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Export barriers:

What are they and who do they matter to?

by

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Abstract

The recent literature on firm exporting behaviour has established that both sunk-cost of exports and firm characteristics, such as size and productivity matter. In this paper we provide fresh evidence on the actual barriers to exporting firms face and how they vary with export experience and other firm-level characteristics. Our results indicate that the higher the export experience of firms the lower are trade costs. These barriers are not related to other firms-level characteristics such as, productivity and size, found by the literature to be associated with export market entry. Overall, these results suggest the existence of a process of learning to export whereby firms learn how to cope with export barriers through direct experience in export markets.

JEL classification: D21, F14

Keywords: Exports experience, exports barriers, productivity, trade costs

Outline

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4. *Empirical methodology*
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Non-Technical Summary

Trade costs, defined as all the costs incurred by firms in delivering a good to foreign consumers except the marginal cost of producing the good itself, are both large and numerous. In addition to costs associated with transport, tariff and non-tariff barriers they include trade frictions caused by different languages, currencies, imperfect information, incomplete contracts as well as non-tariff policy barriers. It remains the case however that almost all of the information that we have on trade costs exists from gravity equations estimated using country or industry level data.

In the spirit of the new literature bringing firms to the heart of models in international trade, in this paper we use newly available survey data for the UK to investigate the relative magnitude of trade costs, measured as the barriers to exporting encountered by firms. In many cases these impediments to exporting reported by firms offer a close comparison to the barriers identified using gravity equations. The data are ideally suited to this task. The survey covers firms that attempted to expand either the extensive or intensive margins of exporting at an identical point in time (two years prior to the survey). Additionally, the data identifies occasions when from a position of not exporting, firms' were either subsequently successful or unsuccessful in starting to export. That is, we can disentangle the factors that prevented non-export firms from starting to export from those faced by experienced exporters trying to penetrate new foreign markets or expand their sales in existing ones.

Our results confirm that the type of barriers found to be significant in gravity equations are also recognised by firms as important barriers to exports. Between a third and one-half of all firms in the sample identified each of the twelve barriers to exporting within the survey as important. These include a number of aspects of the imperfect distribution of information between buyers and sellers, such as obtaining basic information about an export market, identifying their first contact, as well as cultural factors.

Barriers to exports do not matter to all firms in the same way however. The best predictor of whether a particular firm identifies a barrier as relevant is explained almost exclusively by the number of years the firm has been exporting. No other firm-level characteristic is related to export barriers in any consistent fashion. In general as export experience rises the trade costs associated with a given barrier falls. However, this effect is non-linear. The probability of facing a specific barrier and initially increase as experience rises in some cases. In particular the barriers from a second round of export market entry by the firm are greater in number than those encountered from the first market. Together this pattern of results might be used to suggest that barriers to exporting are common across firms, but there are advantages deriving from past export experience. In other words, there is a process of learning to export.

1 Introduction

In their excellent review of the literature on trade costs Anderson and van Wincoop (2004) concluded that they are both large, equivalent to an *ad valorem* tax of 170 per cent in developed countries, and numerous. In addition to costs associated with transport, tariff and non-tariff barriers they also review evidence of trade frictions caused by different languages, currencies, imperfect information, incomplete contracts as well as non-tariff policy barriers. An interesting feature of their review is that almost exclusively the evidence they are able to draw upon is derived from aggregate data, typically from gravity equations estimated using country or industry level data.

In the spirit of the new literature bringing firms to the heart of models in international trade (Melitz, 2003; Bernard *et al*. 2003; Greenaway and Kneller, 2007), in this paper we use newly available survey data for the UK to investigate the relative magnitude of trade costs, measured as the barriers to exporting encountered by firms. In many cases these impediments to exporting reported by firms offer a close comparison to the barriers identified using gravity equations. The data are also rich in detail on the characteristics of firms. This allows us to investigate whether there are any differences in the importance of particular barriers across firms.

At present the new microeconomic-trade literature, while confirming the importance of generic trade costs for firm export decisions, has made only a limited contribution to our understanding of which particular trade barriers matter and how they affect firm export decisions.[1] This is a consequence of data constraints, we typically observe if the firm exports but not where it exports to, and the econometric methodology usually applied to this question. The standard econometric approach has been to estimate a probit or linear probability model of the firm export market participation including as a regressor the one period lag (or further lags) of its export status. The greater the importance of experience, indicated by the size of the coefficient on lagged export status, the more important sunk

[1] The contribution on this issue of the literature has been limited at least in comparison with its contribution to our understanding of the characteristics of firms that export.

costs are viewed as being. Additional firm and industry controls are often significant, but contribute to a relatively small proportion of the predictive power of these regressions.

The direct and detailed information on the barriers to exporting contained in the data used here allow us to depart from this methodology and to compare the relative importance of trade costs arising from different barriers. Two other features of the data make it possible to compare exporting barriers across firms. Firstly, the survey covers firms that attempted to expand either the extensive or intensive margins of exporting at an identical point in time (two years prior to the survey). Second, the data identifies occasions when from a position of not exporting, firms' were either subsequently successful or unsuccessful in starting to export. That is, we can disentangle the factors that prevented non-export firms from starting to export from those faced by experienced exporters trying to penetrate new foreign markets or expand their sales in existing ones.

Our results confirm that the type of barriers found to be significant in gravity equations and reviewed by Anderson and van Wincoop (2004) are also recognised by firms as important barriers to exports. Between a third and one-half of all firms in the sample identified each of the twelve barriers to exporting within the survey as important. These include a number of aspects of the imperfect distribution of information between buyers and sellers, such as obtaining basic information about an export market, identifying their first contact, as well as cultural factors. Barriers to exporting appear to be both large and numerous.

Barriers to exports do not matter to all firms in the same way however. The best predictor of whether a particular firm identifies a barrier as relevant is explained almost exclusively by just one variable: the number of years the firm has been exporting. No other firm-level characteristic, such as R&D intensity, the size of the firm, other measures of export experience, such as export intensity, or industry-level variable, are related to export barriers in any consistent fashion.[2] The importance of prior export experience support the findings,

[2] This has a clear similarity to the results of studies using large firm-level data set (see Wagner (2007) and Greenaway and Kneller (2007) for two recent surveys of the literature). In many of these studies the effect past export experience on current export status dwarfs the impacts of the other firm and industry-level controls.

found in a companion paper (Kneller and Pisu 2006) using the same data source. There we show that the total number of barriers falls as the export experience of firms rises.

In general as export experience rises the trade costs associated with a given barrier falls. However, this effect is non-linear. The probability of facing a specific barrier, and therefore the magnitude of the trade costs generated by it, initially increase as experience rises in some cases. In particular the barriers we interpret as resulting from a second round of export market entry by the firm are greater in number, although those that are common to new export market entrants generate smaller trade costs. Trade costs relating to language differences and logistics appear to increase with the export experience of the firm. Together this pattern of results might be used to suggest that barriers to exporting are common across firms, but there are advantages deriving from past export experience. In other words, there is a process of learning to export.

As one might expect, the pattern of experience is not symmetric across different barriers. The return from export experience decreases more quickly for barriers associated with establishing an initial dialogue and marketing, than for building relationships with key-influencers or decision markers, for example. Experience does not matter for all barriers to exporting however. There are no differences in which firms identify legal, financial and tax environments abroad, a bias in foreign consumers for domestically produced goods or for exchange rates as barriers to exporting for example.[3]

The rest of the paper proceeds as follows. The next section briefly reviews the literature on trade costs at the micro and macro level, which underpins the interpretation of our results. Section 3 describes the survey we use in this exercise while Section 4 presents the empirical methodology we deploy in different stages of the analysis. The main results are analysed in Section 5. In this section we also test the robustness of the results to the construction of the sample, whether the results for experience capture some other omitted variable and a measure of the size of the barriers to exporting. Finally Section 6 concludes.

[3] With regards, barriers relating to exchange risks we find, consistent with intuition, that export intensity matters more than the number of years firms have been exporting. Not surprisingly the probability of facing this barrier is increasing in the export intensity.

2 Barriers to exporting

Anderson and van Wincoop (2004) define trade costs as all those expenses incurred by firms in delivering a good to consumers except the marginal cost of producing the good itself. Despite the recent advances of the theoretical and empirical literature of international trade built around heterogeneous firms, the best detail on the factors determining trade costs can still be found at the aggregate level.

The work-horse of this largely macro-based literature has been the gravity equation, which models bilateral international trade controlling for the distance between the two trading partners and their sizes. Additional variables are then added to this basic set-up. As examples, Eaton and Kortum (2002) and Hummels (2001) capture the importance of language to trade using a zero-one indicator of whether countries share a common language and are able to add significantly to the explanatory power of the regression. Similarly Rauch and Trindade (2002) find that a measure of the proportion of the population of Chinese-ethnic origin, which they interpret as capturing the importance of information asymmetries on trade, adds to our ability to explain bilateral trade flows.[4]

From their review Anderson and van Wincoop (2004) concluded that the costs associated with factors such as different languages, currencies, imperfect information and measures of institutional quality such as the general economic environment, law enforcement, property rights, and regulation are *more* important for trade than direct policy instruments such as tariffs and non-tariff barriers.[5]

The role of trade costs, in particular those that are sunk, have also been emphasised in the micro-based international trade literature. Theoretical and empirical studies, see for instance Melitz (2003) and Bernard *et al.* (2003), find that trade costs are an important

[4] Anderson and Marcouiller (2000), Levchenko (2004), de Groot et al. (2004) and Linders *et al*. (2005) all find evidence of a significant correlation between international trade flows and various indices of institutional quality.

[5] See also Deardorff (2001), Anderson (2001) and Obstfeld and Rogoff (2000) for the importance of trade costs to observed patterns of trade.

factor explaining why not all firms export and for the persistence of firm export behaviour. Similarly Chaney (2006) uses reoccurring sunk-costs of exporting to explain why most firms export to just a few countries and a few to export to lots.[6] Other evidence suggests that the substantive nature of market entry costs results in firms adding new export markets only very slowly. Using data for Slovenia Damijan *et al*. (2007) find new exporters start exporting to only 3-4 markets initially and then add a new market on average every two years.

This same literature has, however, provided little or no precise evidence on what barriers actually generate trade costs and in particular what sunk costs of exporting include. Of the micro-econometric evidence reviewed by Greenaway and Kneller (2007), in addition to the role of previous export experience, only three other components of trade costs have been investigated: exchange rates, imperfect information (usually modelled through agglomeration effects) and trade policies. They conclude that this research has failed to establish complete or conclusive evidence on any of these. For example, using the same measure of agglomeration and econometric methodology, but different European countries, Greenaway *et al*. (2004), Barrios *et al* (2003) and Ruane and Sutherland (2005) find completely contrasting results.

In this study, using a survey specifically commissioned to better understand the export behaviour of firms and the obstacles associated with entering export markets, we are able to provide specific evidence about the relative importance of different barriers to exports. We relate them to firm-level characteristics and compare our findings with those that the literature using gravity equations has provided on trade costs. While in this literature the magnitude of trade costs are inferred from the negative effect trade barriers have on bilateral trade flows, this exercise focus on identifying what are the most common barriers to exports firms report to face and how the trade costs, they generate, vary with firm-level characteristics.

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[6] Eaton, Kortum and Kramarz (2004) find for France 34.5 per cent of all manufacturing exporters export to one overseas country, close to 20 per cent export to ten or more countries and 1.5 per cent to more than 50 countries. For the US Bernard, Jensen and Schott (2005) report that around 56.6 percent of exporters ship products to exactly one foreign country, whereas the 7.7 percent of them to ten or more overseas markets. Muuls and Pisu (2007) report similar findings for Belgium.

3 Data and Sample Characteristics

Sampling Frame

The data used in the study were collected by OMB Research between May and July 2005 as part of a project funded by UK Trade and Investment (UKTI) titled 'Relative Economic Benefits of Exports and FDI'.[7] UKTI are the UK Government Agency responsible for aiding (domestic and foreign) firms to export from, or to locate (goods and service) production within the UK.

Of that wider study we use the part of the survey that covers export behaviour. Two types of firms were selected for this part of the survey. The first group consisted of firms that had participated in a UKTI support programme within the period April 2003 to September 2004. Interview with these firms therefore occurred a maximum of two years after their participation within the UKTI program.[8] The firms within the participation group are identified by UKTI files and represent the complete population of firms that participate in UKTI export programmes.[9] The number of firms participating in a UKTI programme and selected for the survey is chosen to provide sufficient coverage of the different types of UKTI programme, although within each programme the choice of which firms to interview was random.

The sampling structure offers a potentially interesting set of firms to investigate the importance of barriers to export market entry. Participation in a UKTI programme is voluntary and therefore indicates that the firm was attempting to expand export sales in existing or new markets within the sampling window. The sample therefore consists of firms with different levels of export experience and other measurable characteristics that were trying either to expand the intensive or extensive margins of exporting at a known and

[7] A detailed summary of the survey methods used to collect these data can be found in the OMB Research report 'Telephone Survey of UKTI Inward Investment and Trade Development Customers and Non-Users: Summary Report' July 2005.
[8] This helps to reduce the likelihood that the results are due simply to 'memory' effects, or what Bertrand and Mullainathan (2001) call recall bias.
[9] The exception to this is diplomatic support.

identical point in time.[10] Also included in the sample are a number of firms that were non-exporters before they participated in a UKTI export support programme and then, were either successful or failed to start exporting. The inclusion of the latter group is a unique characteristic of the data relative to those typically used to investigate issues of export market participation.

One potentially important issue with respect to the data relates to the possible upward bias in the number of barriers to exporting firms report. That participation in a UKTI export support programme is endogenous suggests an over-representation of firms that were facing barriers to exporting relative to the population of firms that attempted to increase exports during this period. Then, if difficulties in exporting are negatively correlated with size and experience, consistent with the declining extensive margin reported in Bernard *et al.* (2005), these missing firms are likely to be large and experienced exporters. This is likely to lead to an upward bias in the number of barriers firms reported relative to the reference population and to reduce the variation in the number of barriers reported across firm characteristics such as size and experience. Consistent with this explanation in our regressions we can show that controlling for participation in a UKTI programme removes the significance of almost all firm characteristics.[11]

To control for this aspect of the sampling frame we include the second part of the sample collected for UKTI. This consists of exporters that did not seek any support from UKTI. The firms in this group were identified (addresses and telephone numbers) using FAME (for manufacturing) and Dun and Bradstreet (for services) information sources.[12] Firms that did not participate in a UKTI programme report the same set of questions to participant firms, thereby offering a counterfactual to the role of barriers to export market expansion/participation. As shown in Table 1 these firms were large and experienced

[10] Along similar lines, by using a similar point in the business cycle we can feel greater confidence that the results are not driven by some time varying factor (exchange rates, external demand etc.) or other unobserved factor that we do not control for.

[11] These results are not reported for sake of brevity, but are available upon request from the authors.

[12] Equal numbers of manufacturing and service sector firms were chosen for this survey. These were further separated by the size of the firm, with an aim that 30 firms would be selected for interview from each of the following four size bands (1-9 employees; 10-49 employees; 50-249 employees; 250+ employees). Within the industry and size bands, selection was again random.

exporters relative to those drawn from UKTI files and therefore seem likely to provide a reasonable proxy for the under-sampled part of the population.

In addition however, the firms in the second part of the sample were asked whether the firm had sought information about export market entry from sources other than UKTI within the last two years. These sources include both private agencies, such as banks, consultancies and trade associations, as well as public agencies, such as Regional Development Agencies.[13] These are therefore firms that attempted to expand export sales during the relevant period and therefore should mirror those firms in the first part of the population. There are 86 of the 147 firms in the second part of the sample that sought information about exporting from non-UKTI sources. Investigation of the number of barriers reported by this group suggests that they report more barriers to exporting than the remaining firms that did not receive UKTI support.[14] In Section 5 we show the sensitivity of the results to the separation of firms according to whether they sought information about export market entry from UKTI or other sources.

Export Market Experience

Export market experience is likely to contain three main dimensions, the length of time the firm has been exporting, the number of markets it serves and the intensity with which it serves those markets. In the UKTI survey we have information on two of these and partial information on the third. We know in detail when they started exporting and their export intensity and for most firms that they attempted to expand into a new market two years prior to the survey.[15] We measure these at the date at which the survey was conducted (that is up to two years after participation in the UKTI programme).

[13] Often the information delivered through these sources in fact contains information originally drawn from UKTI. We thank UKTI for pointing this out to us.
[14] This outcome holds when we condition on the size, R&D intensity and industry characteristics.
[15] The two dimensions of experience that we observe in the data, age and intensity, are likely to be positively correlated with the third, the number of markets served, which in not observed in full detail. Damijan *et al.* (2007) report that export firms enter a small number of markets initially and add new markets relatively slowly, one every 2-3 years or so.

Six categories for the length of time the firm has exported are used (non-exporters, 0-2 years, 2-5 years, 5-10 years, 10-20 years and 20+ years). The firms that are included in the group of non-exporters are those that participated in a UKTI export programme but this did not lead to overseas sales, while those in the 0-2 year category are those firms from the same cohort of UKTI support programme that were successful. Firms are asked to report also about the ratio of firm exports to total output. Again this information is categorical. The information on these two variables is detailed in Table 1.

While it is the case that firms with longer export experience export a greater fraction of their total output, this is not a linear relationship. Those firms that started to export in the last two years have a mean (model) response that they export less than 15% of turnover. This is the same for firms that started to export between 2 and 5 years ago, although the median response is 16-50% of turnover. Firms in the group of starting to export over 5 years ago are spread across the export intensity bands, with some exporting a small share of total output and others a lot.

Respondents to the survey are asked a number of additional questions about their characteristics. This included information about their size, R&D intensity, ownership, their industry and the characteristics of their region and industry. A full list of the control variables used in the regression can be found in Table 2, and we leave a more detailed discussion to the Appendix.

Barriers to Exporting

The main advantage of the OMB survey is that it contains information about specific barriers to exports. Firms were read a list of 'issues' they might have encountered when trading overseas and asked to indicate whether each of these was a difficulty they had faced. The ordering of these questions was random.[16] These issues are listed in Table 3.

[16] While rich in detail, we recognise that a limitation of data of this type is that they capture perceptions of barriers to exporting and not actual costs incurred.

A number of these issues are comparable to measures used in the gravity equation literature. For example, Rauch and Trinade (2002) have previously stressed the importance of networks and information to trade between countries. The survey used in this study includes factors such as 'Obtaining basic information', 'Identifying the first contact' and 'Establishing initial dialogue'. Eaton and Kortum (2002) and Hummels (2001) investigate language differences as an impediment to trade. The survey allows us to identify several barriers arising from different language as well as the role of other cultural factors in the export decisions of firms.

Other aspects of the data set contain less detail than used in gravity equations but are more direct. Anderson and Marcouiller (2000) for example add a measure of institutional quality to a trade model with predation, while in a search model of trade Rauch and Trindade (2003) argue that lower business costs will improve the quality of matches between customers and suppliers. In the data contracting costs are captured in the measure of 'Problems dealing with legal, financial, tax and other regulations'. For some measures we have less information: Pozo (1992), Chowdhury (1993) and Parley and Wei (1993) have previously considered the effect of the level and uncertainty of exchange rates on trade. In the survey these aspects are captured by a single measure, 'Exchange rates and foreign currency'.

The degree to which different barriers are perceived to be as difficulties in exporting varies across the different barriers. Broadly, we might group them into three types. These are reported in Table 3 along with the percentage of positive replies. The barriers shown in Table 3 are divided in three groups based the results of factor analysis. This identified three clear groups.[17] The first group might be described as factors relating to 'networks' of the type discussed by Rauch (1999). Included in this group are barriers related to identifying the first contact, basic information and marketing. The second group appear to be connected to procedural matters and includes problems of regulation, tax, logistics and exchange rates. The final group includes 'cultural' barriers to entry. Included in this group are issues relating to culture and language.

[17] A fourth factor was also identified, although this did not turn out to be meaningful.

Interestingly, these three factors do not relate strongly with the percentage of firms identifying particular barriers. The least common obstacles to exporting appear to be related to 'Obtaining basic information about an export market'; 'Logistical problems'; 'Language barriers'; 'Cultural differences'; and 'Not having an office or site in an export market'. Between 30 and 37 percent of firms replied positively to the question they faced barriers of this type. Between 42 and 45 per cent of firms reported to face barriers deriving from 'Building relationships with key influencers or decision-makers'; 'Dealing with legal, financial and tax regulations and standards overseas'; 'A bias or preference on the part of overseas customers for doing business with firms established in their own country'; 'Establishing an initial dialogue with prospective customers or business partners'; and 'Exchange rates and foreign currency'. Finally, the most common export impediments are those associated with 'Identifying who to make contact with in the first instance' and 'The marketing costs associated with doing business in an overseas market'. More than 50 percent of firms surveyed reported to face these export impediments.

Table 3 makes clear an obvious similarity among some of the questions posed within the survey. An important issue is whether firms have a tendency to report the same barriers as a difficulty. We investigate this by estimating a correlation matrix between the different types of export market barrier in Table 4. One striking feature of the correlation matrix is the relatively low correlations between answers; the highest correlation is 0.48 (between barriers 2 – "Identifying who to make contact with in the first instance" - and 10 – "Establishing an initial dialogue with prospective customers or business partners"). The range of correlations across the different barriers is also quite low, the lowest correlation is 0.16 (between barriers 2 – "Identifying who to make contact with in the first instance" - and 5 – "Logistical problems"). To the extent that any group of barriers are related then the strongest correlations appear around those relating to identifying who contact (barrier 2), initial dialogue (barrier 10) and building relationships (barrier 3). The correlations between these three measures are all above 0.4.

Export Barriers and Experience

The data set we use in this study contains information about firm-level characteristics. Before going through the formal econometric analysis, it is of interest to investigate the

relationship between different types of barriers and some of these characteristics. Here, we comment upon the number of years firms have been active into export markets and their export intensity.

Figure 1 breaks down the frequency with which firms identified the different barriers as a significant impediment to export market entry broken down by the number of years of export experience of the firm (at the point at which the interviews were made). These graphs suggest that firms with greater experience in export markets are less likely to report they face any given barrier to exporting, although this effect is not universal. The negative relationship between the frequency of firms reporting one of these barriers and export experience is most pronounced for 'Identifying who to make contact with in the first instance', 'Building relationships with key influencers or decision-makers', 'Dealing with legal, financial and tax regulations and standards overseas', 'Establishing an initial dialogue with prospective customers or business partners', 'The marketing costs associated with doing business in an overseas market'. In contrast it appears that some barriers such as 'Logistical problems' and 'Exchange rates and foreign currency' become more common as export experience increases.

The remaining export impediments do not show any particular relationship with export experience. An extreme example of this is the barrier of 'Not having an office or site in an export market'. It was noted above that on average this did not appear to be an obstacle to exporting. But this is true only for experienced exporters. Nearly 60 percent of firms with no export experience reported this as a barrier to export. This may be considered as further evidence suggesting that export experience may change significantly the barriers to exporting perceived by firms.

Figure 2 repeats the analysis of Figure 1 but using the alternative measure of experience available to use, the export intensity of the firm. Overall, the frequency of barriers to exporting appear to be related to export intensity in a similar manner to export the number of years of exporting, but there are some noteworthy differences. For example, the share of firms reporting to face problems related to 'Identifying who to make contact with in the first instance' appears to increase with export intensity if this is above one percent. The same is

true for 'Dealing with legal financial and tax regulations overseas' and 'Marketing costs'. The other barriers showing a strong negative relationship with the number of years firms have been active in export markets, namely 'Building relationship with key influencers and decision makers' and 'Establishing an initial dialogue' are also negatively related to export intensity, although to a less degree. This can be the result of the fact that as firms penetrate new export markets and become more export oriented they are more likely to face the same type of barriers in different export markets. This can be particularly true for 'Identifying who to make contact with in the first instance' and 'Dealing with legal, financial and tax regulations'. Also the marketing costs associated to selling overseas could increase as export intensity rises since firms need probably to tailor their marketing policies to different customers in different countries.[18]

The barriers related to 'Logistical problems' and 'Exchange rates', which become more common as export experience rises also appear to be positively related to export intensity. This could be caused by the fact that as firms ship more goods overseas and to an increasing number of destinations it is likely that they will have to face more complex problems related to the delivery of the goods, deal with multiple exchange rates and will be more exposed to exchange rate risks.

4 Empirical Methodology

We want to model the effect of firm and industry level variable on the trade costs (y^*) generated by each export barrier. Trade costs are unobserved however. What we are able to observe is whether or not a firm report to face a particular export impediment. We define the binary variable $y = 1$ if the enterprise face a particular barrier and $y = 0$ otherwise.

Given this set up, we can estimate the following latent variable model for each barrier:

$$y_i^* = x_i\beta + \varepsilon_i$$

[18] This could take place through changes in advertisement campaigns, brochures for customers, participation in different trade fairs and so on.

$$with \quad y = 1 \text{ if } y_i^* > 0 \qquad and \qquad y = 0 \text{ if } y_i^* \leq 0$$

where i indexes firms; y_i^* is the latent variable, unobserved by the econometrician, which captures the trade costs associated to the barrier to export under scrutiny; x_i is the set of explanatory variables in Table 5, which are supposed to affect trade costs and β is the vector of parameters to be estimated; ε_i is a normal error term.

Assuming that firm i will report to face a specific barrier to export if it generates positive trade costs (i.e. $y_i^* > 0$) and will declare not to face the same barrier if it does not generate trade costs (i.e. $y_i^* \leq 0$), the probability of facing a particular barrier can be modelled through the standard probit specification as (see Verbeek 2005, pp 192):

$$P(y_i = 1 \mid x_i) = P(y_i^* > 0 \mid x_i) = P(x_i\beta + \varepsilon_i > 0) = P(\varepsilon_i \leq x_i\beta) = F(x_i\beta)$$

where $F()$ is the cumulative normal distribution, since ε_i is assumed to be normally distributed. The parameters of interest can then be estimated through standard maximum likelihood method.[19]

The second related issue that we want to examine concerns the severity of the barriers to export. Firms that declared to face a particular barrier were also questioned to rank the extent to which they felt this barrier was a difficulty in a scale from one (to no extent) to five (to a critical extent). Thus, we can define the categorical variable $y = 1, \ , \ ...5$ according to the reply firms gave about the strength of a specific barrier. This ordinal response can be modelled through a ordered probit model of the following type (Verbeek 2005, pp 203):

$$y_i^* = x_i\delta + \varepsilon_i$$

$$with \ y_i = j \ \ if \ \gamma_{j-1} \leq y_i^* < \gamma_j \ \ and \ j = 1,2,...J^{20}$$

y_i^* can still be considered as the actual trade costs firm i has to face to overcome the barrier to export. This is unobserved by the econometrician; x_i is the same set of explanatory

[19] All estimations have been conducted using Stata 9.
[20] In this exercise $J = 5$

variables used in the probit model.[21] Then, the probability of the firm reporting one of the particular *j* values is the probability of the latent variable to fall within the γ_{j-1} - γ_j range.[22] For this reason we have that:

$$P(y_1 = 1 \mid x_i) = F(-\infty < y_i^* \leq \gamma_1 \mid x_i) = F(-x_i\delta)$$

$$P(y_1 = j \mid x_i) = F(\gamma_{j-1} \leq y_i^* < \gamma_j \mid x_i) = F(\gamma_j - x_i\delta) - F(\gamma_{j-1} - x_i\delta) \quad \text{for every } 1 < j < J$$

$$P(y_1 = J \mid x_i) = F(\gamma_{j-1} < y_i^* < \infty \mid x_i) =) = 1 - F(\gamma_{j-1} - x_i\delta)$$

As before the parameter of the model along with the ancillary boundary value of γs can be estimated through standard maximum likelihood. Unlike in the probit, the sign of the estimated parameters is not generally informative about the sign of the respective marginal effects.[23] Therefore, marginal effects, one for each different outcome, need to be calculated as

$$\frac{\partial P(y_i = j \mid x_i)}{\partial x_i} = [f(\gamma_j - x_i\beta) - f(\gamma_{j-1} - x_i\beta)]\beta$$

Marginal effects of dummy variables are computed as the difference between the probabilities obtained when the dummy takes the two different values. Given that these marginal effects are non-linear functions of the parameters of interest their standard errors are computed through the delta method (see Greene 2000, pp 357-358).

5 Results

In Tables 5a/b we investigate the role of firm and industry-level variables on the probability that a firm will face each of twelve barriers to exporting. Export experience is measured using the first date of entry by the firm with the omitted category the most experienced firms (those who started exporting over 20 years ago). The reported effects are marginal effects: the effect of the included age category relative to the most export experienced firms.

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[21] This model is however estimated using only a subset of the observations used for the Probit. This is because the question concerning the importance of the benefits from exporting was posed only to those firms that reported positive benefits.

[22] The ordered probit model assumes that $\gamma_0 = -\infty$ and $\gamma_J = \infty$.

[23] Only for the lowest and largest outcome the sign of the marginal effects can be derived from the sign of the related parameters. If β is positive (negative) then the sign of the marginal effect for the highest outcome is positive (negative) and the sign of the marginal effect for the lowest outcome will be negative (positive).

Overall the date of initial export market entry would appear to be a good predictor of when firms identify an individual barrier as important. At least one of the export experience variables is positive and significant in nine of the twelve barriers. Barriers and therefore trade costs are higher in low experienced firms. While almost always positive the experience variables are not significantly correlated with the problems due to differences in the legal, finance and tax regulations that exist abroad, home bias, overseas regulations and exchange rates. In the gravity literature measures of institutional quality and business costs have consistently been found to be correlated with measures of bilateral trade (Anderson and Marcoullier, 2000; Levchenko 2004; de Groot et al., 2004; and Linders et al, 2005), whereas measures of exchange rates have not (Pozo, 1992; Chowdhury, 1993; and Parley and Wei, 1993).

Among the barriers that in the descriptive analysis we identified as most strongly negatively related to export experience only those related to foreign legal, tax and other regulations appear not to be affected by the number of years spent exporting. For the others, namely 'Identifying first contact', 'Building relationships', 'and 'Establishing an initial dialogue' our results show that firms with a limited export experience, compared to those with more than 20 years, are more likely to face these as barriers to exporting. Clearly these contain a number of the information barriers identified by Rauch and Trindade (2002).

In general, in those regressions where experience is found to matter, the importance of a given barrier declines with experience, although not always in a simple manner. For example, firms that failed to become exporters identify seven different barriers in a manner statistically different from the most experienced exports (the omitted category), while firms with 2-5 years of experience identify nine different barriers. Seven of these nine barriers match those found for the most inexperienced firms. Following the slow addition of new export markets by firms in Damijan et al. (2007), if firms in the 2-5 years age group are interpreted as firms that are trying to expand into new foreign markets or extend export sales in existing ones, then this result might be viewed as consistent with an interpretation

that firms enter the markets with the lowest relative sunk costs first, but that there is learning in this process.

It is almost always the case that the estimated marginal effect for the firm in the 2-5 age group are lower than for the group with no export experience. For example, having no-export experience raises the probability of identifying the barrier related to identifying the first contact as important by 27 per cent relative to the most experienced exporters, compared to 20 per cent for firms with 2-5 years of experience. Or initial dialogue by 19 and 15 per cent respectively. The barriers encountered when trying to enter additional export markets are the same as those encountered for the first export market, but they generate smaller trade costs. This does not happen in all cases however. The exception is the barrier relating to building relations with overseas customers. Here we find that firms with no export experience are 21 per cent more likely to this as a barrier to export market entry relative to the most experienced exporters, while firms with 2-5 years of previous experience are 28 per cent more likely.

Considering the non-linear pattern between export experience and trade costs more generally we find that there are differences in the degree of non-linearity across the barriers. The estimated marginal effects are at their maximum for firms with less than 2-years of export experience for building relationships, initial dialogue, and marketing (marginal effects 31, 20 and 21 per cent respectively), for firms with 2-5 years of experience for logistic problems (marginal effect 13 per cent) and for firms with 5-10 years of experience for language and cultural barriers (marginal effects 16 and 27 per cent respectively).

A second set of interesting comparisons come from the differences between the non-exporters and new entrants. Of the seven barriers identified by non-exporters as an impediment to exporting three are also significant for new entrants. Interestingly these three all belong to the Network and Marketing group identified by the factor analysis. The ones no-longer significant relate to ‘Obtaining basic information about an export market’, ‘Identifying who to make contact with in the first instance’, ‘Cultural differences’, and ‘Not having an office or site in an export market’. This would suggest it is these barriers in particular that are important for why some firms do not enter export markets.

Finally, the estimated marginal effects also suggest that there are diminishing marginal returns to experience, although how quickly these occur differs markedly across the different barriers. This information is presented in Table 6. Concentrating on those barriers that show a general negative correlation with export experience and export barriers we find that costs associated with identifying first contact and marketing stop being significant after the firm has 2-5 years of export experience. Additional export experience appears to have no effect on whether the firm is likely to identify this as a barrier after this point. Barriers relating to whom to make initial contact with and cultural differences persist somewhat longer. They cease to be significant after 5-10 years of experience. Finally barriers relating to other networking and marketing barriers, such as obtaining basic information, building relationships and not having an office or site in an export market persist the longest. For these barriers, firms with 10-20 years of export experience are still statistically more likely to identify them as an impediment to exporting than firms with more than 20 years of experience, with between 10 and 15 per cent higher probability of identifying these barriers.

Of the other control variables, we find that few are statistically significant at conventional levels. We investigated whether this was due to a correlation of the other firm controls with experience and found this was not so. When we omit the experience variable from the regression the significance of the additional covariates does not change. The exception to this general trend are the agglomeration measures, although not always in the expected manner. The measure of whether there are 'lead firms' in the same region is the most commonly significant (for basic information; identifying first contact; home bias; and initial dialogue), while the coefficient on the extent of staff movement between firms is significant on only one occasion (logistic problems). Somewhat perversely firms with other export firms in there area are more likely to report that barriers in the form of basic information and no office abroad.

Export Age and Export Intensity

We run the same regression in Tables 5a/b including both of our measures of export experience, i.e. adding the measure of export intensity of the firms. The results are presented in Table 7a/b (we include the other control variables but do not report them in the

tables). Export intensity is a different measure of the export experience within the firm. It is of interest to understand if the effects captured by export age are determined by the length of time firms have been active in export markets or whether they are due to export intensity. To simplify the presentation we report the result on export age and export intensity only.

The message of the results in Table 7a/b is that the export experience gained by the length of time firms have been active in export market is important in reducing barriers to export whereas export experience measured by the proportion of output shipped abroad has almost no effect. The inclusion of the proportion of output shipped abroad does not change the relationship between export age barriers to exporting. Export intensity itself has no significant effect on barriers to exporting in all cases except one, that relating to exchange rates and foreign currency. Here we find that less export intensive firms are less likely to find these as a problem. This is consistent with the view that this measure of barrier is likely to capture, in part at least, variable rather than fixed trade costs. This would also suggest that exchange rates are most likely to affect the intensive rather than the extensive margin of UK exports.

Robustness – Sample Construction

In Section 3 it was noted the characteristics of the sample in two parts may have some influence on the conclusions drawn. This sub-section shows that sample construction has some effects on the results shown so far, but it does not completely explain the correlation with experience we find in the data. In Table 8a/b we check the robustness of our results adding to the regression equation a control for whether or not firms attempting to expand export sales during the sample period sought information to do so from UKTI or elsewhere. We label this variable broad-help.

We find some influence on the results from this additional variable. Now experience matters for six out of the twelve barriers to exporting (it mattered for nine without this measure). Typically this is due to the loss of significance of variables significant at the 10 per cent level in Tables 5a/b - there is a small fall in the estimated marginal effect. Experience matters for three out of five of the networks and marketing group, none of the

procedural and exchange rate group and three out of four in the cultural group of barriers to trade. In detail across the age groups, we find that firms with no export experience are now likely to report that three barriers are a serious impediment to export market entry (7 previously), firms in the 0-2 age bracket report that one barrier is significant (3 previously), firms with 2-5 years of experience report on six barriers (9 previously), while there are 3 for firms with 5-10 years of experience (4 previously) and 1 for 10-20 years of experience (2 previously).

Of the changes in significance that occur the most noticeable relate to 'Marketing costs', where significance is lost completely. Other changes that occur concern 'Obtaining basic information' which the relationship with non-exporters become insignificant for and weakly significant for firms with 2-5 years of export experience. Similarly, the weak significant effects for 'Logistical problems' and 'Language barriers', found by Eaton and Kortum (2000) and Hummels (2001) to be important at the aggregate level have no systematic variation with experience at the micro level.[24] 'Cultural differences' becomes only weakly significant for non-exporters as does 'No office abroad' for companies with 2-5 years of export markets involvement. Also 'Establishing initial dialogue' appear to be insignificant in Table 8b compared to weakly significant in Table 5b.

It was also noted previously that there was a strong overlap between the barriers reported by firms that had failed to enter export markets and those with 2-5 years of experience. We now find that of the five barriers identified by firms with 2-5 years of export experience, three match those reported by non-exporters. The differences occur for basic information and building relationships. However the t-statistics for the non-exporters are high and when we choose them as the omitted category (experience is measured relative to them) we

[24] It is worth emphasizing that the approach we follow is different from a methodological point of view from the studies using gravity equations and the results need to be interpreted in different ways. The literature employing gravity equations broadly infer the existence and extent of trade costs regressing bilateral trade flows on variables capturing some form of trade barriers, such as those relating to language differences, institutional quality and so on. Thus, this type of studies assess how much trade barriers hinder international trade and infer from this the associated trade costs. In this exercise, we estimate what is the effect of export experience and other firm and industry-level controls on the trade costs generated by the same types of barriers, looking at the probability of firms reporting to face each barrier to exports.

find no statistically significant difference between them and firms with 2-5 years of export experience.

Robustness – Market Specific Costs

Given the importance of experience to the barriers to trade across firms in the results presented thus far, a question that arises is the extent to which these results reflect the effect of some omitted variable such as the market that the firm has recently entered (attempted to enter in the case of non-exporters). If for example firms enter the market with the lowest sunk costs first and the marginal change in sunk costs from each new market is decreasing, the first derivative of the function for trade-costs were positive and the second derivative negative, then this would give a similar relationship with experience identified thus far in the data. This hypothesis is broadly consistent with that put forward on the market entry behaviour of multinational firms in Yeaple (2005), and Feinberg (2003), although it contrasts with the shape of the extensive margin of exports reported in Bernard *et al*. (2005) and Eaton *et al*. (2004).

Within the survey we do not have information on the export market that the firm tried to enter but it does contain information on the countries (in some cases regions) that the firm requested information on when seeking export support. This information exists for both the firms that participated within a UKTI program but also those firms that sought information from non-UKTI sources. These are the firms we know with certainty tried to expand export sales in the past two years and therefore for which the barriers to exporting are of likely to be most reliably measured. Unfortunately firms can and often do request information for more than one country or region at a time. In Table 9 we aggregate the data to a regional basis (country specific data is available only for Europe, China and Japan) and report the number of requests for information against experience. This table suggests a general tendency for more experienced firms to request information on a more diverse set of countries and on countries those that are located further from the UK.

In Tables 10a and 10b we report the regressions for each of the barriers to exporting controlling for the regions for which the firm requested information (as well as broad help).

It would appear that market specific barriers to exporting do not explain the relationship found previously for export experience. There is only one change in the results: the coefficient for firms with 2-5 year of previous export experience is significant at the 10.2 per cent level for the barrier 'Having no office abroad'. Of the regional identifiers themselves there appear to be few identifiable patterns, there are only four examples of where the region identifier is significant in more than one regression (and a maximum of two) with one of these the residual region. Firms requesting information on South East Asia were less likely to cite 'Building relations' or 'Exchange rates' as issues, while those requesting information for South America were more likely to list 'Logistic Problems' and 'Exchange Rates'. Finally, firms requesting information on North America were more likely to cite 'Logistics' and perhaps surprisingly 'Basic information' as barriers to exporting.

The Importance of Individual Barriers

As a final step in investigating barriers to export we report results concerning the strength of these barriers estimating the ordered probit modem described in the previous sction. Firms participating in the survey and replying positively to the question about the existence of each barrier were asked at what extent they felt each of them was a difficulty. The answer could range from 1 ("To no extent") to 5 ("To a critical extent"). This question therefore provides information of whether two firms with different characteristics face the same trade costs generated by a particular barrier, conditional on having previously identified it as such. Given the sampling frame it is likely that the results from this exercise offer a good mean of testing the robustness of the general hypothesis that export experience is important for the barriers to exporting and trade costs they generate.

A downside of the methodology used here is that because of large number of outcomes (we model five possible outcomes) the raw statistical output is somewhat difficult to interpret. For this reason we display the marginal effect of export experience only.

In Table 11 we summarise the estimated marginal effects for each of the difference scores firms could rate a given barrier (1-5) against their export experience by indicating the sign and the significance of the estimated marginal effect (blank cells indicate insignificant

marginal effects).[25] As Table 11 makes clear export experience is a significant determinant of the severity of the barriers faced in a number of cases, there are a number of +'s and –'s in the table. Given the nature of the answers that firms were allowed to give, and the results shown so far, we would expect that firms with no or little export experience face larger trade costs, associated with specific barriers, than established exporters and therefore have a higher predicted probability to report strong barriers. This implies that we expect to find more often that barriers were a problem to a critical extent (a score of 4 or 5), and a lower probability they report a barrier was a problem to a lesser extent (a score of 1 or 2). This involves positive marginal effects of export experience on answer of 4 or 5 and negative ones for those on answer of 1 and 2.

The fact that the negatives are concentrated on the left of the table and the positives on the right indeed reinforces the conclusion that these effects decline with experience. The significant coefficients appear to be concentrated in the columns of medium-low and medium-high barriers to exporting. This reflects in part the popularity of these scores (2 and 4) in the responses by firms such that the effects of export experience are better identified.

While export experience would appear to matter in most cases it is not true that it matters for all barriers. For example, the extent of trade costs associated with identifying first contacts, cultural differences and exchange rates do not depend on experience, and this is close to being the case for marketing costs. This result occurs despite the fact that export experience was found to be a determinant of barriers to exporting in the probit regressions reported in Table 5a/b for identifying first contact and cultural differences. In these cases firms are more likely to reply yes in the first stage question relative to the most experienced exporters, but then do not identify significant differences in the severity of those barriers relative to the most experienced exporters.

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[25] These marginal effects are derived from estimating an ordered probit model with the same explanatory variables as in Table 8a/b. Interpreting the marginal effects in Table 11, it is worth keeping in mind that the reference category is still that identifying the most experienced exporters (i.e. those with more than 20 years of export experience). Therefore, a positive (negative) marginal effects of a particular export experience category for a certain outcome implies that the firms in that category are more (less))likely to report that certain outcome than the most experience exporters.

Aside from the diminishing returns to experience there are perhaps fewer obvious patters that can be picked out from Table 11 compared to the probit regressions in Table 5a/b, despite the larger number of significant coefficients. The patterns that do emerge tend to reinforce the view that barriers are more severe the less the export experience of the firm. The first pattern worth noting is that the change from negative to positive occurs for the mid-critical (a score of 3) in all but one case, that of logistical problems. As noted already there are noticeably fewer significant estimated marginal effects for this value of the importance of barriers compared to the two columns along side it (scores of 2 and 4). There would appear therefore to be important change in the importance of barriers and the role of experience around the middle of the distribution of whether a barrier is critical or not.

Another pattern evident in the table is that the significant estimated marginal effects are concentrated on firms that do not-export, have less 2 years of experience, or have been exporting between 2 and 5 years. Of the 60 significant marginal effects in the table 42 regards for the least experienced firms. Similarly, the significant coefficients in the column identifying that a barrier was important to a critical extent are again concentrated on these less experienced firms. Of the 8 significant estimated marginal effects in this column 7 relate to firms with 5 or less years of experience or who failed to start exporting.

6 Conclusions

In this exercise we provided evidence on the barriers firms both whishing to export and established exporters face. This issue has not been previously investigated by the existing literature in such detail. This is largely because of the limited information large firm-level data set usually offers on trade costs and of the short time period available. This has prevented researchers from considering the whole export experience of firms.

Using a survey specifically commissioned by UKTI to investigate export impediments, we are able to provide novel evidence on this topic. Identifying the first contact and marketing costs appear to be among the most significant barriers to export. This is true for both firms that tried, but did not manage to export and for recent exporters. The probability the firm

will face these barriers decreases as export experience increases. Other relevant barriers seem to be establishing an initial dialogue with prospective clients and partners (akin to identifying the first contact) and building relationships with key influencers and decision makers. For other barriers, such as language barriers, obtaining basic information about foreign markets, and dealing with legal, financial and tax regulation overseas the probability of facing them is lower and decline further with the number of years of export market experience.

These findings can be connected to the literature of trade costs reviewed recently by Anderson and Wincoop (2004). This literature has shown that trade costs are large and associated with barriers such as language differences, imperfect information, institutional quality and so on. Our results show that among many firms and industry-level variables only export experience appear to be significantly related, in a negative way, to trade costs generated by specific barriers.

These formal econometric results suggest the existence of a process of learning to export, whereby firms are able to learn from their past experience how to overcome new export barriers and therefore to incur in lower trade costs. Further progress in this field of enquiry would benefit from additional research on how specific export impediments change as the firm adds new export destinations or exports new products. However, this is likely to require further surveys collecting precise information about the foreign markets firms serve and the products they export in addition to the types of export barriers they face.

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Table 1: Export experience and export intensity

Export intensity / Export experience	0% of turnover	<15% of turnover	16-50% of turnover	50%+ of turnover	*Total*
Do not export	26				26 (5.56%)
Within the last 2-years		20	6	7	33 (7.17%)
Between 2 and 5 years ago		33	30	19	82 (17.83%)
Between 5 and 10 years ago		21	19	19	59 (12.83%)
Between 10 and 20 years ago		29	30	44	103 (22.39%)
More than 20 years ago		37	67	53	157 (34.14%)
Total	26 (5.65%)	140 (30.43%)	152 (33.04%)	142 (30.87%)	460 (100%)

Source: OMB survey. Authors' calculation.

Table 2: Industry and firm-level variables

Firm Variables	Industry Variables
Date of first export market entry (6 categories)	Lots of firms in your area with export experience (binary)
Export Intensity (4 categories)	There is considerable movement of staff between firms in your area (binary)
Employment (4 categories)	Some of the leading firms from your industry are based in your area (binary)
R&D intensity (5 categories)	Manufacturing Indicator (binary)
Multinational Indicator	
Subsidiary Indicator	
Member of UK or International Trade Association	

Source: OMB survey. Notes: Authors' calculation.

Table 3: Barriers to Exporting

Barrier	% Firms Identifying this as a Barrier
Group 1 – Networks and Marketing	
Obtaining basic information about an export market	29.8
Identifying who to make contact with in the first instance	53.7
Building relationships with key influencers or decision-makers	43.5
Establishing an initial dialogue with prospective customers or business partners	42.8
The marketing costs associated with doing business in an overseas market	51.3
Group 2 – Procedural and Exchange Rates	
Dealing with legal, financial and tax regulations and standards overseas	42.2
Logistical problems	35.0
Exchange rates and foreign currency	41.7
Group 3 - Cultural	
Language barriers	36.5
Cultural differences (not language)	32.4
Not having an office or site in an export market	37.2
A bias or preference on the part of overseas customers for doing business with firms established in their own country	45.2

Source: OMB survey.

Table 4: Correlation matrix between barriers to export market entry.

	1	2	3	4	5	6	7	8	9	10	11	12
1	1											
2	.395	1										
3	.340	.401	1									
4	.262	.236	.281	1								
5	.209	.160	.183	.324	1							
6	.197	.179	.236	.257	.258	1						
7	.219	.261	.339	.320	.223	.295	1					
8	.227	.245	.305	.299	.190	.248	.304	1				
9	.230	.257	.278	.278	.194	.236	.332	.278	1			
10	.359	.478	.411	.230	.129	.249	.264	.280	.326	1		
11	.311	.377	.354	.304	.241	.215	.321	.245	.290	.351	1	
12	.220	.167	.183	.259	.229	.154	.177	.206	.247	.194	.251	1

Source: OMB survey. Notes: Authors' calculation. Notes: 1 = Obtaining basic information about an export market; 2 = Identifying who to make contact with in the first instance; 3 =Building relationships with key influencers or decision-makers; 4= Dealing with legal, financial and tax regulations and standards overseas; 5 = Logistical problems ;6= Language barriers; 7 = Cultural differences (not language); 8 = Not having an office or site in an export market; 9 = A bias or preference on the part of overseas customers for doing business with firms established in their own country; 10 = Establishing an initial dialogue with prospective customers or business partners; 11 = The marketing costs associated with doing business in an overseas market; 12 = Exchange rates and foreign currency.

Table 5a: Probit regression for the probability of facing each barrier

	Basic info.	Identifying first contact	Building relations	Initial dialogue	Markting costs	Legal, finance, tax regs overseas
Firm Variables						
Experience						
Non-exporter	0.184	0.272	0.213	0.194	0.208	0.148
	(1.66)+	(2.55)*	(1.86)+	(1.72)+	(1.87)+	(1.27)
<2 years	0.017	0.155	0.314	0.196	0.211	0.120
	(0.18)	(1.57)	(3.15)**	(1.89)+	(2.10)*	(1.15)
2-5 years	0.153	0.198	0.283	0.145	0.166	0.087
	(2.11)*	(2.68)**	(3.76)**	(1.91)+	(2.17)*	(1.15)
5-10 years	0.067	0.001	0.171	0.031	0.127	0.118
	(0.85)	(0.01)	(2.05)*	(0.37)	(1.54)	(1.43)
10-20 years	0.111	0.044	0.156	0.036	0.024	0.086
	(1.72)+	(0.65)	(2.30)*	(0.54)	(0.37)	(1.29)
Employment						
10-49	-0.002	0.012	0.052	0.099	0.014	0.031
	(0.02)	(0.14)	(0.61)	(1.16)	(0.16)	(0.37)
49-249	-0.005	0.019	0.082	0.076	-0.091	0.038
	(0.05)	(0.19)	(0.81)	(0.76)	(0.88)	(0.38)
250+	0.010	0.017	0.213	-0.034	0.031	0.129
	(0.09)	(0.15)	(1.91)+	(0.30)	(0.27)	(1.15)
No R&D	-0.079	-0.151	-0.092	-0.055	-0.129	-0.051
	(1.25)	(2.13)*	(1.33)	(0.77)	(1.83)+	(0.73)
Low R&D		-0.308	-0.285	-0.116	-0.189	-0.198
		(1.49)	(1.58)	(0.57)	(1.00)	(1.10)
Medium-Low	0.027	0.042	-0.028	0.048	0.167	0.043
R&D	(0.28)	(0.40)	(0.27)	(0.46)	(1.58)	(0.42)
Medium-High	-0.052	-0.020	0.008	-0.033	0.012	-0.102
R&D	(0.63)	(0.22)	(0.09)	(0.37)	(0.13)	(1.14)
MNE dummy	0.046	-0.000	0.081	0.033	-0.130	0.104
	(0.65)	(0.00)	(1.05)	(0.44)	(1.70)+	(1.40)
Subsidiary	0.006	0.126	0.126	0.122	0.098	0.073
dummy	(0.09)	(1.71)+	(1.71)+	(1.69)+	(1.35)	(1.03)
Member of	0.001	0.055	0.038	0.038	0.110	0.140
Trade assoc.	(0.02)	(1.12)	(0.78)	(0.77)	(2.22)*	(2.89)**
Industry Variables						
Export	0.111	0.066	0.042	0.042	0.037	0.028
agglomeration	(2.27)*	(1.26)	(0.81)	(0.81)	(0.70)	(0.55)
Staff Movement	-0.026	0.059	-0.053	-0.027	-0.051	0.003
	(0.46)	(0.93)	(0.86)	(0.44)	(0.80)	(0.04)
Technical	-0.090	-0.150	-0.079	-0.130	0.008	0.001
Frontier	(1.78)+	(2.68)**	(1.41)	(2.37)*	(0.14)	(0.01)
Manufacturing	0.049	0.051	0.045	0.042	0.044	-0.036
Dummy	(1.04)	(1.00)	(0.88)	(0.82)	(0.86)	(0.70)
Observations	439	448	448	448	448	448

Source: OMB survey. Notes: Authors' calculation. Notes: Robust z statistics in parentheses; + significant at 10%; * significant at 5%; ** significant at 1% ; the reported coefficients all refer to estimated marginal effects (calculated at the mean of the right hand side variables). Omitted category for export years is 20+ years, for export intensity is 0%-5%, for employment is 0-10 employees, for R&D is Zero R&D. Omitted category for export years is 20+ years, for export intensity is 0%-5%, for employment is 0-10 employees, for R&D is Zero R&D.

Table 5b: Probit regression for the probability of facing each barrier

	Logistic problems	Exchange rates	Language barriers	Cultural diffs.	No office abroad	Home bias
Firm Variables						
Experience						
Non-exporter	0.067	-0.041	0.146	0.259	0.356	0.002
	(0.58)	(0.36)	(1.28)	(2.23)*	(3.16)**	(0.02)
<2 years	-0.026	0.063	-0.098	0.098	0.138	-0.057
	(0.25)	(0.62)	(0.93)	(0.93)	(1.32)	(0.55)
2-5 years	0.125	-0.038	0.128	0.202	0.176	-0.081
	(1.69)+	(0.50)	(1.69)+	(2.69)**	(2.25)*	(1.07)
5-10 years	0.078	0.038	0.163	0.270	0.233	0.020
	(0.98)	(0.46)	(2.01)*	(3.29)**	(2.75)**	(0.24)
10-20 years	0.075	0.040	0.067	0.087	0.044	-0.070
	(1.16)	(0.60)	(1.01)	(1.34)	(0.65)	(1.06)
Employment						
10-49	-0.074	0.107	0.026	0.095	0.024	0.137
	(0.91)	(1.27)	(0.32)	(1.16)	(0.28)	(1.60)
49-249	0.071	0.077	0.133	0.159	-0.009	0.010
	(0.75)	(0.79)	(1.37)	(1.65)+	(0.09)	(0.10)
250+	0.042	0.145	0.283	0.385	0.276	0.049
	(0.39)	(1.27)	(2.45)*	(3.43)**	(2.40)*	(0.44)
No R&D	-0.076	0.005	-0.070	-0.020	-0.027	0.004
	(1.16)	(0.08)	(1.04)	(0.30)	(0.39)	(0.05)
Low R&D	-0.078	-0.035		-0.222	-0.334	-0.117
	(0.45)	(0.18)		(1.54)	(2.27)*	(0.62)
Medium-Low	0.052	0.074	-0.055	-0.002	0.133	0.246
R&D	(0.53)	(0.73)	(0.57)	(0.03)	(1.28)	(2.40)*
Medium-High	0.056	-0.076	-0.051	0.014	0.043	-0.037
R&D	(0.64)	(0.85)	(0.59)	(0.17)	(0.48)	(0.40)
MNE dummy	0.038	-0.162	-0.034	-0.005	-0.110	0.021
	(0.54)	(2.23)*	(0.47)	(0.07)	(1.55)	(0.28)
Subsidiary	-0.077	0.006	-0.008	0.103	-0.012	0.083
dummy	(1.17)	(0.09)	(0.11)	(1.46)	(0.17)	(1.16)
Member of	0.083	0.009	0.054	0.049	0.109	0.102
Trade assoc.	(1.80)+	(0.18)	(1.13)	(1.07)	(2.28)*	(2.07)*
Industry Variables						
Export	0.030	0.027	0.066	-0.019	0.150	0.056
agglomeration	(0.61)	(0.54)	(1.28)	(0.40)	(3.02)**	(1.08)
Staff Movement	-0.101	0.013	0.002	0.040	0.041	0.072
	(1.72)+	(0.20)	(0.04)	(0.69)	(0.69)	(1.14)
Technical	-0.071	-0.016	-0.051	-0.005	-0.059	-0.098
Frontier	(1.35)	(0.30)	(0.96)	(0.10)	(1.10)	(1.76)+
Manufacturing	0.083	0.068	0.050	0.019	0.021	0.046
Dummy	(1.70)+	(1.34)	(1.01)	(0.41)	(0.42)	(0.90)
Observations	448	448	439	448	448	448

Source: OMB survey. Notes: Authors' calculation. Notes: Robust z statistics in parentheses; + significant at 10%; * significant at 5%; ** significant at 1% ; the reported coefficients all refer to estimated marginal effects (calculated at the mean of the right hand side variables). Omitted category for export years is 20+ years, for export intensity is 0%-5%, for employment is 0-10 employees, for R&D is Zero R&D. Omitted category for export years is 20+ years, for export intensity is 0%-5%, for employment is 0-10 employees, for R&D is Zero R&D.

Table 6: Point beyond which additional experience no longer matters

Export Experience	Barrier
2-5 years	Establishing an initial dialogue with prospective customers or business partners
	The marketing costs associated with doing business in an overseas market
5-10 years	Identifying who to make contact with in the first instance
	Cultural differences
10-20 years	Obtaining basic information about an export market
	Building relationships with key influencers or decision-makers
	Not having an office or site in an export market

Source: OMB survey. Notes: Authors' calculation.

Table 7a: Probit model adding export intensity

	Basic info.	Identifying first contact	Building relations	Initial dialogue	Marketing costs	Legal, finance, tax regs overseas
Experience						
Non-exporter	0.179	0.259	0.255	0.222	0.196	0.146
	(1.53)	(2.32)*	(2.16)*	(1.90)+	(1.68)+	(1.20)
<2 years	0.039	0.179	0.308	0.193	0.229	0.131
	(0.38)	(1.78)+	(3.01)**	(1.81)+	(2.23)*	(1.23)
2-5 years	0.163	0.211	0.276	0.141	0.176	0.093
	(2.21)*	(2.84)**	(3.59)**	(1.83)+	(2.27)*	(1.21)
5-10 years	0.076	0.013	0.171	0.030	0.136	0.123
	(0.96)	(0.15)	(2.04)*	(0.37)	(1.63)	(1.48)
10-20 years	0.117	0.050	0.164	0.042	0.028	0.090
	(1.80)+	(0.73)	(2.40)*	(0.62)	(0.42)	(1.33)
Intensity						
<15%	-0.043	-0.074	0.061	0.036	-0.058	-0.025
	(0.74)	(1.13)	(0.94)	(0.56)	(0.88)	(0.40)
16%-50%	0.009	-0.003	0.082	0.053	-0.004	0.008
	(0.15)	(0.04)	(1.31)	(0.85)	(0.06)	(0.12)
Observations	439	448	448	448	448	448

Source: OMB survey. Notes: Authors' calculation. Notes: Robust z statistics in parentheses; + significant at 10%; * significant at 5%; ** significant at 1%; the reported coefficients all refer to estimated marginal effects (calculated at the mean of the right hand side variables); these regressions include measures of firm size (employment), R&D intensity, MNE indicator, subsidiary indicator agglomeration variables, and whether the firm is a member of a trade association. Omitted category for export years is 20+ years, for export intensity is 0%-5%, for employment is 0-10 employees, for R&D is Zero R&D.

Table 7b: Probit model adding export intensity

	Logistic problems	Exchange rates	Language barriers	Cultural diffs.	No office abroad	Home bias
Experience						
Non-exporter	0.024	-0.125	0.130	0.302	0.368	0.033
	(0.21)	(1.11)	(1.10)	(2.49)*	(3.10)**	(0.28)
<2 years	-0.006	0.148	-0.088	0.113	0.132	-0.055
	(0.06)	(1.42)	(0.82)	(1.05)	(1.24)	(0.52)
2-5 years	0.140	0.015	0.136	0.205	0.171	-0.084
	(1.86)+	(0.19)	(1.77)+	(2.68)**	(2.17)*	(1.10)
5-10 years	0.085	0.070	0.168	0.278	0.231	0.023
	(1.05)	(0.85)	(2.06)*	(3.35)**	(2.71)**	(0.27)
10-20 years	0.073	0.050	0.067	0.100	0.045	-0.063
	(1.12)	(0.74)	(1.01)	(1.51)	(0.65)	(0.93)
Intensity						
<15%	-0.078	-0.243	-0.039	0.015	0.027	0.028
	(1.30)	(3.93)**	(0.63)	(0.24)	(0.42)	(0.43)
16%-50%	-0.063	-0.106	-0.017	0.087	0.020	0.064
	(1.10)	(1.75)+	(0.28)	(1.49)	(0.33)	(1.03)
Observations	448	448	439	448	448	448

Source: OMB survey. Notes: Authors' calculation. Notes: Robust z statistics in parentheses; + significant at 10%; * significant at 5%; ** significant at 1%; the reported coefficients all refer to estimated marginal effects (calculated at the mean of the right hand side variables); these regressions include measures of firm size (employment), R&D intensity, MNE indicator, subsidiary indicator agglomeration variables, and whether the firm is a member of a trade association. Omitted category for export years is 20+ years, for export intensity is 0%-5%, for employment is 0-10 employees, for R&D is Zero R&D.

Table 8a Probit model adding broader measure of help

	Basic info.	Identifying first contact	Building relations	Initial dialogue	Markting costs	Legal, finance, tax regs overseas
Experience						
Non-exporter	0.155	0.239	0.178	0.153	0.149	0.134
	(1.40)	(2.17)*	(1.54)	(1.34)	(1.29)	(1.14)
<2 years	-0.007	0.121	0.287	0.161	0.161	0.108
	(0.07)	(1.21)	(2.84)**	(1.54)	(1.57)	(1.03)
2-5 years	0.127	0.161	0.252	0.106	0.110	0.075
	(1.75)+	(2.12)*	(3.27)**	(1.38)	(1.38)	(0.96)
5-10 years	0.047	-0.031	0.145	-0.000	0.080	0.108
	(0.60)	(0.38)	(1.72)+	(0.00)	(0.95)	(1.29)
10-20 years	0.112	0.048	0.161	0.040	0.037	0.088
	(1.73)+	(0.71)	(2.34)*	(0.59)	(0.53)	(1.32)
Broad-Help	0.118	0.208	0.180	0.198	0.328	0.066
	(1.62)	(2.59)**	(2.29)*	(2.58)**	(4.15)**	(0.88)
Observations	439	448	448	448	448	448

Source: OMB survey. Notes: Authors' calculation. Notes: Robust z statistics in parentheses; + significant at 10%; * significant at 5%; ** significant at 1%; the reported coefficients all refer to estimated marginal effects (calculated at the mean of the right hand side variables); these regressions include measures of firm size (employment), R&D intensity, MNE indicator, subsidiary indicator agglomeration variables, and whether the firm is a member of a trade association. Omitted category for export years is 20+ years, for export intensity is 0%-5%, for employment is 0-10 employees, for R&D is Zero R&D.

Table : 8b: Probit model adding broader measure of help

	Logistic problems	Exchange rates	Language barriers	Cultural diffs.	No office abroad	Home bias
Experience						
Non-exporter	0.028	-0.088	0.108	0.216	0.323	-0.052
	(0.24)	(0.79)	(0.94)	(1.86)+	(2.80)**	(0.47)
<2 years	-0.059	0.018	-0.127	0.063	0.105	-0.103
	(0.57)	(0.17)	(1.22)	(0.60)	(1.00)	(1.00)
2-5 years	0.088	-0.082	0.093	0.163	0.141	-0.131
	(1.16)	(1.06)	(1.20)	(2.12)*	(1.78)+	(1.71)+
5-10 years	0.048	-0.001	0.137	0.238	0.206	-0.023
	(0.61)	(0.02)	(1.64)	(2.82)**	(2.40)*	(0.28)
10-20 years	0.085	0.047	0.073	0.095	0.048	-0.068
	(1.30)	(0.70)	(1.10)	(1.44)	(0.70)	(1.00)
Broad-Help	0.203	0.239	0.192	0.223	0.188	0.263
	(2.97)**	(3.25)**	(2.57)*	(2.98)**	(2.45)*	(3.48)**
Observations	448	448	439	448	448	448

Source: OMB survey. Notes: Authors' calculation. Notes: Robust z statistics in parentheses; + significant at 10%; * significant at 5%; ** significant at 1%; the reported coefficients all refer to estimated marginal effects (calculated at the mean of the right hand side variables); these regressions include measures of firm size (employment), R&D intensity, MNE indicator, subsidiary indicator agglomeration variables, and whether the firm is a member of a trade association. Omitted category for export years is 20+ years, for export intensity is 0%-5%, for employment is 0-10 employees, for R&D is Zero R&D.

Table 9: Information requested by export destination and export experience

Region	0 years	0-2 years	2-5 years	5-10 years	10-20 years	20+ years
European Union	10	10	36	20	30	44
Eastern Europe	2	1	4	5	14	19
North America	7	9	31	22	20	28
Russia & Central Asia	10	8	25	16	26	39
South East Asia & China	6	10	28	19	31	42
Australia & Pacific	2	0	5	6	10	14
South America	1	2	6	4	15	19
Africa	2	2	8	7	9	23
Other	2	3	3	6	3	16
Total	42	45	146	105	158	244
No Firms	26	32	81	57	80	123

Source: OMB survey. Notes: Authors' calculation

Table 10a: Probit model Controlling for Market

	Basic info.	Identifying first contact	Building relations	Initial dialogue	Markting costs	Legal, finance, tax regs overseas
Experience						
Non-exporter	0.171	0.231	0.182	0.145	0.102	0.084
	(1.50)	(2.19)*	(1.55)	(1.22)	(0.86)	(0.70)
<2 years	0.012	0.130	0.301	0.167	0.125	0.073
	(0.11)	(1.26)	(2.86)**	(1.50)	(1.17)	(0.66)
2-5 years	0.142	0.150	0.267	0.096	0.065	0.026
	(1.78)+	(1.87)+	(3.22)**	(1.12)	(0.77)	(0.31)
5-10 years	0.050	-0.023	0.153	-0.011	0.041	0.076
	(0.58)	(0.25)	(1.69)+	(0.13)	(0.46)	(0.85)
10-20 years	0.112	-0.010	0.167	-0.008	-0.043	0.065
	(1.50)	(0.12)	(2.14)*	(0.11)	(0.56)	(0.85)
Market						
European	-0.002	-0.025	-0.071	0.003	-0.119	-0.015
Union	(0.03)	(0.46)	(1.24)	(0.06)	(2.09)*	(0.26)
Eastern &	0.074	0.131	-0.044	0.144	0.078	0.073
Central Europe	(0.95)	(1.60)	(0.51)	(1.68)+	(0.95)	(0.88)
North	0.124	-0.013	0.047	0.038	0.012	0.083
America	(2.17)*	(0.21)	(0.78)	(0.63)	(0.20)	(1.37)
Russia &	-0.073	-0.046	-0.094	-0.081	-0.040	0.028
Central Asia	(1.27)	(0.76)	(1.54)	(1.33)	(0.64)	(0.45)
South East	-0.067	-0.033	-0.124	0.061	-0.005	-0.035
Asia & China	(1.21)	(0.58)	(2.14)*	(1.04)	(0.09)	(0.60)
Australia	-0.017	-0.056	0.047	0.050	0.065	-0.022
& Pacific	(0.18)	(0.57)	(0.48)	(0.52)	(0.68)	(0.23)
South	0.025	0.102	0.058	0.014	-0.008	0.029
America	(0.31)	(1.24)	(0.69)	(0.16)	(0.10)	(0.34)
Africa	-0.020	-0.123	-0.044	-0.191	0.047	-0.032
	(0.25)	(1.46)	(0.54)	(2.29)*	(0.57)	(0.41)
Other	-0.015	-0.204	-0.031	0.046	-0.125	0.004
	(0.16)	(1.96)+	(0.30)	(0.45)	(1.18)	(0.04)
Observations	383	389	389	389	389	389

Source: OMB survey. Notes: Authors' calculation.

Table : 10b: Probit model Controlling for Market

	Logistic problems	Exchange rates	Language barriers	Cultural diffs.	No office abroad	Home bias
Experience						
Non-exporter	0.009	-0.109	0.084	0.239	0.325	-0.080
	(0.07)	(0.92)	(0.71)	(1.94)+	(2.75)**	(0.68)
<2 years	-0.072	0.024	-0.142	0.077	0.112	-0.123
	(0.68)	(0.21)	(1.30)	(0.69)	(1.01)	(1.10)
2-5 years	0.043	-0.109	0.064	0.173	0.139	-0.145
	(0.53)	(1.31)	(0.77)	(2.09)*	(1.63)	(1.73)+
5-10 years	0.024	0.001	0.080	0.237	0.188	-0.045
	(0.28)	(0.01)	(0.94)	(2.69)**	(2.08)*	(0.51)
10-20 years	0.065	0.013	0.055	0.156	0.046	-0.112
	(0.83)	(0.17)	(0.72)	(2.02)*	(0.58)	(1.44)
Market						
European	0.077	0.021	0.035	-0.033	0.009	-0.089
Union	(1.36)	(0.36)	(0.62)	(0.60)	(0.16)	(1.56)
Eastern &	-0.011	0.007	-0.007	0.023	-0.094	0.076
Central Europe	(0.14)	(0.08)	(0.09)	(0.28)	(1.15)	(0.83)
North	0.104	0.006	0.014	0.069	0.081	0.066
America	(1.76)+	(0.11)	(0.24)	(1.20)	(1.37)	(1.11)
Russia &	0.010	-0.032	0.013	0.017	0.039	0.065
Central Asia	(0.16)	(0.51)	(0.22)	(0.29)	(0.64)	(1.06)
South East	-0.003	-0.097	0.044	0.082	0.009	0.018
Asia & China	(0.05)	(1.66)+	(0.76)	(1.47)	(0.16)	(0.31)
Australia	0.032	-0.011	0.068	-0.026	-0.088	0.077
& Pacific	(0.34)	(0.12)	(0.70)	(0.29)	(0.90)	(0.76)
South	0.155	0.245	-0.053	-0.036	0.041	0.057
America	(1.87)+	(2.87)**	(0.64)	(0.45)	(0.48)	(0.69)
Africa	0.052	-0.019	-0.046	0.007	0.074	-0.097
	(0.63)	(0.23)	(0.55)	(0.08)	(0.90)	(1.16)
Other	-0.008	-0.113	0.118	0.083	0.068	0.241
	(0.08)	(1.08)	(1.13)	(0.81)	(0.63)	(2.34)*
Observations	389	389	383	389	389	389

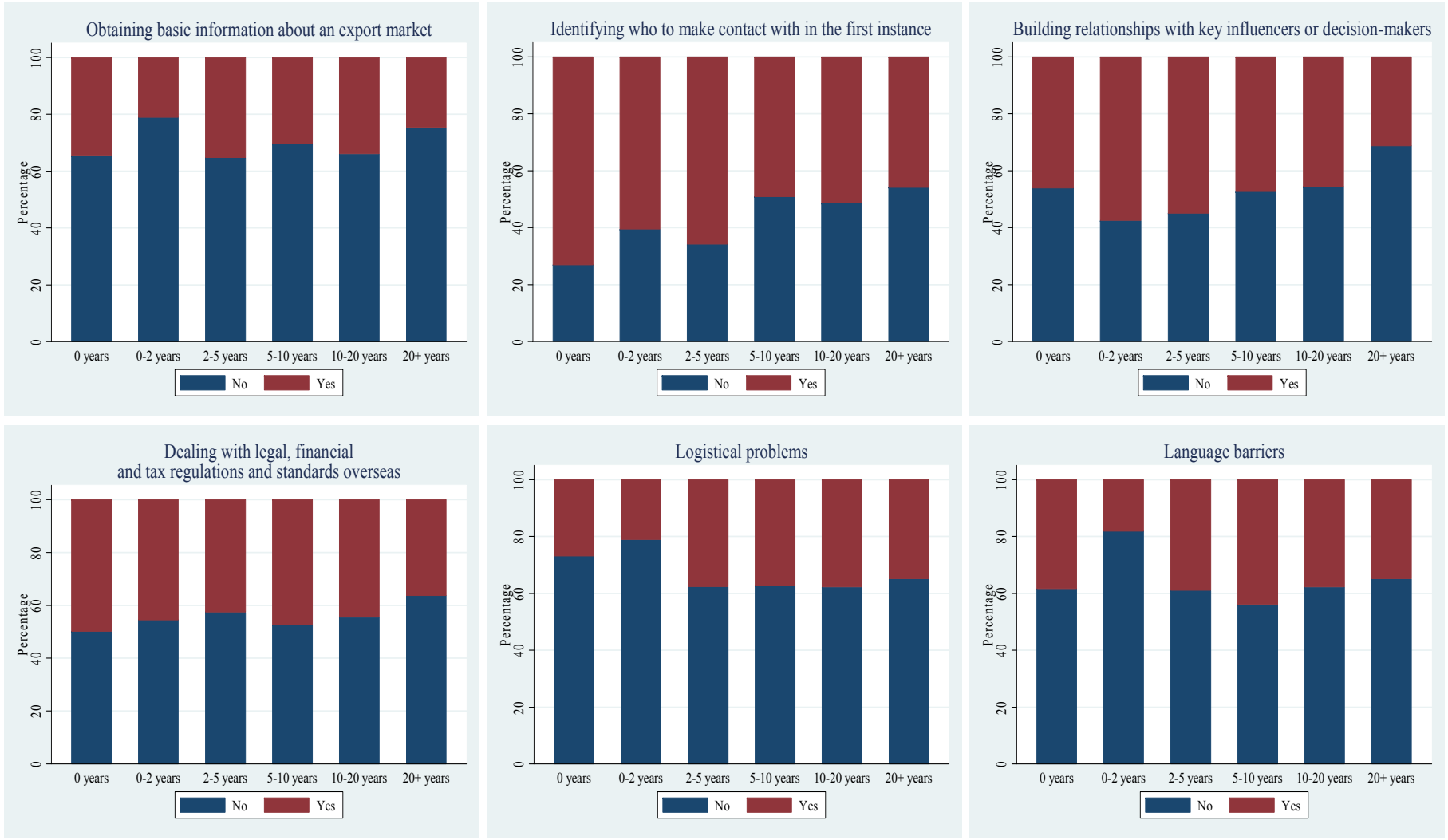
Source: OMB survey. Notes: Authors' calculation.

Table 11: Summary of the marginal effects from Ordered Probit regressions

Barrier		Not critical	Med-Low	Mid critical	Med-High	To a critical
Obtaining basic information about an export market	Non-Exporter					
	<2 years	-	-		+	
	2-5 years	-	-		+	+
	5-10 years	-	-		+	
	10-20 years	-	-		+	
Identifying who to make contact with in the first instance	Non-Exporter					
	<2 years					
	2-5 years					
	5-10 years					
	10-20 years					
Building relationships with key decision-makers	Non-Exporter		-	-		+
	<2 years		-	-	+	+
	2-5 years					
	5-10 years		-		+	
	10-20 years					
Establishing an initial dialogue with prospective customers	Non-Exporter				+	
	<2 years					
	2-5 years		-		+	
	5-10 years				+	
	10-20 years		-			
Marketing costs of doing business overseas	Non-Exporter				+	
	<2 years					
	2-5 years					
	5-10 years					
	10-20 years					
Dealing with legal, financial and tax regulations and standards	Non-Exporter	-	-	-		+
	<2 years					
	2-5 years		-		+	
	5-10 years					
	10-20 years	-	-	-	+	+
Logistical problems	Non-Exporter					
	<2 years	-	-	+	+	
	2-5 years					
	5-10 years					
	10-20 years					
Exchange rates and foreign currency	Non-Exporter					
	<2 years					
	2-5 years					
	5-10 years					
	10-20 years					
Language barriers	Non-Exporter		-	-	+	
	<2 years					
	2-5 years		-	-	+	+
	5-10 years		-		+	
	10-20 years					
Cultural differences (not language)	Non-Exporter					
	<2 years					
	2-5 years					
	5-10 years					
	10-20 years					
Not having an office or site in an export market	Non-Exporter	-	-		+	
	<2 years					
	2-5 years				+	
	5-10 years	-			+	
	10-20 years					
Home bias	Non-Exporter					
	<2 years		-			+
	2-5 years		-	-	+	+
	5-10 years			-		
	10-20 years					

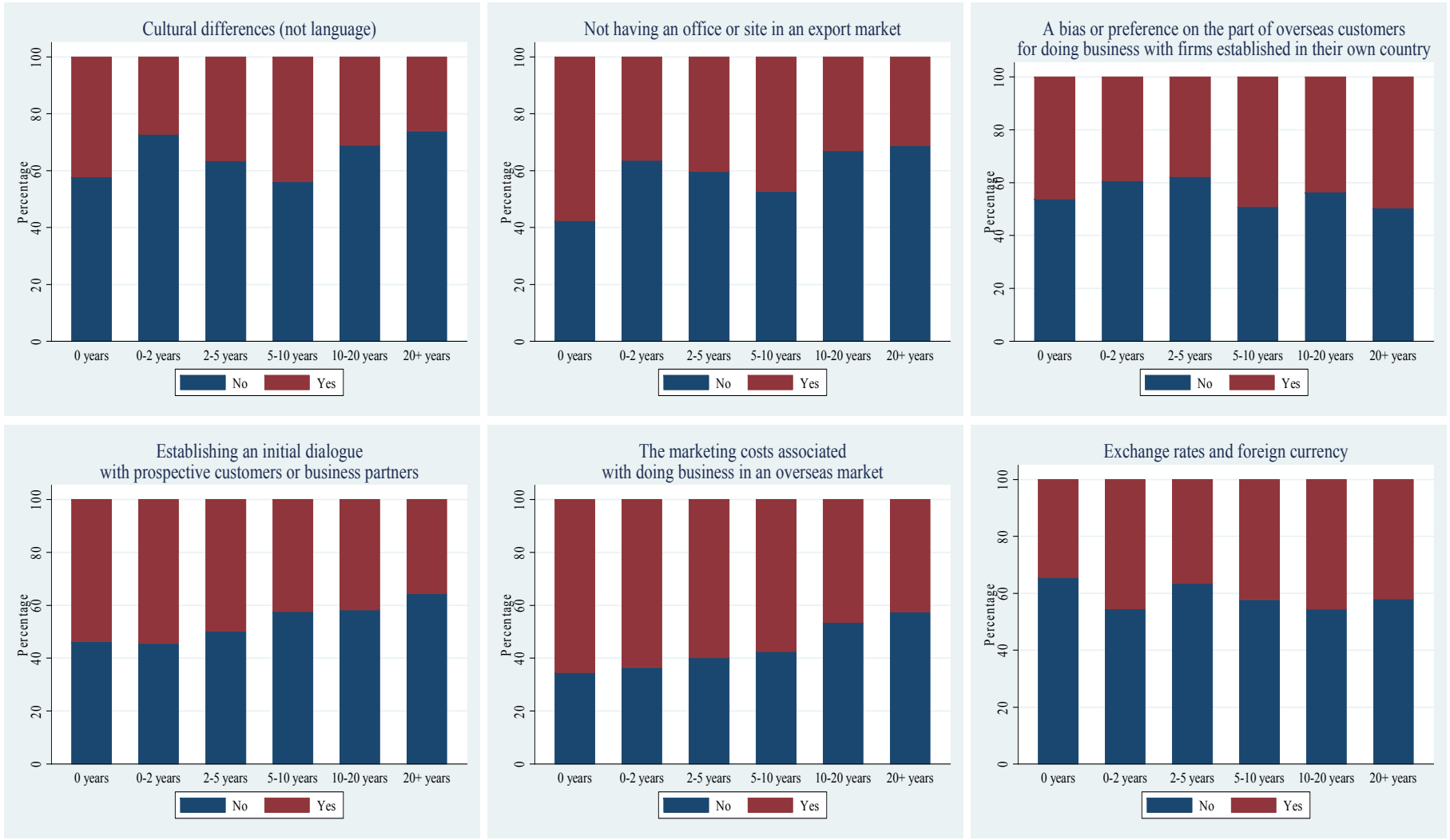
Source: OMB survey. Notes: Authors' calculation. The model is estimated using the same explanatory variables as in Table 8a/b

Figure 1a: Barriers faced broken down by export age.



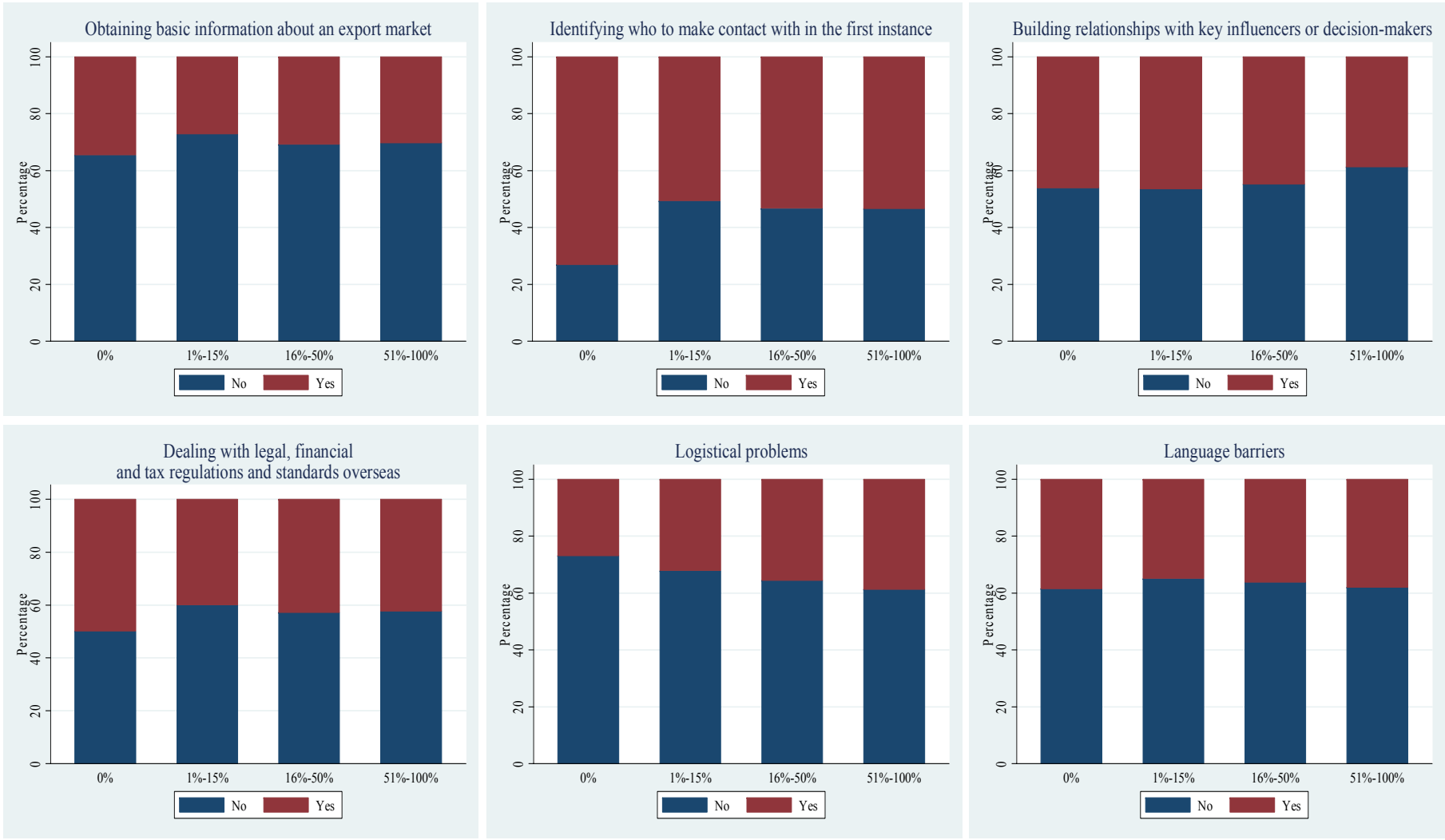
Source: OMB survey. Authors' calculation

Figure 1b: Barriers faced broken down by export age.



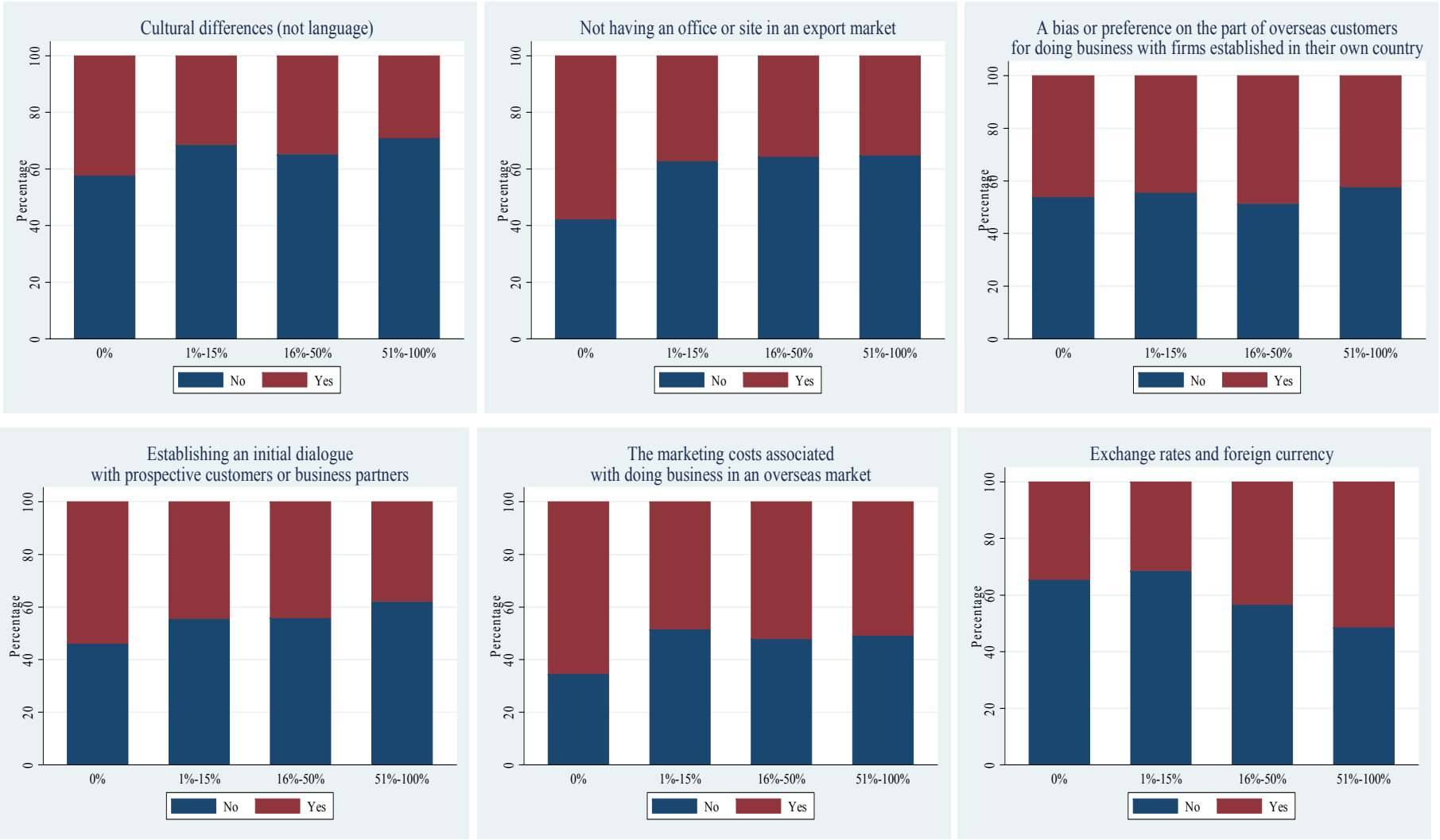
Source: OMB survey. Authors' calculation

Figure 2a: Barriers faced broken down by export intensity



Source: OMB survey. Authors' calculation

Figure 2b: Barriers faced broken down by export intensity



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Source: OMB survey. Authors' calculation

Appendix

Firm and Industry-level Characteristics

Respondents to the survey were asked a number of questions about their characteristics. Firms are asked to report on their size, as measured by employment and turnover. It occurred that firms either did not know, or were more reluctant to report, their turnover so we concentrate on size as measured by employment. These are grouped into four size bands (1-10, 10-50, 50-250 and 250 plus employees). Information on the distribution of firm size is shown in Table A1. Consistent with existing evidence large firms have more export experience than small firms. In the sample there are no firm with more than 250 employees with no export experience and only one had been selling abroad for less than two years. In contrast, there is a certain number of small firms with a non-negligible export experience.

The data available in this study does not allow us to compute productivity measures. However, firms were asked to report on the number of employees engaged in R&D. R&D can be considered a measure of technology, hence a good proxy of the productivity level of firms.[26] We constructed a categorical variable with the same four classes of the employment variable. To reduce collinearity between them we generated five R&D intensity categories. These were labelled as Zero R&D, Low-intensity R&D, Low-medium R&D, Medium-high R&D, High R&D.[27]

As it is possible to see from Table A2, around 25 percent of firms surveyed are classified as not doing any R&D. Only two percent of them have low R&D intensity. For the remaining companies the share of them doing R&D is increasing with the level of R&D intensity. From Table A2, it is evident that in general R&D intensity increases with the years of export experience. As for the total number of employees, only a small number of firms falling in the high range of R&D intensity have little export experience. In comparison, there is a greater number of enterprises with a low level of R&D that have been active in the export market for more than five years. Thus, like for the relationship of the number of employees and export experience, the number of years of exporting appear to be positively correlated with R&D intensity. However, this correlation is reduced more by those firms with zero or low R&D and a great deal of export experience than by those firms with a high R&D intensity and a short history in export markets.

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[26] One general result of the literature on R&D spending and productivity is that they are positively correlated. However this correlation seems to be driven by between firms variation rather than within firms variation (see Klette and Kortum (2004) for a review of the main stylised facts of the literature on R&D and productivity). Since we are using a cross section dataset we can be confident that the number of people engaged in R&D controls for different productivity levels among companies.

[27] If number of employees engaged in R&D is zero, then R&D intensity is classified as zero. The other values of R&D intensity are created using the two categorical variables concerning the total number of employees at the firm and number of employees engaged in R&D and subtracting the former from the latter. The difference can assume four different values (from -3, to 0), with increasing numbers identifying higher R&D intensity firms. Therefore, we constructed a R&D intensity variable consisting of four categories, from zero (no R&D) to four (high R&D intensity)<

In addition to the firm-level variables just described we also consider whether or not the firm is a multinational, a subsidiary of a larger group and a member of a UK or international trade association.[28] All these characteristics can be thought to be relevant for the number of barriers, and therefore the extent of trade costs firms face. Companies with foreign affiliates abroad, or being part of a larger groups or a trade association could, in principle, have a their disposal a larger set of information about foreign markets that might make exporting easier. This might be reflected in a lower numbers of export barriers they confront.

Of the firms surveyed around some 20 per cent of them reported themselves as multinationals. The multinational firms were asked in the survey whether they exported to affiliates within the same group. Sixty firms identified that this was the case, although all also confirmed that they exported to non-affiliates also. It seems reasonable to assume that multinationals would not participate in a UKTI programme in order to expand intra-firm exports so we choose to leave all multinational firms within the sample. Around 48 percent of companies in the data reported to being member of UK or international trade association.

The last set of variables we consider includes three types of agglomeration measures and whether firms are in the manufacturing or service sectors. The three geographical concentration measures consider whether in the local same area there are other exporting firms, there is a high mobility of workers between firms in your industry, or there is a leading firm from your industry. It is conceivable that agglomeration facilitates the exchange of information among firms. This could facilitate exports leading to a lower reported number of barriers. To add some detail: 50 percent of firms surveyed reported to be in an area with other exporting firms, 21 percent declared there to be a high level of mobility of workers between firms in the area, whereas 30 percent reported they were located nearby a leading firms from their industry. Finally 60 percent of the companies sampled were in the manufacturing sector.

[28] Subsidiaries were asked that all answers relate to their experiences as individual plants and not to the group as a whole.

Table A1: Export experience and R&D intensity

Export experience \ R&D	Zero	Low	Medium-low	Medium-high	High	Total
Do not export	8	0	1	7	10	26 (6%)
Within the last 2-years	14	0	1	7	11	33 (7%)
Between 2 and 5 years ago	23	1	7	16	33	80 (18%)
Between 5 and 10 years ago	12	0	8	18	19	57 (13%)
Between 10 and 20 years ago	20	1	25	29	27	102 (23%)
More than 20 years ago	35	7	41	43	24	150 (33%)
Total	112 (25%)	9 (2%)	83 (19%)	120 (27%)	124 (28%)	448

Source: OMB survey. Notes: Authors' calculation. R&D intensity is computed considering the four categories of the categorical variables concerning the number of employees engaged in R&D and their total number of employee. The four categories are 1-10, 10-50, 50250 and 250+ employees. R&D intensity is obtained subtracting the former from the latter. The difference can assume four different values, which identify firms with zero, medium-low, medium high and high R&D.

Table A2: Export experience and Size for UKTI non-participants (participants)

Export experience \ Number of Employees	1-10	11-50	50-250	250+	*Total*
Do not export	0 (15)	0 (10)	0 (1)	0 (0)	0 (26)
Within the last 2-years	0 (21)	2 (7)	0 (2)	0 (1)	2 (31)
Between 2 and 5 years ago	0 (43)	1 (23)	0 (12)	1 (2)	2 (80)
Between 5 and 10 years ago	2 (23)	1 (18)	3 (10)	1 (1)	7 (52)
Between 10 and 20 years ago	12 (14)	11 (24)	20 (12)	6 (3)	49 (53)
More than 20 years ago	19 (8)	17 (19)	30 (27)	20 (16)	86 (70)
Total	33 (124)	32 (101)	53 (64)	28 (23)	146 (312)

Source: OMB survey. Note: Authors' calculation.