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Export Oriented FDI

by

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Abstract

It is well known that the performance of foreign firms compared to domestic companies is superior with respect to employment, wages, and productivity. In this paper we detail the export behaviour of foreign affiliates in the United Kingdom relative to indigenous firms. Our findings show that foreign firms are more likely to export, and when they do so they are more export intensive and overall contribute disproportionately to total manufacturing exports from the UK. While firm-level advantages explain some of these differences in export behaviour, strategic considerations dominate, where these include the differential in costs, productivity, and market size between the UK and foreign countries. That is, both horizontal and vertical motives can be found for the use of the UK as an export platform by foreign firms.

Outline

1. *Introduction*
2. *What Does Theory Tell Us?*
3. *The Extent of Export-Oriented FDI in the UK*
4. *Conclusions*

Non-Technical Summary

Two salient characteristics of the UK economy are that it is relatively open (the UK is the fifth largest exporters of manufactures globally) and it attracts a large share of FDI inflows (in 1998 and 1999 it has registered FDI inflows for around 65 and 82 billion of dollars, second only to the USA). Besides, UK policymakers have committed considerable amount of public money to attract foreign multinationals and to promote exports through a vast range of financial incentives. This paper shows that these two aims are closely interwoven.

It has become a well known fact that foreign affiliates are more productive, pay higher wages, employ a more educated workforce and have superior technology than domestic companies. The novelty of this research is to provide a detailed analysis of the export behaviour of foreign firms in the UK. Our firm level data shows that foreign affiliates contributed substantially to the export performance of the manufacturing sector for the period 1988--96, and more so over time. Foreign companies are more likely to export than domestic owned firms and when they do, they export a large share of their output. However, the distribution of the export share of non-UK owned firms is more dispersed than that of UK owned. This implies that among foreign affiliates some are more export oriented than domestic companies, whereas some others are less. What is driving these differences?

We try to reconcile this evidence with theories of multinational enterprises. The export behaviour of foreign affiliates in the UK seems to be determined by strategic considerations. Although, firm characteristics are important (the larger and the more productive are foreign firms, the higher their export share), we find that the country/area of origin is a stronger predictor than firm characteristics of their export orientation. Firms from the EU do not appear to be more export oriented than domestic businesses, whereas those with headquarter from outside EU do. This is consistent with tariff jumping FDI. However, this is not the end of the story since firms from different country/area of origin outside the EU have vastly different export propensity. Thus, strategic consideration concerning, distance, market size differentials and other country and industry characteristics may play an important role in determining the export decisions of foreign companies, consistently with recently developed theoretical models.

Furthermore, the export behaviour of domestic enterprises is also an important determinant of the probability of foreign acquisition. Nevertheless, there are differences according to the country/are of origin of the acquiring firm. In fact, firms with previous export experience are more likely to be the target of take-overs undertaken by non-EU multinationals, whereas the same is not true for EU multinationals. Therefore, strategic considerations concerning the future export behaviour seem to be important for choosing what kind of firms to acquire.

Overall, if one of the goals of policy makers is to improve the export performance of the UK manufacturing sector, the findings of this research project provide additional support towards those policies aiming at attracting affiliates of foreign firms in the UK.

1:Introduction

Attracting foreign direct investment (FDI) and promoting exports have figured prominently in the minds of policymakers in the UK. Financial incentives such as tax breaks, duty drawbacks, investment allowances and so on have been offered to multinational enterprises (MNEs) to establish foreign affiliates (see Haskel *et al.* 2002). Likewise, export promotion activities range from financing trade fairs, through providing free information about foreign markets and financing market researches, to export credit insurance. The rationale of all such initiatives is founded on the belief that FDI inflows and exports contribute positively to economic development.

While this policy intervention reflects, partly at least, an entrenched attitude whereby exports are good and imports are bad, econometric evidence has recently suggested why exports might actually promote long term growth.[1] Foreign direct investments are also deemed to bring many benefits to the UK economy (Porter and Ketels 2003). FDI increases the level of competition in the domestic economy, and offers consumers greater choice. They are also seen as an important source of new technologies, innovation and business practice. It has become an established fact that foreign multinationals have higher productivity and superior technology than domestic firms and there is some evidence that these both help to raise aggregate productivity in the economy through the reallocation of resources, and also spills over to domestic firms resulting in some self-improvement. There are also important effects on employment and wages from FDI.

A neglected aspect of the effect of foreign multinationals on the UK economy is their contribution to the UK exports. The aim of this paper is to document the export

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[1] At the macro level GDP growth is strongly positively correlated with the growth of exports (Edwards 1993, 1998), and there is now supporting evidence at the micro level. Exports raise aggregate productivity by encouraging productivity improvements within the firm (e.g.: Girma *et al.* 2004; Wagner 2002) and by reallocating resources towards high productivity firms within the industry (low productivity firms either shut down or lose market share; e.g.: Bernard and Jensen in this issue).

behaviour of foreign multinational firms using a firm level data set for the UK manufacturing sector from 1988-1999.[2]

Our sample shows that foreign firms contribute disproportionately to the UK exports of manufacturing industries. In 1996 foreign multinationals accounted for one third of all exports from the UK manufacturing sector (they contributed 28 per cent of total output).[3] Foreign firms are more likely to export than UK owned firms, and when they do, exports account for a greater proportion of total sales. In the data 85 per cent of multinational firms export compared to 75 per cent of domestically owned firms, while the share of exports in total output is 10.3 per cent and 5.6 per cent respectively. Moreover, the size of this gap has been increasing over time.

In this paper we attempt to shed light on a number of issues. These include why foreign firms export at all. The export activity of foreign affiliates is not consistent with traditional theories of FDI (for example Markusen 2002). According to this set of models firms invest in foreign production facilities to avoid the costs of international trade (there is a cost advantage of proximity versus concentration, Brainard 1993). Exports and FDI are substitute methods of serving markets. Exporting foreign firms may be envisaged in three situations: 1) the good is exported to a third country being part of a free trade area as the host country (this leads to tariff jumping FDI); 2) multinational enterprises undertake more complex integration strategies, which involve export to a third country and intra-firm trade (this happens when there are more than two stages of production and more than two countries); 3) the firm produces multiple products that are delivered to foreign markets through different means and there is a positive correlation in demand across these products (cross-product complementarity). We try to assess which of the two is the more likely to explain the UK experience.

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[2] The relationship between FDI and *aggregate* export has been investigated before by, *inter allia*, Blake and Pain (1994) for the UK O'Sullivan (1993) and Barry and Bradley (1997) for Ireland. Our study is more in the spirit of Hanson *et al.* (2001) and Feinberg and Keane (2002) where they analyses the export behaviour of *foreign affiliates* of US multinationals.
[3] As explained in Section 3 of the paper the data set used in this study does not contain all manufacturing firms within the UK (the ARD does not have information about exporting at the firm level). There is a bias in our sample towards large firms. This will have the effect of increasing the share of multinational firms in total manufacturing output. In the ARD multinational firms accounted for 21 per cent of total manufacturing output in the 2001 (Griffith *et al.* 2004). The effect on the share

We also focus on the policy implications of our results: Is there a one-size fits all export promotion policy? Do foreign firms face the same incentives and costs as domestic firms in their export decisions, or are other characteristics important? Can the financial incentives granted to foreign affiliates to locate in the UK be justified on grounds (i.e. exports promotion) other than those traditionally advocated (i.e. direct productivity and employment gains)? Finally, we also consider the strategic motives for using the UK as a platform for exports.

The rest of the paper is organised as follows. Given the paucity of the empirical evidence on the export behaviour of foreign multinational firms we first consider economic theory. Section 3 then documents the empirical evidence for the UK. This is considered at various levels of aggregation and brownfield FDI. Finally, Section 4 provides a summary of the evidence found and an assessment of the predictions from the theoretical models.

2:What does theory tell us?

In traditional theories of the multinational firm, exporting and FDI are alternative methods of supplying foreign markets (see for example Markusen 1995). Firms invest in foreign production facilities to avoid the costs of international trade, there is a cost advantage of proximity to markets versus the concentration of production facilities (Brainard 1987).

The process of modelling the export decision of MNEs has developed along two lines: export platform FDI and complementarity. These can broadly be distinguished by the number of product lines that the firm is assumed to produce. Export platform FDI is typically defined as the establishment of production facilities in a foreign country and the use of part or all of the output from those facilities to serve a third country. It therefore refers to the export of a single product line, where these exports are not back to the parent country. Complementarity between exports and FDI refers instead to the

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of exports of multinational firms will be less affected by this bias because large firms are more likely to export than smaller firms (Girma *et al.* 2004).

case of a multi-product firm and to the export and FDI flows from the home country to foreign countries: exports and FDI become positively correlated if there are horizontal or vertical complementarities across product lines. We cannot distinguish between these two explanations within the data and so we review briefly the predictions of both literatures.

Theories of export platform FDI have developed by adding more countries and stages of production into traditional theories of FDI. Vertical FDI occurs when the stages of production occurs in more than one country; and horizontal FDI when the same stage of production occurs in more than one country. Vertical FDI is factor seeking, whereas horizontal FDI is market seeking.

When there are more than two countries and more than two stages of production, multinationals are likely to undertake more complex FDI choices which involves intra-firm trade and export platform FDI. The effect of adding more countries to the model is to allow for the possibility of a horizontal motive for export platform FDI, whereas adding more stages of production allows for a vertical motive. Motivated by the evidence presented in the next section we limit ourselves to a discussion of when two of the three countries are involved in a free trade agreement. We also focus on the differences between the equilibrium actions of those inside and those outside the free trade area.

Motta and Norman (1996), motivated by the observation that much FDI is between countries involved in regional trading blocks such as NAFTA or the EU, consider the case of three identical countries and a single stage of production. Costs of production do not differ between countries but costs of trading do (because two either enter a free trade agreement or raise external barriers against the third). If we assume that we start from an equilibrium where each firm exports to the other two countries from its home country, then the action of raising external barriers or creating a free trade area will encourage the outside firm to set up production facilities inside the free trade area and export to the other country in the regional bloc. Which of the countries the outside country chooses to locate production in and export from is left undetermined, as both are identical. Again, because of identical costs neither of the inside countries choose export platform FDI as a strategy.

The *World Investment Report* (1998) has described the modern integration strategies of multinationals as *complex*; they involve vertical FDI in some countries and horizontal FDI in others, by the same firm. These complex integration strategies are consistent with export platform FDI, which involves export of intermediates or final goods by foreign affiliates. The conditions under which export platform FDI is likely to take place have been explicitly analysed by Ekholm *et al* (2003). In their model there are multiple countries, two identical countries in the North (A and B) and one in the South, and multiple stages of production. Each firm produces intermediates and a final good. Firms must provide headquarter services from their home northern country but can choose where to produce intermediates as well as assembly the final product. Two of the countries, one northern (A) and one southern are assumed to be members of a free trade area. The drivers of the model concern the assumptions about the size of the (marginal) cost advantage of southern firms and the costs of trading between the different sets of countries.

The free trade area between country A and the Southern country means that it is always optimal for the northern country to locate production in the Southern country and export products back home (owing to the cost advantage from doing so). Therefore, unlike in Motta and Norman (1996), when there are no vertical motives for FDI, the country inside the free trade area always has a motive to undertake export platform FDI.

For the other northern country (B) the model predicts three outcomes. First, no FDI: firm B produces in its home country and exports to the free trade area; second, export-platform FDI: firm B produces in its home country the good to be sold there; whereas the final good sold in the other northern country is produced in the South and then exported; third, vertical FDI (hybrid MNE): firm B locates all production in the South and exports the good to both markets in the North. This last alternative is a hybrid of FDI types because, toward the home country, the firm undertakes vertical FDI whereas, toward the other Northern country, it undertakes a pure form of export platform FDI.

Which of these sets of alternative strategies occurs depends on the size of the (marginal) cost advantage to Southern firms, and the various trade costs between the different countries. As the cost advantage of Southern relative to Northern firms increases we move from the first equilibrium, to the second and then when the cost advantage of locating production in the South becomes large enough all production moves there. Similarly as trade costs between the Southern country and the two Northern countries fall then the Northern firm not in the FTA finds it is competitive to move from exporting to the FTA, to export platform FDI, to locating all production in the Southern country. This part has similarities to Motta and Norman (1996).

The predictions of these models are driven primarily on cross-country differences in costs firms face (owing to the fact that some are inside and some outside the free trade area). Grossman, Helpman and Szeidl (2003), developing the complex FDI model of Yeaple (2003), show that firm level characteristics may also be important. If firms within the same industry are heterogeneous in their productivity levels they may make different choices, even though the costs of exporting and FDI they face are the same. They assume the presence of three countries (two in the North and one in the South); firms must provide headquarter services, produce intermediates and assemble the final product. Their analysis allows for the coexistence in the same sector of a rich array of profitable FDI strategies. In brief, the general lesson that can be drawn from this paper is that least productive firms will not undertake FDI. More productive firms will choose complex strategies that involve a mix of FDI and exports. In most situations these can be classified as neither purely horizontal nor purely vertical, but as complex and involve the export of intermediates and/or the final product.

Models of export platform FDI simplify the analysis to a single product firm (albeit with multiple stages of production). An alternative set of models consistent with the idea that multinational firms may also export their product comes from the literature on complementarity between FDI and exports (for example see Head and Ries, this issue). Again there are horizontal and vertical elements to this complementarity. In a multi-product firm exports and FDI become positively correlated if there are horizontal or vertical complementarities across product lines. For example, in the case of horizontal complementarities the increased demand for the good supplied by foreign production may lead to increased demand for all goods produced by that firm,

some of which may be supplied through arms-length trade. For vertical complementarities the establishment of a plant in a foreign country to produce or assemble final goods will displace the exports of this product, but at the same time will increase the export of intermediates, from the home to the foreign country. Net complementarity may arise if the displaced export of the final good is more than compensated by the increase in export of intermediates.

3:The extent of export oriented FDI in the UK

We study the export behaviour of foreign firms located in the UK using a panel of firms taken from *OneSource* for the period 1988 to 1996. Further details on the *OneSource* dataset can be found in Oulton (1998). [4] In total we have 4,500 observations for 741 foreign firms. Part of the industry wide variation we observe in the data may reflect the fact that foreign multinationals tend to be concentrated in industries with high productivity, while exports from the UK might be expected to reflect comparative advantage. To provide a comparison to foreign firms we therefore also report on the export behaviour of domestic firms. In our sample we have 40,200 observations for 5,100 domestic firms.

To assess the extent to which foreign multinationals export we start by analysing the export share for the totality of firms in our sample. Figure 1 reports histograms of UK and non-UK owned firms according to their share of exports in total output. [5]

There are noticeable differences between them. Foreign firms are more likely to export than indigenous enterprises, and on average when they sell abroad they export a higher share of total output. About 25% of domestic firms report no sales abroad, whereas the comparable figure for foreign enterprises is around 15%. The export intensity of domestic firms is also lower, the median export share of foreign owned firms being 21 per cent compared with 8.8 per cent for domestically owned firms.

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[4] The choice of this data set was dictated by the fact that the production census for the UK (the Annual Respondents Database) does not collect information on firms' exporting activity. *Onesource* has information about foreign ownership and exports. It is a non-stratified samples with an oversampling of large firms. Where relevant we discuss the likely direction of any bias in the results we find.

[5] The data in Figure 1 represent averages across the full sample period. The distribution of export shares does not change significantly if it is computed on a cross section basis.

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This difference between the two is manifest across the distribution of export shares. For example, 27 per cent of domestic firms export less than 10 per cent of total sales whereas just 21 per cent of companies under foreign control report such a low level of export sales. Similarly foreign firms are more likely to have larger export shares than domestic firms: around 22 per cent of foreign owned firms have an export share greater than 50 per cent of total output, whereas the comparable figure for domestic firms is 13 per cent.

Figure 1: Distribution of the export share for domestic and foreign companies


Graphs by Foreign
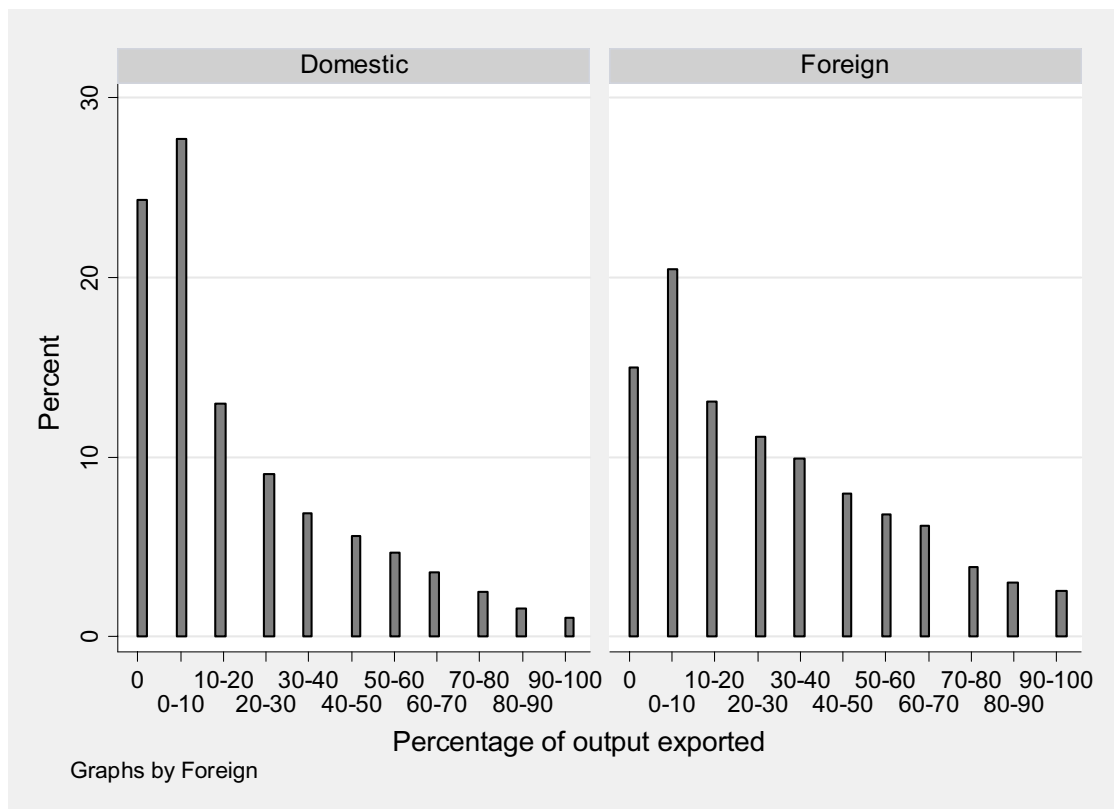
A comparison of export sales by domestic and foreign firms of the type conducted above does not account for the fact that foreign firms might be concentrated in export intensive industries and may export more in certain years. To control for the effect of industries and the business cycle (i.e. industry and time effects) we measure the export share of each firm relative to median export share in the industry and year. The export intensity of firm i was computed as the percentage difference between the export share of the firm and the median export share at time t in industry j (industries are at SIC92 3 digit level). All values lie within the range -1 and +1 (a value of 0.5 indicates that firm i has an export share 50 per cent points higher than the median firm

in that industry and year). Figure 2 presents a box plot of the export share for UK and non-UK firms computed using this methodology. In addition to the median export share (represented as the vertical line inside the box) the boxplot presents information on other aspects of the distribution. The full range and the inter-quartile range (represented by the full box) are also included in the diagram.

The results from this exercise would appear to confirm the evidence presented in Figure 1, the export intensity of foreign owned firms is greater even conditioning on industry and time. At the median foreign firms export 3.4 percentage points more than domestic firms in the same industry and time period. Other papers using this same data set have shown that foreign businesses are bigger and more productive than domestic ones. From this figure we note that in addition they have also larger export shares.

Figure 2: Boxplot of the export share of domestic and foreign firms
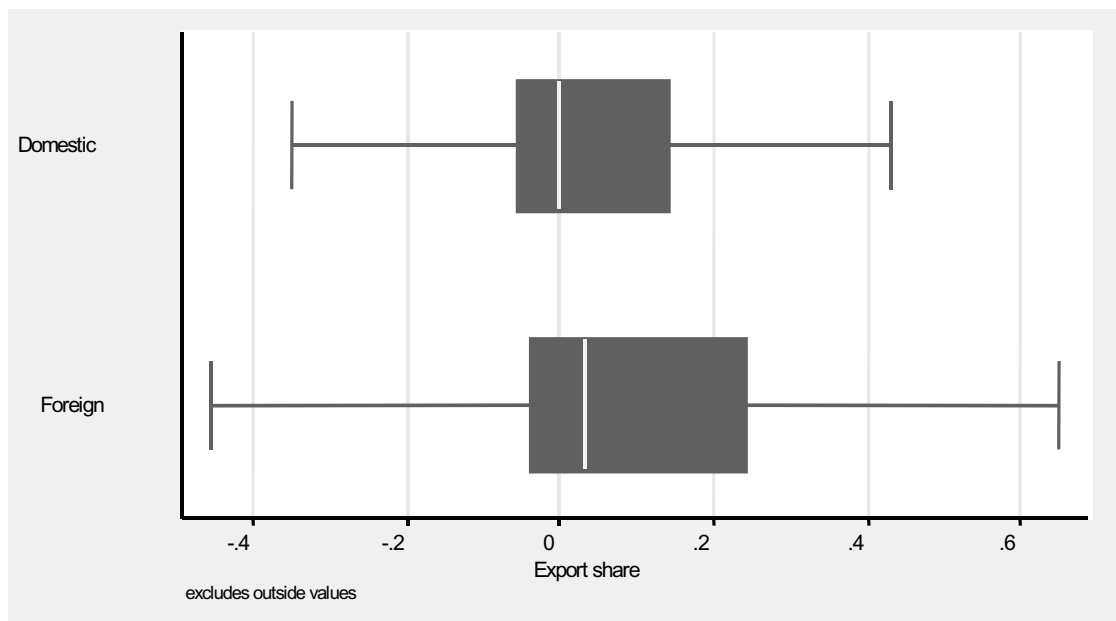
Notes: The export share is measured as difference between the export share of firm i in industry j at time t and the median of the export share of all firms in industry j at time t.

Figure 2 also suggests however, that there are large differences in the export behaviour of foreign firms, and more so than UK owned firms. The inter-quartile range for the export share of foreign owned firms is 0.28. The equivalent figure for domestic firms is 0.19. Indeed formal tests show that the distribution of export share

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amongst foreign companies does not stochastically dominate that of indigenous firms, even though measures of the average export share (both median and mean) are to the right of domestic firms. The high spread of the distribution of export sales for companies with headquarters overseas suggests great heterogeneity in the type of FDI inflows the UK has received. Among foreign companies, there are some that are relatively export oriented (with respect to the median firm) and others that are relatively host market oriented.

We investigate these differences in the export share of foreign firms by disaggregating according to the country of origin of the parent company. The models of export platform FDI reviewed in Section 2 make strong predictions according to the country of origin of the firm. In the first two columns of Table 1 we report the percentage of observations from each country that export or do not export. In the third column we report the mean export share of exporters (again calculated relative to the industry and year median), while the final column reports the number of observations we have on companies from each country. Figure 3 presents graphically the mean export share of firms by country.

As reported already, there is a higher percentage of foreign export than domestic firms in our sample: 75 per cent of domestic firms export compared to 85 per cent of foreign firms. Of these foreign firms only European (80.7%) and Australian (50%) are noticeably less likely to export than the average foreign firm. At the other end of the scale all Asian firms observed in our sample export.

The percentage of exporters versus non-exporters in the sample varies less by country than the export intensity. In terms of the share of output exported there would appear to be two broad groups of countries. In the first group are EU countries and Australia where the export share is slightly below that for UK firms. In the second group, which includes firms from the US, Japan, Asia, and non-EU Europe, export intensities are between 5 and 9 percentage points above that of UK firms. Canadian firms are the most export oriented in the sample and appear somewhat of an outlier. The mean export share of Canadian owned firms is 36 percentage points above the median in the respective industry and year.

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It is interesting to note from this figure that companies headquartered in countries that are part of the EU have a similar propensity to export as domestic firms, whereas firms whose parent company headquarters in non-EU European countries are more export oriented. The former result might be used to suggest that vertically motivated export platform FDI may be important for the choice of the UK as a location for production even by firms from other EU countries. The latter result is consistent with the idea that firms from non-EU European countries establish production facilities in the UK to gain access to the European market. A horizontal motive for FDI.

Table 1: Export share and the number of exporters and non-exporters by country

	Non-exporters%	Exporters%	Export Share%	Observations
All firms	23.7	76.3	6.0	30715
UK	24.7	75.3	5.3	27617
All foreign	15.1	84.9	10.4	3098
US	10.9	89.1	13.9	1045
Canada	9.6	90.4	36.1	135
EU	19.3	80.7	4.2	1329
Europe non-EU	12.9	87.1	12.5	241
Asia	0.0	100.0	11.4	34
Japan	16.0	84.0	10.2	156
Australia	50.0	50.0	3.6	28
Others	10.8	89.2	12.8	130

Figure 3: Boxplot of the distribution of the export share of firms by country of origin.
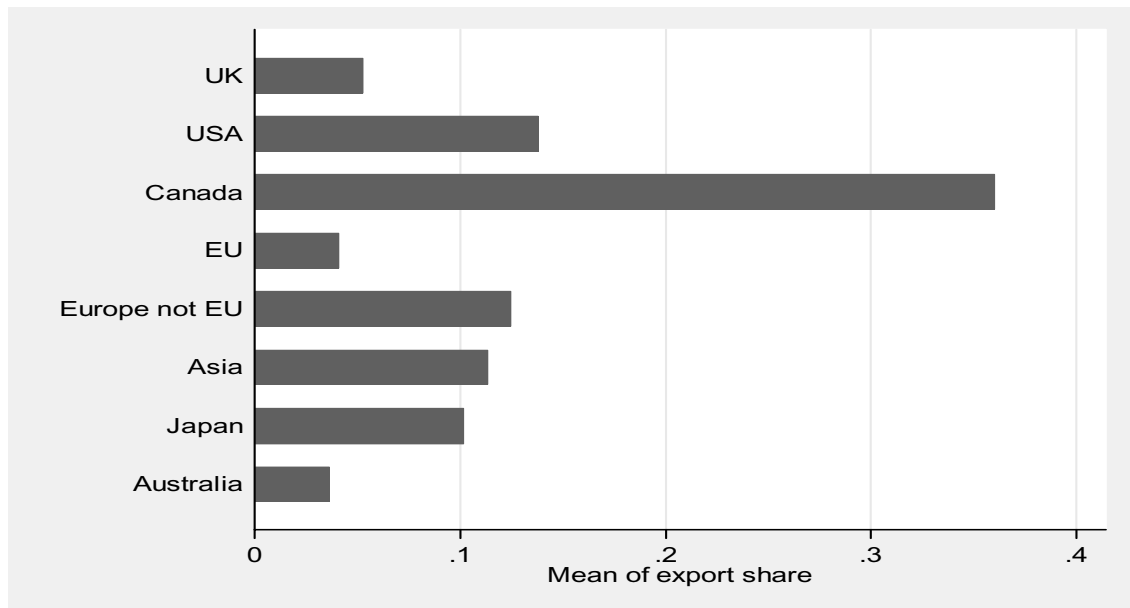
Notes: The export share is measured as difference between the export share of firm *i* in industry *j* at time *t* and the median of the export share of all firms in industry *j* at time *t*.

Thus far in the analysis we have ignored the question of whether these patterns have changed noticeably across time. There are some reasons to expect that this might be the case. The available sample period coincides with the creation of the European Single Market Programme in 1992. Given we have found that strategic motives are important for export platform FDI we might expect a change in behaviour around this point.

Figure 4 shows the behaviour of the mean of the export share over time broken down by country.[6] It is evident that in general foreign affiliates from outside the EU have been more export intensive than domestic enterprises in all years in our sample (there is some variation for some countries possibly due to the relatively small number of observations for some groups). Overall it would appear that foreign firms have become more export intensive relatively to domestic firms over time, although this is in part because domestic firms appear to have become slightly less export intensive. There is no evidence of a clear break in behaviour around 1992 however. This also occurs irrespective of the country of origin. Firms whose owners are from the EU countries have lower export intensity than domestic firms at the start of the period and near identical levels by the end, whereas firms from non-EU have an export intensity

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[6] We do not display all of the countries included in the previous analysis in the chart for reasons of clarity, we focus instead on the main countries and the main trends.

that is above that of domestic firms at both the start and the end of the period. This implies that foreign companies have been contributing more over the years than domestic firms to the overall export performance of the manufacturing sector in the UK.

Figure 4: Behaviour of the export share of foreign and domestic firms by year
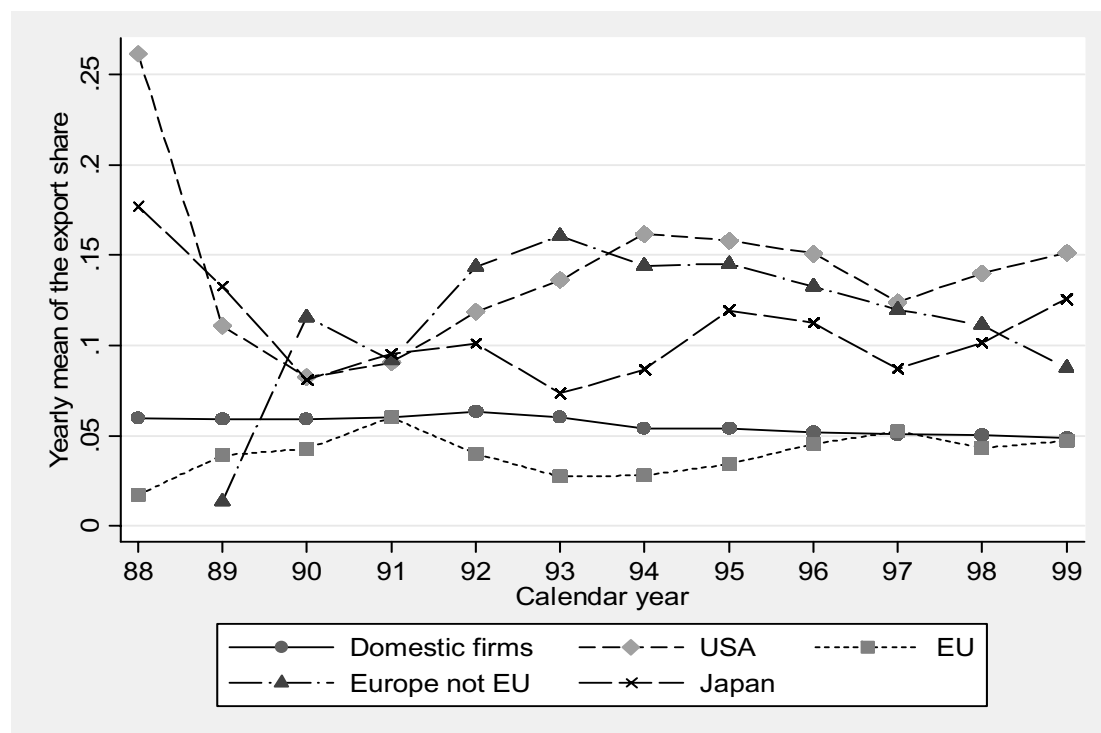
Notes: The export share is measured as difference between the export share of firm i in industry j at time t and the median of the export share of all firms in industry j at time t.

It remains possible that firm characteristics rather than strategic decisions could determine the differences among countries described above. Firm level microeconometric evidence both for the UK and other countries has for example, found that the export decision of domestic firms is driven by their advantageous underlying performance characteristics. Firms that are sufficiently large and productive self-select into becoming exporters (Bernard and Jensen, this issue; Greenaway and Kneller, this issue). Therefore it might be for example that Canadian firms are more productive than EU multinationals and it is this that explains there higher export intensity. Or similarly, multinational firms are known to be more productive than domestic firms (Griffith, Redding & Simpson, this issue) and as such one might expect therefore that foreign multinational firms contribute disproportionately to exports from the UK because of these favourable characteristics.

We investigated the differences amongst countries more formally by controlling for other covariates thought to be important determinants of the probability of exporting and the export share.[7] For domestic firms the probability of exporting has been found to be increasing in the size and productivity of the firm (Greenaway and Kneller, this issue). 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. Finally, the level of skill embodied in the workforce may play an important role in the export behaviour of the firm since better workers may lead to better quality product and higher levels of efficiency (see Bernard and Jensen 2004 for a similar argument).

We therefore include in the regression a set of firm level variables and an 0/1 variable indicating when the firm is foreign. If firm level variables fully explain the export behaviour of foreign firms then we would expect this indicator to add no additional information to the regression and to be insignificant. The firm level characteristics included in the regression are: the number of employees (to control for size), its square (since it has been reported that export and size have an inverted U shape relationship), the wage per employee (to control for the skill level of workers) and labour productivity (measured as value added per worker).

One complication of performing regression analysis with the export share as the dependent variable is that it is bounded by construction between 0 and 1. Linear regression is unsuited in this case since it may lead to a prediction of export shares that are lower than zero and higher than one. We detail the estimation method employed in this paper in the Appendix. For the export decision we estimated a probit model.

Table 2, in the first two columns, reports the results from the export dummy and export share regression for all firms (both domestic and foreign). Overall, the estimates for the firm level variables are in line with those found in previous studies

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[7] All these control variables are in log and 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 was subtracted.

(Bleaney and Wakelin 1999; Wagner 2001, Girma *et al.* 2004). According to the results from the first regression in the table export firms are more productive, larger and a more skilled intensive than non-export firms. These same variables also matter for the export share. Firms that are more productive, larger and more skill intensive export a higher proportion of their total production. The significance of the firm level variables are usually interpreted as reflecting sunk costs of export market entry; product compliance, market studies, marketing necessary to penetrate foreign markets and to maintain international sales networks and product quality.

Conditional on these firm level variables we still find however, that the foreign indicator is positive and strongly significant in both regressions. This suggests that foreign firms are both more likely to export than domestic firms and to export more than domestic companies, even after controlling for the sort of firm level variables used in previous studies to model the export behaviour of firms. Foreign firms are different in their export behaviour from domestic firms.[8]

In Table 2, from column three to five, we explore these results further in two ways. Firstly, we ask whether the firm level characteristics found to be important in the previous regressions predict export behaviour in the same way as for indigenous firms. This is done by splitting the sample according to the country of origin of the parent company. The results in table 2 suggest that there are differences between domestic and foreign firms. With respect to the export decision, firm level variables appear important for domestic firms (all coefficients have the expected sign and are strongly significant), whereas these variables all less important for foreign firms (only size is significant). The differences are less marked for the export share regressions. Firm level variables play a similar role in the two sets of firms. Overall these results might be seen as consistent with the Grossman, Helpman and Sziedl (2003) model, where the export decision of foreign firms is based on strategic considerations concerning the complex integration strategies of MNEs.

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[8] In a related paper Greenaway *et al.* (2004) report positive and statistically significant export spillovers from foreign to domestic companies for the UK. The rationale for such effect, as they explain, is that foreign firms may generate information externalities, which enable domestic enterprises to start exporting or increase their export share.

Table 2: Export decision and export intensity regression results for domestic and foreign firms separately

Sample	All firms		Export Dummy		Export share	
	Export Dummy	Export Share	Domestic firms	Foreign firms	Domestic firms	Foreign firms
Size	0.196	0.115	0.205	0.156	0.122	0.078
	(22.16)**	(12.03)**	(21.96)**	(5.09)**	(11.87)**	(2.96)**
Size squared	-0.030	-0.002	-0.033	-0.004	-0.006	0.022
	(6.54)**	(0.39)	(6.64)**	(0.28)	(1.03)	(2.05)*
Skill	0.142	0.190	0.132	0.165	0.231	-0.017
	(3.37)**	(2.19)*	(2.89)**	(1.38)	(2.25)*	(0.16)
Productivity	0.186	0.272	0.202	0.048	0.262	0.292
	(7.64)**	(8.31)**	(7.64)**	(0.76)	(7.07)**	(4.34)**
Foreign	0.180	0.238				
	(5.26)**	(8.40)**				
Constant	0.126	-2.627	-0.075	0.279	-2.716	-1.930
	(2.01)*	(38.38)**	(1.42)	(0.79)	(37.30)**	(8.39)**
Observations	26893	26920	24001	2809	24020	2900

Notes:

(i) Absolute value of robust z-statistics in parentheses

(ii) + significant at 10%; * significant at 5%; ** significant at 1%

(iv) Firm level variables are lagged one year: size is the number of employees, skill the wage per worker; productivity the value added per worker. Year and industry dummies (2 digit level) included.

From a policy perspective, these results suggest that in the planning and evaluation of those incentives and policies aimed at turning non-exporters into exporters or at increasing exports the ownership of firms should be take into consideration. Indeed, foreign affiliates may respond differently from indigenous companies to such initiatives given the apparent importance of strategic motives in their export decisions.

Secondly, to distinguish whether or not the export decisions of foreign firms vary systematically according to their country (or area) of origin we performed the export

dummy and export share regression substituting the foreign indicator with dummies indicating the country/area of origin of the corresponding firm. (The UK dummy was excluded so that the estimates of the country/area dummies take British firms as a reference.) In addition, to account for differences in the relationship of firm level variables with respect to exporting across foreign and domestic firms found above, we allow the coefficients on these variables to vary across the two different types of firm (we do not report these coefficients to conserve space).

In Table 3 we disaggregate the foreign dummy from Table 2 into the various countries of origin of the parent company. In this regression we also control for differences in the effect of firm level characteristics on the decision to export and the export share. Again a number of these country effects are significant, confirming that the export decisions (entry and share) of foreign multinationals does not just reflect the superior underlying performance characteristics of these firms.

There are few consistent patterns in the export behaviour of countries, where this might be considered to match the complex integration strategies of MNEs as highlighted in theoretical models by Yeaple (2003), Grossman *et al* (2003) and Ekholm *et al* (2003). Foreign multinationals from the US, Canada and other countries are both more likely to export and have significantly higher export shares than domestic firms. Asian firms, who all export (and are therefore not included in the probit regressions) do not have significantly higher export shares. Firms from non-EU European countries and Japan are no more likely to export than domestic firms, conditional on the underlying characteristics, but are more export intensive than domestic firm when they do. Firms from the EU countries are more likely to export (the significance of this variable is only at the 10 per cent level) but have significantly lower export shares than domestic firms, and finally Australian firms are less likely to export but do not have significantly lower export shares.

Table 3: Regression of the export dummy and export share

Country of Origin	Export Dummy	Export Share
US	0.243	0.472

	(3.73)**	(10.88)**
Canada	0.705	1.327
	(3.83)**	(8.17)**
EU	0.038	-0.135
	(0.77)	(2.99)**
Europe not EU	0.100	0.441
	(0.87)	(5.13)**
Asia		-0.116
		(0.42)
Japan	-0.150	0.301
	(1.12)	(2.74)**
Australia	-0.613	-0.212
	(3.09)**	(0.84)
Others	0.575	0.436
	(3.25)**	(3.50)**
Constant	-0.052	-2.613
	(1.03)	(35.54)**
Observations	26860	26920

Notes:

(i) Absolute value of robust z-statistics in parentheses

(ii) + significant at 10%; * significant at 5%; ** significant at 1%

(iii) Europe not EU includes Switzerland and Norway; Asia includes Hong Kong, Malaysia and Singapore.

(iv) Firm level variables are lagged one year: size is measured as number of employees, skill as wage per worker; productivity as value added per worker. Year and industry dummies (2 digit level) included.

That said, the strong significance of the non-EU indicators (outside of Australia and Asia) in the export share regressions suggests that tariff jumping is an important motive of export FDI into the UK. Foreign affiliates of multinationals with headquarters in the EU are less export oriented than affiliates of firms with headquarters outside the EU. However, if tariff jumping is the only motive of FDI in the UK we would expect that firms whose headquarters are outside the EU will have

the same export propensity. If complex integration strategies were undertaken we would expect that firms from different countries would have different export intensities. In this situation the export intensity would depend on cost, productivity and market size differentials between the UK and the country of origin.

Table 4 shows some figures that allow us to assess the importance of firm level variables relative to country/area of origin dummies, given the estimates in Table 3 column 2. For each country/area of origin whose dummy is significant in the export share regression of Table 3 we computed the predicted export share of foreign firms setting the relative geographic dummy to one and the firm level variables to their mean values (computed considering only those foreign affiliates whose parent company is headquartered in the respective country). This value was subtracted from the predicted export share, setting, one at a time, the variables in the columns of Table 4 to the mean level of UK firms and the dummy to zero. The differences so computed lets us to gauge the change in the predicted export share of foreign firms caused by setting firm level variables or the geographic dummy to the average value for UK firms. Where foreign are larger, more productive or more export intensive than domestic firms we would expect the figure in Table 4 to be negative.

As one can see, the country/area dummies have a bigger effect than firm level variables; indeed, setting the respective geographic dummy to zero (and given the estimates in Table 3) would decrease the export share of US foreign affiliates by 9.5 percentage points, of Canadian firms by 30, of European firms not in the EU by 8.5 and Japanese firms by 5.5 percentage points. By contrast, the export share of foreign affiliates whose parent company is headquartered within the EU would increase by 2 percentage points. The effects of the main firm level variables, namely size and productivity, on the export share appear to be smaller for all foreign countries. This finding would suggest that strategic motives related to countries differences in costs, productivity and market size may be more important than firm level variables in determining the export intensity of foreign firms.

Table 4: Effect of geographic dummy and firm level variables on the predicted export share

Origin	Geographic	Size	Productivity

	Dummy		
USA	-.091	-.007	-.008
Canada	-.300	-.008	-.025
EU	.022	-.000	-.003
Europe not EU	-.085	-.010	-.009
Japan	-.055	-.012	.001

Acquisition

The most important mode of entry by foreign firms into the UK is through cross border mergers and acquisitions.[9] Interesting questions that relate to the above analysis include: whether foreign acquisition turns firms that previously served just the domestic market into exporters, or whether they target domestic firms with export experience, and if it is the latter what happens to the export share in these acquired firms?

In Table 4 we compare the characteristics of acquired versus non-acquired domestic firms using a Probit regression taken from Girma, Kneller and Pisu (2004). Given our primary interest in the export status of the acquired firm we report just that variable to conserve space, although the regression also includes firm level variables (productivity, size, average skills and age), fixed industry and time effects. In the first regression in the table we compare the characteristics of all acquired firms in the sample, while in the remaining regressions we split the sample to consider the country of origin of the parent company. Owing to a relatively small number of acquisitions in the data and our interest in the differences in behaviour of countries inside and outside the EU we separate acquisitions into those by EU firms, those by US firms and finally non-EU firms (including US firms).[10]

As is evident from regression 1 foreign firms disproportionately target domestic firms with export experience, compared to their distribution in the population of domestic

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[9] As reported in the *World Investment Report* (UNCTD 2000) the share of total cross border merger and acquisitions in world total FDI flows has risen from 52% in 1997 to 83% in 1999. In developed countries it is thought to account for an even greater share.

[10] In our data set we have 259 acquisitions by EU, 224 by USA and 385 by non-EU multinationals.

firms. On average, being an exporter increases the probability of acquisition by about 43%. However, once again we find there are noticeable differences in this acquisition according to the of origin of the parent company. The acquisition of exporters by EU firms is not significantly different from what one would expect given the distribution of exporters amongst the population of domestic firms. Consistent with the evidence in Table 3, EU firms are no more likely to be exporters than domestic firms. In contrast, acquisitions by non-EU firms (when separated by US and others) are more likely if the domestic firm has export experience.

When we explore whether there are differences in the probability of acquiring an exporter in the post 1992 period we find the effect to be negative (acquisition of exporter is lower post-1992) but insignificant.

Firms from non-EU countries appear to target domestic firms with export experience for acquisition. Firms from EU countries are no more likely to target exporters than their density in the population of domestic firms. In the final set of results we explore this strategic behaviour further by considering what happens to the export intensity of acquired firms in the post acquisition period. If multinationals from non-EU countries target exporters for strategic reasons we might expect the export intensity to rise over time. We measure this effect relative to the export intensity of non-acquired domestic firms. The evidence is presented in Table 5. We separate acquisitions according to the broad grouping of EU and non-EU.

Table 5: Characteristics of Acquired Firms

Acquisitions from	All foreign countries	EU	US	Non-EU
Export	0.185	0.0216	0.2279	0.2215
Indicator	(3.10)**	(0.23)	(1.81)+	(2.34)*
Observations	19345	15283	15180	16848

Notes:

(i) Absolute value of z-statistics in parentheses

(ii) + significant at 10%; * significant at 5%; ** significant at 1%

In combination with the results from the previous table the evidence would appear to suggest that firms from EU countries do not target export firms, and when they do

acquire exporters these firms tend to become less export intensive relative to domestic exporters over time. In contrast firms from non-EU countries appear to both target exporters and then increase the export intensity of these acquisitions over time.

Table 6: Post acquisition export share

	Change in export share relative to domestic firms
EU Acquisitions	-0.174
	(3.71)**
Non-EU Acquisitions	0.526
	(12.77)**
Observations	26701

Notes:

(i) Absolute value of z-statistics in parentheses

(ii) + significant at 10%; * significant at 5%; ** significant at 1%

4:Conclusions

A well-known fact in the empirical literature concerned with FDI is the superior performance of foreign firms compared to domestic companies with respect to employment, wages and productivity. In this paper we investigate the export behaviour of foreign affiliates in the UK. Our findings show that foreign firms are more likely to export than indigenous ones, when they do so they are more export intensive and contribute disproportionately to total manufacturing exports from the UK.

In some regards this is surprising. Traditional theories of FDI suggest that FDI and exports are alternative means of serving foreign markets not complementary. Two theories can be found in the literature that might explain the export behaviour of multinationals and neither fits perfectly with the evidence found for the UK.

We find that the export behaviour of foreign firms is determined overwhelmingly by strategic considerations involving the differential in costs, productivity and market size between the UK and foreign countries. If there is complementarity between exports and FDI we would not expect the significant differences in behaviour across

countries we find in the data. In this sense the evidence might be considered to be more consistent with export platform FDI. In this literature there are two main motives for export platform FDI: vertical and horizontal. There is strong evidence of horizontal motives in the data: firms from non-EU countries are much more likely to export than firms from EU countries located in the UK. However this does not provide a full explanation: vertical motives are also important. There is evidence of this not only from the fact that non-EU firms use the UK as an export platform, but that EU firms also use the UK to export back to mainland Europe.

While strategic motives appear to dominate the explanation, we also find that firm level variables are important. Our results show that the larger and the more productive are foreign firms the more export oriented they are. However that said, it is also clear from our analysis that what drives foreign firms to export is different from domestic firms. Even conditioning on firm level characteristics, which themselves appear to have a smaller role in the export behaviour of foreign firms than for domestic companies, foreign firms are more export intensive than domestic firms. Therefore, foreign firms may respond differently from domestic firms to policies devised to spur firms to start exporting or to increase their exports,

Policy markers within the UK clearly view exporting as a good thing. Foreign firms contribute disproportionately to exports from the UK, and could, given their favourable underlying performance characteristics, potentially offer a larger share. If policymakers aim to improve the export performance of the UK manufacturing sector this fact may provide an additional motive to invest public funds to attract affiliates of foreign multinationals to locate in the UK.

In addition, anything that threatens the permanence of foreign companies - for example it is has been suggested by some that the UK's membership of the EU might be such a variable - could have significant consequences for the export performance of the UK manufacturing sector.

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Appendix A

One complication of performing regression analysis in this instance 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. Besides, because of the same reason linear least square may lead to predictions of the dependent variable outside the extreme points.

The most common alternatives to linear OLS in this situation have consisted in employing the Tobit model (e.g.: Bleaney and Wakelin 1999) and the log-odds ratio transformation of the limited dependent variable modelled as a linear function of the regressors (e.g.: Gourlay and Seaton 2003). However, both methodologies have drawbacks. Indeed, the Tobit model is unsuited since the dependent variable is bounded by construction and not because of censoring whereas the log-odds ratio is appropriate when dependent variable is strictly within the bounds.

In this investigation we employ the quasi-likelihood method of estimation for fractional response variable introduced in the econometric literature by Papke and Wooldbridge (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

$$E(y_{it} \mid X_{it}) = G(X_{it}'\beta) \tag{1}$$

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 $G(z) = \dfrac{\exp(z)}{1+\exp(z)}$. 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[11]:

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

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 (1) holds. The standard errors of the estimators have been computed as in Papke and Wooldbridge (1996) and are robust to heteroskedasticity.

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[11] The estimation was conducted using STATA Release 8, and details are available from the author upon request.