Do Foreign Contacts Enable Firms to Become Exporters?

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JEL classifications: F10; F23; L10
Keywords: Export; Sunk costs; Foreign contacts; Establishment data; Indonesia

Abstract

The pattern of trade between nations is well understood, but much less is known about firm level determinants to export: why do some firms start to export while others continue to produce for the domestic market? One reason for different firm strategies could be that the fixed costs for export differs between firms. This paper examines if foreign contacts decrease export-costs and thereby have a positive impact on the export propensity. More specifically, are establishments which have large degrees of foreign contacts relatively likely to become exporters? Three different types of foreign contacts are examined: foreign ownership, import, and regional presence of Foreign Direct Investment. The study is conducted using Indonesian establishment data covering all manufacturing establishments with more than 20 employees.

I. INTRODUCTION*

The pattern of trade between nations is well understood. Factor endowments, technology, market size, transport costs, and consumer preferences determine a country's export and import. Less is understood about which firms will conduct the export. Typically, many firms produce only for the domestic market even in industries where their home countries have large export levels. What is it that enables some firms to become exporters when many others continue to produce for the domestic market?

Previous empirical studies find persistence in export: an establishment that has started export tends to continue.[1] Moreover, firms' characteristics affecting the costs of production and the quality of the products seem to be important determinants to export. For instance, firms with exports tend to be large; to have high productivity levels; and to have high shares of white collar workers.[2] However, low costs and good quality are necessary but presumably not sufficient to qualify for export. Success in foreign markets requires that the exporters take the foreign conditions in to consideration. Information on foreign preferences, regulations, distribution channels and other market characteristics has to be gathered and analyzed. This type of information can be costly and the higher the costs are, the less likely is it that the firm will find it profitable to start export. More importantly, the cost can be expected to decrease with the amount of various foreign contacts since knowledge on foreign conditions may increase with such contacts.

This paper will focus on establishments' decision to start export. More specifically, I examine if various types of foreign contacts enable establishments to become exporters. Consequently, in a sample of previously non-exporting establishments, we would expect those

* I am grateful for financial support from the Tore Browaldh Fond. The paper has benefited from comments at seminars at Stockholm School of Economics, National University of Singapore, CSIS in Jakarta, NIDA in Bangkok and at the Nordic workshop in international economics in Bergen, May 1999.

[1] See Roberts and Tybout (1997), and Bernard and Wagner (1998).

[2] See for instance Berry (1992), Roberts and Tybout (1997), Bernard and Wagner (1997, 1998), Aw et al. (1998), Clerides et al. (1998), and Bernard and Jensen (1999).

with much foreign contacts to be relatively likely to start export. The determinants to export are examined in the Indonesian manufacturing sector, covering all large and medium sized manufacturing establishments. Three types of foreign contacts are examined: foreign ownership, import, and spillovers from regional presence of foreign direct investment (FDI). Our results suggest that foreign contacts through foreign owners or import have a positive effect on the propensity to become an exporter. We find no spillovers from a large regional presence of FDI.

To analyze the issue at hand, we will begin with a discussion on the mechanism between various types of foreign contacts and the entrance in to export. Next we describe the institutional framework on international trade in Indonesia, together with descriptive statistics on export propensities among different establishments. We continue with econometric estimations and, finally, we sum up and discuss the results of our study.

II. HOW MAY FOREIGN CONTACTS ENABLE FIRMS TO EXPORT?

As previously mentioned, export to a foreign market requires extensive information on different matters such as consumer preferences, distribution channels, and marketing. Moreover, it is necessary to identify the main competitors and to learn about the foreign institutional framework. Consequently, there are considerable costs for collecting information before export can take place. These costs are normally referred to as sunk entry costs: expenses incurred from entering a foreign market must be written off whether the firm decides to export or not.[3] On the other hand, once the firm has invested in collecting the information, it can utilize it without much further costs. Hence, there will be large degrees of persistence in trade flows; firms that once have entered the foreign market tend to continue to export.

The costs for starting to export can be expected to vary between firms. One plausible hypothesis is that foreign contacts will decrease a firm's cost for collecting information on

new markets (Roberts and Tybout (1997 p. 561). Although information on foreign markets can be acquired through various sources such as books and journals, collecting such information is presumably enhanced through foreign contacts. In particular, face-to-face communication facilitates the understanding of foreign markets, as you have the opportunity to secure clarification or additional information. There are different channels where foreign contacts can develop. This paper concentrate on three channels: foreign ownership; a regional presence of FDI; and import of goods from abroad.

Foreign ownership has presumably a positive effect on export propensities since multinational corporations by definition have international experience. Frequently, the multinational is not only familiar with its home country conditions, but also has information on other markets. One would therefore expect firms with foreign ownership to be relatively likely to start export.

There are reasons to believe that high regional presence of FDI may increase the likelihood of export. Presumably, not all multinationals' information on foreign markets is exclusive but may leak out to domestic firms. Domestically owned firms may therefore learn about foreign markets even if they do not participate in joint ventures with foreign firms. This externality is one type of spillovers from FDI.[4] Spillovers may occur from supply of linkage industries or labor turnover, and may take place either in the foreign firm's own industry or among the suppliers and customers in other industries. Again, some of the spillover may be facilitated through personal contacts, but such contacts are limited by geographical distance.[5] In order to benefit from spillovers, it should therefore be an advantage for domestic firms to be located in the same geographic region as foreign firms. In other words, regional spillovers

[3] See e.g. Baldwin (1988, 1989), Baldwin and Krugman (1989), Dixit (1989a, 1989b), and Krugman (1989).
[4] For empirical work on productivity spillovers from FDI in Indonesia, see Blomström and Sjöholm (1999), and Sjöholm (1999a, 1999b).
[5] See e.g. Jacobs (1984), Porter (1990 p. 157), Glaeser et al. (1992).

from foreign firms may imply location-specific external economies contributing to domestic firms' abilities to export.[6]

Finally, import promotes personal contacts and facilitates information on foreign markets. [7] The impetus for information transfer between exporters and importers is increased profits. Both parties try to improve their competitive positions and increase their revenues through exchange of information between each other. For instance, exporters of intermediate goods will inform foreign business-partners on new markets and how to facilitate them, since it will increase their own sales and profits. The exchange of information between exporters and importers leads us to expect that firms with foreign contacts through imports are relatively likely to start export.

III. INDONESIAN MANUFACTURING EXPORTS

The policy in Indonesia towards export has changed considerably over the years. In general, there has been a deep mistrust of foreign trade, shown by a strong anti-export bias in tariffs. However, economic downturns have often forced through reforms of the regulatory framework. For instance, the decline in oil prices in the beginning of the 1980s initiated reforms, which have continued throughout the 1980s and 90s. Indonesia has today a trade policy which is as liberalized as in most other Southeast Asian countries. The liberalization has resulted in a large increase in manufacturing exports; from constituting less than 10 per cent of total Indonesian exports in 1980, the share of manufacturing exports was above 50 per cent in the mid 1990s.

Table I

[6] Kokko et al. (1996) and Aitken et al. (1997) find a positive correlation between local export and the degree of outward oriented multinational corporations in the industry or region. We do not know if the positive effect is caused by old firms starting to export or by the establishment of new export oriented firms.
[7] See Sjöholm (1996).

Some characteristics of the Indonesian manufacturing sector are shown in Table I. Wood products has the largest share of Indonesia's manufacturing export. Other sectors with large exports are Food products, Textiles and Electrical goods. Around 17 per cent of the 21,550 establishments were participating in export in 1995, but there are large differences between industries. For instance, more than 30 per cent of the establishments are engaged in exports in Footwear, Wood products, Furniture, Rubber products, Non-ferrous metals, and Other manufactures. Contrary, the share is less than five per cent in Tobacco, Printing, Petrol refineries, Cement, and Clay products. The differences are of course corresponding to differences in international competitiveness. What needs to be emphasized, is that even in industries where Indonesia has substantial exports – a high degree of international competitiveness - are a majority of the establishments producing only for the domestic market.

The last column in Table I shows the propensity among non-exporters in 1995 to export in 1996: six per cent of the establishments that did not export in 1995 started to export the year after. Again, there are large differences between industries. For instance, almost a fourth of the non-exporting establishments in the Glass industry started to export in 1996, whereas the figure was close to zero in Cement and Clay products. It is clear that there are industry specific effects in export propensities: previously non-exporting establishments in industries with a large share of exporters show high propensity to become exporters themselves. Again, one reason is likely to be industry specific effects, such as comparative advantages and international competitiveness. Another reason could be learning effects from exporters to non-exporters: the more exporters in the industry, the larger is the potential for remaining non-exporters to learn about foreign markets.

The central question in this paper is: do the six per cent of the establishments that started to export differ from the rest in their degrees of foreign contacts?

Table II

Table II shows ratios in foreign contacts in 1995 between establishments that started to export in 1996 and establishments that continued to produce only for the domestic market. Ratios between the two groups are calculated for three variables. Firstly, Foreign ownership is the share of foreign establishments. Secondly, Spillovers is the share of a district's gross output produced in establishments with foreign ownership. Finally, Imports is the share of establishments with import from abroad.[8] Values on Foreign ownership, Spillovers and Imports above (below) one means that establishments which started to export in 1996 had comparable high (low) levels of foreign contacts in 1995.

Establishments with foreign ownership were in all industries more likely to start export than establishments with only domestic owners, as seen from the figures in Table II. Moreover, establishments that started to export were, with a few exceptions, located in districts with relatively large foreign presence. Finally, establishments that imported goods in 1995 were in all industries relatively likely to start export in 1996.

The figures indicate that foreign contacts are an important determinant of the decision to export, but other factors may also affect the choice to export. We continue with an econometric analysis to control for these factors.

[8] As an example; Foreign ownership is calculated as (Foreign firms that started to export/ Total firms that started to export) / (Foreign firms that did not start to export/ Total firms that did not start to export).

IV. ECONOMETRIC ESTIMATIONS

Data

The Indonesian Central Bureau of Statistics has supplied establishment data. The Bureau conducts an annual survey covering all manufacturing establishments with more than 20 employees. There were 21,550 establishments of this size in 1995. We will use those 17,724 establishments that did not export in 1995.[9] In this group of non-exporters we identify the establishments' export status in 1996.

Model

We start with a cost function where we assume that firm *i* at time *t* is able to produce the profit maximizing level of exports, $q_{it}*$, if it enters the foreign market:

$$\pi_{it}(E_t, Z_{it}, Y_{it}) = p_t \cdot q_{it}^* - c_{it}(E_t, Z_{it}, Y_{it}, q_{it}^*) \qquad (1)$$

where π is the profit, *p* is the price, and *c* is the cost of producing quantity *q*. The profit from export is a function of exogenous factors (E) such as international prices; of establishment characteristics (Z) such as size and age; and of foreign contacts (Y). Profits from export can decrease or increase from exogenous factors and establishment characteristics, but is assumed to always increase with the amount of foreign contacts.

The firm export if expected profits are zero or greater. The export status of firm *i* at time *t* is given by X_{it}, where

[9] 201 additional establishments did not export in 1995 but had to be excluded because of missing observations on some of the variables.

$$X_{it} = 1 \, if \; \pi_{it} \geq 0$$
$$X_{it} = 0 \, if \; \pi \prec 0 \qquad (2)$$

Writing out all variables, the test equation is:

$$X_{it} = 1 \text{ if } \beta_0 + \beta_1 \text{Foreign ownership}_{\text{it-1}} + \beta_2 \text{Import}_{\text{it-1}} + \beta_3 \text{Spillovers}_{\text{it}-1} +$$
$$\beta_4 \text{District export}_{\text{it-1}} + \beta_5 \text{Size}_{\text{it}-1} + \beta_6 \text{Skill}_{\text{it}-1} +$$
$$\beta_7 \text{Capital}_{\text{it}-1} + \beta_8 \text{R \& D}_{\text{it}-1} + \beta_9 \text{Age}_{\text{it-1}} +$$
$$\text{Region} + \text{Industry} + \varepsilon_{it} \geq 0 \qquad (3)$$
$$X_{it} = 0 \qquad \text{otherwise}$$

The causality between several of the independent variables and the export decision is not obvious, so the independent variables are lagged one period: the test equation sets the export decision in period *t* as a function of establishment, district, and industry characteristics in period *t-1*. The set of independent variables is seen in Table III. Descriptive statistics together with a correlation matrix are included in the appendix (Table AI-AII).

Table III

As previously mentioned and as seen in Table III, we use three variables on foreign contacts: *Foreign ownership*, *Import* and *Spillovers*. *Foreign ownership* is a dummy variable for foreign ownership (above zero per cent) and *Import* is a dummy variable for import of intermediate products. Data on import of capital equipment is not available, which may bias the results since some establishments are involved in imports not captured by our variable. On the positive side, import of intermediate products is presumably of an ongoing character, fostering good learning opportunities about foreign conditions, whereas purchase of capital

goods may be a one-time event. *Spillovers* is the foreign share of a districts gross output and is constructed for Indonesia's 280 districts. The construction of *Spillovers* differs from the industry specific measures used by Kokko et al. (1996), and Aitken et al. (1997), since learning about foreign markets might come from contacts with foreign suppliers or buyers located in the district, not only from establishments within the same industry. Indeed, Sjöholm (1999a) finds regional knowledge flows between, rather than within, industries to be relatively important in Indonesia.

Establishments may learn to export also from other domestic ones that are already engaged in export. For instance, Clerides et al. (1998) find some evidence that exporters reduce the costs of breaking into foreign markets for other producers. *District export* may capture learning effects from exporters to non-exporters, but also localization advantages: regions with a large amount of export may have good infrastructure such as roads, airports, and harbors.

Size, *Skill*, *Capital*, *R&D* and *Age* are establishment specific variables likely to affect the export propensity. *Size* is included since large firms are relatively likely to export, which may be caused by decreasing average costs (Berry, 1992). Another plausible explanation is that large establishments have been relatively successful in the domestic market, which could increase the possibility to succeed also internationally.

Skill, *Capital*, and *R&D* aim at capturing the quality of the product. *Skill* measures the educational level of the employees. We would expect *Skill* to have a positive effect on export, if exported goods are of a relatively high quality and if higher skills of the workforce increase the quality of the product. Accordingly, high capital intensities and R&D expenditures may have a positive effect on the quality of the products and, perhaps, on the ability to export. *Age* is included since experience has been found to increase the possibility to export (Roberts and Tybout, 1997).

As previously said, there are clear industry specific effects in export propensities: for instance establishments in Wood products are, ceteris paribus, more likely to export than establishments in the Tobacco industry. We use two methods to control for industry specific effects. Firstly, we will construct our variables as ratios with industry averages (5-digit level of ISIC). Hence, we try to explain an establishment's export decision by its characteristics in comparison to the other establishments within the same industry. Secondly, dummy variables for industries and for regions will be included. The industry specific dummies aim at capturing, for instance, price and demand effects. One drawback with controlling for industry specific effects is that we are likely to underestimate the effect on export propensities from the included variables. Some industries may have many exporters because they are, for instance, large in size and with an educated labor force. As a result, our estimated effects on export propensities may bee seen as a lower bound.

The establishments are also divided in five different regions - Java, Sumatra, Nusa Tengara, Kalimantan, and Sulawesi - in order to control for regional specific effects not captured by the variable *District export*.[10]

Results

Different estimations of Equation 3 are shown in Table IV. Estimations 1 and 2 include all establishments. The former estimation is without dummy variables whereas all other estimations include industry and regional specific effects. Industry dummy variables are included at a 2-digit level of ISIC.[11] Estimation 3 is conducted on the sample of domestically owned establishments, in order to examine if there are different export determinants in this group. In Estimation 4 I have lagged the independent variables two, instead of one years: export in 1996 is assumed to be a function of establishments' characteristics in 1994. Two-

[10] The regions Irian Jaya and the Malucus have been included in the Sulawesi region.
[11] The base group for comparison is an establishment in food products, located on Java.

year lags are likely to correct for any causality problem that, possibly, still could plague estimations with one-year lags.[12] In Estimation 5, finally, I have included only those establishments that are present in 1996, i.e. I have excluded establishments that have exit the market between 1995 and 1996. By including only the survivors, we avoid a possible bias from the fact that exiting establishments are likely to be relatively weak.

Table IV

Most variables have statistically significant coefficients and give support to the prior hypothesis. The fit of the estimations, shown by the percentage of correct predictions and the average log likelihood, are acceptable. Moreover, inclusion of industry and regional specific dummy variables does not improve the fit of the estimations, which suggests that the other variables explains export propensity reasonably well. Finally, the results seem to be rather stable; the results are, with a few exceptions, similar in the different estimations.

To start with the variables on foreign contacts, *Foreign ownership* and *Import* have the expected positive and statistically significant coefficients. We conclude that establishments with foreign contacts through foreign ownership and imports are relatively likely to become exporters. However, large foreign presence in the district does not seem to benefit export; *Spillovers* is only positive and statistically significant in one estimation.

Large establishments and establishments located in districts with large exports are relatively likely to start export, as seen by the coefficients on *Size* and *District export*. Furthermore, high quality as measured by *Skill*, and *R&D* seems to increase the potential for export since these variables have statistically significant coefficients. The results for *Capital* are not straightforward; the coefficient is positive and statistically significant in most

[12] For instance, it is possible that an establishment that has decided to start export in 1996 has to import certain inputs, and that this import take place already in 1995.

estimations, but negative and statistically significant when we lag our independent variables two years. *Age* finally, has a negative and statistically significant coefficient in all estimations. The negative effect is surprising since one would assume experience to increase the potential to export. One reason could be that an old establishment founded under heavy import substitution policies may be more focused on the domestic market and therefore less likely to start export. However, estimating the export propensities with a sample of establishments established after 1986 - under a more outward oriented trade regime - did not change the effect from age; relatively new establishments are still likely to start export. The other variables were also stable to the different sample.

The industry specific dummy variables show that in comparison to establishments in Food products, establishments in Textiles, Wood products, Chemicals and Other Manufactures are likely to start export. Contrary, establishments in Furniture and Non-Metal products are less likely to start export. Moreover, the regional specific dummy variables suggest that in comparison to establishments located on Java, establishments on Nusa Tenggara, and possibly Sumatra, are likely to start export. There is no effect from localization on Sulawesi, or Kalimantan. Hence, Java's superior infrastructure does not seem to increase the probability of establishment starting to export, but the superior infrastructure may also be captured by the variable *District export*.

So far, we have been concerned with statistical rather than economic significance. The probit model does not allow us to interpret the coefficients included in Table IV. We have therefore estimated the marginal effects from Estimation 1 which are included in Table V. The effects for some of the control variables such as *R&D* and *Capital* are rather small, whereas the effects are larger for *Size*, *Skill*, and *Age*. Moreover, the marginal effects for *Foreign ownership* and *Import* show that foreign ownership increases the probability of export with 12 per cent and import increases the probability with 4 per cent. The marginal effects were in

comparison to Estimation 1 similar but slightly larger for most variables in Estimations 2-5 (not shown).

Table V

The high level of aggregation could affect the results. For instance, changes in export prices differ between industries and other industry specific effects may also shape the possibility to start export. In addition, different regulations of the Indonesian manufacturing sector are likely to affect export propensities. As an example, the cooking oil industry (ISIC 3115) was not allowed to export until 1997. Although industry specific effects might be captured by our construction of variables as shares of industry averages or by the dummy variables, it may be more appropriate to estimate Equation (3) at an industry level. We therefore repeat our estimations at a two- digit level of ISIC and with the inclusion of industry specific dummy variables at a four- digit level.

Table VI

The industry level estimations, shown in Table VI, confirm the previous results on the role of foreign contacts. Foreign establishments and establishments with imports are relatively likely to start export. *Foreign ownership* is positive and statistically significant in seven out of nine industries, and *Import* is positive and significant in six industries. The non-significant effect from a large foreign presence is confirmed at the industry level: *Spillovers* is non-significant in all estimations. The marginal effects for *Foreign ownership* and *Import* differ between industries (not shown). Foreign ownership increases the probability of export with

between seven per cent (ISIC 38) and 25 per cent (ISIC 39). Accordingly, imports increases the probability of exports with between two per cent (ISIC 34) and 14 per cent (ISIC 37).

The industry level estimations give strong support to the importance of size as a determinant of export, but the effect from the other control variables is less obvious than in the previous aggregated estimations. *Skill* has a positive effect in four out of nine industries. *Age* has a negative effect on export only in 3 industries, *District export* and *Capital* positive effects in 3 industries, and *R&D* a positive effect in one industry alone. With the exception of *Size*, and perhaps *Skill*, it seems that the previous positive export effects from the control variables were affected by different industry distribution of exporters and non-exporters.

Foreign ownership includes all types of foreign ownership: minority, majority and total. Since restrictions on the share of ownership allowed to foreigners are frequent in developing countries, it is of interest to examine if the share of foreign ownership is important in explaining export propensities. I therefore made additional estimations, not shown in the paper, were I differed between establishments with different degrees of foreign ownership. Establishments with as little as below five-percent foreign ownership had, in comparison to wholly domestically owned establishments, high propensities to start export. Moreover, the propensity increased with the degree of foreign ownership: establishments with majority foreign ownership were more likely to start export than establishments with minority foreign ownership.

As shown by the results, the degree of foreign presence in the district does not explain export. One reason could be that *Spillovers* includes all foreign activities. As previously mentioned, other studies find a positive effect on domestic export from the location of outward oriented FDI. I therefore made additional estimations with a variable constructed as foreign establishments' export as a share of a district's gross output. However, albeit a more significant effect on the export propensity compared to the variable *Spillovers*, the new

variable was still significant only in three industries: Furniture, Chemicals, and Fabricated Metal Products. I also tried with industry specific measures on the foreign presence by calculating the share of a foreign gross output in each industry in each district. Again, no effect was found on the probability that an establishment would start to export. One reason to the difference with the results from Kokko et al. (1996) and Aitken et al. (1997) could be that these studies capture the entrance of new exporting firms.

Additional estimations, not shown in the paper, examined the results' sensitivity. Firstly, I included variables such as value added per worker, capacity utilization, and a dummy variable for public ownership. The results did not change to any significant extent.[13] Moreover, I tried alternative constructions of the control variables such as the capital stock for size, white-collar over blue-collar worker for skill, and average wage for efficiency. The results remained robust. Finally, I made interaction variables with our different measures on foreign contacts and the variable *Skill*, to examine if a certain educational level among the employees is necessary in order to learn from the foreign contacts. The estimations did not show any clear results.

V. CONCLUDING REMARKS

What enables a firm to start export? While economic literature explains aggregated trade flows between countries, the micro causes of international trade have been less explored. This paper has tried to evaluate micro determinants of exports and contributes to the literature by focusing on the role played by foreign contacts. To sum up the results, import and foreign ownership increase the possibility that establishments will start export whereas the district presence of FDI does not have an effect. There are obvious policy implications to be drawn from the obtained results.

Firstly, allowing inward FDI will increase a country's possibility to export. It is well documented that MNCs locating in developing countries often have a high degree of export in comparison to domestic firms.[14] The results in this paper suggest that high export propensity among foreign firms is not only caused by a high export orientation when they are established; even foreign establishments that start by producing only for the domestic market are more likely, than purely domestic establishments, to start export. Hence, foreign owned establishments show a higher degree of flexibility: a higher ability to seek new markets when it is necessary or favorable.

Studies on international trade and economic development are often focusing on the role played by export. In general, possible effects from import have been left out of the analyses although a few studies argue that import may positively affect economic development through technology embodiment and technology transfer.[15] The result in this paper suggests that one additional, but so far less emphasized, effect from import is that it increases exports. Hence, import penetration fosters export orientation.

APPENDIX

Table AI

Table AII

[13] It is especially worth mentioning that high productivity, measured by value added per employee, was not found to increase the probability of export. This contrasts results in Aw et al. (1998), Clarides et al (1998), and Bernard and Jensen (1999).

[14] In the case of Indonesia see Ramstetter (1998).

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[15] See Sjöholm (1999c).

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TABLE I
DESCRIPTIVE STATISTICS OF THE INDONESIAN MANUFACTURING SECTOR

Sector	ISIC	Number of establishments (1995)	Share of total Indonesian manufacturing export 1995 (%)	Share of establishments participating in export 1995 (%)	Share of non-exporters in 1995 who started to export in 1996 (%)
All sectors		21,550	100.0	16.8	6.0
Food products	311/12	4,272	10.2	10.5	4.4
Beverages	313	250	0.3	9.2	1.8
Tobacco products	314	814	0.6	3.9	1.2
Textiles	321	2,241	11.7	11.6	7.0
Clothing	322	2,110	6.5	21.0	7.6
Leather products	323	217	0.5	25.8	9.3
Footwear	324	389	7.9	33.4	12.0
Wood products	331	1,754	20.0	35.2	10.6
Furniture	332	1,159	2.3	39.5	14.0
Paper products	341	311	1.1	14.1	5.2
Printing	342	594	1.2	3.4	1.4
Industrial Chem.	351	403	4.3	25.3	9.6
Other chemicals	352	605	0.9	14.5	7.7
Petrol refineries	353	4	0.0	0.0	0.0
Coal products	354	21	0.0	9.5	5.3
Rubber products	355	441	8.4	32.7	12.5
Plastic products	356	938	1.7	12.5	4.5
Pottery	361	95	0.3	26.3	18.6
Glass products	362	71	0.5	28.2	23.5
Cement	363	829	0.1	1.2	0.2
Clay products	364	957	0.0	1.1	0.2
Non-metal products	369	275	0.2	12.0	5.4
Iron and steel	371	103	1.9	22.3	7.5
Non-ferrous metals	372	65	2.5	30.8	11.1
Metal products	381	958	1.8	12.5	5.3
Machinery	382	322	0.5	8.4	5.1
Electrical goods	383	459	12.0	28.8	8.0
Transport equipm.	384	577	0.8	9.4	4.4
Professional goods	385	73	0.5	24.7	9.1
Other manufactures	390	441	1.2	33.3	11.9

Source: Calculations on data obtained from the Indonesian Bureau of Statistics.

TABLE II
FOREIGN CONTACTS IN INDONESIAN ESTABLISHMENTS. RATIOS BETWEEN ESTABLISHMENTS THAT BECOME EXPORTERS AND ESTABLISHMENTS THAT DO NOT BECOME EXPORTERS

Sector	ISIC	Foreign Ownership	Spillovers	Import
All sectors		6.1	1.3	2.4
Food products	311/12	9.1	1.1	2.4
Beverages	313	--	2.4	4.1
Tobacco products	314	19.3	1.3	6.7
Textiles	321	6.2	1.5	2.6
Clothing	322	14.8	1.1	4.1
Leather products	323	9.7	1.4	2.0
Footwear	324	11.0	1.3	4.1
Wood products	331	5.1	1.3	8.4
Furniture	332	12.3	1.1	1.7
Paper products	341	1.2	1.3	3.5
Printing	342	6.4	0.4	1.9
Industrial Chem.	351	1.8	1.2	1.7
Other chemicals	352	4.2	1.1	1.4
Petrol refineries	353	--	--	--
Coal products	354	--	0.6	--
Rubber products	355	18.7	1.0	1.1
Plastic products	356	7.5	1.4	1.6
Pottery	361	--	1.0	1.4
Glass products	362	--	1.2	3.2
Cement	363	20.6	3.4	10.5
Clay products	364	--	2.8	--
Non-metal products	369	--	0.9	2.8
Iron and steel	371	1.5	1.2	2.6
Non-ferrous metal	372	4.1	0.8	2.7
Metal products	381	5.2	1.2	2.9
Machinery	382	7.9	1.3	2.2
Electrical goods	383	3.1	1.2	1.5
Transport equipm.	384	4.7	1.8	3.9
Profession. Goods	385	--	1.4	2.5
Other manufact.	390	8.3	1.2	1.8

Source: See Table I.

TABLE III
LIST OF VARIABELS

Set	Variable	Unit	Expect. sign	Aimed to measure
Variables on foreign contacts	*Import*	Dummy variable for imports	+	Foreign contacts
	Foreign ownership	Dummy variable for foreign ownership	+	Foreign contacts
	Spillovers	Share of district's output produced in foreign establishments	+	Foreign contacts
Control variables	*District export*	Share of district's gross output that is exported	+	Regional export advantages
	Size	Employment	+	Efficiency
	Skill	Share of workforce with higher than primary education	+	Quality
	Capital	Capital stock per worker	+	Quality
	R&D	R&D expenditures	+	Quality
	Age	Years of operation	+	Experience

Note: *Spillovers*, *District export*, *Size*, *Skill*, *Capital*, *R&D*, and *Age* are calculated as ratios with industry averages (5-digit level of ISIC).

TABLE IV
PROBIT ESTIMATIONS ON THE PROPENSITY TO START EXPORT
(DEPENDENT VARIABLE - EXPORT STATUS IN 1996)

	All establ.	All establ.	Dom. Establ.	Two-year lags	Survivors
Variables	Estimation 1	Estimation 2	Estimation 3	Estimation 4	Estimation 5
Constant	-1.83	-2.07	-2.08	-2.13	-2.01
	(46.97)***	(39.26)***	(38.50)***	(44.56)***	(37.36)***
Foreign	0.70	0.74	--	0.87	0.74
ownership	(10.77)***	(11.08)***		(13.25)***	(10.95)***
Import	0.39	0.46	0.48	0.49	0.46
	(9.92)***	(10.93)***	(10.85)***	(11.73)***	(10.59)***
Spillovers	-0.003	0.01	0.01	0.04	0.01
	(0.25)	(0.69)	(0.86)	(2.57)**	(0.47)
District export	0.07	0.05	0.05	0.09	0.05
	(3.34)***	(2.16)**	(2.04)**	(3.69)***	(1.95)*
Size	0.06	0.06	0.06	0.08	0.06
	(13.75)***	(13.52)***	(13.27)***	(15.64)***	(13.07)***
Skill	0.09	0.10	0.10	--	0.10
	(5.19)***	(5.35)***	(5.15)***		(5.36)***
Capital	0.01	0.01	0.01	-0.01	0.01
	(2.13)**	(2.32)**	(2.10)**	(1.74)*	(2.31)**
R&D	0.003	0.003	0.004	0.002	0.003
	(2.65)***	(2.77)***	(3.05)***	(2.05)**	(2.74)**
Age	-0.09	-0.09	-0.08	--	-0.10
	(4.48)***	(4.24)***	(3.78)***		(4.56)***
Textiles	--	0.32	0.32	0.39	0.34
		(6.73)***	(6.46)***	(7.91)***	(6.92)***
Wood	--	0.66	0.66	0.69	0.70
		(12.23)***	(12.14)***	(11.65)***	(12.79)***
Furniture	--	-0.27	-0.26	-0.10	-0.28
		(2.57)***	(2.40)***	(0.98)	(2.64)***
Chemicals	--	0.15	0.16	0.12	0.14
		(2.58)***	(2.52)***	(1.85)*	(2.35)**
Non-Metal prod	--	-0.29	-0.33	-0.03	-0.30
		(3.70)***	(3.97)***	(0.40)	(3.73)***
Metal prod	--	0.22	0.29	0.49	0.21
		(1.27)	(1.60)	(3.09)***	(1.19)
Fabricated Metal	--	0.00	0.03	0.03	-0.003
		(0.08)	(0.38)	(0.42)	(0.05)
Other Manufact	--	0.48	0.46	0.40	0.48
		(4.43)***	(4.06)***	(3.32)***	(4.40)***
Sumatra	--	0.11	0.07	0.02	0.12
		(2.06)**	(1.36)	(0.33)	(2.26)**
Nusa Tenggara	--	0.52	0.54	0.08	0.52
		(6.15)***	(6.30)***	(0.74)	(6.05)***
Kalimantan	--	0.06	0.06	0.11	0.04
		(0.59)	(0.52)	(1.03)	(0.40)
Sulawesi	--	-0.07	-0.06	0.09	-0.07
		(0.69)	(0.56)	(0.93)	(0.71)
No observations	17,724	17,724	17,212	15,621	15,990
Correct pred (%)	93.9	93.9	94.6	93.4	93.3
Log Likelihood	-3,725	-3,560	-3,271	-3,308	-3,453
Average Log Likelihood	0.81	0.82	0.83	0.81	0.81

Note: t-values in parenthesis. *) Significant at the ten per cent level, **) Significant at the five per cent level, ***) Significant at the one per cent level.

TABLE V
MARGINAL EFFECTS ON THE PROBABILITY TO START EXPORT. EFFECTS CALCULATED FROM ESTIMATION I IN TABLE IV.

Variable	Marginal effect
Foreign ownership	0.1189
Import	0.0463
Spillovers	-0.0009
District export	0.0080
Size	0.0089
Skill	0.0086
Capital	0.0006
R&D	0.0002
Age	-0.0088

Note: The marginal effect is a discrete change of a dummy variable from 0 to 1 for the variables *Foreign ownership* and *Import*. The marginal effects for the other (continues) variables represent the change in probability of exporting due to a one standard deviation increase in the variable. The marginal effect for a particular variable is evaluated at the means of the other variables.

TABLE VI
PROBIT ESTIMATION ON THE PROPENSITY TO START EXPORT. INDUSTRY ESTIMATIONS (DEPENDENT VARIABLE - EXPORT STATUS IN 1996)

Variabl.	Food (31)	Textiles (32)	Wood (33)	Furnit. (34)	Chem. (35)	Non-metal prod (36)	Metal prod (37)	Fabr. Metal prod (38)	Other manuf. (39)
Constant	-3.13	-2.27	-1.47	1.67	-2.01	2.53	-3.51	-2.41	-1.70
	(6.35)***	(20.93)	(11.2)***	(3.61)***	(11.1)***	(11.4)***	(2.86)***	(8.70)***	(4.25)***
Foreign	0.81	0.65	0.71	0.30	0.75	2.40	0.37	0.57	1.12
Ownersh.	(4.49)***	(3.97)***	(1.90)*	(0.70)	(5.18)***	(4.02)***	(0.63)	(3.72)***	(2.47)**
Import	0.54	0.52	0.35	0.46	0.17	1.29	1.20	0.65	0.06
	(3.92)***	(6.23)***	(1.60)	(1.71)*	(1.59)	(5.68)***	(2.53)**	(5.71)***	(0.20)
Spillover	0.03	0.02	-0.05	0.05	-0.01	-0.04	0.21	0.01	-0.05
	(1.16)	(0.87)	(1.50)	(0.29)	(0.12)	(0.46)	(0.56)	(0.19)	(0.44)
D.export	-0.07	0.06	0.17	-0.01	0.15	-0.02	0.07	0.06	0.08
	(1.29)	(1.08)	(2.61)***	(0.06)	(1.74)*	(0.19)	(0.16)	(0.54)	(0.41)
Size	0.03	0.09	0.19	0.12	0.17	0.14	0.05	0.06	0.16
	(4.64)***	(9.67)***	(8.49)***	(3.86)***	(7.43)***	(2.18)**	(0.23)	(3.84)***	(2.60)***
Skill	0.07	0.30	0.22	-0.01	0.15	-0.15	0.33	0.25	-0.02
	(2.29)**	(5.94)***	(2.86)***	(0.04)	(1.60)	(1.24)	(0.37)	(1.68)*	(0.13)
Capital	0.03	0.01	0.01	-0.07	0.00	0.08	0.03	-0.04	0.06
	(3.24)***	(1.57)	(0.82)	(0.94)	(0.45)	(2.11)**	(0.24)	(1.35)	(1.12)
R&D	0.01	0.003	-0.00	0.01	0.001	0.01	0.03	-0.002	0.03
	(2.30)	(1.35)	(0.76)	(1.75)*	(0.29)	(1.65)*	(0.66)	(0.22)	(1.09)
Age	0.00	-0.04	-0.24	-0.09	-0.13	-0.16	0.26	-0.31	-0.09
	(0.03)	(0.98)	(4.03)***	(0.58)	(1.98)**	(1.19)	(0.78)	(3.44)***	(0.54)
Industry dummies	estimated	estimated	estimated	estimated	estimated	estimated	estimated	estimated	estimated
Regional dummies	estimated	estimated	estimated	estimated	estimated	estimated	estimated	estimated	estimated
No obs	4,735	4,029	1,829	838	1,949	1,897	124	2,029	294
Correct Pred. (%)	96.2	92.6	88.6	97.1	92.8	98.3	90.3	94.5	89.1
Log Like	-628	-898	-588	-76	-429	-110	-28	-354	-79
Av Log Likelih.	0.88	0.80	0.73	0.91	0.80	0.94	0.79	0.84	0.76

Note: t-values in parenthesis. *) Significant at the ten per cent level, **) Significant at the five per cent level, ***) Significant at the one percent level.

TABLE AI
DESCRIPTIVE STATISTICS

Variable	Mean	Standard Deviation	Minimum	Maximum
X	0.1	0.2	0.0	1.0
Foreign ownership	0.0	0.2	0.0	1.0
Import	0.1	0.4	0.0	1.0
Spillovers	1.0	1.3	0.0	28.0
District export	1.0	0.8	0.0	8.2
Size	1.0	2.2	0.0	173.8
Skill	1.0	0.8	0.0	25.4
Capital	1.0	4.2	0.0	369.6
R&D	1.0	12.9	0.0	1202.1
Age	1.0	2.4	0.0	240.0

TABLE AII
CORRELATION MATRIX

	X	Foreign Owner.	Import	Spillov	D.exp	Size	Skill	Capital	R&D	Age
X	1									
Foreign owner.	0.16	1								
Import	0.13	0.25	1							
Spillov.	0.04	0.08	0.07	1						
D.exp	0.04	0.04	0.03	0.42	1					
Size	0.19	0.12	0.15	0.07	0.01	1				
Skill	0.07	0.05	0.07	0.05	0.07	0.11	1			
Capital	0.03	0.05	0.04	0.02	0.02	0.03	0.07	1		
R&D	0.06	0.08	0.05	0.03	0.01	0.09	0.05	0.02	1	
Age	-0.01	-0.01	0.04	-0.03	0.01	0.01	-0.02	-0.01	-0.00	1