



FACTORS THAT INFLUENCE THE EXPORT DECISION

By

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Abstract: This study attempts to identify what are the characteristics of a possible exporter using a database covering over 8,000 firms in manufacturing, services and agricultural activity and in 81 countries. A Probit model of the export decision is estimated for the full sample of firms and for sub-samples of firms in various country groupings. The study's results indicate that size, age, previous export experience, ownership status, the provision of subsidies and market competition are significant determinants of the export decision. JEL no. F20, D21, L60

## **Factors that Influence the Export Decision**

### **I. Introduction**

The performance of export-oriented economies during the last two decades has received significant attention from policymakers and researchers alike as a possible avenue to spur growth in developing economies. An active export industry transforms domestic resources into products to satisfy the demands of both foreign and local markets and also has a direct impact on the macro economy, as a component of gross domestic product. Moreover, the entry of firms into foreign markets allows these entities to benefit from economies of scale in production and usually leads to increased innovation, capital formation and employment.

Given the above discussion it is not difficult to see why many countries have set up special export promotion agencies focused solely on assisting firms who desire to enter foreign markets. However, two key questions should be addressed if export promotion policies are to be successful. First, what types of enterprises are likely to be exporters and second, what are the key factors that affect businesses' decisions to enter foreign markets. An understanding of these questions could allow policymakers to design initiatives focused to the needs of potential exporters.

Engendering an export culture is becoming even more important given the new multilateral trading system, which attempts to develop a rules-based framework to promote the notions of non-discrimination, reciprocity and transparency. The Organization for Economic Co-operation and Development (2001) estimates that, as a result of the eight rounds of multilateral trade negotiations, the most-favored nation tariff rates on industrial goods has declined from about 40%, after the second world war, to approximately 4% at present. Such a system provides both opportunities and pitfalls. It implies that possible exporters, irrespective of their country of origin, should be able to market their goods and services within previously protected economies. However, with free access to formerly restricted

markets, strategically important industries (maybe due to the level of employment they provide) may come under significant pressure from larger internationally based firms.

Generally, previous empirical studies have modeled a firm's export market participation decision as a function of the sunk costs of exporting and the firm's characteristics such as its age and size. However, these studies suffer from three main shortcomings. First, these papers, mainly due to data limitations, tend to focus solely on the export decision of manufacturing entities. However, in many countries non-manufacturing enterprises are also part of the export sector. Thus, the results obtained in these studies limits the broad conclusions that may be drawn. Second, cross-country comparisons of the factors that influence internationalization have previously been ignored. The final criticism is that the influence of government's policies on firm's decision to enter foreign markets is not explicitly examined. Indeed, only one study, Bernard and Jensen (2001), explicitly modeled the role of government, assessing the impact of the provision of government subsidies.

This study attempts to address these three shortcomings to identify whether they provide further explanation regarding the decision of firms to export. The structure of the essay is as follows. Section II provides a review of the existing theoretical and empirical literature. Section III presents the empirical specification, estimation approach and data employed. Section IV then offers a discussion of the empirical results and Section V concludes with a summary of the findings and three key policy implications.

### **II. Literature Review**

#### **Theory**

Bilkey and Tesar (1977) present one of the early attempts to examine the decision to export. The authors descriptively model the decision as a learning process segmented into a series of stages. In the first stage the firm is uninterested in exporting. Next, it moves on to fill unsolicited orders from foreign buyers, which are usually from a psychologically close country. The process ends with the firm

committing to involvement in the export market. The corporation is assumed to take this gradual approach due to the greater perceived uncertainty and risk associated with exporting. The framework has, however, been criticized for ignoring the influence of market characteristics, firm resources and the situational differences in each firm's export decision (see Reid, 1983). For example, Young (1987) and Christensen (1991) argue that firms enter into foreign markets more rapidly when economic integration is taking place, this integration usually takes the form of lower import duties and other non-tariff barriers, which lower the transaction costs of entering foreign markets and thus encourages exports. Lower trade barriers can also encourage greater export activity, since it leads to increased to competition in the domestic market and, as a result, persuades firms to seek markets abroad (Cavusgil, 1984).

Simmonds and Smith (1968), Lee and Branch (1978), Cavusgil (1980) and Reid (1981) present an alternative, but similar view of the decision to export. The authors argue that the export decision should be viewed as an innovation adoption process consisting of five stages. These are: export awareness; export intention; trial; evaluation and acceptance, and; the adoption of export market participation. The main criticism of this approach is that it ignores the roll of spillover effects (Simmonds and Smith, 1968). The innovation of exporting is considered within the closed environs of the firm and ignores the impact that other enterprises exporting might have on the firm's internationalization decision.

More formal approaches to modeling a business' foreign market participation decision are usually formulated within a continuous time profit-maximizing framework. The decision to export is therefore based not only on expected profits in period  $t$  from exporting, but in periods  $t+1 \dots T$ , as well (see Dixit, 1989; Baldwin, 1988; Krugman and Baldwin, 1987, and; Krugman, 1986). In addition, to enter the overseas market the firm must incur some level of sunk costs. These could be related to setting up a distribution service in the new market or establishing the firm's product or service through marketing. The solution to the enterprise's dynamic optimization problem then predicts that a firm only makes the decision to export if its expected profits are greater than sunk costs. Incorporating sunk costs into the dynamic optimization problem also implies that those businesses which have incurred these costs in the previous period, and therefore have entered the export arena, are also more likely to be supplying

overseas markets in the current period. This result is obtained, since the decision to incur the sunk costs in the current period is tantamount to choosing to export in every period thereafter (see Bernard and Jensen, 2001). The results from these more formal approaches are also limited since they tend to ignore the importance of domestic market conditions.

Aitken, Hanson and Harrison (1997) account for spillover effects on the decision to export. The authors put forward that spillovers occur, since the penetration of one firm into foreign markets reduces entry costs for other potential entrants. Two types of spillover effects are considered. The first hypothesis suggest that all export activity generates spillovers, while the second, assumes that only the export activity of multinational enterprises generate spillover effects. The authors go on to test these hypotheses and the results are given in the empirical section of this literature review.

Aw, Chung and Roberts (1998) argue that firms, which enter foreign markets, are usually more productive than their domestic peers. The authors utilize the model of the firm and market dynamics developed by Hopenhayn (1992) since, it allows one to consider how self-selection will lead to differences in the productivity of entering, exiting or continuing businesses in the export market. The model assumes a large number of price-taking enterprises, which produce a homogenous good. Firms differ in their efficiency with each business' output dependent on a random productivity shock. The distribution of future productivity implies that an enterprise with high productivity in the current period has a relatively higher probability of having higher productivity in the following period. In each period, before the productivity shock is observed, incumbent firms choose to exit or remain in the market and pay a fixed cost, after which they observe the productivity shock and choose their output level. Potential entrants enter after paying a sunk entry cost, then draw their initial productivity level and choose their output. Output prices are competitively determined. The model predicts that exiting firms will be concentrated among the least productive going concerns.

## **Empirics**

Given the theoretical literature survey above, many empirical studies in the area have included lagged values of the export market participation variable, as proxies, to capture the influence of sunk costs and have inferred that sunk costs do act as a significant barrier to export market participation (see Table 1). For example, Roberts and Tybout (1997) examine the effect of prior exporting experience on the internationalization decision of Columbian manufacturing. The analysis is based on plant level data for between 585 and 816 enterprises for the years 1981 to 1989. The explanatory variables include lagged export status, year dummies and cross-plant differences in the industry captured by location, business type, age, capital stock, the relative price of foreign to domestic output and wages. The model is estimated by both maximum likelihood and the method of simulated moments (Keane, 1994). The authors find that exporting history is significant in explaining the export decision, which they take to imply that sunk costs are important. In addition, an expansion in plant size, age and corporate ownership all raise the probability of participating in foreign markets. Roberts and Tybout also find that firm location impacts on the export decision. Bernard and Jensen (2001) and Bernard and Wagner (1998) using differing data obtained similar results. These results are reflective of the barriers posed by the sunk costs of exporting but they also indicate that once a firm gains export experience it is more likely to continue in the arena.

Given the results above, the question arises regarding what types of firms are likely to be exporters? Robert and Tybout (1997) find that an enterprise's age, sector (for example, textile or chemicals) and corporation status are all significant determinants of export market participation. Bernard and Jensen (2001) and Aw, Chung and Roberts (1998), in addition, note the importance of productivity. These results seem to indicate that 'good' firms are more likely to participate in the export market. However, it could also be the case that businesses that are just as promising are not able to obtain sufficient funds to cover the sunk costs of export market participation since they are not as established.

The relationship between exporting status and size seems to be robust across industries and countries with the positive relationship between size and the probability of exporting being found by Verwal and Donkers (2001), Lautanen (2000), Aw, Chung and Roberts (1998), Bernard and Wagner (1998) and Aitken, Hanson and Harrison (1997). But why does size have this impact on the export decision? Johanson and Vahlne (1977), who take the stages view of why firms export, link internationalization to being able to develop resources and capabilities over time. Thus, larger firms should be more likely to have the resources necessary to develop a successful international marketing effort. Another argument put forward is that smaller firms are more risk-averse, due to informational asymmetries and the larger impact that failure would have on overall business activity (see Nootboom, 1989).

In addition, to the variables given above, particular attention has also been given to the role of spillovers or the effects of the existence of an exporting firm in a geographic area or sector positively influencing the probability of other companies to export. Aitken, Hanson and Harrison (1997) using data on 2104 Mexican manufacturing plants between 1986 and 1990 find evidence of the existence of these effects. The authors report that the probability of a domestic plant exporting is positively correlated with its proximity to multinational firms. However, spillover effects from local exporters could not be found, which suggests that export spillovers are restricted to multinational firms. This finding could explain the encouragement of export processing zones by some countries. However, Bernard and Jensen (2001), using data on 13550 US manufacturing plants over the period 1984 to 1992, could find no evidence of geographic spillover effects or the importance of export activity by other firms in the same industry. The authors' results are, however, most likely related to the sample selection criteria employed, which biases the results towards larger plants.

### III. Econometric Approach

#### *Econometric Model*

A discrete choice specification is used to empirically model an enterprise's decision to export:

$$y_i = x_i' \delta + \varepsilon_i, \quad \varepsilon_i \sim NID(0,1) \quad (1)$$

where  $y_i = 1$  if  $\pi > \pi^*$  or zero otherwise. In Equation (1) above,  $y_i$  denotes the export decision,  $x_i$  is a matrix of explanatory variables thought to be related to the decision to export and  $\delta$  is the coefficient vector. Thus, a firm enters foreign markets if the cost of not exporting exceeds the profits of producing only for the domestic market. The binary choice model is non-structural in form, i.e. a reduced form expression in exogenous plant and market characteristics used to identify the participation condition. The choice of variables included in the basic export model is based on the existing literature on the determinants of the export decision surveyed in Section II. As such, firm level determinants of the export decision such as age, size, ownership status, industry and dummy variables, which take the value of one if the firm is a multinational, received a subsidy, is foreign-owned and has export experience and zero otherwise, are employed in the empirical specification. The model also includes sector specific variables with dummy variables indicating if the firm has 3 or more competitors or none.

The inclusion of size and age follows the work of Roberts and Tybout (1997) and Aitken, Hanson and Harrison (1997), to name a few and are included to control for the past performance of the firm. More specifically older and larger firms are more likely to have been successful in terms of profitability and growth in the past and therefore should be more likely to be exporters. Bernard and Jensen (2001) also note that larger firms may have lower average or marginal costs, through economies of scale, which increases the likelihood of exporting.

Dummy variables signifying whether the firm is a corporation or soleowner are also included in the model. These are employed to test whether a particular ownership status is related to the export decision. It is expected that corporations should be more likely to enter foreign markets since they

usually have the necessary human resources to enter trade. Three dummy variables representing the sector of business are also included in the model. Multinational enterprises should be more likely to be producing for export (see Brainard, 1997), thus a dummy variable which takes the value of one if the firm is a multinational is included in the empirical specification. Ownership status is also differentiated by the inclusion of a dummy indicating whether the firm is foreign or locally owned.

Policymakers in various countries have tried to encourage firms to export by utilizing subsidies or by also acting as a coordinator by actively seeking markets for domestic firms. These encourage internationalization by reducing the cost of entering foreign markets. The final firm specific variable attempts to capture the sunk costs of exporting, similar to Roberts and Tybout (1997), Bernard and Wagner (1998) and Bernard and Jensen (2001). It is expected that those firms with previous experience in export markets should more likely be exporters in the current period given that they have already paid the sunk costs of establishing an international presence.

The basic export model also includes a sector specific variable, which takes into account the number of competitors of a firm. This variable is included to test whether competition acts as a spur to export activity or if an increase in the number of competitors restricts the size of the firm and therefore makes it less likely to be an exporter.

A probit model, which assumes a standard normal distribution, is used to estimate the specification given in Equation (1). Thus,  $y_i$  is restricted to take values in the interval [0,1], in contrast to estimation by standard ordinary least squares. It should be noted, however, that the coefficients obtained from the probit model cannot be easily related to the probability of exporting. Thus, marginal effects  $\frac{\partial \Phi(x_i' \beta)}{\partial x_{ik}} = \Phi(x_i' \beta) \beta_k$  are calculated which give the probability that the firm is exporting given the  $k$ -th element in  $x_i$  these marginal effects can then be interpreted in terms of a given variable affecting the probability of a firm exporting. This study reports the average marginal effects.

The model is estimated by the method of maximum likelihood using the Quadratic-Hill Climbing algorithm (other algorithms such as Bendt-Hall-Hausman and Netwon-Raphson are employed, but these yield similar estimation results). Since the maximum likelihood estimates are only consistent when the likelihood function is correctly specified, a test for homoscedasticity of the models errors are undertaken (see Verbeek, 2000). The generalized linear model (GLM) is used to generate robust standard errors. GLM imposes the condition that the true conditional variance of  $y_i$  is proportional to the conditional variance of the distribution used to specify the log-likelihood. Thus, when over-dispersion occurs, that is  $\sigma^2 > 1$ , the GLM covariance matrix has the property of being consistent and efficient (see Fahrmeir and Tutz, 1994).

#### Data

The data used in this study is obtained from the World Bank's World-Wide Survey of Businesses. The survey contains data on 10,032 firms from 81 countries (see Schiffer and Weder, 2001 for further analysis of the survey). However, due to missing data, the sample used in this study contains 8,047 observations. Table I reports descriptive statistics of the full sample and of the sub-sample used. The sample contains a large number of small firms relative to large enterprises (see Appendix for a full definition of all variables). In addition, exporters are more likely to be manufacturing firms, foreign owned and corporations. Only 12% of the firms that were exporting received any type of subsidy indicating that this was not a common method of encouraging business development in the countries surveyed.

## IV. Empirical Results

### Evaluation of Econometric Model and Goodness of Fit

Table 2 reports the coefficients and standard errors of the explanatory variables along with some goodness of fit and test statistics for both the Probit model and the linear probability model (LPM). Since the coefficients on the explanatory variables cannot be directly interpreted to indicate the probability of exporting, marginal effects are evaluated at the sample mean and these are given in the final column of Table 2. Regional dummies are also included in the estimated model but these are not reported. The table also gives the LR statistic, which tests the null hypothesis that all of the slope coefficients except the constant can be restricted to zero. Comparing this statistic to the 5% critical value of 44.2 indicates that the null hypothesis cannot be accepted. The calculated LM test statistic which tests the null of homoskedastic errors is 2.516 compared to the 5% critical value of 7.890, indicating that the null hypothesis cannot be rejected.

Table 2 also provides the McFadden  $R^2$ , which gives an indication of the goodness of fit of the model. The calculated statistics indicate that the estimated model performs 37% better than a model with just a constant. The predictive ability of the model can also be evaluated by examining the actual and predicted probabilities (Table 3). Column 3 of the table shows that the estimated model correctly predicts the firm as being an exporter or non-exporter in more than eight out of every ten instances. In addition, only 34% of the time did the estimated model predict a firm is an exporter when this is not the case.

More formally, one can calculate Hosmer and Lemeshow (1984) and Andrews (1988) goodness-of-fit tests. These tests compare the fitted expected values to the actual values by group, and; if the differences are large the model can be rejected as providing an insufficient fit to the data. Calculating the Hosmer-Lemeshow and Andrews's test statistics the author obtains values of 12.6 and 17.2, respectively, compared to 5% critical values of 15.5 and 18.3, respectively. It can therefore be concluded that the model adequately predicts export-market participation and has homoskedastic errors.

### *Discussion of Results*

Turning to the coefficient estimates, one notices that the results agree with *a priori* reasoning in most instances. For example, both size and age are significant determinants of the export participation decision. Large firms are 5% more likely to export compared their smaller counterparts indicating that these enterprises, irrespective of ownership status, may be benefiting from economies of scale both in production and finance. Such advantages are likely to increase profit margins and also raise their ability to cover the sunk costs of export market participation. Similarly, the relationship between age and export participation is also positive, however, the estimated marginal effect is less than 1%. The relatively miniscule impact of age on internationalization could reflect the disadvantages associated with age such as product obsolescence and the inability of older firms to respond quickly to new market opportunities. Moreover, it leads one to the conclusion that these drawbacks seem to more than outweigh the potential effects of experience.

The regression results related to ownership status shows that only soleowner forms of organizations are less likely to be exporters while the sector of operation dummy variables show that only manufacturing companies are significantly more likely to be exporters, while the services and agricultural sector dummies are not statistically substantial. Foreign owned and multinational enterprises have a higher probability of producing for markets. Moreover, the marginal effects are quite large, with foreign owned enterprises being 7.5% more likely to be exporters while multinationals are 10.6% more probable to be supplying overseas markets. This finding could be due in large measure to the superior resources, both in terms of human and physical capital, available to the multinational enterprise in terms of human and financial capital. The sign on the marginal effect of the government dummy is negative, however, its standard error suggest that it is imprecisely estimated.

The findings reported in Table 2 also suggest that subsidies have a positive effect on export participation. However, these results are contrary to those reported by Bernard and Jensen (2001), but are consistent with the tremendous growth in export promotion policies in most countries. It should be noted that from the description of the data given in Table 1, receiving a subsidy does not seem to be a precondition for exporting, since only 10% of the exporters in our sample received a subsidy. Thus, this finding could suggest that exporting firms are more likely to receive a subsidy as countries attempt to benefit from possible spillover effects. The sunk costs proxy agrees *a priori* expectations, with previous export experience being positively related to internationalization. In fact, the marginal effects estimate is the largest among all the regressors given and implies that firms with previous export experience are 37.4% more likely to be exporters in the current period.

The final two variables included in the model capture what effects the level of competition experienced by firms in the domestic market impact on the export decision. The sign of the marginal effects estimate suggests that firms with zero domestic competitors, or monopolies, are more likely to be exporters. However, the standard error on this variable indicates that it is imprecisely estimated and thus, an insignificant factor in the data considered. In contrast, the coefficient on the competition variable is negative and significant. Moreover, the marginal effects estimate implies that firms with three or more competitors are 2.4% less likely to be exporters. This result could suggest that the policy of encouraging domestic competition so as to increase domestic welfare, may act as a hindrance to export participation in some instances. This could be related to the negative effects fierce competition has on firm growth. Moreover, if firms remain small they are less likely to have the resources necessary to become exporters.

### *Regional Comparisons*

Regional models of the export decision are also estimated and these are given in Table 4. In all regions, excluding South Asia, size is an important factor in the export participation decision. In Africa large firms are less likely to be exporters while in Latin America and the Caribbean and Transition Europe

large firms are more likely to participate in export activities. In all the regions considered, where size is a significant determinant of the export decision, the coefficient estimates indicate that smaller firms were less likely to be exporters. This finding lends greater weight to the conclusion that countries would like to boost the level of participation by domestic firms in external markets they need to assist small firms to gain experience and the technical capabilities necessary to engage in foreign markets.

The relationship between internationalization and age is positive in all instances, however, only in transition Europe is it a significant determinant of the export decision. This suggests that countries within transition Europe need to focus on enabling younger firms to benefit from international market participation. Only in Africa is a firm's corporation status a significant determinant of the export decision, while in East Asia and Latin America and the Caribbean, soleowner types of organizations are less likely to be exporters. In most of the other countries, the coefficient on the soleowner dummy is negative, but its standard error, implies that it is imprecisely estimated. Nevertheless, the finding that soleowner forms of organizations are less likely to be exporters has implications for both policy-makers and the business community alike. For policymakers it implies that firms should be encouraged to diversify their leadership base and that support to soleowner types of firms should be limited since they are less likely to engage in foreign exchange generating activities. For the business community it implies that firms should seek to diversify their ownership structure to benefit from the advantages that equity or even a partnership brings in terms of capital, knowledge and experience.

The manufacturing sector dummy is consistently a significant determinant of the export decision. However, in Africa and Transition Europe the service sector dummy is also a significant determinant of the decision to trade. This suggests that these countries could take advantage of their relatively cheap labor resources to act as the supplier of services to more developed nations. This would, however, mean that greater investment in human capital would be needed to take advantage of these activities. The agricultural sector dummy is also a significant determinant of internationalization in Africa and Latin America and the Caribbean, reflecting the dependence of these two regions on their agricultural sectors to generate foreign exchange.

In Latin America and the Caribbean government ownership of enterprises has a significantly negative impact on firms decision to export. This suggest that if this region is to make any further gains in terms of trading, policymakers in the region will need to privatize most, if not all of these businesses. As expected, multinational and foreign owned enterprises are more likely to be exporters in every region considered. Only in the OECD countries are subsidies a significant determinant of the export decision. This result can be interpreted in a number of ways. First, this finding could suggest that the other regions are not directing their subsidies to potential and current exporters. Alternatively, it could also imply that for subsidies to have a positive impact on the export decision they should be provided in quantities/amounts usually not feasible in the less developed regions considered. This conclusion would, however, require data on the amount and direction of subsidies provided to firms. However, this data is not collected in the survey, but could be a useful area for future economic study.

As expected, export experience is positively related to internationalization in all regions considered. It implies that export experience is a key area where policies can influence the decision to enter foreign markets. The competition variables are only significant determinants of the export decision in Latin America and the Caribbean and Africa. In Latin America and the Caribbean monopolies are more likely to be exporters while in Africa, firms with more than three competitors are more likely to be exporters. This finding could be related to the generally smaller markets, in terms of population, available to Latin American and Caribbean firms, where only monopolies are able to reach the optimal scale necessary to participate in export activities. It could also reflect the dominance of agricultural companies in these countries.

## **VI. Conclusions**

This study presents evidence on the decision to export. The study estimates an empirical model of firms' decision to export using a unique database on 8,000 firms in 81 countries, and Probit estimation

techniques. The model's results suggest that larger, older, foreign and multinational enterprises are more likely to be exporters. In addition, export experience has the most positive impact on the firm's export participation decision, while size is the greatest hindrance to internationalization. Additionally, subsidies, which make export participation relatively more profitable, are positively correlated with the export decision. The empirical findings also suggest that competition can act as an impediment export participation due to the negative effects that fierce competition has on firm growth.

The empirical specification is also estimated for various groupings such as the OECD, Africa, South Asia, East Asia, Latin America and the Caribbean and Transition Europe. In all the regions considered, size is positively related to the export decision with smaller firms being less likely to be exporters. In East Asia and Latin America and the Caribbean, soleowner enterprises are significantly less likely to be exporters. This outcome implies that business enterprises in these groupings should diversify their ownership base to benefit from the increased human and financial resources. It is also found that subsidies are a significant determinant of the export decision only in the OECD countries. This suggests that countries in the other regions should focus more on directing subsidies to enterprises with export experience. This result could also have implications for trade negotiations between the OECD and other less developed nations.

The study's findings lead to three key policy conclusions. Firstly, if a country is going to engender an export environment they will need to address the negative impact that size has on the export decision. Enabling policies for small firms, such as export market research and facilitation policies, which reduce the sunk costs of exporting should be a priority. Secondly, in all instances age is positively related to the export decision. This suggests that younger firms have not been operating in an environment conducive to export participation. Finally, firms should be encouraged to diversify their ownership base given the negative relationship between the export decision and the soleowner form of organization obtained.

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Table 1: Descriptive Statistics of Exporting Firms

Variable	Non-Exporters	Exporters	All
Large	0.100	0.295	0.163
Small	0.503	0.241	0.418
Age	16.097	24.118	18.675
Corporation	0.040	0.064	0.048
Soleowner	0.557	0.362	0.494
Manufacturing	0.240	0.593	0.354
Service	0.498	0.273	0.426
Agriculture	0.077	0.042	0.065
Foreign owned	0.103	0.302	0.167
Government owned	0.105	0.155	0.121
Multinational	0.090	0.296	0.156
Subsidy	0.084	0.122	0.096
Export Experience	0.068	0.623	0.246
Monopoly	0.092	0.126	0.103
Competition	0.478	0.401	0.454

Table 2: Probit Model of Export Participation

Explanatory variables	LPM	Probit	Marginal effects
Intercept	0.120 (0.018)**	-1.259 (0.083)**	-0.274
Large	0.062 (0.012)**	0.236 (0.052)**	0.051
Small	-0.052 (0.010)**	-0.233 (0.044)**	-0.051
Age	0.001 (0.000)**	0.003 (0.001)**	0.001
Corporation	-0.004 (0.019)	-0.047 (0.084)	-0.010
Soleowner	-0.022* (0.009)	-0.101 (0.041)*	-0.022
Manufacturing	0.169 (0.013)**	0.690 (0.058)**	0.150
Service	0.014 (0.012)	0.086 (0.058)	0.019
Agriculture	-0.012 (0.019)	-0.036 (0.092)	-0.008
Foreign owned	0.088 (0.012)**	0.345 (0.051)**	0.075
Government owned	0.002 (0.014)	-0.001 (0.060)	-0.000
Multinational	0.124 (0.012)**	0.489 (0.053)**	0.106
Subsidy	0.036 (0.014)**	0.145 (0.061)*	0.032
Export Experience	0.545 (0.010)**	1.721 (0.042)**	0.374
Monopoly	0.000 (0.014)	0.018 (0.063)	0.004
Competition	-0.031 (0.012)**	-0.111 (0.053)*	-0.024
Log-likelihood	-	-3151.525	
McFadden R-squared	0.441	0.376	
LR statistic (20 df)	-	3802.240	
Observations	8047	8047	

Notes: GLM robust standard errors are used.

\*\*\*, \*\*, \* denotes significance at the 1, 5 and 10 percent level.

Table 3: Actual and Predicted Probabilities

	Estimated Equation			Constant Probability Model		
	Non-Exporter	Exporter	Total	Non-Exporter	Exporter	Total
Non-Exporter	5089	885	5974	5461	2586	8047
Exporter	372	1701	2073	0	0	0
Total	5461	2555	8047	5461	2586	8047
Predicted						
% Correct	93.2	65.8	84.4	100.0	0.0	67.9
% Incorrect	6.8	34.2	15.6	0.0	100.0	32.1

Note: Prediction evaluation (success cut-off is 0.5)

Table 4: Probit Model of Export Participation in Various Regions

Explanatory variables	OECD	Africa	South Asia	East Asia	Latin America & the Caribbean	Transition Europe
Intercept	-1.073 (0.182)**	-1.030	-0.968	-1.390	-1.462 (0.114)**	-1.520 (0.132)**
Large	-0.104 (0.150)	(0.106)** -0.355	(0.327)** 0.182	(0.262)** 0.157	0.266	0.379 (0.104)**
Small	-0.337 (0.122)**	(0.090)** -0.258	0.151 (0.218)	-0.519	(0.093)** -0.197 (0.092)*	-0.203 (0.073)**
Age	0.002 (0.001)	-	0.007 (0.005)	0.002 (0.003)	0.003 (0.002)	0.008 (0.002)**
Corporation	-0.083 (0.020)	0.224 (0.113)*	-0.315 (0.347)	-0.306 (0.227)	0.094 (0.137)	0.055 (0.209)
Soleowner	0.046 (0.117)	-0.136 (0.083)	-0.078 (0.191)	-0.266 (0.107)*	-0.172 (0.083)*	-0.063 (0.071)
Manufacturing	0.617 (0.185)**	0.413	0.453 (0.257)	1.142	0.827	0.591 (0.105)**
Service	-0.093 (0.170)	(0.093)** 0.281	-0.527 (0.321)	(0.239)** 0.234 (0.240)	(0.097)** -0.024 (0.100)	0.346 (0.103)**
Agriculture	0.296 (0.498)	(0.088)** 0.621	-0.189 (0.491)	0.894 (0.366)	1.127	-0.130 (0.132)
Foreign owned	0.539 (0.133)**	(0.162)** 0.050	0.588	0.413	(0.301)** 0.046 (0.099)	0.437 (0.104)**
Government owned	0.237 (0.191)	(0.091)** -0.181 (0.137)	(0.206)** 0.239 (0.281)	(0.116)** 0.117 (0.227)	-0.482 (0.229)*	-0.019 (0.082)
Multinational	0.464 (0.135)**	0.930	0.061 (0.224)	0.430	0.328 (0.094)**	1.070 (0.118)**
Subsidy	0.310 (0.136)*	(0.084)** -	-0.657 (0.448)	(0.129)** 0.283 (0.217)	0.236 (0.148)	0.077 (0.092)
Export Experience	1.544	1.816	1.624	1.126	2.207 (0.100)**	1.883 (0.071)**
Monopoly	(0.130)** -0.005 (0.173)	(0.096)** 0.052 (0.168)	(0.183)** -0.327 (0.740)	(0.097)** -0.115 (0.182)	0.290	-0.078 (0.121)
Competition	-0.083 (0.197)	0.259	-0.239 (0.192)	-0.139 (0.106)	0.232 (0.278)	-0.030 (0.087)

Log-likelihood	-392.023	-823.505	-154.547	-484.576	-717.526	-1214.618
McFadden R-squared	0.328	0.352	0.340	0.363	0.456	0.406
LR statistic (15 df)	381.765**	894.517**	158.893**	551.968**	1200.928**	1657.946**
Observations	891	1883	338	1192	2071	3464

Notes: Standard errors are reported in parentheses.

\*\*\*, \*\*, \* denotes significance at the 1, 5 and 10% percent level.

## Appendix

### Definition of Variables

Large	Dummy equal to 1 if the firm employs more than 500 employees, and zero otherwise
Small	Dummy equal to 1 if the firm employs less than 50 persons, and zero otherwise
Age	Number of years in business
Corporation	Dummy equal to 1 if the firm is currently organized as a corporation and zero otherwise
Soleowner	Dummy equal to 1 if the firm has a single owner, and zero otherwise
Manufacturing	Dummy equal to 1 if the firm is in the manufacturing sector, and zero otherwise
Service	Dummy equal to 1 if the firm is in the services sector, and zero otherwise
Agriculture	Dummy equal to 1 if the firm is in the agricultural sector, and zero otherwise
Foreign owned	Dummy equal to 1 if the firm is foreign owned, and zero otherwise
Government owned	Dummy equal to 1 if the firm is government owned, and zero otherwise
Multinational	Dummy equal to 1 if the firm is a multinational, and zero otherwise
Subsidy	Dummy equal to 1 if the firm is receives a subsidy from government, and zero otherwise
Export experience	Dummy equal to 1 if the firm exported in the previous period, and zero otherwise
Monopoly	Dummy equal to 1 if the firm does not have and competitors, and zero otherwise
Competition	Dummy equal to 1 if the firm has three or more competitors, and zero otherwise