$	1.472***	1.490***	1.464***	2.340***	2.282***	2.302***
	(7.66)	(8.60)	(7.90)	(9.63)	(10.07)	(9.51)
$wage_{i(t-1)}$	-0.416	-0.388	-0.408	-0.456***	-0.451***	-0.468***
	(1.47)	(1.42)	(1.43)	(3.98)	(3.94)	(4.08)
$SKILL_{i(t-1)}$	0.100	0.025	0.102	0.051	0.028	0.048
	(0.69)	(0.19)	(0.70)	(0.28)	(0.16)	(0.26)
$TRAIN_{i(t-1)}$	0.313	0.283**	0.343*	0.687**	0.689**	0.680**
	(1.63)	(1.97)	(1.82)	(2.31)	(2.54)	(2.29)
$RDPRODUCT_{i(t-1)}$	0.375***	0.337***	0.372***	0.212	0.197	0.206
	(2.74)	(3.10)	(2.84)	(1.09)	(1.01)	(1.05)
$RDPROCESS_{i(t-1)}$	-0.283**	-0.220*	-0.285**	-0.124	-0.082	-0.120
	(2.10)	(1.84)	(2.10)	(0.60)	(0.43)	(0.60)
Observations	2296	2548	2298	1921	2011	1921

Note: Robust t statistics in parentheses. Standard errors are adjusted for clustering at 2-digit industry. Region, 2-digit industry and time dummies are included. All the dependent variables are lagged one year. * significant at 10%; ** significant at 5%; *** significant at 1%.

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Appendix A

Table A1: Definition of Variables

Variable	Definition
EX_{it}	A dummy variable for export status where a dummy equals 1 if firm i at time t has positive export sales and 0 otherwise.
$EXSALES_{it}$	Export sales of firm i at time t.
$LIQUIDITY_{i(t-1)}$	A firm's liquidity ratio is defined as the ratio of current assets minus liabilities to total assets.
$LEVERAGE1_{i(t-1)}$	A firm's financial leverage ratio is defined as the ratio of current liabilities to current assets
$LEVERAGE2_{i(t-1)}$	Another definition of a firm's financial leverage ratio is defined as the ratio of total liabilities to total assets.
$FOREIGN_{i(t-1)}$	A dummy variable that indicates the structure of foreign ownership where a dummy equals 1 if shares of at least 10% are foreign owned.
$FOREIGN25_{i(t-1)}$	A dummy variable that indicates the structure of foreign ownership where a dummy equals 1 if shares of at least 25% are foreign owned.
$FOREIGN50_{i(t-1)}$	A dummy variable that indicates the structure of foreign ownership where a dummy equals 1 if shares of at least 50% are foreign owned.
$TFP^{LP}_{i(t-1)}$	Total factor productivity that is obtained from the estimation of the semi-parametric approach of Levinsohn and Petrin (2003).
$TFP^{BUETTNER}_{i(t-1)}$	Total factor productivity that is obtained from system estimation, a semi-parametric and nonlinear least square regression, of Buettner (2003).
$TFP^{LABPROD}_{i(t-1)}$	Labour productivity that is calculated from the log of value added divided by total labour.
$SMALL^{A}_{i(t-1)}$	For a small firm variable, a dummy variable is equal to 1 if the total capital stock of the firm i at time $t-1$ is in the first quartile of the distribution of the total labour of all firms operating in the same two-digit ISIC level (Revision 3) as firm i at time $t-1$.
$LARGE^{A}_{i(t-1)}$	For a large firm variable, a dummy variable equal to 1 if the total capital stock of the firm i at time $t-1$ is in the third quartile of the distribution of the total labour of all firms operating in the same two-digit ISIC level (Revision 3) as firm i at time $t-1$.
$VLARGE^{A}_{i(t-1)}$	A very large firm variable, a dummy variable equal to 1 if the total capital stock of the firm i at time $t-1$ is in the forth quartile of the distribution of the total labours of all firms operating in the same two-digit ISIC level (Revision 3) as firm i at time $t-1$.
$wage_{i(t-1)}$	The log of wage per employee where wage per employee is calculated from the ratio of total labour payments over total labour less owners.
$RDPRODUCT_{i(t-1)}$	A dummy variable equals 1 if a firm carries out R&D in product development and 0 otherwise.
$RDPROCESS_{i(t-1)}$	A dummy variable equals 1 if a firm performs R&D in the development of production processes and 0 otherwise.
$BKKM$	A dummy variable identifies whether firm locates in Bangkok and Metropolitan Area or not.
$CENTRAL$	A dummy variable equals 1 if a firm locates in Central region excluding Bangkok and Metropolitan Area and 0 otherwise.
$EAST$	A dummy variable equals 1 if a firm locates in Eastern region and 0 otherwise.

NORTH	A dummy variable equals 1 if a firm locates in the North of Thailand and 0 otherwise.
SOUTH	A dummy variable equals 1 if a firm locates in the South of Thailand and 0 otherwise.

Table A2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
EX_{it}	7939	0.57	0.49	0	1
$EXSALES_{it}$	4559	14.66	2.21	4.95	20.33
$LIQUIDITY_{i(t-1)}$	6961	0.08	0.51	-10.45	0.99
$LEVERAGE1_{i(t-1)}$	7939	1.15	4.63	0.00	239.68
$LEVERAGE2_{i(t-1)}$	6961	0.75	0.80	0.00	13.32
$FOREIGN_{i(t-1)}$	7939	0.31	0.46	0	1
$FOREIGN25_{i(t-1)}$	7939	0.28	0.45	0	1
$FOREIGN50_{i(t-1)}$	7939	0.16	0.37	0	1
$TFP^{LP}_{i(t-1)}$	7939	9.40	1.84	0.47	16.69
$TFP^{BUETTNER}_{i(t-1)}$	7642	10.40	1.21	1.21	15.31
$TFP^{LABPROD}_{i(t-1)}$	7939	9.11	1.02	1.45	14.00
$SMALL^{A}_{i(t-1)}$	7939	0.19	0.39	0	1
$LARGE^{A}_{i(t-1)}$	7939	0.27	0.45	0	1
$VLARGE^{A}_{i(t-1)}$	7939	0.29	0.45	0	1
$wage_{i(t-1)}$	7939	7.78	0.51	4.19	10.29
$SKILL_{i(t-1)}$	7939	0.53	0.32	0	1
$TRAIN_{i(t-1)}$	7939	0.90	0.30	0	1
$RDPRODUCT_{i(t-1)}$	7939	0.09	0.28	0	1
$RDPROCESS_{i(t-1)}$	7939	0.07	0.25	0	1

Note: The descriptive statistics are for the 3 year sample period of 2001 to 2003 except for EX_{it} and $EXSALES_{it}$ of which sample period covers 2002 to 2004.

Table A3: Correlation Matrix

	EX_{it}	*LIQUIDITY*	*LEVERAGE1*	*LEVERAGE2*	*FOREIGN*	*FOREIGN25*	*FOREIGN50*	TFP^{LP}	$TFP^{BUETTNER}$	$TFP^{LABPROD}$	$SMALL^{A}$	$LARGE^{A}$	$VLARGE^{A}$	*wage*	*SKILL*	*TRAIN*	*RDPRODUCT*	*RDPROCESS*
EX_{it}	1.00																	
LIQUIDITY	0.01	1.00																
LEVERAGE1	-0.04	-0.54	1.00															
LEVERAGE2	-0.09	-0.58	0.32	1.00														
FOREIGN	0.32	0.02	-0.03	-0.11	1.00													
FOREIGN25	0.32	0.02	-0.03	-0.10	0.92	1.00												
FOREIGN50	0.28	0.01	-0.02	-0.09	0.66	0.72	1.00											
TFP^{LP}	0.12	-0.02	0.01	-0.02	0.09	0.08	0.04	1.00										
$TFP^{BUETTNER}$	0.31	-0.01	-0.03	-0.14	0.34	0.32	0.28	0.58	1.00									
$TFP^{LABPROD}$	0.17	-0.01	-0.01	-0.11	0.32	0.31	0.25	0.57	0.92	1.00								
$SMALL^{A}$	-0.29	0.11	-0.03	0.07	-0.17	-0.16	-0.16	-0.18	-0.40	-0.27	1.00							
$LARGE^{A}$	0.07	-0.02	-0.01	-0.02	0.03	0.02	0.02	-0.00	0.02	0.01	-0.28	1.00						
$VLARGE^{A}$	0.29	-0.10	0.03	-0.06	0.23	0.22	0.22	0.26	0.53	0.38	-0.30	-0.43	1.00					
wage	0.17	-0.01	0.01	-0.09	0.38	0.38	0.32	0.35	0.61	0.68	-0.19	0.03	0.27	1.00				
SKILL	-0.02	0.01	0.01	0.01	-0.02	-0.01	-0.01	-0.03	-0.02	0.02	0.06	-0.03	-0.02	0.09	1.00			
TRAIN	0.16	-0.03	0.00	-0.05	0.10	0.09	0.08	0.11	0.22	0.15	-0.16	0.03	0.18	0.13	-0.02	1.00		
RDPRODUCT	0.11	0.01	-0.01	-0.04	0.03	0.03	0.02	0.06	0.12	0.07	-0.07	0.02	0.08	0.04	-0.05	0.07	1.00	
RDPROCESS	0.07	0.02	-0.01	-0.04	0.03	0.03	0.01	0.06	0.11	0.08	-0.07	0.00	0.08	0.06	-0.02	0.07	0.57	1.00

Appendix B

Table B1: Sensitivity Analysis of the Pooled Probit Model on the Determinants of a Firm's Decision to Export – 10% Cut-off Point for Foreign Ownership.

	(1)	(2)	(3)	(4)	(5)	(6)
$LIQUIDITY_{i(t-1)}$	0.032*			0.046**		
	(1.68)			(2.41)		
$LEVERAGE1_{i(t-1)}$		-0.013***			-0.017***	
		(2.75)			(3.18)	
$LEVERAGE2_{i(t-1)}$			-0.013			-0.024**
			(1.27)			(2.26)
$FOREIGN_{i(t-1)}$	0.247***	0.249***	0.248***	0.240***	0.245***	0.241***
	(10.54)	(11.30)	(10.75)	(10.64)	(11.32)	(10.89)
$TFP^{BUETTNER}_{i(t-1)}$	0.049**	0.053***	0.051***			
	(2.54)	(2.88)	(2.73)			
$TFP^{LABPROD}_{i(t-1)}$				-0.011	-0.008	-0.010
				(0.42)	(0.31)	(0.41)
$SMALL^{A}_{i(t-1)}$	-0.180***	-0.183***	-0.173***	-0.205***	-0.208***	-0.197***
	(4.44)	(4.40)	(4.40)	(5.10)	(5.09)	(5.02)
$LARGE^{A}_{i(t-1)}$	0.130***	0.141***	0.128***	0.144***	0.155***	0.141***
	(3.57)	(4.15)	(3.58)	(4.31)	(4.96)	(4.30)
$VLARGE^{A}_{i(t-1)}$	0.248***	0.258***	0.243***	0.298***	0.309***	0.292***
	(4.83)	(4.97)	(4.84)	(6.33)	(6.60)	(6.35)
$wage_{i(t-1)}$	-0.046	-0.031	-0.049	0.012	0.028	0.011
	(0.88)	(0.62)	(0.95)	(0.29)	(0.64)	(0.25)
$SKILL_{i(t-1)}$	-0.011	-0.025	-0.010	-0.019	-0.033	-0.018
	(0.32)	(0.71)	(0.28)	(0.58)	(0.98)	(0.52)
$TRAIN_{i(t-1)}$	0.099***	0.111***	0.093**	0.111***	0.122***	0.105***
	(2.66)	(3.31)	(2.49)	(3.13)	(3.69)	(2.93)
$RDPRODUCT_{i(t-1)}$	0.130***	0.133***	0.130***	0.120***	0.118***	0.120***
	(4.56)	(4.22)	(4.48)	(6.88)	(6.53)	(6.95)
$RDPROCESS_{i(t-1)}$	0.012	0.042	0.014	0.032	0.062*	0.033
	(0.31)	(1.12)	(0.34)	(0.90)	(1.92)	(0.95)
Observation	6690	7642	6702	6961	7939	6973

Note: Robust z statistics in parentheses. Standard errors are adjusted for clustering at 2-digit industry. Region, 2-digit industry and time dummies are included. All the dependent variables are lagged one year. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table B2: Sensitivity Analysis of the Pooled Probit Model on the Determinants of a Firm's Decision to Export – 25% Cut-off Point for Foreign Ownership.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$LIQUIDITY_{i(t-1)}$	0.039**			0.034*			0.049**		
	(2.00)			(1.74)			(2.49)		
$LEVERAGE1_{i(t-1)}$		-0.015***			-0.013***			-0.017***	
		(2.84)			(2.83)			(3.30)	
$LEVERAGE2_{i(t-1)}$			-0.020*			-0.014			-0.025**
			(1.78)			(1.30)			(2.30)
$FOREIGN25_{i(t-1)}$	0.248***	0.259***	0.249***	0.255***	0.265***	0.257***	0.248***	0.259***	0.249***
	(10.80)	(12.24)	(10.98)	(11.17)	(12.44)	(11.34)	(11.32)	(12.83)	(11.57)
$TFP^{LP}_{i(t-1)}$	0.056***	0.061***	0.059***						
	(3.02)	(3.55)	(3.29)						
$TFP^{BUETTNER}_{i(t-1)}$				0.051***	0.055***	0.053***			
				(2.63)	(3.05)	(2.84)			
$TFP^{LABPROD}_{i(t-1)}$							-0.010	-0.006	-0.009
							(0.37)	(0.24)	(0.35)
$SMALL^{A}_{i(t-1)}$	-0.193***	-0.196***	-0.186***	-0.184***	-0.187***	-0.177***	-0.210***	-0.212***	-0.202***
	(4.85)	(4.93)	(4.79)	(4.51)	(4.50)	(4.48)	(5.16)	(5.17)	(5.08)
$LARGE^{A}_{i(t-1)}$	0.126***	0.135***	0.122***	0.129***	0.138***	0.126***	0.144***	0.154***	0.140***
	(3.90)	(4.50)	(3.85)	(3.63)	(4.19)	(3.63)	(4.40)	(5.05)	(4.39)
$VLARGE^{A}_{i(t-1)}$	0.254***	0.262***	0.248***	0.247***	0.254***	0.241***	0.299***	0.308***	0.293***
	(5.39)	(5.55)	(5.35)	(4.77)	(4.87)	(4.77)	(6.30)	(6.52)	(6.29)
$wage_{i(t-1)}$	-0.053	-0.040	-0.057	-0.049	-0.036	-0.052	0.010	0.023	0.008
	(1.01)	(0.76)	(1.09)	(0.95)	(0.73)	(1.02)	(0.24)	(0.54)	(0.20)
$SKILL_{i(t-1)}$	-0.020	-0.034	-0.019	-0.014	-0.026	-0.013	-0.022	-0.034	-0.021
	(0.61)	(1.01)	(0.56)	(0.40)	(0.75)	(0.36)	(0.66)	(1.03)	(0.60)
$TRAIN_{i(t-1)}$	0.099***	0.113***	0.094***	0.097***	0.111***	0.092**	0.110***	0.122***	0.104***
	(2.89)	(3.59)	(2.70)	(2.71)	(3.43)	(2.52)	(3.20)	(3.83)	(2.99)
$RDPRODUCT_{i(t-1)}$	0.116***	0.114***	0.116***	0.129***	0.132***	0.129***	0.118***	0.116***	0.119***
	(6.92)	(6.73)	(6.91)	(4.84)	(4.41)	(4.76)	(7.29)	(6.89)	(7.40)
$RDPROCESS_{i(t-1)}$	0.031	0.061*	0.032	0.012	0.043	0.013	0.033	0.064*	0.034
	(0.88)	(1.84)	(0.91)	(0.29)	(1.12)	(0.31)	(0.93)	(1.95)	(0.97)
Observation	6961	7939	6973	6690	7642	6702	6961	7939	6973

Note: Robust z statistics in parentheses. Standard errors are adjusted for clustering at 2-digit industry. Region, 2-digit industry and time dummies are included. All the dependent variables are lagged one year. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table B3: Sensitivity Analysis of the Pooled Probit Model on the Determinants of a Firm's Decision to Export – 50% Cut-off Point for Foreign Ownership.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$LIQUIDITY_{i(t-1)}$	0.040**			0.036*			0.049**		
	(2.07)			(1.88)			(2.56)		
$LEVERAGE1_{i(t-1)}$		-0.014***			-0.014***			-0.017***	
		(2.91)			(2.96)			(3.35)	
$LEVERAGE2_{i(t-1)}$			-0.021*			-0.016			-0.026**
			(1.85)			(1.40)			(2.36)
$FOREIGN50_{i(t-1)}$	0.261***	0.284***	0.262***	0.267***	0.290***	0.268***	0.258***	0.281***	0.259***
	(6.87)	(7.09)	(6.92)	(6.76)	(6.98)	(6.83)	(7.05)	(7.26)	(7.12)
$TFP^{LP}_{i(t-1)}$	0.058***	0.065***	0.061***						
	(3.37)	(3.99)	(3.67)						
$TFP^{BUETTNER}_{i(t-1)}$				0.054***	0.059***	0.056***			
				(3.03)	(3.54)	(3.24)			
$TFP^{LABPROD}_{i(t-1)}$							-0.005	-0.001	-0.005
							(0.22)	(0.05)	(0.20)
$SMALL^{A}_{i(t-1)}$	-0.190***	-0.194***	-0.182***	-0.180***	-0.185***	-0.173***	-0.207***	-0.211***	-0.198***
	(4.65)	(4.76)	(4.61)	(4.35)	(4.37)	(4.31)	(4.96)	(4.99)	(4.91)
$LARGE^{A}_{i(t-1)}$	0.125***	0.133***	0.121***	0.128***	0.135***	0.125***	0.143***	0.152***	0.139***
	(3.94)	(4.48)	(3.88)	(3.68)	(4.17)	(3.67)	(4.47)	(5.05)	(4.44)
$VLARGE^{A}_{i(t-1)}$	0.251***	0.257***	0.244***	0.242***	0.248***	0.236***	0.295***	0.304***	0.289***
	(5.35)	(5.49)	(5.30)	(4.75)	(4.82)	(4.74)	(6.27)	(6.47)	(6.25)
$wage_{i(t-1)}$	-0.031	-0.020	-0.035	-0.026	-0.016	-0.029	0.031	0.042	0.029
	(0.58)	(0.38)	(0.66)	(0.49)	(0.31)	(0.56)	(0.75)	(1.01)	(0.72)
$SKILL_{i(t-1)}$	-0.021	-0.034	-0.020	-0.015	-0.027	-0.014	-0.023	-0.035	-0.021
	(0.64)	(1.04)	(0.59)	(0.46)	(0.80)	(0.41)	(0.69)	(1.06)	(0.63)
$TRAIN_{i(t-1)}$	0.099***	0.111***	0.093***	0.096***	0.109***	0.091**	0.109***	0.121***	0.103***
	(2.97)	(3.69)	(2.77)	(2.74)	(3.48)	(2.55)	(3.29)	(3.96)	(3.07)
$RDPRODUCT_{i(t-1)}$	0.119***	0.117***	0.119***	0.129***	0.132***	0.129***	0.121***	0.119***	0.121***
	(6.22)	(6.26)	(6.19)	(4.47)	(4.15)	(4.40)	(6.75)	(6.62)	(6.81)
$RDPROCESS_{i(t-1)}$	0.035	0.065**	0.036	0.020	0.051	0.020	0.036	0.068**	0.038
	(1.03)	(2.02)	(1.06)	(0.51)	(1.38)	(0.53)	(1.10)	(2.15)	(1.14)
Observation	6961	7939	6973	6690	7642	6702	6961	7939	6973

Note: Robust z statistics in parentheses. Standard errors are adjusted for clustering at 2-digit industry. Region, 2-digit industry and time dummies are included. All the dependent variables are lagged one year. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table B4: Sensitivity Analysis of the OLS Model on the Determinants of a Firm's Export Sales – 10% Cut-off Point for Foreign Ownership.

	(1)	(2)	(3)	(4)	(5)	(6)
$LIQUIDITY_{i(t-1)}$	0.194			0.321**		
	(1.70)			(2.46)		
$LEVERAGE1_{i(t-1)}$		-0.053			-0.090**	
		(1.65)			(2.47)	
$LEVERAGE2_{i(t-1)}$			-0.068			-0.154*
			(0.96)			(1.76)
$FOREIGN_{i(t-1)}$	0.430***	0.439***	0.431***	0.469***	0.486***	0.468***
	(4.52)	(4.68)	(4.62)	(4.56)	(4.78)	(4.60)
$TFP^{BUETTNER}_{i(t-1)}$	0.756***	0.759***	0.762***			
	(12.53)	(13.06)	(12.92)			
$TFP^{LABPROD}_{i(t-1)}$				0.306***	0.322***	0.307***
				(3.24)	(3.56)	(3.31)
$SMALL^{A}_{i(t-1)}$	-0.807***	-0.804***	-0.786***	-1.037***	-1.024***	-1.001***
	(4.73)	(4.79)	(4.66)	(5.90)	(5.92)	(5.81)
$LARGE^{A}_{i(t-1)}$	0.629***	0.597***	0.617***	0.874***	0.844***	0.854***
	(6.79)	(6.77)	(6.52)	(10.15)	(9.70)	(9.48)
$VLARGE^{A}_{i(t-1)}$	1.622***	1.591***	1.592***	2.268***	2.230***	2.224***
	(9.69)	(10.47)	(9.51)	(16.64)	(17.59)	(16.61)
$wage_{i(t-1)}$	-0.536***	-0.501***	-0.541***	-0.17	-0.15	-0.18
	(4.23)	(4.07)	(4.22)	(1.45)	(1.29)	(1.47)
$SKILL_{i(t-1)}$	0.027	-0.011	0.032	0.006	-0.038	0.017
	(0.21)	(0.09)	(0.25)	(0.05)	(0.28)	(0.12)
$TRAIN_{i(t-1)}$	0.383**	0.352**	0.393**	0.539***	0.497***	0.550***
	(2.13)	(2.65)	(2.20)	(2.89)	(3.42)	(2.92)
$RDPRODUCT_{i(t-1)}$	0.292**	0.270**	0.290**	0.349**	0.329**	0.343**
	(2.79)	(2.76)	(2.80)	(2.69)	(2.68)	(2.71)
$RDPROCESS_{i(t-1)}$	-0.238**	-0.202**	-0.236**	-0.238**	-0.178*	-0.234**
	(2.32)	(2.09)	(2.29)	(2.48)	(1.95)	(2.38)
Observation	4032	4363	4034	4217	4559	4219

Note: Robust t statistics in parentheses. Standard errors are adjusted for clustering at 2-digit industry. Region, 2-digit industry and time dummies are included. All the dependent variables are lagged one year. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table B5: Sensitivity Analysis of the OLS Model on the Determinants of a Firm's Export Sales – 25% Cut-off Point for Foreign Ownership.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$LIQUIDITY_{i(t-1)}$	0.228*			0.196*			0.325**		
	(1.77)			(1.74)			(2.54)		
$LEVERAGE1_{i(t-1)}$		-0.062			-0.053			-0.091**	
		(1.65)			(1.67)			(2.54)	
$LEVERAGE2_{i(t-1)}$			-0.101			-0.068			-0.156*
			(1.22)			(0.97)			(1.82)
$FOREIGN25_{i(t-1)}$	0.480***	0.492***	0.479***	0.491***	0.500***	0.491***	0.501***	0.517***	0.499***
	(4.39)	(4.59)	(4.45)	(4.46)	(4.64)	(4.52)	(4.22)	(4.47)	(4.24)
$TFP^{LP}_{i(t-1)}$	0.727***	0.737***	0.730***						
	(11.64)	(12.31)	(12.12)						
$TFP^{BUETTNER}_{i(t-1)}$				0.762***	0.765***	0.768***			
				(12.72)	(13.33)	(13.15)			
$TFP^{LABPROD}_{i(t-1)}$							0.312***	0.328***	0.313***
							(3.32)	(3.67)	(3.40)
$SMALL^{A}_{i(t-1)}$	-0.945***	-0.936***	-0.925***	-0.797***	-0.797***	-0.777***	-1.031***	-1.021***	-0.994***
	(5.06)	(5.21)	(5.04)	(4.62)	(4.68)	(4.55)	(5.75)	(5.78)	(5.66)
$LARGE^{A}_{i(t-1)}$	0.756***	0.721***	0.741***	0.632***	0.598***	0.619***	0.881***	0.849***	0.860***
	(8.91)	(8.52)	(8.80)	(6.68)	(6.60)	(6.43)	(9.95)	(9.48)	(9.30)
$VLARGE^{A}_{i(t-1)}$	1.898***	1.860***	1.865***	1.621***	1.586***	1.591***	2.274***	2.233***	2.230***
	(10.46)	(11.14)	(10.62)	(9.80)	(10.53)	(9.63)	(16.94)	(17.81)	(16.89)
$wage_{i(t-1)}$	-0.461***	-0.435**	-0.464***	-0.557***	-0.522***	-0.562***	-0.183	-0.164	-0.193
	(3.00)	(2.79)	(2.98)	(4.24)	(4.06)	(4.23)	(1.48)	(1.33)	(1.50)
$SKILL_{i(t-1)}$	0.025	-0.022	0.031	0.016	-0.022	0.021	-0.006	-0.051	0.004
	(0.19)	(0.17)	(0.23)	(0.13)	(0.18)	(0.16)	(0.05)	(0.38)	(0.03)
$TRAIN_{i(t-1)}$	0.412**	0.386***	0.429**	0.380**	0.351**	0.390**	0.536***	0.497***	0.547***
	(2.32)	(2.85)	(2.43)	(2.18)	(2.75)	(2.25)	(2.96)	(3.54)	(2.99)
$RDPRODUCT_{i(t-1)}$	0.266**	0.242**	0.262**	0.285**	0.262**	0.283**	0.338**	0.317**	0.332**
	(2.33)	(2.24)	(2.33)	(2.74)	(2.67)	(2.74)	(2.62)	(2.59)	(2.63)
$RDPROCESS_{i(t-1)}$	-0.208*	-0.151	-0.205*	-0.225**	-0.186*	-0.223**	-0.225**	-0.162	-0.221**
	(2.05)	(1.55)	(1.98)	(2.22)	(1.97)	(2.19)	(2.18)	(1.67)	(2.10)
Observation	4217	4559	4219	4032	4363	4034	4217	4559	4219

Note: Robust t statistics in parentheses. Standard errors are adjusted for clustering at 2-digit industry. Region, 2-digit industry and time dummies are included. All the dependent variables are lagged one year. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table B6: Sensitivity Analysis of the OLS Model on the Determinants of a Firm's Export Sales – 50% Cut-off Point for Foreign Ownership.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$LIQUIDITY_{i(t-1)}$	0.220*			0.185			0.316**		
	(1.73)			(1.67)			(2.50)		
$LEVERAGE1_{i(t-1)}$		-0.061			-0.052			-0.091**	
		(1.62)			(1.59)			(2.49)	
$LEVERAGE2_{i(t-1)}$			-0.093			-0.059			-0.147*
			(1.14)			(0.86)			(1.76)
$FOREIGN50_{i(t-1)}$	0.676***	0.689***	0.675***	0.693***	0.703***	0.694***	0.695***	0.710***	0.693***
	(4.71)	(4.90)	(4.81)	(5.01)	(5.18)	(5.13)	(4.61)	(4.84)	(4.72)
$TFP^{LP}_{i(t-1)}$	0.732***	0.743***	0.735***						
	(11.66)	(12.24)	(11.93)						
$TFP^{BUETTNER}_{i(t-1)}$				0.769***	0.772***	0.775***			
				(13.00)	(13.68)	(13.27)			
$TFP^{LABPROD}_{i(t-1)}$							0.324***	0.341***	0.325***
							(3.55)	(3.89)	(3.61)
$SMALL^{A}_{i(t-1)}$	-0.922***	-0.923***	-0.904***	-0.769***	-0.780***	-0.750***	-1.008***	-1.008***	-0.972***
	(5.00)	(5.12)	(4.96)	(4.32)	(4.42)	(4.25)	(5.59)	(5.59)	(5.49)
$LARGE^{A}_{i(t-1)}$	0.733***	0.697***	0.719***	0.607***	0.572***	0.596***	0.857***	0.825***	0.837***
	(8.27)	(8.01)	(8.16)	(6.15)	(6.13)	(5.93)	(9.17)	(8.85)	(8.62)
$VLARGE^{A}_{i(t-1)}$	1.865***	1.828***	1.833***	1.583***	1.549***	1.554***	2.240***	2.200***	2.197***
	(10.10)	(10.75)	(10.24)	(9.22)	(9.89)	(9.03)	(16.36)	(17.13)	(16.29)
$wage_{i(t-1)}$	-0.465***	-0.442**	-0.468***	-0.565***	-0.532***	-0.569***	-0.195	-0.177	-0.204
	(2.90)	(2.72)	(2.88)	(4.04)	(3.89)	(4.03)	(1.51)	(1.36)	(1.53)
$SKILL_{i(t-1)}$	0.026	-0.017	0.031	0.017	-0.018	0.021	-0.006	-0.047	0.004
	(0.21)	(0.15)	(0.25)	(0.14)	(0.15)	(0.18)	(0.04)	(0.36)	(0.03)
$TRAIN_{i(t-1)}$	0.423**	0.398***	0.441**	0.394**	0.364**	0.404**	0.548***	0.509***	0.559***
	(2.39)	(2.91)	(2.51)	(2.25)	(2.79)	(2.32)	(3.03)	(3.59)	(3.05)
$RDPRODUCT_{i(t-1)}$	0.272**	0.245**	0.269**	0.285**	0.260**	0.283**	0.345**	0.321**	0.340**
	(2.43)	(2.32)	(2.45)	(2.82)	(2.74)	(2.83)	(2.74)	(2.69)	(2.76)
$RDPROCESS_{i(t-1)}$	-0.202*	-0.143	-0.199*	-0.212*	-0.174	-0.211*	-0.219**	-0.155	-0.215*
	(2.00)	(1.46)	(1.94)	(1.93)	(1.69)	(1.91)	(2.12)	(1.57)	(2.05)
Observation	4217	4559	4219	4032	4363	4034	4217	4559	4219

Note: Robust t statistics in parentheses. Standard errors are adjusted for clustering at 2-digit industry. Region, 2-digit industry and time dummies are included. All the dependent variables are lagged one year. * significant at 10%; ** significant at 5%; *** significant at 1%.