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Overseas Trading Costs and Firm Export Performance

by

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Abstract

The recent micro economic literature concerning exports has highlighted the importance of firms characteristics and trade costs for export decisions. Although the presence of trade costs (i.e. sunk and variable costs) are essential to describe the different export choices firms with different level of productivity make, little is known about them. The previous literature has concentrated mainly on the tariff barriers exporting firms face. The aim of this study is to provide evidence on a different aspect of trade costs, those of overseas trading costs. Firstly, we model theoretically the effect of a reduction in the cost of doing business in foreign countries. Secondly, using a data set of UK manufacturing firms we test these predictions. Controlling for firm and industry level covariates we find that: 1) improvement in the business environment of foreign countries led to an increase in the export intensity of established exporters rather than additional export market entry; 2) the change in exports was almost exclusively explained by the reform took place within Europe; 3) multinationals responded disproportionately to these changes; 4) exports responded most to changes in the rules governing ownership, labour market regulation and international capital markets.

JEL classification: D24 F14, F23

Keywords: Exports; Overseas transaction costs; Productivity; Multinationals

Outline

1. *Introduction*
2. *Theoretical Framework and Literature Review*
3. *Empirical Method*
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Non-Technical Summary

The rapid expansion of the literature on exporting using micro level data in recent years has taught us much about the characteristics of firms that export relative to those that do not, and therefore why not all firms choose to engage in international trade . Within this literature, along with firm heterogeneity, the role of trade costs has been central. Despite the importance of trade costs to our understanding of export behaviour at the firm level, *outside* of changes to tariffs, relatively little is still known about what exactly they include and how firms respond once they change. Using aggregate bilateral trade data Anderson and Marcouiller (2000), Levchenko (2004), de Groot et al. (2004) find a significant correlation between international trade flows and overseas trading costs such as institutional quality. In their comprehensive review of trade costs, Anderson and van Wincoop (2004) conclude that direct policy instruments such as tariffs, quotas and exchange rate restrictions are *less* important for trade than policies aimed at improving the economic environment, law enforcement, property rights, informational institutions and regulation etc.

In this paper we make such a contribution by considering a different aspect of trade costs: how changes in *overseas trading costs* affect export sales for UK manufacturing firms. Specifically we test whether, improvements in the overseas business environment, through amongst others stronger protection of intellectual property rights, the removal of bureaucratic procedures and better enforcement of contracts, directly lower the costs of doing business therein, affecting the extensive (the number of firms engaged in trade) and intensive margins (the export intensity of those firms) of exports to those countries.

We model theoretically the effect of a reduction in the cost of doing business in foreign countries on firm exports and test these predictions using a data set of UK manufacturing firms. We find, in our measure of overseas trading costs, reductions over the period of study (1988—1998) related to improvements in the overseas business environment that are greater than those related to traditional measures of trade costs such as tariffs. Controlling for firm and industry level covariates we find that improvement in the business environment of foreign countries led to an increase in the export intensity of established exporters rather than additional export market entry, and multinationals responded disproportionately to these changes. These results are driven by the EU component of the index. Furthermore, among the different business costs, improvement in the legal structure and property rights, business regulations, macroeconomic stability and labour market restrictions all have stronger effect on firm exports.

1. Introduction

The rapid expansion of the literature on exporting using micro level data in recent years has taught us much about the characteristics of firms that export relative to those that do not, and therefore why not all firms choose to engage in international trade (see for example Bernard and Jensen, 1999, or the reviews by Lopez, 2005 and Greenaway and Kneller, 2005). Within this literature, along with firm heterogeneity, the role of trade costs has been central (Clerides, Lach and Tybout, 1998; Melitz, 2003; Bernard et al. 2003). In addition to the (variable) costs involved in the actual delivery of their products (including transportation, insurance, property rights, regulation, and policy costs)[1] exporters face significant sunk costs in gathering information on foreign markets, developing marketing and delivery channels, adapting products and packaging, and learning bureaucratic procedures before they enter export markets (Melitz, 2003; Roberts and Tybout 1997; Tybout, 2003).

Despite the importance of trade costs to our understanding of export behaviour at the firm level, outside of changes to tariffs, relatively little is still known about what exactly they include and how firms respond once they change (Greenaway and Kneller, 2005). In this paper we make such a contribution by considering a different aspect of trade costs: how changes in *overseas trading costs* affect export sales for UK manufacturing firms. Specifically we test whether, improvements in the overseas business environment, through amongst others stronger protection of intellectual property rights, the removal of bureaucratic procedures and better enforcement of contracts, directly lower the costs of doing business therein, affecting the extensive (the number of firms engaged in trade) and intensive margins (the export intensity of those firms) of exports to those countries.[2]

Motivations for the study of overseas trading costs are easy to find. Firstly, evidence of a significant correlation has been found between international trade flows and overseas transaction costs using aggregate bilateral trade data by Anderson and Marcouiller (2000),

[1] Anderson and van Wincoop (2004).
[2] As noted by de Groot et al. (2004), there is a large supporting literature to this question within the literature on growth and development, for example Knack and Keefer (1995) Mauro (1995) and Hall and Jones (1999).

Levchenko (2004), de Groot et al. (2004) and Linders et al. (2005).[3] In these studies the effect on aggregate trade flows has been found to be quantitatively large. Anderson and Marcouiller (2000) estimate for example, that an improvement in institutional quality in Latin American countries[4] to that in European countries would increase trade by 30 per cent. This effect is similar in size to the estimated effect from a reduction in tariffs in Latin American countries to those of the US levels. Similarly, de Groot et al. (2004) estimate the trade effect of a one standard deviation increase in regulatory quality from the mean is 26 per cent. From such evidence, in their comprehensive review of trade costs, Anderson and van Wincoop (2004) conclude that direct policy instruments such as tariffs, quotas and exchange rate restrictions are less important for trade than policies aimed at improving the economic environment, law enforcement, property rights, informational institutions and regulation etc.[5]

While such changes are likely to be smaller in a developed country such as the UK, we find, in our measure of overseas trading costs, reductions over the period of study (1988—1998) related to improvements in the overseas business environment that are greater than those related to traditional measures of trade costs such as tariffs. The measure of the business environment we use is rich in detail containing information on factors such as credit market regulation, access to international credit markets, labour market restrictions and business regulations.[6] According to the index there was an improvement in the UK business environment by 0.6 points on a ten-point scale between 1988 and 1998 and, as a weighted average, for foreign countries by 1.4 points.[7] Over the same period an index based on tariff rates increased by just 0.2 points. Such changes are likely to be typical of many developed countries.

[3] In these studies what we label overseas trading costs are often referred to as institutional quality. In Section 4 of the paper we describe the similarity of our measures with these.
[4] Measured by an indicator of the quality of the legal system and the transparency of the system for the formulation of government policy.
[5] See also Deardorff (2001), Anderson (2001) and Obstfeld and Rogoff (2000) for the importance of trade costs to observed patterns of trade.
[6] More details on the index can be found in Section 4.
[7] Where the stock of UK inward FDI provides the weights. Perhaps unsurprisingly, this reduction in foreign transaction costs has been greatest amongst the members of the European Union. Here the Single Market Programme and EMU has shifted responsibility for traditional policy levers away from national governments, such that many have turned to improving the micro business environment (Blomström and Kokko, 2003). That said, the US remains the country with the lowest barriers to business in the sample. The EU cost index decreased from 3.8 to 2.1 up to 1998 but was only 0.2 points lower by 1998 in the US (at 1.8).

Finally, as already mentioned, existing evidence of firm level response of exports to policy change is largely confined to that of direct policy changes such as tariffs. Example of work here includes Roberts and Tybout (1991, 1996), Head and Ries (1999) and Pavnick (2002) and Bernard and Jensen (2004), albeit where the effects considered relate to the consequences for (firm) size or productivity (firm and industry). Such changes are likely to have an indirect effect on exports.[8] Fewer report on the export response of firms to changes in policy. Blalock and Gertler (2004) find that trade liberalisation in Indonesia between 1990 to 1996 doubled the number of exporters, while in their study of the effects of NAFTA on Canadian firms, Baldwin and Gu (2004) report increases in both the number of exporters (the share of plants that export increases from 37 to 53 per cent between 1984 to 1990) and in export intensity (48 per cent of exporters increased export intensity). Of this literature the current paper is perhaps closest in spirit to Bernard et al. (2005) who use a measure of trade costs using duty, freight and insurance rates. While they concern themselves chiefly with the productivity effects they also report a significant effect of trade costs on both the intensive and extensive margin of exporting for US firms.

The paper proceeds in two parts. In the first part, to generate predictions regarding the export response of firms to changes in trade costs we draw upon the recent models of heterogeneous firms and international trade of Melitz (2003), Bernard et al. (2004) and Helpman *et al.* (2004) and simplified in Head and Ries (2003). In those models all firms face the same costs of operating in foreign markets but as a result of underlying differences in characteristics (namely their productivity), they self-select into foreign markets (choosing either to export or locate some production abroad). Our departure comes from the effect of changes in the foreign business environment on both sunk and variable trade costs. Here we hypothesise that improving the legal system and the strengthening intellectual property rights of a country decrease costs of commerce raising the appeal of that country as export destination. According to our theoretical model reductions in the costs of doing business abroad leads to additional export market entry and increased export intensity. In order to allow for a differentiated response of exports by multinational firms the model also allows for the vertical separation of production.

[8] See Tybout (2003) for additional references. See also Bernard and Jensen (2004), Alvarez (2004) and Görg *et al*. (2005) for the effect of policies aimed at export promotion.

The empirical analysis is conducted for a panel of UK manufacturing firms from 1988 to 1998. In the data used we have information about various firm level characteristics such as turnover, employment, exports. To measure the costs of doing business in abroad we rely on the index tracked by the Fraser Institute, specifically those parts that relate to the legal structure and security of property rights, macroeconomic stability and the regulation of credit, labour and capital markets. We exploit the variation of these different components of the index both across countries and time (weighting each country measure with the UK capital stock located there) to obtain a measure of the costs of doing business overseas faced by UK firms.

To preview our findings, the empirical results confirm that an improvement in the foreign business environment increases the exports of UK firms. Consistent with the predictions of the theoretical model, the effect is more robust for the intensive over the extensive margin of exports and larger for multinationals than non-multinationals. At the mean we find that a unit improvement in the foreign business environment adds 3.5 per cent to the export intensity of the firm. This is close to the estimate of Anderson and Marcoullier (2000) whose estimate of the elasticity for exports is 5 per cent. We find that these results are driven by the EU component of the index and that among the different business costs, improvement in the legal structure and property rights, business regulations, macroeconomic stability and labour market restrictions all have significant effect on firm exports.

The rest of the paper is organised as follow. In section 2 we discuss a simplified heterogeneous firm model with vertical separation of production. The set up allows us to generate predictions of both substitution and complementarity between exports and FDI within the same industry. Using the theoretical model Section 3 then sets up the regression equation to be tested and discusses some econometric concerns. Section 4 discusses the data sources used in the paper and the construction of the conditioning variables, including the measure of foreign transaction costs used. The empirical results for the intensive and extensive margins of exporting are then presented in Section 5 and Section 6 draws some conclusions from these.

Section 2: Theoretical Framework and Literature Review

This section provides a theoretical model to underpin and guide the empirical analysis. We extend a simplified version of the heterogeneous firm models with trade found in Head and Ries (2003, 2004). Our model incorporates vertically integrated firms, and replicates the Helpman, et al. (2004) results on the productivity hierarchy of domestic exporters and multinationals. It provides clear predictions of the effects of overseas business costs on the extensive and intensive margins of exports for both domestic exporters and multinationals. More importantly, for the purpose of this paper, the model predicts that the export response depends upon firm characteristics such as productivity. It also predicts that improvements in the overseas business environment will lead to an increase in export intensity of both vertically integrated MNEs and domestic exporters, where MNEs may respond disproportionately to exporters.

Model Setup: We set up the model so that each firm's decision can be characterised as if a monopolist facing a downward sloping demand curve:

$$q_i = M \cdot (A - p_i) \qquad (1)$$

where *i* is firm index, p_i is firm level price , M and A denote market size and demand shifter, respectively, which are taken as exogenous to individual firms. We assume that firms are vertically integrated so that each firm manufactures both the intermediate (upstream) good and the final (downstream) good. The production technology of the final good is characterised by the Leontieff function:

$$q = \varphi \cdot \min(l, m) \qquad (2)$$

Where *l, m* represent the quantity of labour, intermediate inputs, respectively, and φ denotes total factor productivity. We further assume that a positive fraction β of the intermediate good is manufactured by the firm itself, which represents the degree of vertical integration. Production of the intermediate good uses constant return to scale technology with one unit labour per unit of output, and is supplied in a competitive market so that price of the intermediate good equals wage.

To serve the foreign market, firms choose between two strategies: one, to centralise production at home and export to the foreign market, the other, to centralise the upstream product at home but replicate the downstream production in the foreign country. Following Head and Ries (2004) we call the former strategy 'centralisation' and the latter 'branching'. If the firm chooses centralisation it remains a domestic firm, whilst under branching the firm is a MNE with exports of the upstream product.[9] Figure 1 shows configuration of these two strategies.

In the model we use three different types of trade costs. Firstly, Roberts and Tybout, (1997a, 1997b), Tybout (2003) and others have shown that new exporters face significant start-up costs as they gather information on foreign markets, develop marketing channels, adapt products and packaging to foreign tastes, and learn bureaucratic procedures. We therefore assume that the centralisation strategy incurs a fixed exporting cost F_X . According to Anderson and van Wincoop (2004) trade costs include the costs incurred in getting a good to the final user other than the marginal cost of producing the good itself. It therefore includes all of the costs involved with transportation, policy barriers, contract enforcement costs, legal and regulatory costs and local distribution. To our measure of fixed export costs we add a measure of per unit transportation cost on the downstream product τ_D that captures the costs associated with transportation between countries. For multinationals, branching in the model also incurs a fixed costs F_I to set up the foreign affiliate, and a transportation cost of the upstream good τ_U , where $F_I > F_X$, and $\tau_D > \tau_U$.

Departing from the existing exporting versus FDI literature, we further assume that selling products abroad, via either branching or centralisation, incurs an *additional* per unit variable cost θ that is affected by the overseas trading environment.[10] This measures the non-transportation aspects of trade costs discussed by Anderson and van Wincoop (2004)

[9] A vertically integrated MNE may also serve the foreign market by other strategies such as replicating both downstream and upstream plants in the foreign country (Head and Ries 2004), or place the upstream plant abroad and keep the downstream production domestically. For the purpose of this paper we focus on the branching strategy as MNEs simultaneously engage in FDI and exports, which enables us to derive predictions on how MNE's exports may respond to changing foreign business costs. We discuss these points again at the end of this section.

[10] We might also have modelled overseas trading costs as affecting the sunk costs of entry into export markets. We limit the effect to variable trade costs to simplify the analysis: changing variable trade costs affects both the intensive and extensive margins of exports, whereas changing fixed trade costs would affect the extensive margin only.

and modelled by Anderson and Marcouiller (2000). We assume that the business and market regulations raise not only the fixed but also the variable costs of doing business. These are likely to include a number of different costs such as time costs in dealing with bureaucracy, the enforcement of contracts or getting products to market and better protection of intellectual property.[11] More generally the overseas economic environment determines the uncertainty that with which exporters will make contracts and complete successful trades.

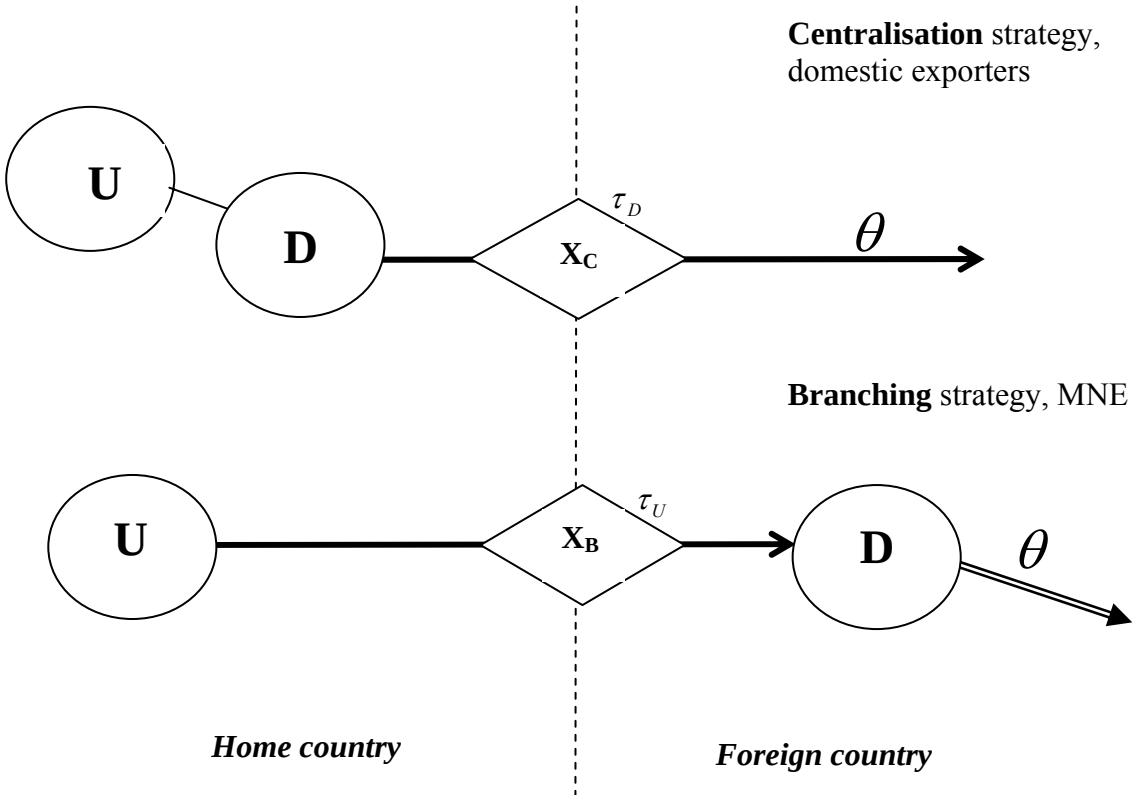

Figure 1 Exports of MNEs and domestic firms

Firms make their strategy about how to serve the foreign market by comparing the profits of centralisation or branching. Let W_H and W_F denote the wage rate at home and foreign country, and M_H and M_F represent the number of consumer of home and foreign country. The profit of serving the foreign market and the export sales under centralisation would be:

[11] The effect of business costs on aggregate exports is likely to be similar in this model to a number of alternatives. For example, Anderson and Marcouiller (2000) add a measure of institutional quality to a trade model with predation. Or in a search model of trade (Rauch and Trindade, 2003) lower business costs will improve the quality of matches between customers and suppliers.

$$\pi_C = \frac{M_F}{4}\left(A - \left(\frac{2W_H}{\varphi} + \tau_D + \theta\right)\right)^2 - F_X \tag{3}$$

$$X_C = \frac{M_F}{4}\left(A^2 - \left(\frac{2W_H}{\varphi} + \tau_D + \theta\right)^2\right) \tag{4}$$

And the profit of serving the foreign market and the export sales under branching would be:

$$\pi_B = \frac{M_F}{4}\left(A - \left(\frac{W_H + W_F + \tau_U}{\varphi} + \theta\right)\right)^2 - F_I \tag{5}$$

$$X_B = \frac{M_F}{2}\beta \cdot W_H \cdot \left(A - \left(\frac{W_H + W_F + \tau_U}{\varphi} + \theta\right)\right) \tag{6}$$

The model developed here is therefore consistent with the evidence on complementarity or substitution between exports and FDI. In the early theoretical literature on location choice (see for example Brainard, 1993) exporting and FDI were seen as substitute methods of serving foreign markets. The decision to export or to undertake FDI was determined by the balance between the advantages of proximity versus concentration. The firm chose to export when there were cost advantages of concentration (economies of scale), and chose foreign production when proximity to local markets was more important. The model has this feature, but just as with the empirical evidence, substitution no longer holds as we move to higher levels of aggregation (see Head and Rises 2004 for a summary). At the level of the firm, because of the vertical separation of production FDI and exports are complements.[12] As support of our model, Head and Ries (2003b) using firm level data find evidence of net complementarity in the most vertically integrated firms and substitution for the least integrated.

[12] Within firm complementarity between exports and FDI has been generated through a number of mechanisms in the literature and this therefore represents just one possibility. For example similar effects can be generated once we allow for multiple products and cross-product dependence of demand (Lipsey and Weiss, 1984), strategic motives in the location decision of firms (Choi and Davidson, 2004) or export platform FDI (Ekholm *et al* 2003).

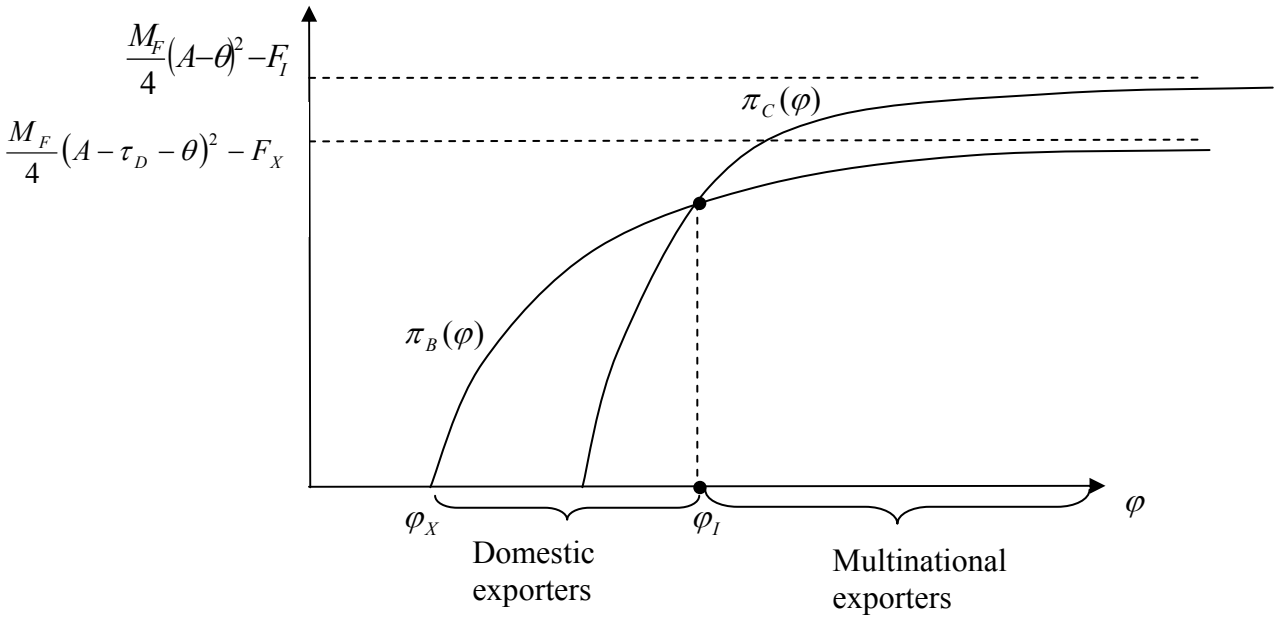

Figure 2 Productivity hierarchy across firms choosing alternative strategies

Productivity Hierarchy Equation [3] and [5] implies that profits of centralisation and branching strategies are increasing in productivity φ. Figure 2 plots the schedule of π_C and π_B as a function of φ. A firm with given productivity will choose centralisation if $0<\pi_C(\varphi)<\pi_B(\varphi)$, but branching if $\pi_C(\varphi)>\pi_B(\varphi)$. Inspection of equation [3] and [5] reveals that the relative incentive of branching to centralisation is increasing in productivity, so the most productive firms will choose branching rather than centralisation to maximize their profit.[13] As shown in figure 2, the intersection of $\pi_X(\varphi)$ and the horizontal axis determines the productivity threshold of centralisation, whereas the intersection of $\pi_I(\varphi)$ and $\pi_X(\varphi)$ determines the productivity threshold of branching. Let

[13] A prerequisite for this result is that the foreign wage is not to low $W_F > W_H - \tau_D$ so that the slope of π_B will be greater than that of π_C ,and that F_I is not too high so that the upper bound of π_B will exceed that of π_C .

φ_X and φ_I denote the productivity threshold of exporting and FDI respectively, they must satisfy $\pi_C(\varphi_X) = 0$ and $\pi_C(\varphi_I) = \pi_B(\varphi_I)$. Then φ_X would be given by:[14]

$$\varphi_X = \frac{2W_H}{A - 2\sqrt{\frac{F_X}{M_F}} - \theta - \tau_D} \tag{7}$$

φ_X This threshold determine the minimum level of productivity for firms that export, and thus the extensive margin of exports. Furthermore, if domestic exporters and multinational firms co-exist in our model, the FDI threshold φ_I must be above φ_X,[15] which means the productivity hierarchy across domestic exporters and multinationals found in HMY and Head and Ries also holds in our model. The most productive firms will find it more profitable to become multinational, whereas less productive firms choose to centralise their production at home.

Export Effects of Reductions in Overseas Trading Costs: We assume that improvement in the foreign business environment may lead to a decrease in the variable costs of selling goods therein θ. Improvements in the overseas business environment allows firms to sell more than they would otherwise have done because the regulatory burden has fallen.

Extensive margin:

Changes to the variable cost of selling abroad will lead the export productivity threshold φ_X to fall. The intuition is simple: there is an expansion of profits available from exporting so that the marginal domestic firm will make positive profits from export market entry, leading to an expansion of the extensive margin of exports. In a probit regression of export market participation we might expect therefore, that a reduction in overseas business costs will have a significant effect only on the most productive non-exporting firms.

Intensive margin:

[14] It is assumed that the demand shifter is sufficiently large and the fixed export cost is sufficiently low so that $A > 2\sqrt{\frac{F_X}{M_F}} - \theta - \tau_D$, leading to $\varphi_C > 0$ a positive threshold of centralisation.

[15] This requires that F_I is not too low, otherwise branching will be the dominant strategy and there will be no domestic exporters.

Somewhat clearer is the prediction about the effect on firms that are currently exporting. Reductions in overseas trading costs, by increasing the size of foreign markets, should mean that the share of exports in total firm sales rises. The firm becomes more export intensive, for a given size of the domestic market. This effect should be common to all exporters. We therefore expect that exporters have become more export intensive over the period. The effect will differ between domestic exporters and MNEs however. Let R_C, R_B denote the domestic sales of a domestic exporter and that of a multinational , and φ_B and φ_C represent the productivity of a typical domestic exporter and multinational. Then the firm level response of export intensity to a change in θ at firm level of a domestic exporter is:

$$\frac{\partial\left(X_C / R_C\right)}{\partial \theta} = \frac{-2M_F}{M_H} \frac{\left(\frac{2W_H}{\varphi_C} + \theta + \tau_D\right)}{\left(A^2 - \frac{4W_H^2}{\varphi_C{}^2}\right)} \tag{8}$$

And the response of export intensity to a change in θ for a multinational is:

$$\frac{\partial\left(X_B / R_B\right)}{\partial \theta} = \frac{-M_F}{M_H} \beta \frac{W_H}{2\left(A^2 - \frac{4W_H^2}{\varphi_B{}^2}\right)} \tag{9}$$

So $\left|\frac{\partial\left(X_B / R_B\right)}{\partial \theta}\right| > \left|\frac{\partial\left(X_C / R_C\right)}{\partial \theta}\right|$, if and only if,

$$\beta > \beta^* = \left(\frac{2}{\varphi_C} + \frac{\theta + \tau_D}{W_H}\right)\kappa,$$

where $\kappa = \frac{4\left(A^2 - \frac{4W_H^2}{\varphi_B{}^2}\right)}{\left(A^2 - \frac{4W_H^2}{\varphi_C{}^2}\right)}$. So export intensity and export sales response positively to a fall in the foreign trade costs for both domestic exporters and multinationals, but multinationals

response disproportionately if β the degree of vertical integration is high, or the transportation costs τ_D is low.

While the above model achieves the desired outcome that multinationals' exports respond to changes in overseas trading costs, and these responses are very different to those of domestic exporters, we recognise that it offers only one, amongst many alternative multinational strategies to serve foreign markets. As Yeaple (2003) writes multinational strategies are often complex. We feel however that these alternatives are unlikely to overturn the main result that MNE respond to these costs and in a different way to exporters (although they may now respond less rather than more). We discuss briefly these alternatives. For example, MNEs may 'source' the production of the intermediate good in a low wage foreign country by placing the upstream plant there, keeping the downstream plant at home and serving the global market by exporting. In this case the changes to overseas trading costs would be similar to that for purely domestic exporters, although again their response would differ with the degree of vertical integration and transportation costs.[16] Or in a multi country version of the model, multinationals may export final goods to one or more foreign market and replicate both the upstream and the downstream plants in others to sell locally, thereby not exporting the intermediate good. In this case one will expect that the exports of multinationals will inevitably response *less* than domestic exporters to changes in overseas trading costs.

Section 3: Empirical Methodology

In testing the predictions of the model we are interested in testing the effect of changes in overseas trade costs on the decision of whether to export or not, and how much to export. The decision concerning whether to export or not can be estimated through a probit where the dependent variable is one if the firm exports and zero otherwise. Therefore we estimate the latent structural equation

$$d^*_{it} = z_{it}\gamma + v_{it} \qquad \text{(export decision);} \tag{10}$$

$$d_{it} = 1 \qquad if \qquad d^*_{it} > 0$$

$$d_{it} = 0 \qquad if \qquad d^*_{it} < 0$$

[16] Algebraic proof of this result can be obtained from the authors upon request.

The decision regarding how much to export is estimated using as the dependent variable the export share of the firm. One complication of performing regression analysis of this type is that the dependent variable is bounded by construction between 0 and 1. Linear OLS is likely to produce highly biased estimates when there are many observations lying at the boundaries or near them (in this case the majority of firm has zero or low export share) because of its inability to cope with the inherent nonlinearities around those regions. Along similar lines, linear least square may lead to predictions of the dependent variable outside the extreme points.

The most common alternatives to linear OLS applied previously have consisted of the Tobit model (eg. Bleaney and Wakelin, 1999) and the log-odds ratio transformation of the limited dependent variable, modelled as a linear function of the regressors (eg. Gourlay and Seaton, 2003). However, both methodologies have drawbacks. As convincingly argued by Wagner (2001) the Tobit model is unsuited since the dependent variable is bounded by construction and not because of censoring, whereas the log-odds ratio is inappropriate when the dependent variable is strictly within the bounds. In this paper we follow Wagner's recommendation and estimate our model via the quasi-likelihood estimation method for fractional dependent variables developed by Papke and Wooldridge (1996). This methodology is a synthesis between the Generalised Linear Model (GLM) from the statistical literature (McCullagh and Nelder, 1989) and the quasi-likelihood method from the econometric literature (Gourieroux, Monfort and Trognon, 1984).

Denoting the propensity to export by $0 \leq y_{it} \leq 1$ and the vector of covariates by X, we are interested in estimating

$$E(y_{it} \mid X_{it}) = G(X'_{it}\beta) \tag{11}$$

where $0 \leq G(z) \leq 1$. Typically, $G(z)$ is chosen to be a cumulative distribution function and traditionally in the GLM approach it has been assumed to be the logistic function $G(z) = \frac{\exp(z)}{1+\exp(z)}$. The estimation of the parameter vector β, say, $\hat{\beta}$, is conducted by quasi-likelihood method (QMLE) by maximising the following Bernoulli log-likelihood function:

$$l_{it}(\hat{\beta}) = y_{it} \log\left\{G(X'_{it}\hat{\beta})\right\} + (1 - y_{it}) \log\left\{1 - G(X'_{it}\hat{\beta})\right\} \qquad (12)$$

This is the same log-likelihood function used when the dependent variable is a binary outcome. However, as shown by Gourieroux, Monfort and Trognon (1984) the estimators obtained by QMLE are consistent and asymptotically normal regardless of the distribution of y conditional on X, provided (12) holds. The standard errors of the estimators have been computed as in Papke and Wooldbridge (1996) and are robust to heteroskedasticity.

Section 4: Data Sources and Construction of Additional Variables

The United Kingdom is a relatively large industrialised economy and the fifth largest exporter of manufactures globally. The census firm level data set for the UK (ARD) contains information about outputs and inputs at plant/firm-level, but it does not have information about exports. For this reason we chose to work with another data source, namely *OneSource*, which does.[17] This database is derived from the accounts that both private and public companies are legally required to deposit at Companies House. All public limited companies, all companies with employees greater than 50, and the top companies based on turnover, net worth, total assets, or shareholders funds (whichever is largest) are included in the database. The downside of this datasource is its bias towards large firms. As a result exporters are overrepresented within the sample. We discuss the implications of this for the results in Section 5. Further details on the *OneSource* dataset can be found in Oulton (1998) and previous applications found amongst others in Conyon, Girma, Thomson and Wright (2002), Girma, Greenaway and Kneller (2004), Kneller and Pisu (2004) and Greenaway and Kneller (2004).

OneSource provides information on employment, physical capital, output and cost of goods sold in a consistent way both across firms and across time.[18] The data were screened to select those firms for which there are a complete set of information about the value of output, factors of production and export. Companies that are dissolved or in the process of liquidation were excluded from the sample, while finally we concentrate our analysis on firms in the manufacturing industries.

[17] For this study we used the *OneSource* CD-ROM entitled "UK companies, Vol. 1", for October 2000.

While *OneSource* is one of the very few UK databases with firm level export data, it does not provide any information on the multinational activity of UK-owned firms. To capture this we were able to merge it with a newly created database of foreign multinational activity called the European Linkages and International Ownership Structure (ELIOS) database developed at the University of Urbino.[19]

Altogether we have an unbalanced panel of 19,849 firm level observations from 3,305 firm for the period 1988 to 1998. Of these 850 firms (3,669 observations) do not export in at least one year, 2,249 export in at least one year (14,573 observations) and a 206 firms are identified as multinationals (1607 observations).[20] Over 87 per cent of multinationals in the sample export. We provide some summary statistics on the characteristics of firms in our sample broken down into non-exporters, exporters and multinationals in Table 1.

The evidence presented in Table 1 is consistent with that found previously using this, and other datasets for the UK and other countries. Exporters are for example, both larger and more productive than non-exporters. The average level of employment in non-exporters is 20 per cent below the industry mean and the level of labour productivity 7 per cent below the mean, whereas for exporters the same figures are 11 per cent above the mean 0 per cent respectively. Similar evidence has been found previously by amongst others Bernard and Jensen (1995) for the US, Bernard and Wagner (1997) for Germany and Girma et al (2004) for the UK. Similarly multinationals in this dataset are larger and more productive than both exporters and non-exporters. Previously using the same dataset Girma, Kneller and Pisu (2005) have found that the cumulative productivity distribution of UK multinationals stochastically dominates that of exporters, which in turn dominates that of non-exporters. Finally one interesting feature of Table 1 is that the average export intensity of multinational firms is slightly greater than that of domestic firms that export. It is possible that this reflects the firm specific advantages enjoyed by multinationals identified in the rest of the table. This point is considered more formally below.

Table 1: Summary statistics of main variables

	Non-exporters	Exporters	UK Multinationals

[18] Detailed industry level price indices are used to deflate nominal values .
[19] We would like to thank Davide Castellani and Antonello Zanfei for allowing us to use the information from this database.
[20] The number of firms listed here is greater than the total due to entry into and out of export markets.

Observations	3669	14573	1607
Firms	850	2249	206
Employment	-0.200	0.110	0.204
(relative to industry mean)	(1.14)	(1.10)	(1.17)
Average wage	-0.054	-0.006	-0.009
(relative to industry mean)	(0.29)	(0.31)	(0.21)
Labour Productivity	-0.074	-0.001	0.021
(relative to industry mean)	(0.50)	(0.48)	(0.46)
Export Intensity	0	0.250	0.273
		(0.24)	(0.26)

Notes: industry means are computed at 3-digit SIC92 level; standard errors in parenthesis

The measure of overseas trading costs used in the paper is broad in coverage and includes information on legal structure and security of property rights, macroeconomic stability, and the regulation of credit, labour and business. The source of the data is the Canadian public policy organisation the Fraser Institute, and covers 124 countries for the years 1970, 1975, 1980, 1985, 1990, 1995 and 2000. The index itself is constructed using primary data sources such as the World Bank and IMF as well as data drawn from institutions such as the World Economic Forum.[21] The information considered in each of these sub-components of the overall foreign transaction costs index are detailed in Table 1 of the Appendix.

This measure of the overseas business environment employed in this paper overlaps to some extent that used previously to measure institutional quality in the gravity equation literature. For example, Anderson and Marcouiller (2000) use index on the transparency of government policy and whether the legal system is effective in enforcing commercial contracts from the World Economic Forum. The measure we use is likely to include only the latter. Similarly, of the six institutional measures used by de Groot et al. (2004) we are overlap best with their measures of regulatory quality and rule of law. This same source is used by Linders et al. (2005).[22]

[21] Further detail on the construction of the index can be found on the Fraser Institute website.
[22] A similar index to that used in this study was employed by Amiti and Wakelin (2003) to study the relationship between exports and FDI.

In order to exploit the information on the large number of countries contained in the Fraser Institute dataset, we construct a measure of overseas trading costs as the weighted average of each sub-component of the index, where we use information about UK outward FDI stocks and flows as weights. The choice of the weights for the foreign business cost index is important. We chose not to use exports destination as weights since this is likely to induce endogeneity problems in our estimates. Were export weights used shocks to export performance not completely controlled by industry and time dummies in the regression will be picked by the error term v_{it} and affect in the same direction the export weights used in the construction of the overseas trade costs index. This will artificially conflate its value and bias upward the parameter on overseas trading costs. To avoid this problem we chose to use as country weights UK FDI stocks or flows to destination countries. FDI measures have been found to be highly correlated with exports at the aggregate level and for this reason are likely to be a good proxy of the importance of foreign markets as potential export destinations.[23]

The UK FDI information is from the OECD for the period 1988 to 1998. To make the process manageable we exclude countries for which the stock or flow of UK FDI is never greater than 0.5 per cent of the total FDI capital stock in any year. This leaves 35 countries covering more than 90 per cent of the reported stock or flow of FDI from the UK. For reference the share of each country in the total stock of outward FDI for the year 1996 is reported in Table 2 of the Appendix. As can be seen from this Table the US is the location with the largest share of total UK FDI at 27 per cent. Collectively the EU accounts for close to 44 per cent of the total, while the Commonwealth countries (Australia, Canada, Hong Kong, India, Malaysia, New Zealand, Singapore and South Africa) account for a further 16 per cent.

The final index, calculated using either the stock or flow of FDI, is reported in Table 2 for each year, where higher values of the index indicate lower costs.[24] Both show the same

[23] The issue of complementarity versus substitution between FDI and exports has spurned a large literature. As Head and Ries (2005) underline which effect dominates seems to depend on the level of aggregation considered. At the most disaggregate level there is evidence of substitution between FDI and export, as the proximity-concentration trade off would suggest, whereas at the country and broad industry level FDI and export have been found to be complements.

[24] The components of the index published by the Fraser Institute vary from 0 to 10. The higher the index the lower the lower the lower the transaction costs due to regulations. The index and its components used throughout is computed as 10 minus the original value. This has the advantage to be more easily interpreted speaking about costs since the higher the index the higher the costs.

downward trend over time, indicating that the environment for overseas trading has improved during the sample period.[25] Perhaps unsurprisingly, this process is somewhat smoother when using data on FDI stocks as weights. Of the various sub-components the greatest change has occurred due to improvements in the index measuring international capital market controls (change over the period of 1.2 points), business regulations (change over the period of 1.1 points), and legal system and property rights (change over the period of 1.0 points). There has also been a noticeable improvement in the index measuring macroeconomic volatility and labour market restrictions (change over the period of 0.5 points). In contrast there has been little change in credit market regulation, albeit where costs as measured by this component of the index were already low (the average over the period is 0.7).

Table 2: Overseas trading costs

year	Weighted by stock of FDI	Weighted by flow of FDI
1988	3.68	3.03
1989	2.95	2.78
1990	2.53	3.29
1991	2.56	2.84
1992	2.55	3.08
1993	2.67	2.6
1994	2.72	2.91
1995	2.23	2.21
1996	2.22	2.53
1997	2.22	2.53
1998	2.32	2.54

Notes: Costs are from the Fraser Institute; FDI data are from the OECD.

Over the sample period, reductions in trade costs induced by improvements in the overseas business environment has taken place at the same time as further reductions in trade costs due to other factors. Clearly it becomes important to control for such changes when studying the effects of overseas trading costs. We measure fixed and variable trade costs using the estimates of an industry by industry gravity equation. Using data the methodology proposed by Rose we estimate a gravity equation using a total of 93 3-digit

[25] The correlation between the two indexes is 0.52

SIC92 industries.[26] We collect the parameters on the distance variable to measure variable costs (the responsiveness of industry exports to a unit change in distance) and sum the parameters on measures of language, cultural similarity (current colony, EU member), and geographic features (landlocked, island, common border) to measure fixed costs. These are labelled VTCOST and FTCOST respectively. We multiply both FTCOST and VTCOST by –1 so that higher values of both variables suggest higher trade costs. Summary statistics on these variables are reported in Table 3. As an alternative measure and to account for cross-time reduction in trade costs we use information contained with Fraser Institute Index regarding the international trade environment in the UK.

Table 3: Trade cost estimates

	Observations	**Mean**	**Standard deviation**
Variable Trade Costs (VTCOST)	93	0.768	0.451
Fixed Trade Costs (FTCOST)	93	-0.909	3.26

Notes: Mean of VTCOST refers to the cross-industry average of the distance coefficients estimated through the gravity regressions. The mean of FTCOST refers cross-industry average of the sum the parameters of language, cultural similarity (current colony, EU member), and geographic features (landlocked, island, common border) estimated through the same gravity regressions.

Section 5: Empirical Evidence

In table 4 column 1 and 2 we report the results for our baseline specifications, where the export share and the export indicator depend on a series of firm level variables as well as fixed industry and time effects. We report only the firm level variables in order to conserve space. When using the export share as the dependent variable estimation uses the quasi-likelihood estimation method for fractional dependent variables, whereas for the indicator of participation in export markets we estimate a probit model.

The choice of firm level variables is motivated by the existing empirical literature. The probability of exporting has been found previously to be increasing in both the size and productivity of the firm (Bernard and Jensen, 1995; Greenaway and Kneller, 2004).

[26] To estimate the gravity equation we used trade data from the OECD. Details about the estimation are available upon requests from the authors.

Similarly, Bleaney and Wakelin (1999) for the UK and Wagner (2004) for Germany report evidence of a significant inverted U shape relationship between export intensity and size.[27] Following Bernard and Jensen (2004), the effect of the level of skill embodied in the workforce, because better workers may lead to better quality products and higher levels of efficiency, is measured using the average level of wages of the firm.

To capture differences in the motives for exporting between multinational and non-multinational firms we separate domestic firms using a zero-one indicator of multinational status. If differences in exporting are fully explained by the advantageous underlying characteristics of multinational firms we would expect this indicator to be insignificant, while the sign on this indicator provides evidence as to whether exports and FDI are complements or substitutes for UK multinational firms (see Head and Ries, 2003, who also provide firm level evidence on this question). Finally, in the probit regressions we include the lagged export status of the firm. This variable captures the importance of past experience in export markets and is generally interpreted as evidence of sunk-costs (Bernard and Jensen, 2004).

Overall, the estimates for the firm level variables in column 1 and 2 are in line with those found for the UK and other countries (Bleaney and Wakelin 1999; Wagner 2001, Bernard and Jensen, 1995; Girma et al. 2004). According to the results from the first regression in the table, firms that are more productive, larger and a more skill intensive export a larger share of output. These same variables also matter for export participation. Firms that are more productive, larger and more skill intensive are also more likely to export. The significance of the firm level variables are usually interpreted as reflecting self-selection with respect to export market entry. Unlike several existing studies we find non-linearity for export market participation with respect to the size of the firm but not for the export share.

Table 4: Results of export dummy (probit) and export share (quasi-maximum likelihood) regressions

Dependent variable	**Export**	**Export**	**Export**	**Export**	**Export**	**Export**

[27] The control variables are all in log form, where addition, to control for the fact that wages and employment depend on industry characteristics the mean of the same variable (in log) computed for each industry and year is subtracted.

	dummy	share	dummy	share	dummy	share
	(1)	(2)	(3)	(4)	(5)	(6)
Size	0.067	0.105	0.070	0.108	0.070	0.108
	(4.23)**	(9.81)**	(4.21)**	(9.55)**	(4.22)**	(9.55)**
Size squared	-0.019	-0.008	-0.021	-0.006	-0.020	-0.006
	(2.22)*	(1.32)	(2.37)*	(0.89)	(2.25)*	(0.89)
Skills	0.015	0.240	0.024	0.156	0.017	0.152
	(0.21)	(2.14)*	(0.33)	(1.22)	(0.23)	(1.19)
Labour productivity	0.107	0.243	0.093	0.267		
	(2.23)*	(5.84)**	(1.84)+	(5.85)**		
UK MNE	0.056	0.219	0.142	0.192	0.133	0.192
	(0.79)	(6.40)**	(1.77)+	(5.09)**	(1.68)+	(5.08)**
Variable trade costs			-0.176	-0.398	-0.177	-0.398
			(2.42)*	(8.41)**	(2.45)*	(8.41)**
Fixed trade costs			-0.003	-0.019	-0.002	-0.019
			(0.26)	(2.67)**	(0.18)	(2.67)**
Overseas trading costs			-0.022	-0.234	0.004	-0.233
			(0.28)	(5.20)**	(0.07)	(5.17)**
Overseas trading costs*					-0.012	-0.036
Labour productivity					(1.89)+	(5.89)**
Lagged export status	3.047		3.010			
	(84.67)**		(79.46)**			
Constant	-1.425	-2.604	-0.642	-4.387	-1.095	-3.849
	(14.88)**	(31.27)**	(0.90)	(10.58)**	(2.46)**	(11.29)**
Observations	19804	19849	17227	17252	17227	17252

Notes:

1) + indicates significance at 10 percent, * at 5 percent and ** at 1 percent. Robust t-statistics are in parenthesis.
2) All firm-level variables are in log. Size is measured trough employment; skills through average wage per worker. Labour productivity is value added per worker. To control for industry and year effects the relevant industry-year mean was subtracted from firm-level variables (industries are defined as 3-digit SIC92).
3) Year and industry dummies have been included

According to the results in 1 the participation in export markets is explained largely by experience. Firms are persistent in their export behaviour. At the mean of variables, exporting in the previous period raises the probability the firm will export in this period by over 80 per cent. This is below the comparable figure estimated for Italy by Bugamelli and Infante (2002) but significantly above that estimated for the US by Bernard and Jensen (2004). Bernard and Wagner (1998) estimate the equivalent figure in Germany to lie between 0.38 and 0.85.

The other firm level variables play a more minor role, even if one allows for the sample variation in the size of firms or labour productivity. At the mean a one standard deviation increase raises the probability of exporting by 1.3 percentage points for size and by 0.7 percentage points for labour productivity. In comparison firm characteristics have a larger impact on the export intensity of firms. At the mean a unit increase in the size of the firm increases the export ratio by 1.7 percentage points, while a unit increase in labour productivity or skills are associated with an increase in the export ratio of 4.0 and 2.4 percentage points respectively.

Finally, we find that the multinational indicator is positive and strongly significant only in the export share regression. This suggests that multinational firms are no more likely to export than non-multinational firms, controlling for the sort of firm level variables used in previous studies, but they export a higher share of their output than non-multinational firms when they do. At the mean of variables, multinationals export an additional 3 percentage points of output.

Column 3 and 4 add to these base regressions the two measures of trade costs and the overseas business cost variable. The results for trade costs provide support for the methodology used in their construction. Variable trade costs enter with the expected signs and are significant at standard significance levels in both regressions, whereas the fixed cost element matters only for the export share.[28] The export intensity of a firm is lower in industries associated with high variable trade costs and high fixed trade costs, while participation depends negatively on the distance between countries.

[28] The significance of the fixed costs variable might at first glance be considered surprising. The most likely explanation is that the available data cannot distinguish a higher export ratio between entry to new markets

From column 3 and 4 it also possible to see that lower overseas trade costs increase the trade intensity of firms, but does not raise the probability of export market entry. The effect of a unit change in foreign business costs is according to the marginal effects relatively large. At the mean of variables, the effect is 3.5 percentage points. Quantitatively this is similar to the effect of an increase in labour productivity on the export ratio. These figures suggest that over the sample period improvements in the foreign business environment (lower values of the index) have increased the export ratio of UK firms by close to 5 percentage points. For comparison, Anderson and Marcouiller (2000) estimate that a 10 per cent rise in their institutional quality score, equivalent to a change in our index by one point, leads to a 5 per cent change in trade volumes. In de Groot et al. (2004) the effect of a one standard deviation increase regulatory quality from the mean is 26 per cent while Linders et al. (2005) estimate that the standardised coefficient on importer institutional quality allows it to explain 5 per cent of the variation in bilateral trade flows.

The lack of significance of the overseas trade cost index in the export market participation regression (in column 3) is consistent with the model set out in Section 2. There would be no predicted effect on the average firm unless the decrease in trade costs due to improvement in the business costs of overseas countries is large. An alternative explanation might be that it is caused by the oversampling of large firms in the data (and therefore away from non-exporters). To investigate this possibility we test to see whether an effect can be identified for the marginal non-exporter, the firm whose productivity is just below the cut-off value necessary to make positive profits from exporting, by interacting the firms' labour productivity with the overseas trading costs variable (columns 5 and 6). Due to the high collinearity between the direct effect of labour productivity and the interaction term we include only the interaction term in these regressions.

The results in column 5 show that the interaction term is significant (albeit weakly) and positive in the probit regression. Collinearity and the subsequent omission of the direct effect of labour productivity prevents us from making strong statements about the effect on the marginal firm however. It is however suggestive that the lowering of foreign business costs over the 1990's led to some additional export market entry amongst the most

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and increased sales to existing export markets. Fixed costs may therefore be picking up an effect on the former.

productive non-exporters. There is also, as expected, a disproportionate an increase in the intensive margin for the most productive firms since the transaction costs-productivity interaction term is significant in column 6.

5.2: Robustness checks and extensions

The results in table 4 suggest that the effect of lower overseas trading costs abroad over the 1990's has increased the volume of exports from the UK. It is possible however that this variable is picking up the reductions in the tariff costs of trade and the reduction in the costs of trading in the UK over the same period. To control for these effects we include in table 5 column 1 an index of UK tariff and non-tariff barriers from Fraser Institute and in column 2 add to the regression the UK component of the business costs index from the same source.[29] Given the insignificance of the overseas business cost variable in the export participation equation in table 4 column 3 and 5, we concentrate on the export intensity regressions only. None of the additional variables are significant in the probit regression and the existing covariates change little from their introduction.

Of these new measures only the index measuring UK trade restrictions enters with a significant coefficient. Improvements in the domestic business environment, which mirrors changes that were also taking place in the rest of Europe as part of the EU Single Market Programme, has had a positive but insignificant effect on the competitiveness and therefore exports of UK firms. That is, they did not lead to significantly higher levels of exporting relative to domestic sales. The overseas business costs variable, whilst it remains significant, is reduced in size by the addition of these two variables. At the mean the effect of foreign transaction costs is 1.96 compared to 3.5 in column 4 of table 4. Under these new results, the change in the index for overseas trading costs has added 2.7 percentage points to the export/output index of the mean firm over time. In comparison at the mean the marginal effect of changes in the trade index would appear much larger than this, adding 5.7 percentage points to the ratio of exports to firm output. However, as this index has changed little over time its effect over the sample period has been much smaller at 1.7 percentage points. Overall, therefore improvements if the foreign business environment that took place over the 1990's has added more to UK exports than trade liberalisation.

[29] The UK business costs variable is collinear with the time effects and so the results in regression 6 are reported without time effects.

The theoretical model developed in Section 2 was unclear as to the effect of changes in overseas trading costs on the export decision of multinational firms, suggesting only that they were likely to be different to that of exporters. In Table 5 column 3 we test whether the responsiveness of the domestic firms to changes in trade and foreign business costs varies depending on the existing location decisions of firms. We do this by interacting the trade and foreign business costs variables with the indicator of multinational status of UK firms. We find from this that multinationals are more responsive to changes in costs compared to non-multinational firms. This is consistent with the theoretical prediction of our model concerning the fact that multinationals will respond disproportionately if their degree of vertical integration is high. Given the restricted form of production and export behaviour by multinational firms within the model we make no additional comment on this result, aside from noting that it is interesting enough to warrant further research.

In table 5 column 4 we report the results obtained using the flow of investment out of the UK as weights. As is clear the results are robust to this exercise, with the only noticeable impact being on the size of the estimated coefficient.

Table 5: Results of export share (quasi-maximum likelihood) regressions

Dependent variable	**Export share**			
	(1)	**(2)**	**(3)**	**(4)**
Size	0.109	0.108	0.108	0.109
	(9.57)**	(9.57)**	(9.55)**	(9.61)**
Size squared	-0.006	-0.006	-0.007	-0.006
	(0.92)	(0.91)	(1.02)	(0.94)
Skills	0.156	0.156	0.156	0.160
	(1.22)	(1.22)	(1.22)	(1.25)
Labour Productivity	0.265	0.266	0.267	0.263
	(5.83)**	(5.84)**	(5.85)**	(5.78)**
UK MNE	0.192	0.193	-1.607	0.197
	(5.08)**	(5.10)**	(1.65)+	(5.21)**
Variable trade costs	-0.397	-0.397	-0.381	-0.395
	(8.40)**	(8.40)**	(7.99)**	(8.35)**

Fixed trade costs	-0.019	-0.019	-0.017	-0.019
	(2.67)**	(2.67)**	(2.41)*	(2.73)**
Overseas trading costs	-0.194	-0.130	-0.175	-0.113
	(5.43)**	(2.22)**	(4.77)**	(2.47)*
UK tariff/non/tariff	0.399	0.385**	0.389	0.394
barriers	(4.47)**	(4.25)	(4.35)**	(3.59)**
UK trading costs		-0.122		
		(1.36)		
Overseas trading costs			-0.260	
***UK MNE**			(2.00)*	
Variable trade costs			0.239	
***UK MNE**			(1.89)+	
Fixed trade costs			-0.025	
***UK MNE**			(0.99)	
Constant	-2.595	-7.515	-6.826	-6.376
	(35.71)**	(9.36)**	(9.23)**	(8.13)**
Observations	17252	17252	17252	17252

Notes:

1) + indicates significance at 10 percent, * at 5 percent and ** at 1 percent. Robust t-statistics are in parenthesis.
2) All firm-level variables are in log. Size is measured as employment; skills as average wage per worker. Labour productivity is value added per worker. To control for industry and year effects the relevant industry-year mean was subtracted from firm-level variables (industries are defined as 3-digit SIC92).
3) Year and industry dummies have been included.
4) In column 5 the foreign transaction costs is calculated considering the flows of FDI out of the UK as weights.

In the remainder of the paper we further explore the robustness of our measure of overseas trading costs to disegregations in both countries and components used to construct the index. We begin by separating countries into three groups. According to the data reported in Table 2 of the Appendix the majority of FDI out-flows from the UK are into either the US, EU countries or Commonwealth countries. The largest change in costs of doing business over the period has been amongst EU countries, where the index decreased from a value of 3.8 in 1988 to 2.1 in 1998, where much of this decrease has occurred in the second

half of the sample. Despite this decrease the value of the index for the overall business environment in the EU is below that for the US, which has an average score of 1.8. Perhaps unsurprisingly there is little change in the value of the US component of the index over time, it increases by just 0.1 between 1988 and 1998. There has also been a general improvement in the business environment within Commonwealth countries, although at 0.6 this increase is smaller than that experienced in the EU.

In Table 6 we report the effect of transaction costs from each of these sets of countries/regions on the export ratio of UK firms.[30] We report only the transaction costs variable to conserve space and because none of the other results under this exercise change. Column 1 of table 6 reports the results for the change in US business environment, column 2 reports the results for the change in EU component, column 3 for the change in the index for Commonwealth countries and column 4 includes all three sets of countries. In column 1 to 3 the business costs variables remain significantly different from zero, and there is evidence that UK exports are more responsive to a change in business costs in the US compared to EU or Commonwealth countries. At the mean the marginal effect of lower trading costs is 8.3 for US transaction costs and 2.6 and 1.6 for EU and Commonwealth costs respectively.

Table 6: Export share regressions considering the different regional component of the overseas trading cost index

	(1)	**(2)**	**(3)**	**(4)**
US trading costs	-0.605			0.009
	(7.07)**			(0.06)
EU trading costs		-0.170		-0.163
		(8.51)**		(4.65)**
Commonwealth trading costs			-0.100	-0.029
			(4.17)**	(1.10)
Observations	17252	17252	17252	17252

Notes:

[30] The limited time variation in the index for the US means that this variable is collinear with the fixed time effects. For this we report all of the regressions in Table 6 without time effects.

1) + indicates significance at 10 percent, * at 5 percent and ** at 1 percent. Robust t-statistics are in parenthesis.
2) These regressions have the same explanatory variables as that in column 2 of table 5.

From column 4 there is however, the suggestion that the results for the US and Commonwealth countries are capturing the trend evident in the index for EU countries, which is of course omitted from column 2 and 3. When included altogether it is only the EU part of the index that remains significant. In that regression the marginal effect is estimated at 2.5 percentage points. Using the change in the index over time suggests an increase in the export ratio at the mean of 4.5 percentage points.

As a final exercise we try to understand which parts of foreign business costs have been most important for changes in exports over time by disaggregating the index used thus far into its six components. These are reported as regression Table 7 along with their marginal effects. Interestingly all of the parts of the index remain statistically significant, except for credit market regulations. This is helpful in suggesting that the results are not simply picking up the trend of some other omitted variable but have a real impact on the export decision of firms. The exception, credit market regulations, displayed a downward trend in many countries over the sample period. Of the marginal impact the strongest effect is from macroeconomic stability. The other variables have marginal effects in the range of 0.02 to 0.03.

Table 7: Export share regressions considering different component of the overseas trading cost index

	Coefficients	**Marginal effects**
	(1)	**(2)**
Legal Structure and Property Rights	-0.13	-0.019
	(2.09)*	
Macroeconomic Stability	-0.38	-0.058
	(5.84)**	
Credit Market Regulation	-0.19	-0.029
	(1.37)	
Business Regulations	-0.08	-0.013
	(2.61)*	

Labour Market Regulations	-0.19	-0.029
	(3.98)**	
International Capital Market Controls	-0.14	-0.022
	(5.03)**	

Notes:

1) + indicates significance at 10 percent, * at 5 percent and ** at 1 percent. Robust t-statistics are in parenthesis.
2) These regressions have the same explanatory variables as that in column 2 of table 5.

Section 6: Conclusions

The recent micro economic literature concerning exports has highlighted the importance of firms characteristics and trade costs for export decisions. Although the presence of trade costs (i.e. sunk and variable costs) are essential to describe the different export choices firms with different level of productivity make, little is known about them. The previous literature has concentrated mainly on the tariff barriers exporting firms face. The aim of this study was to provide evidence on a different aspect of trade costs, those of overseas trading costs.

Firstly, we model theoretically the effect of a reduction in the cost of doing business in foreign countries drawing upon the recent models of heterogeneous firms and international trade of Melitz (2003), Bernard et al. (2004) and Helpman *et al.* (2004). In those models all firms face the same costs of operating in foreign markets but as a result of underlying differences in characteristics (namely their productivity), they self-select into foreign markets (choosing either to export or locate some production abroad). Our departure comes from the effect of changes in the foreign business environment on both sunk and variable trade costs. Here we hypothesise that improving the legal system and the strengthening intellectual property rights of a country decrease costs of commerce raising the appeal of that country as export destination. According to our theoretical model reductions in the costs of doing business abroad leads to additional export market entry and increased export intensity. In order to allow for a differentiated response of exports by multinational firms the model also allows for the vertical separation of production.

Secondly, we test these predictions using a data set of UK manufacturing firms. We find that reductions in costs of doing business in other countries leads to some additional export market entry by firms that did not previously export. In line with the theoretical model, the effects are larger however for those firms that already exported however. These exporting firms now sell an increasing share of their output abroad. Among those policies associated with improvements in the overseas business environment, improvement in the legal structure and property rights, business regulations, macroeconomic stability and labour market restrictions all have significant effect on firm exports. At country/regional level, the reforms that have taken place in the EU seem to have had the largest impact on the export share of UK firms.

More studies, both theoretical and empirical, are needed to investigate further the actual trade costs exporting firms face. In particular, we need more studies using data set from other countries to clarify if the effect we found in this exercise is specific to the UK or common to other countries.

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Appendix

Table A1: Information included in the Index of Foreign Business Costs Costs

Sub-component of Index	*Includes information on*
Legal Structure and Property Rights	• Judicial independence: the judiciary is independent and not subject to interference by the government or parties in disputes • Impartial courts: A trusted legal framework exists for private businesses to challenge the legality of government actions or regulation • Protection of intellectual property • Military interference in rule of law and the political process • Integrity of the legal system
Macroeconomic Stability	• Standard inflation variability in the last five years.
Credit Market Regulation	• Ownership of banks: percentage of deposits held in privately owned banks. • Competition: domestic banks face competition from foreign banks • Extension of credit: percentage of credit extended to private sector. • Avoidance of interest rate controls and regulations that lead to negative real interest rates. • Interest rate controls: interest rate controls on bank deposits and/or loans are freely determined by the market

Business Regulations	• Price controls: extent to which businesses are free to set their own prices. • Administrative conditions and new businesses: administrative procedures are an important obstacle to starting a new business • Time with government bureaucracy: senior management spends a substantial amount of time dealing with government bureaucracy • Starting a new business: starting a new business is generally easy • Irregular payments: irregular, additional payments connected with import and export permits, business licenses, exchange controls, tax assessments, police protection, or loan applications are very rare
Labour Market Regulations	• Impact of minimum wage: the minimum wage, set by law, has little impact on wages because it is too low or not obeyed • Hiring and firing practices: hiring and firing practices of companies are determined by private contract • Share of labor force whose wages are set by centralized collective bargaining • Unemployment Benefits: the unemployment benefits system preserves the incentive to work • Use of conscripts to obtain military personnel
International Capital Market Controls	• Access of citizens to foreign capital markets and foreign access to domestic capital markets. • Restrictions on the freedom of citizens to engage in capital market exchange with foreigners—index of capital controls among 13 IMF categories.

Source: Fraser Institute

Table A2: Percentage of UK Outward FDI by Location

Country	*1996*
Argentina	0.23
Australia	5.73
Austria	0.28
Belgium-Luxembourg	2.52
Brazil	1.16
Canada	2.17
Chile	0.32
China	0.17
Colombia	0.61
Denmark	1.09
France	6.03
Germany	4.32
Greece	0.22
Hong Kong	2.20
Hungary	0.09
India	0.25
Indonesia	0.19
Ireland	3.02
Italy	1.49
Japan	1.16
Malaysia	1.03
Mexico	0.26
Netherlands	21.40
New Zealand	0.86
Norway	0.56
Philippines	0.21
Portugal	0.57
Singapore	2.78
South Africa	1.18
Spain	1.66

Sweden	0.57
Switzerland	0.75
Thailand	0.50
Turkey	0.11
United States	27.24
WORLD	92.95