CENTRO STUDI LUCA D'AGLIANO

WWW.DAGLIANO.UNIMI.IT

CENTRO STUDI LUCA D'AGLIANO
DEVELOPMENT STUDIES WORKING PAPERS

N. 258

October 2008

Foreign Market Conditions and Export Performance: Evidence from Italian Firm-Level Data

*Holger Breinlich**
*Alessandra Tucci***

* University of Essex and Centre for Economic Performance (LSE)
** Centre for Economic Performance (LSE)

Foreign Market Conditions and Export Performance: Evidence from Italian Firm-Level Data*

Holger Breinlich† Alessandra Tucci‡

July 2008

Abstract

A large body of literature in International Economics has analysed the impact of increased import competition on domestic firms. The link between firm-level exports and changes in the competitive environment on foreign markets is less well understood, however. This is despite the fact that exports make up a significant and growing share of total manufacturing production in most countries. We derive a theory-based econometric specification linking destination-specific exports to foreign demand and the degree of competitiveness or "crowdedness" of a foreign market. The latter is a summary measure of the number and productive efficiency of firms competing in a given market and the barriers impeding their access, such as tariffs or physical distance. We estimate this specification on a large sample of Italian manufacturing firms in 1992-2003 and use the results for a series of counterfactual experiments. Our findings indicate that increased numbers and efficiency of foreign firms and improvements in their access to destination markets have reduced Italian exports by around 0.2-0.4% per year. This is similar to the effects of tariff reductions for Italian firms (+0.3%/year) but smaller than the impact of higher unit labour costs (-1.4%/year) and less favourable exchange rates (-2.0%/year). By far the most important determinant of export performance was foreign demand growth, however, raising Italian exports by up to 5.3% per year or almost 60% over the sample period. Our results also indicate that China's impact on Italian export performance is small and if anything positive. Much more important in explaining the loss of export market shares in recent years has been the relatively slow demand growth in Italy's main export market, the EU15.

KEY WORDS: International Trade, Competition, Exporters, Foreign Markets
JEL CLASSIFICATION: F12, F13, F15

*We would like to thank Joao Santos-Silva, Frédéric Robert-Nicoud, Giovanni Facchini and seminar and conference participants at the Universities of Essex, Warwick and Stockholm, the Stockholm School of Economics, Royal Holloway, ETSG 2007, EIIE 2008 and the CEP Annual Conference 2008 for helpful comments and suggestions. We gratefully acknowledge financial support through British Academy grant SG-47030.

†University of Essex and Centre for Economic Performance at the London School of Economics. Address: Wivenhoe Park, Colchester CO4 3SQ, United Kingdom. Tel.: +44 (0)1206 87 2768. E-mail: hbrein@essex.ac.uk.

‡Centre for Economic Performance at the London School of Economics, Houghton Street, London WC2A 2AE.

1 Introduction

Exports make up a large and growing share of total manufacturing sales in most industrialized economies. For example, the ratio of total manufacturing exports to production in 2003 was 16% for the USA, 42% for the UK, 47% for Germany and over 70% for small open economies such as Belgium, Denmark or the Netherlands. For all OECD countries, this ratio was on average 53% in 2003, up from 35% in 1990 and 24% in 1970 (OECD STAN, 2005). At the same time there have been growing concerns in industrialized countries about the rise of large emerging economies - Brazil, India and especially China - and the 'threat' this poses to domestic exporters. Given the increasing importance of foreign markets for manufacturing sales, what impact will these changes have on firms in developed economies? More generally, how do competitive conditions on foreign markets affect exports of domestic firms? Are these conditions key determinants of export success or are other factors such as foreign demand or firm-level unit labour costs more important?

In this paper, we use a large dataset on Italian manufacturing firms to address these questions. We employ a firm-level gravity model to derive an econometric specification linking destination-specific exports to firm characteristics, foreign demand and the competition intensity or "crowdedness" of foreign markets.[1] This latter variable will be at the centre of our analysis. In essence, it is a measure of the number and efficiency of firms competing in a given market and the barriers impeding their access, such as tariffs or physical distance. It summarizes how easy or difficult it will be for an exporter to penetrate a given market, holding constant other factors such as foreign demand or unit costs of the exporting firm. The principal goal of this paper is to quantify the role of market crowding and its components and to compare their quantitative importance to other determinants of export performance.

We proceed in three steps. Having derived our econometric specification, we estimate it on a large sample of Italian manufacturing firms in 1992-2003. We find that market crowding has a robust negative impact on firm-level exports across a wide range of specifications and that its effect operates both along the extensive and the intensive margin. We also show that the same does not hold true for a number of alternative, non-theory based measures of foreign competition intensity.

We then examine the quantitative importance of our findings more closely by performing a series of counterfactual experiments. Our findings indicate that increased numbers and efficiency of foreign firms and improvements in their access to destination markets have reduced Italian exports by around 0.2-0.4% per year. This is similar to the effects of tariff reductions for Italian firms (+0.3%/year) but smaller than the impact of higher unit labour costs (-1.4%/year) and less favourable exchange rates (-2.0%/year). By far the most important determinant of export performance was foreign demand growth, however, raising Italian exports by up to 5.3% per year or almost 60% over the sample period. Our results also indicate that China's impact on Italian export performance is small and if anything positive at around +0.2%/year. Much more important in explaining the loss of export market shares in recent years has been the relatively

[1] The New Economic Geography literature also uses the term "market crowding". We use these expressions in the rest of the paper since - as will become clear below - our measure is somewhat different from the standard usage of the word "competition intensity" in indudstrial organization.

slow demand growth in Italy's main export market, the EU15.

We believe that these findings are important for a number of reasons. From a policy perspective, Italy is an interesting case to study since its exporters have been losing world market shares for over a decade. This is often linked in public debates to the emergence of competitors from low-wage countries like China which compete head to head in traditional Italian export sectors such as apparel or textiles. Our finding that the increased crowdedness of foreign markets is not the principal determinant of Italian export performance sheds some doubts on this conjecture.

Our findings also contribute to the wider issue of firm-level responses to trade integration. The traditional focus of this literature has been on the effects of import penetration on a firm's home market, particularly in the wake of trade liberalizations (see e.g. Pavcnik, 2002, and Trefler, 2004, for two recent influential contributions; Tybout, 2001, provides a survey of the earlier literature). In contrast, our analysis quantifies - among other things - the effects of lower trade barriers on *foreign* markets. While the two issues are evidently related, there are also important differences. First, exporting firms are usually quite different from purely domestic firms. As previous research has shown, exporters tend to be larger, more productive, use more capital intensive production and employ a more highly skilled workforce (see for example Bernard and Jensen, 1995 and 1999; Wagner, 2007, and Greenaway and Kneller, 2007, provide surveys of the literature). Secondly, exporters will have more options at their disposition to react to increased market crowding than purely domestic firms – for example, redirecting exports to less crowded markets. On the other hand, the set of potential intervention mechanisms available to policy makers is more limited. This is because traditional instruments for protecting domestic firms from import penetration (tariffs, quotas) are evidently not available to national governments in this new setting. Taken together, these considerations suggest that the reaction of exporters to changes on foreign markets might be quite different from the reactions of domestic firms to increased import penetration which have been studied so far.

From a methodological point of view, our empirical measure of market crowding provides a new way of analysing what Anderson and van Wincoop (2003) label 'multilateral resistance'. As these authors explain, controlling for the multilateral resistance (or crowdedness) of a market is necessary to obtain consistent parameter estimates in gravity equation estimations. We go beyond simply controlling for multilateral resistance and decompose it into its different components - number and efficiency of competitors and the barriers impeding their access (tariffs, distance etc.).

Our analysis is also related to recent contributions by Redding and Venables (2003), Hanson and Robertson (2006) and Bernard and Jensen (2003). The first two papers use gravity models to decompose changes in South-East Asian and Mexican exports, respectively, into contributions of the supply characteristics of the exporting countries and foreign market conditions. They rely on country-level trade data, however, which prevents them from analysing the potentially heterogenous impact of foreign markets conditions across firms - which is an important part of our analysis. They also do not separate out the role played by foreign demand and the various components of market crowding. Bernard and Jensen regress growth rates of U.S. firm-level exports in 1987-1992 on exchange rate variations, firm productivity and a measure of foreign income. They do not analyse the role of export market crowding and their data do not allow a destination specific analysis.

The rest of this paper is organized as follows. Section 2 presents a model of firm-level export behaviour and introduces our empirical measure of market crowding. Section 3 describes the data and section 4 presents econometric results. Section 5 uses our estimates for various counterfactual experiments and a decomposition of Italian firm-level exports. Section 6 concludes.

2 Theoretical Framework

We base our empirical analysis on a partial equilibrium model of firm-export behaviour. Firms make market-specific export decisions taking expenditure, the number of competitors on each market, their marginal cost and the trade costs of serving a market as given. To illustrate what we mean by the "crowdedness" of a market n in this context, consider the following uncompensated demand function facing an Italian firm i from sector s on market n:

$$d_{ins} = d(p_{ins}; \bar{e}_{ns}, \bar{p}_{ns})$$

In this expression, p_{ins} denotes the price charged by firm i on market n, sector s, and $\bar{e}_{ns}$ is a vector of consumers' expenditures in market n and sector s. The vector $\bar{p}_n$ denotes the prices charged by firm i's competitors active on the same market. These competitors can be local firms or other foreign exporters. By "market crowding" we understand a summary measure of the price vector $\bar{p}_n$ (e.g. a price index) and its effect will be summarized by the corresponding cross-price elasticities of demand.

To make this approach operational, we have to choose a particular demand system and price setting mechanism. Following the vast majority of research in internation trade, we assume that firms face CES demand and operate under monopolistic competition. This framework has a number of advantages over possible alternatives, both in terms of empirical predictions and analytical convenience. Most importantly, CES demand generates a log-linear specification relating exports to importer and exporter characteristics and bilateral trade costs. As a large empirical literature on gravity equation estimation has shown, this specification provides an excellent fit to international trade data at different levels of aggregation and is indeed the most successful device we have for explaining bilateral trade flows (see Anderson and van Wincoop, 2004, and Disdier and Head, 2007, for recent overviews). Our framework also has the obvious advantage of comparability with existing theoretical and empirical work which mostly also builds on similar frameworks (e.g. Anderson and van Wincoop, 2003; Helpman et al., 2007). Third, CES allows to conveniently summarize the degree of market crowding in a single measure, the CES price index. Finally, the assumption of monopolistic competition will allow us to derive prices as log-linear functions of observable firm characteristics and bilateral variables such as import tariffs.

2.1 Firm-level exports

Assume thus that consumers in market n have identical CES preferences over the different varieties produced by firms in sector s. The demand facing any firm i in this sector from market n then takes the form

$$d_{ins} = p_{ins}^{-\sigma_s} P_{ns}^{\sigma_s - 1} E_{ns} \tag{1}$$

where p_{ins} is the c.i.f. price charged by the firm in market n, E_{ns} is total industry-specific expenditure in market n and σ_s denotes the elasticity of substitution between varieties in industry s. $P_n = \left(\sum_j \int_{i_{jns}} p_{ins}^{1-\sigma_s} di\right)^{\frac{1}{1-\sigma_s}}$ is the CES price index which measures the degree of crowdedness on market n. The index j denotes all countries exporting to n while i_{jns} denotes exporters from these countries. In our data, each firm is classified into a single industry, so we drop the subscript s from firm-specific variables from now on.

In order to enter a foreign market, firms have to make upfront investments such as adapting products to local standards or setting up distribution channels (see Roberts and Tybout, 1997; Bernard and Jensen, 2004). The costs of doing so are equal to F_{in}. Firms also incur variable trade costs when exporting. These are $\tau_{ij} - 1$ in terms of the exported good for each unit shipped to market n. Finally, revenues from market n have to be converted back to the home market's currency at the exchange rate e_{in}, expressed as units of the home currency per foreign currency unit.

With monoplistic competition, firms set prices at a constant markup over marginal costs, i.e. $p_{in} = \frac{\sigma_s}{\sigma_s - 1}\tau_{in} c_i e_n^{-1}$.[2] We assume that the marginal costs of production, c_i, are constant. The choice of export price and quantity on market n is thus independent of the situation on other markets. With this pricing rule, the value of exports by firm i to market n is

$$r_{in} = p_{in} d_{in} = \left(\frac{\sigma_s}{\sigma_s - 1}\right)^{1-\sigma_s} \tau_{in}^{1-\sigma_s} e_n^{\sigma_s - 1} c_i^{1-\sigma_s} P_{ns}^{\sigma_s - 1} E_{ns} \tag{2}$$

and the price index can be expressed as

$$P_n = \left(\frac{\sigma_s}{\sigma_s - 1}\right) \left(\sum_j \tau_{jn}^{1-\sigma_s} e_{jn}^{\sigma_s - 1} n_{jns} \frac{\int_{i_{jns}} c_{i_{jns}}^{1-\sigma_s} di}{n_{jns}}\right)^{1/(1-\sigma_s)}$$

where n_{jns} is the number of firms from j exporting to market n.

Note that firms will only export if the variable profits from doing so are at least equal to the initial setup costs F_{in}. Noting that variable profits are $\pi_{in} = \frac{e_n r_{in}}{\sigma_s}$, we obtain a market entry condition for firm i in terms of its marginal costs, setup costs F_{in}, market specific characteristics and bilateral trade costs. That is, firm i will enter a market n if and only if:

[2] We also experimented with alternative frameworks allowing for variable price-cost margins (e.g. Ottaviano and Melitz, 2007). However, the absence of income effects and the linearity of the resulting demand functions resulted in a substantially lower fit of our firm-level export regressions. In any case, our empirical proxy for the CES price index will be more general than its theoretical counterpart. Its components will capture both the direct effect of market crowding on firm-level demand (present in the model) and the indirect effect via reduced price-cost margins (absent from our model).

$$D_{in} \equiv \left(\frac{e_n^{\sigma_s} (\sigma_s - 1)^{\sigma_s - 1} E_{ns} P_{ns}^{\sigma_s - 1}}{c_{in}^{\sigma_s - 1} F_{in} \tau_{ins}^{\sigma_s - 1} \sigma_s^{\sigma_s}} \right)^{1/(\sigma_s - 1)} \geq 1 \tag{3}$$

Expressions (2) and (3) form the basis our econometric specifications. We can summarize a firm's export decision as

$$r_{in} = \begin{cases} \left(\frac{\sigma_s}{\sigma_s - 1}\right)^{1-\sigma_s} \tau_{in}^{1-\sigma_s} e_{in}^{\sigma_s - 1} c_i^{1-\sigma_s} P_{ns}^{\sigma_s - 1} E_{ns} \text{ if } D_{in} \geq 1 \\ 0 \text{ otherwise} \end{cases} \tag{4}$$

To reiterate, by estimating (4) we perform a partial equilibrium analysis taking the number of competitiors and their prices, exchange rates, as well as foreign demand as given. In general equilibrium, these will be determined as a function of underlying taste and technology parameters. We believe, however, that a partial equilibrium approach is better suited here since finding empirical proxies for the right-hand side elements of (4) is relatively straightforward - which is not true for the underlying parameters determining them. The direct econometric implication of our partial equilibrium framework is that we have to assume that individual Italian firms' influence on the destination-specific variables in (4) is negligible. Given that the average share of firms in our sample in the total sales volume of foreign markets is less than 0.0025%, we believe that reverse causality issues are indeed unlikely and this assumption thus justifiable.[3]

2.2 Choice of empirical proxies

We now turn to the choice of empirical proxies for the variables in (2) and (3).

Market Crowding - CES Price Index An empirical proxy for the price index P_n requires data on $\tau_{jns}^{1-\sigma_s}$, $e_{jn}^{\sigma_s - 1}$, n_{jns}, and $n_{jns}^{-1} \int_{i_{jns}} c_{i_{jns}}^{1-\sigma_s} di$. Exchange rate data are easily obtainable. However, we want to allow for imperfect exchange rate pass through and thus proxy $e_{jn} = \mu_1 ex_{jn}^{\alpha_1}$ where ex_{jn} denotes the bilateral exchange rate between j and n, and μ_1 and α_1 are parameters to be estimated below.

We do not have internationally comparable data on the number of exporters (n_{jns}) and individual firms' marginal costs (c_i) for all countries j appearing in P_{ns} (see section 3 for a description of our sample). We thus write the number of exporters n_{jns} as a function of the number of establishments in country j, sector s, multiplied by the share of n in country j's exports. That is, $n_{jns} = \mu_2 (est_{js} \times share_{jn})^{\alpha_2} \equiv \mu_2 \nu_{jn}^{\alpha_2}$. This reflects the empirical regularity observed by Kramarz et al (2004) - and present in our data as well - that a larger fraction of domestic firms exports to more important destination markets. Note that the parameters μ_2 and α_2 allow for added flexibility in this specification.

We further assume that $n_{jns}^{-1} \int_{i_{jns}} c_{i_{jns}}^{1-\sigma} di$ is proportional to the average unit labour costs (the total wage bill divided by value added) in sector s, country j. That is, $n_{jns}^{-1} \int_{i_{jns}} c_{i_{jns}}^{1-\sigma} di = \mu_3 (uc_{js})^{\alpha_3(1-\sigma_s)}$. We show in appendix B that a sufficient condition for this to hold is that

[3] Even for the EU15, Italy's main export market, the average firm's market share is just 0.004%. There are of course other endogeneity concerns arising from potential omitted variable bias. We address these in a number of ways below.

value added production functions are Cobb-Douglas with constant returns to scale, firms within a given sector and country have the same level of total factor productivity, and the cost of capital is either identical across sectors and countries or proportional to wages or total factor productivity. Again, the inclusion of the parameters μ_3 and α_3 increases the degree of flexibility in this functional form.

Third, we write trade costs as a function of variables commonly used in gravity equation estimations

$$\tau_{jns} = \mu_4 dist_{jn}^{\alpha_4} \times \mu_5(1+t_{jns})^{\alpha_5} \times \mu_6 e^{\alpha_6 lang_{jn}} \times \mu_7 e^{\alpha_7 col_{jn}} \times \mu_8 e^{\alpha_8 int_{jn}} \tag{5}$$

where $dist_{jn}$ denotes the geographical distance between j and n and t_{jns} is the sector-specific import tariff charged by n on imports from j. The binary variables $lang_{jn}$, col_{jn}, and int_{jn} indicate whether j and n have an official language in common, were in a colonial relationship at some point after 1945 or are part of the same market, respectively. This last term is included in the specification of τ_{jns} since the price index also includes firms from n. As a large body of research shows that border effects are quantitatively important, ignoring them would significantly underestimate the trade cost advantage of domestic firms (see McCallum, 1995; Anderson and van Wincoop, 2003).

With these assumptions, we obtain our empirical measure for the crowdedness of market n as

$$P_{ns}^{1-\sigma_s} = CR_{ns} = A_s \left[\sum_j ex_{jn}^{\alpha_1(\sigma_s-1)} \nu_{jn}^{\alpha_2} uc_{js}^{\alpha_3(1-\sigma_s)} \tau_{jns}^{1-\sigma_s} \right] \tag{6}$$

where $A_s = \Pi_{z=1}^{8} \mu_z \times \left(\frac{\sigma_s}{\sigma_s - 1}\right)^{1-\sigma_s}$ summarizes constant terms and τ_{jns} is defined in (5). While (6) has been derived from a specific economic model we believe that its intuitive appeal is more general. For example, we can use CR_{ns} to ask what will happen to firm-level exports to market n if the number of competitors active there goes up (ν_{jn} up), their unit costs decrease (uc_{js} down) or the trade barriers protecting it are lowered (τ_{jns} down).

Expression (6) requires estimates for the parameters A_s and $\alpha_1(1-\sigma_s)$ to $\alpha_8(1-\sigma_s)$. These can be obtained from estimating gravity equations under the same assumptions which have been made so far. To see this, first note that the value of total exports from j to n in sector s is given by

$$R_{jn} = \sum_j \int_{i_{jns}} p_{jn}^{1-\sigma_s} P_n^{\sigma_s - 1} E_n di$$

Under the assumptions entering the definition of (6), this can be written as (see appendix B.2):

$$R_{jn} = A_s ex_{jn}^{\alpha_1(\sigma_s-1)} \nu_{jn}^{\alpha_2} uc_{js}^{\alpha_3(1-\sigma_s)} \tau_{jns}^{1-\sigma_s} P_n^{\sigma_s-1} E_n$$

Using our functional form assumption for τ_{nj} from (5) and adding a time dimension, we derive the following gravity equation (in multiplicative form):

$$R_{jnst} = \beta_0 ex_{jnt}^{\beta_1} \nu_{jnt}^{\beta_2} uc_{jt}^{\beta_3} \times \left[dist_{jnt}^{\beta_4} (1+t_{jnt})^{\beta_5} e^{\beta_6 lang_{jnt} + \beta_7 col_{jnt} + \beta_8 int_{jnt}} \right] \times d_{nst} \times \varepsilon_{jnt} \tag{7}$$

where ε_{jnt} is an error term and d_{nst} are destination-sector-time fixed effects, capturing the term $P_{nst}^{\sigma_s - 1} E_{nst}$ for which do not have an empirical counterpart yet.

We estimate (7) by Poisson QMLE, following Santos-Silva and Tenreyro (2006). We use data on sectoral exports for all countries in our sample in 1992-2003.[4] Results are shown in table 1. Column 1 reports coefficient estimates from a regression pooling the data across industries and thus estimating a single coefficient for each of the required parameters. Columns 2-4 summarize estimates of sector-by-sector regressions by displaying the median, minimum and maximum coefficient estimates along with the corresponding t-statistics.

Table 1: Table 1 about here

Overall, our results are very much in line with previous gravity equation estimates (see Disdier and Head, 2007). Distance has a significantly negative influence on bilateral trade while sharing a common language or colonial ties or being part of the same market all have a positive impact. Besides these more traditional determinants, the additional variables suggested by our model also have the expected sign and are highly statistically significant. In the pooled regression, a 1% increase in the exporter's unit labour costs reduces exports by around -0.25% while a 1% increase in the number of exporters is associated with 0.67% more exports.

We use our estimates from (7) to obtain the required parameter values in (6) as $A_s = \hat{\beta}_0$, $\alpha_1(1-\sigma_s) = \hat{\beta}_1$ etc. Thus,

$$CR_{nst} = \hat{\beta}_0 \left(\sum_j ex_{jnt}^{\hat{\beta}_1} \nu_{jnt}^{\hat{\beta}_2} uc_{jt}^{\hat{\beta}_3} \times \left[dist_{jnt}^{\hat{\beta}_4} (1+t_{jnt})^{\hat{\beta}_5} e^{\hat{\beta}_6 lang_{jnt} + \hat{\beta}_7 col_{jnt} + \hat{\beta}_8 int_{jnt}} \right] \right) \tag{8}$$

For the main part of the analysis, we calculate (8) using the parameter estimates from the pooled regression (column 1 of table 1). The reason for this is that these estimates have a much higher degree of precisision than the sectoral-level estimates (which are often insignificant for a large fraction of industries - see table 1). Section 4.2 presents results for robustness checks using the sectoral coefficient estimates.

Other variables Finding proxies for the remaining variables in (2) and (3) is straightforward. Total expenditure E_{ns} in market n, sector s, is proxied by total absorption, i.e. local production plus imports minus exports. For sector-specific trade costs between Italy and market n (τ_{ins}), we use a similar assumption to before, i.e. $\tau_{ins} = \mu_{I3} dist_{in}^{\gamma_3} \times \mu_{I4}(1+t_{ins})^{\gamma_4}$. We have dropped the indicators for common language and colonial ties since these are almost always equal to zero

[4] See section 3 for details on our data. We pool data across four three-year periods in the regressions for comparability with the later firm-level regressions (see section 3). To estimate (7), we need to convert trade flows into a common currency (U.S. dollars). Accordingly, the relevant exchange rate on the right-hand side is the exchange rate between exporter j's currency and the U.S. dollar.

(the only other country which has Italian as an official language is Switzerland and Italy has not had colonial ties with any country after 1945). Since we only consider exports, we further excluded the dummy for intranational trade.

To proxy firm-specific marginal costs c_i, we use two approaches. In analogy to our earlier assumptions, we first consider the case $c_i = \mu_{I2}\left(\frac{w_i}{VA_i}\right)^{\gamma_2} = \mu_{I2}\left(uc_i\right)^{\gamma_2}$ where w_i denotes the total wagebill of firm i, VA_i is a firm's value added and uc_i its unit labour costs.[5] We will also use firm-by-year fixed effects to proxy c_i to show that our results do not depend on this specific assumption about production technologies.

Finally, we require an empirical counterpart for the initial setup costs F_{in} from equation (3). Our proxy for F_{in} should affect the export entry decision but not the value of exports. We use two different variables which arguably fulfil this property (see section 3 for details on the data sources). The first is a firm's distance to Milan. Since Milan is Italy's business capital and learning about export markets happens in large part through contact with other exporting firms, proximity to Milan should lower F_{in}. Secondly, we use an indicator for whether a firm is credit constraint or not. In most industries, the setup costs F_{in} have to be paid before any exports can take place and thus cannot be paid out of current export revenues. Since these initial investments can be considerable, credit is needed to finance them upfront (Roberts and Tybout, 1997; Manova, 2008).

2.3 Empirical Specifications

With these empirical proxies, we arrive at our baseline estimation equation

$$r_{int} = \begin{cases} \gamma_0 ex_{int}^{\gamma_1} uc_{it}^{\gamma_2} dist_{in}^{\gamma_3} (1+t_{ins})^{\gamma_4} E_{nst}^{\gamma_5} CR_{nst}^{\gamma_6} \eta_{1inst} \text{ if } D_{ins} \geq 0 \\ 0 \text{ otherwise} \end{cases} \tag{9}$$

where $D_{ins} = \delta_0 ex_{int}^{\delta_1} uc_{it}^{\delta_2} dist_{in}^{\delta_3} (1+t_{ins})^{\delta_4} E_{nst}^{\delta_5} CR_{nst}^{\delta_6} F_{in}^{\delta_7} \eta_{2inst}$. Before turning to the estimation, we present details on our data sources and some descriptive statistics.

3 Data and Descriptive Statistics

Firm-level data on exports and other firm characteristics come from a survey conducted every three years by Capitalia on a representative sample of Italian manufacturing firms. In this paper, we use the four most recent waves of the survey carried out in 1995, 1998, 2001, and 2004, each covering the previous three years with very similar questionnaires. We pool data across the corresponding three-year periods (1992-1994, 1995-1997, 1998-2000, 2001-2003) since we only have information on average exports per survey period.

Firms in our sample are always selected for at least two out of the four surveys. However, only firms firms with more than 500 employees are included in each wave. For smaller firms, the sample is selected with a stratified design on location, industrial activity and size. The

[5] As before, a sufficient condition for this is that the short-run value added production function (i.e. after setup costs are incurred) is Cobb-Douglas with constant returns to scale and the cost of capital is either identical across firms or proportional to wages or total factor productivity (see before and appendix B.2). Note that most of our regressions will include industry-by-year fixed effects so that the cost of capital can vary across industries.

time dimension of our panel is thus short (two adjacent three-year periods for most firms) and we will rely mainly on cross-sectional identification in our analysis. After excluding firms with missing observations for required data, we obtain a sample of 3,628 firms and 8,084 firm-year pairs in 1992-2003.

The main data items we use are the value of exports by destination and unit labour costs (a firm's wage bill divided by value added). Table 2 shows descriptive statistics on these and a few additional variables for the firms in the sample (see appendix A.1 for more details on data construction). The majority of firms serve both the domestic and foreign markets. In our sample 74% of firms export in at least one period. As expected, exporting firms are larger in terms of both employment and sales and have lower unit labour costs and higher productivity than non-exporters. In our data export destinations are grouped by main geographical areas. Excluding the domestic market we can observe a maximum of 8 foreign destinations.[6] However, most firms serve substantially fewer markets: 20% of firms only export to one foreign market (mostly the EU15), while less than 2% serve all eight markets. The average number of destinations among exporters is 2.9.

Table 2: Descriptive Statistics

	Non Exporters			Exporters			Total		
	Obs	*Mean*	*Sd*	Obs	Mean	Sd	Obs	Mean	Sd
Employment	2256	57.0	174.2	5831	190.0	613.4	8087	155.7	537.5
Sales (Mil Euro)	2256	12.7	79.8	5831	36.2	137.0	8087	30.0	125.0
Labour Prod. (index)	2256	0.93	0.40	5831	1.03	0.41	8087	1	0.41
Unit Lab. Costs (index)	2256	1.02	0.25	5831	0.99	0.24	8087	1	0.24
Export Share (%)	2256	0	0	5831	0.39	0.29	8087	0.28	0.30
N. of dest.out of 8	2256	0	0	5831	2.89	1.90	8087	2.13	2.07
Family Firms (share)	2255	0.87	0.34	5829	0.80	0.40	8084	0.82	0.38
N. of workers in R&D	2243	2.0	4.2	5771	5.2	6.0	8014	4.3	5.7
Multinationals (share)	2256	0.05	0.21	5822	0.28	0.45	8078	0.21	0.41

The country-level data required for the calculation of our competition measure come from a number of sources. Sectoral-level information on value added, the total wage bill and the number of establishments are taken from UNIDO's Industrial Statistics Database. Bilateral exchange rates are from the IMF's International Financial Statistics. The trade data we use for estimating the model's parameters are provided by CEPII (2005) which uses UN Comtrade as its main source but performs a number of additional data cleaning exercises. Data on bilateral tariffs, distances, common official languages and colonial links is also from CEPII (2005, 2006).

[6] These are Europe (EU15 excluding Italy), other European countries (including Russia and Turkey), NAFTA (United States, Canada and Mexico), Central and South American countries, China, other Asian countries (excluding China), Africa, and Australia and Oceania.

The number of countries common to these datasets is 144. Missing data force us to discard additional countries, leaving us with a sample of 77 countries for 1992-2003 (see appendix A.2 for a list of countries).

We calculate our measure of market crowding using absorption-weighted averages for the bilateral variables in (8). For example, the distance between the United Kingdom (j) and NAFTA (n) is $dist_{jn} = \sum_{m \epsilon n} dist_{jm} \times share_{mn}$, where $share_{mn}$ is the share of country m in total absorption of NAFTA and $n = \{$USA, Canada, Mexico$\}$. We use the same approach for obtaining bilateral distances and tariffs for Italian firm-level exports in (9).[7]

Table 3 displays information on the crowdedness of the eight export destinations in terms of our measure CR_{nst}. We compute a ranking (1.-8.) of these destinations for each industry and period in our data.[8] The percentage figures indicate in how many industry-period combinations a particular market was the most crowded, second most crowded etc. For example, the entries for NAFTA indicate that in 25% of industry-period combinations, this market scored highest on our CR measure. The markets of the EU15 and Asia ex. China are more crowded, with the EU15 and Asia ex China coming first in 33% and 37%, respectively. The markets of Australia-Oceania and especially Africa are much less crowded and appear in "last place" for most cases. The remaining markets (China, Central and South America and Europe ex. EU15) are intermediately crowded and represent the largest fractions of the 4th-6th place entries.

Table 3: Ranking of Markets by Degree of Crowdedness

	Ranking, Crowdedness (1992-2003)								
Export Market	1st	2nd	3rd	4th	5th	6th	7th	8th	
Africa	0%	0%	0%	0%	0%	2%	9%	89%	100%
Asia ex. China	37%	24%	36%	3%	0%	0%	0%	0%	100%
Australia-Oceania	0%	0%	0%	0%	6%	39%	46%	9%	100%
CS-America	0%	0%	0%	0%	4%	54%	43%	0%	100%
China	5%	13%	19%	30%	25%	6%	2%	2%	100%
EU15 (ex. Italy)	33%	25%	19%	23%	0%	0%	0%	0%	100%
Europe other	0%	0%	5%	29%	66%	0%	0%	0%	100%
NAFTA	25%	38%	22%	15%	0%	0%	0%	0%	100%
	100%	100%	100%	100%	100%	100%	100%	100%	

[7] We use total rather than sectoral absorption and compute shares for 1989-1991 to reduce endogeneity problems.

[8] See appendix A for a description of our industry classification.

4 Econometric Results

4.1 Baseline Specification

We start by estimating a Heckman selection model based on a log-linearized version of equation (9).[9] Column 1 of table 4 presents results without exclusion restrictions (i.e. assuming that $\gamma_7 = 0$). Identification thus relies on the nonlinearity of the inverse Mills ratio (Wooldridge, 2002). Column 2 uses as exclusion restriction a proxy for whether a firm is credit constraint and would thus find it more difficult to finance the initial setup costs (see appendix A.1 for details on this variable). Column 3 proxies the setup costs of exporting F_{in} by distance of the exporter to Milan.

As shown in table 4 the results are not very sensitive to the choice of exclusion restriction. In all cases, foreign absorption enters significantly with a positive contribution while market crowding, distance to the export market and firm-level unit labour costs show the expected negative sign. Looking at the selection equations, a similar pattern holds for the decision to export to a specific market. Higher absorption and lower unit labour costs raise the probability that a firm is active on market n, while distance and stronger market crowding reduce it. Note that the excluded variables (distance to Milan, dummy for credit constraints) are also significant and have the expected sign - both lowering the probability of export market entry.

To get an impression of the overall impact of the regressors, we also report marginal effects evaluated at the sample mean. As seen, the combined effect of a 1% increase in the level of crowdedness of a foreign market is a -0.27% to -0.28% decrease in firm-level exports there. For foreign absorption, a 1% increase leads to an increase in exports of 0.53% to 0.54%. Marginal effects for a 1% increase in the other variables are +0.66% to +0.67% for exchange rates, -3.10% to -3.30% for tariffs, -0.72% to -0.74% for bilateral distance and -0.31% to -0.36% for unit labour costs.

< Table 4 about here >

4.2 Robustness Checks

Table 5 reports a number of robustness checks on our initial results.[10] Columns 1 and 2 control for conditions on other markets. Column one includes an absorption-weighted average of the competition on all eight foreign markets,

$$CR_{RoW,st} = \sum_n share_{ns} \times CR_{nst}$$

where $share_{ns}$ is the average share of market n in the overall absorption of industry s over the period 1992-2003. Column 2 includes market crowding in Italy itself, calculated in the

[9] We thus assume that $(\eta_{1inst}, \eta_{2inst}) \sim N(0, \Sigma)$ where $\Sigma = \begin{bmatrix} 1 & \rho\sigma_1 \\ \rho\sigma_1 & \sigma_1^2 \end{bmatrix}$.

[10] Since table 4 suggests that results are robust to the absence of exclusion restrictions, we report results for Heckit estimations without such restrictions. This maximises the number of available observations and ensure comparability with alternative estimation techniques reported below. To save space, we also only report marginal effects from now. Full results are available from the authors upon request.

same way as CR_{nst} for all other markets. In both specifications, we also add total industry absorption in Italy and the rest of the world, respectively, as an additional control. As the results show, the sign of these variables is mostly as expected. Higher demand in Italy or the rest of the world reduces exports to any given market. Lower levels of market crowding in Italy also impact exports negatively. The sign on market crowding in the rest of the world ($CR_{RoW,st}$) is counterintuitively negative but the coefficient is small and statistically insignificant. In both specifications, foreign market crowding remains statistically and economically significant.

< Table 5 about here >

Columns 3 and 4 report results with different sets of fixed effects. Column 3 adds destination-year fixed effects and column 4 uses industry-year specific effects. Using destination-year fixed effects reduces the magnitude of the destination-specific regressors while using industry–year fixed effect has the opposite impact. A possible explanation is that the cross-destination variation in our regressors is more important than the cross-industry variation and that measurement error thus tends to bias results more strongly towards zero in the destination-year fixed effects specification. In both cases, however, all regressors retain their sign and significance, indicating that the earlier results are not relying on a single dimension of the data only. Note that the use of industry-year fixed effects also controls for the influence of alternative export markets which were found to be important above. We use this set of fixed effects for most of our remaining empirical results.[11]

In column 5, we recalculate our measure of market crowding using the sector-specific estimates from table 1. While estimation precision is much lower, they are closer to the theoretical model from section 1. This is because elasticities of substitution σ_s are likely to vary across sectors which in turn will influence the degree of market crowding. As shown, the qualitative picture of the previous regressions stays intact when allowing for this additional variation.

Columns 6-9 report results for two alternative estimation techniques. Columns 6-7 show results obtained via the QML Poisson estimator proposed by Santos-Silva and Tenreyro (2006) for gravity equation estimations. This estimation method does not allow to disentangle the extensive and intensive margin of export decisions suggested by the model. However, it has the advantage over the previous Heckit estimates of not imposing distributional assumptions on the error structure - a correct specification of the conditional mean is sufficient to obtain consistent estimates. Poisson further allows estimation of results with firm-by-year fixed effects since (unlike Heckit) it is not susceptible to incidental parameter problems (Wooldridge, 2002). Columns 8-9 finally present OLS estimates for comparison with much of the earlier literature on gravity equation estimations.

A comparison with the marginal effects reported in column 4 reveals that the impact of competition is around 50% lower with OLS although still highly statistically significant. The remaining coefficient estimates are broadly in line with the comparable Heckit marginal effects.

[11] As said, using industry-by-year fixed effects implies that identification relies on cross-destination variation in the data. In our view, this is also closer to the theoretical framework from section 2 which models firm-export decisions to different destinations within a given industry. All qualitative results in the remainder of the paper carry through under alternative sets of fixed effects (year or destination-year).

Adding firm-by-year fixed effects (column 9) leaves the coefficient on CR and the other regressors almost unchanged. For Poisson QMLE, coefficient estimates of destination-specific variables are generally slightly larger in magnitude than with Heckit and OLS, with the exception of tariffs (whose coefficient is halved). Overall, however, the qualitative picture of the earlier results remains very much intact.

4.3 Alternative Measures of Export Market Competition

We also present results for two non-theory based measures of export market crowding. First, we use the average trade-weighted import tariff of market n:

$$AvgTar_{nst} = \sum_j (share_{jns} \times tariff_{njst})$$

where $tariff_{njst}$ is the average tariff imposed in market n on imports from country j. These tariffs are weighted by the average import share of country j on market n over the entire period 1992-2003 ($share_{jns}$).

Secondly, we construct a measure based on the Herfindahl index for market n, sector s. We do not have data on the market shares of individual firms. Instead, we assume that total exports from j to n are equally split among exporters in j. Thus,

$$Herf_{nst} = \sum_j n_{jst} \left(\frac{share_{njst}}{n_{jst}} \right)^2$$

where $share_{jnst}$ is the share of country j in total absorption of market n, sector s, period t. We continue to proxy the number of exporters (n_{jst}) as described in section 2.2. If exports from j to n are equally distributed among exporters, each exporter will have a market share of $share_{njst}/n_{jst}$. Squaring this share, multiplying by n_{jst} and summing over all countries exporting to n then yields the Herfindahl index for the respective market and industry.

< Table 6 about here >

Table 6 present the results for these two alternative measures. The tariff variable $AvgTar_{nst}$ is significant and has the expected sign in column 1. Ceteris paribus, higher average destination market tariffs should increase exports since foreign competitors will find access to that market more difficult (controlling for the tariffs faced by Italian exporters themselves). However, this result is not robust to the inclusion of industry fixed effects in column 2 - the coefficient on $AvgTar$ actually becomes negative although statistically insignificantly so. A similar picture emerges for the Herfindahl index. It has the expected positive sign in column 3. More concentrated and thus presumable less competitive markets attract more Italian exports, ceteris paribus. But again, controlling for industry-year fixed effects overturns this result.

4.4 Firm Heterogeneity

There are several apriori reasons why one might expect the effect of market crowding to vary across firms. This section investigates this issue further. First, one might expect vertically differentiated firms to be less affected by the degree of crowdedness of a foreign market. In essence, higher product quality will increase the degree of differentiation with other products and reduce the impact of competition from other exporters and local firms.

Secondly, firms are likely to be less affected by foreign market conditions if they belong to international networks within multinational entreprises. For example, they might sell goods abroad using different distribution channels or sell to other firms within the same group. Overcoming initial sunk costs associated with exporting might also be easier for such firms and less influenced foreign market crowding.

Finally, an interesting source of potential heterogeneity comes from the type of ownership. In Italy, a substantial share of firms (of any size) are owned and managed by families. Barba Navaretti, Faini and Tucci (2007) show how such firms tend to export less and to less distant markets than publicly owned firms.

Table 7 presents results for regressions allowing for heterogeneity by interacting proxies for the above groups of firms with foreign market crowding. We classify a firm as being vertically differentiated if it engages in R&D activity (i.e. employs workers in R&D). "Multinational companies" are firms that are either foreign owned or have affiliates abroad themselves. "Family firms" are firms that are managed by the owner or some member of its family. Table 2 contains summary statistics on these variables and appendix A provides further details on their construction.[12]

< Table 7 about here >

Columns 1 to 3 introduce these characteristics one by one. We see how firms engaging in R&D tend to be less affected by the crowdeness on the foreign markets both in the intensive and in the extensive margin. A similar effect is present for non-family owned firms, although only for the intensive margin. For MNEs results are less conclusive. Both the export market entry decision and overall exports are less influenced by market crowding for firms which are part of MNEs. However, the coefficient estimates are small in magnitude and only very marginally statistically significant.

In Column 4, we include all three characteristics and their interactions with the CR variable in the same specification. As before, the marginal effects of the interaction terms are all positive albeit only statistically significant for R&D. Note that the firm characteristics which we interact with CR are not mutually exclusive. Our results thus indicate that the firms most affected by foreign market crowding are domestic family firms that are not part of multinationals and do not employ R&D workers. On the other end of the range are multinationals not managed by a family and employing workers in R&D. According to our results, the overall average impact of foreign market crowding is around 10% less important for this latter group than for the former. This difference is statistically significant although economically not very large - market crowding clearly matters for all types of firms.

[12] Note that we code the family-firm dummy as 0 for family firms and 1 for other firms.

5 Quantitative Importance of Results

We now turn to an evaluation of the quantitative importance of our results. We do so by performing a series of counterfactual experiments. That is, we set various elements of the right-hand side of (9) to new counterfactual values, compute new predicted exports and compare them to their original value.

Specifically, let $r_{int} = E(r_{int}|X_{int})\varepsilon_{int}$ denote the original value of exports and $\hat{r}_{int} = E(r_{int}|\hat{X}_{int})\varepsilon_{int}$ the exports under the counterfactual values of the regressors X. The percentage change in exports across all firms between the counterfactual and the actual scenario is then

$$\frac{\hat{R}_{it} - R_{it}}{R_{it}} = \sum_{i=1}^{I}\sum_{n=1}^{N} s_{it}s_{int}\frac{E(r_{int}|\hat{X}_{int}) - E(r_{int}|X_{int})}{E(r_{int}|X_{int})}$$

where s_{it} and s_{int} are, respectively, the share of firm i in total actual exports (R_{it}) and market n's share in firm i's actual exports (r_{it}). Note that we require values for $E(r_{int}|.)$ rather than $E(\ln r_{int}|.)$ for these calculations. For our Heckit estimates, the expected value of r_{int} in levels is given by (see Dow and Norton, 2003):

$$E(r_{int}|X) = \Phi\left(X_1\hat{\gamma}_{sel} + \hat{\rho}_{\varepsilon\eta}\hat{\sigma}_{\varepsilon}\right)\exp\left(X_2\hat{\gamma}_{out} + 0.5\hat{\sigma}_{\varepsilon}^2\right)$$

where $\hat{\sigma}_{\varepsilon}$ is the estimated variance of the outcome equation's error term and $\hat{\rho}_{\varepsilon\eta}$ the estimated coefficient of correlation between outcome and selection residuals. X_1 and X_2 denote the variables in the selection and outcome equation, respectively, and $\hat{\gamma}_{sel}$ and $\hat{\gamma}_{out}$ are the corresponding coefficient estimates. For OLS, Mullahy (1998) shows that

$$E(r_{int}|X) = X\hat{\gamma}_{OLS} + 0.5\hat{\sigma}_{OLS}$$

where $\hat{\gamma}_{OLS}$ is the vector of OLS coefficient estimates corresponding to X and $\hat{\sigma}_{OLS}$ is the estimated variance of the OLS residual.[13] Note that the Poisson regressions directly give us $E(r_{int}|X)$ so that no transformation is necessary.

We start our counterfactuals by setting the various regressors $X = \{ex, uc, t, E, CR\}$ on the right-hand side of (9) to their values lagged by one period. We do so separately for each of the regressors. This allows us to calculate the growth rate of total exports in the absence of, for example, demand growth ($\hat{E}_{nst} = E_{nst-1}$), changes in exchange rates ($\hat{ex}_{nt} = ex_{nt-1}$), or unit labour costs ($\hat{uc}_{it} = uc_{it-1}$). Table 8 shows results for all regressors except distance which is time-invariant. We report geometric averages of growth rates across periods, expressed in %-changes per year. These figures thus tell us by how much more or less Italian exports would have grown per year in the absence of any changes in, say, absorption or unit labour cost over the sample period 1992-2003.[14]

[13] This result requires homoskedasticity and normality of the OLS residual. Similarly, for the above Heckit transformation we require joint normality and heteroskedasticity of the error terms in outcome and selection equation (this is of course already required for consistency of our earlier Heckit estimates so that no new assumptions are needed here).

[14] The reason for taking this approach is that we do not observe all firms in all periods or even in the first and last period. Otherwise, we could have simply set regressors in 2001-2003 to their 1992-1994 value and computed

We should note that these counterfactuals are not general equilibrium in nature. For example, lower demand growth is likely to result in a reduction in the number of foreign competitors active on Italian export markets. It might also result in lower world-wide demand for manufacturing inputs and thus lower unit labour costs of Italian producers.

With these caveats in mind, we turn to a discussion of the results from table 8. The Heckit estimates allow us to analyse the effect of the above counterfactual changes on the probability of selection into exporters status (the "extensive margin") and the value of exports taking the probability of selection as given (the "intensive margin"). We thus report three counterfactual growth rates of exports. First, we only use counterfactual values of the regressors X_1 in the outcome equation (the intensive margin, column 1). Next, we only set the regressors in the selection equation, X_2, to their new values (the extensive margin, column 2). Finally, we change both X_1 and X_2 which gives us the total effect of the counterfactual change.

According to the counterfactuals based on our Heckit estimates, absorption is by far the most important determinant of export growth. Keeping absorption constant would have reduced exports by around -4% per year or by 42% over the sample period. Not unexpectedly, the biggest contribution to this overall figure comes from the EU15 (excluding Italy). Holding absorption growth there constant would have meant -1.3% less exports/year. The second and third most important markets with regards to demand growth were other European countries (-0.9%/year) and NAFTA (-0.2%/year).

Exchange rate variations and changes in unit labour costs were also important. Holding unit labour costs fixed would have allowed Italian exports to grow by around 1.4%/year more rapidly. Keeping exchange rates unchanged would have increased Italian exports by 2% per year. This relatively large figure seems to be mainly due to the large scale devaluations of big South American importers (Brazil, Argentina) over the sample period. This is evident from the next two lines where we disaggregate results by allowing South and Central American exchange rates to vary but holding all other exchange rate fixed - as well as the other way around.

Turning to the remaining regressors, the roles of tariffs and market crowding are less significant. In the absence of any further tariff reductions after 1992, Italian export growth would have been -0.3% per year lower. The impact of freezing the level of market crowding is actually the smallest among all regressors. Holding it constant would have increased exports by only around -0.2% per year or around 1.5% over the entire sample period.

The same qualitative picture reappears when looking across estimation techniques. OLS results are mostly very similar to Heckit, with the exception of unit labour costs which are less important now (0.5% per year). Poisson implies a somewhat stronger impact of market crowding (0.35% per year or 3.2% over the sample period) but most of the other factors also become more important. For example, an absence of demand growth now would have reduced exports by -5.3% per year or almost 60% over the sample period. Thus, changes in market crowding were an order of magnitude less important than changes in foreign demand conditions.

Of course, these aggregate figures might hide substantial variation across the components of CR which could cancel each other out. We thus also report the impact of the various components of CR - number of exporters, foreign tariff, exchange rates and unit labour costs. That is, for

counterfactual yearly growth rates.

each one of these components we recompute our market crowding measure while only holding this particular variable constant over time. As the results indicate, the impact of changes in the number of exporters, foreign tariffs and unit labour costs all worked in the same direction - each contributed towards a (small) reduction in Italian exports.

Another possibility of decomposing the impact of market crowding is to look at the role of individual countries. We do so by returning to one of the motivating questions for this paper and ask whether Italian exports would have grown faster or more slowly in the absence of China's intergration into the world economy. To this end, we first fix the contribution of China to our CR measure, i.e. we freeze the number of Chinese exporters, unit labour costs, and the exchange rates and tariffs they face. Since CR is a sum over all countries in our sample, China's impact could in principle be bigger than the aggregate figure of -0.2% per year presented above. Secondly, we do the same with China's absorption growth and its external tariffs and exchange rate facing Italy. As the results in table 9 indicate, the role of China is not very important in our sample period and if anything positive. China's integration into the world economy meant more competition for Italian exporters but this effect is neglibible (0.02% per year). Furthermore, it is dominated by increased exporting opportunities to the large Chinese market. An absence of absorption growth in China would have lowered Italian exports by -0.13% per year and freezing tariffs at their 1992 level would have contributed another -0.09% per year. Overall, we estimate that in the absence of changes in China and its integration into the world trading system, Italian exports would have grown by -0.2% per year less quickly.

As a final counterfactual, we ask what Italian exports would have been had absorption growth in the EU15 had been as rapid in the rest of the world - i.e. on average 1.5% per year higher than it has been. As the last row in table 9 shows, the slow growth in demand in Italy's main market is an order of magnitude more important than the emergence of China. Bringing EU15 demand growth up to the world average would have increased Italian exports by up to 0.8% per year.

6 Conclusions

This paper examined the role of foreign market conditions for firm-level exports. Given the growing share of exports in manufacturing production it is of key interest for both academic and economic policy debates to obtain a better understanding of how levels of demand and competition intensity of foreign markets affect export performance.

We started by constructing a simple firm-level gravity model to derive an econometric specification linking destination-specific exports to firm characteristics, foreign demand and the degree of competitiveness or "crowdedness" of foreign markets. This latter variable is a measure of the efficiency of firms competing in a given market and the barriers impeding their access, such as tariffs or physical distance. We estimated this specification on a large sample of Italian manufacturing firms in 1992-2003. Having shown that market crowding has a robust negative impact on firm-level exports across a wide range of specifications, we used our estimates to evaluate the quantitative importance of market crowding. Our main specification indicates that increased numbers and efficiency of foreign firms combined with better overall accessibility of destination markets have reduced Italian exports by around 0.2% per year or 1.5% over the sample period. This is similar to the effects of tariff reductions for Italian firms (+0.3% per year) but smaller than the impact of higher unit labour costs (-1.4% per year) and less favourable exchange rates (-2.0% per year). By far the most important determinant of export performance was foreign demand growth, however, raising Italian exports by up to 5.3% per year or almost 60% over the sample period. Our results also indicate that the role of China in explaining Italian export performance is small and if anything positive. Stronger competition from China marginally lowered Italian exports but this was overcompensated by Chinese demand growth and tariff reductions, yielding an overall positive effect on export growth of 0.2% per year. Much more important was the fact that demand on Italy's main export market, the EU15, has grown more slowly over 1992-2003 than in the rest of the world. Bringing demand growth in the EU15 up to the world average would have increased Italian exports by 0.8% per year.

References

[1] Anderson, J.E., and E. van Wincoop (2003), "Gravity With Gravitas: A Solution to the Border Puzzle," American Economic Review 93:1, 170–192

[2] Anderson, J. and E. van Wincoop (2004), "Trade Costs", Journal of Economic Literature, 42, 691-751.

[3] Barba Navaretti, G., R. Faini and A. Tucci (2007) "Does Family Control Affect Trade Performance? Evidence for Italian Firms", mimeo

[4] Bernard, A.B. and J.B. Jensen (1995), "Exporters, Jobs, and Wages in U.S. Manufacturing: 1976–1987", Brookings Papers on Economic Activity: Microeconomics, 67–119.

[5] Bernard, A.B. and J.B. Jensen (1999), "Exceptional Exporter Performance: Cause, Effect, or Both?", Journal of International Economics, 47, 1, 1–25.

[6] Bernard, A. and J.B. Jensen (2003), "Entry, Expansion and Intensity in the U.S. Export Boom, 1987-1992", Review of International Economics, 2004, 12(4), 662-675.

[7] Bernard A. and J. B. Jensen (2004), "Why Some Firms Export", The Review of Economics and Statistics, 86, No. 2: 561-69

[8] CEPII (2005), *Trade, Production and Bilateral Protection Database*, Mayer, T. and S. Zignago, Centre d'Etudes Prospectives et d'Information Internationales.

[9] CEPII (2006), *Distance Database*, Mayer, T. and S. Zignago, Centre d'Etudes Prospectives et d'Information Internationales.

[10] Disdier A.C. and K. Head, (2007) "The Puzzling Persistence of the Distance Effect on Bilateral Trade", Review of Economics and Statistics, forthcoming

[11] Dow, W.H. and Norton, E.C. (2003) "Choosing Between and Interpreting the Heckit and Two-Part Models for Corner Solutions", Journal Health Services and Outcomes Research Methodology , 4, 5-18.

[12] Greenaway, D. and R. Kneller (2007), "Firm Heterogeneity, Exporting and Foreign Direct Investment", The Economic Journal, 117 (February), F134-F161.

[13] Hall, B. H, F. Lotti and J.Mairesse (2007) "Employment, Innovation and Productivity:Evidence from Italian Microdata" NBER WP 13296

[14] Hanson, G. and R. Robertson (2006), "China and the Recent Evolution of Mexico's Manufacturing Exports", mimeo, University of California at San Diego.

[15] Helpman, E., M. Melitz and Y. Rubinstein (2007), "Estimating Trade Flows: Trading Partners and Trading Volumes", NBER Working Paper 12927.

[16] Levinsohn, J. and A. Petrin (2003), "Estimating Production Functions Using Inputs to Control for Unobservables", Review of Economic Studies, 70, 317-341

[17] ISTAT (2005) "Conti Economici 1970-2004", Istituto nazionale di statistica, Roma, Italy

[18] Manova, K. (2008), "Credit Constraints, Equity Market Liberalizations and International Trade", mimeo, Stanford University.

[19] McCallum, J. (1995), National Borders Matter, *American Economic Review*, 85(3): 615-623.

[20] Melitz, M. and G. Ottaviano (2007), "Market Size, Trade, and Productivity", Review of Economic Studies, forthcoming

[21] Mullahy, J., (1998). "Much ado about two: Reconsidering retransformation and the two-part model in health econometrics," Journal of Health Economics 17, 247 - 282.

[22] Structural Analysis Database, Organisation for Economic Co-operation and Development, Paris.

[23] Olley, S. and A Pakes (1996), "The Dynamics of Productivity in the Telecommunications Equipment Industry", Econometrica, 64, 1263-1297.

[24] Pavcnik, N, (2002), "Trade Liberalization, Exit, and Productivity Improvements: Evidence from Chile"an Plants", Review of Economics and Statistics, 69, 245-276.

[25] Redding, S. and A. Venables (2003), "South-East Asian Export Performance: External Market Access and Internal Supply Capacity", Journal of Japanese and International Economies, 2003, 17, 404-31.

[26] Roberts, M.J. and J.R. Tybout (1997), "What Makes Exports Boom?", Directions in Development Series, World Bank, Washington D.C.

[27] Santos Silva J. and S. Tenreyro (2006) "The log of Gravity", Review of Economics and Statistics, 88(4), pp. 641-658.

[28] Trefler, D. (2004), "The Long and Short of the Canada-U.S. Free Trade Agreement", American Economic Review, 94(4), 870-895.

[29] Tybout, J., 2001, "Plant and Firm-Level Evidence on New Trade Theories", in E. Kwan Choi and James Harrigan (ed.), Handbook of International Trade, Oxford: Basil-Blackwell, and NBER Working Paper No. 8418.

[30] Wagner, J. (2007), "Exports and Productivity: A Survey of the Evidence from Firm-level Data", The World Economy, 30(1), 60-82.

[31] Wooldridge, J.M. (2002), "Econometric Analysis of Cross Section and Panel Data", MIT Press, Cambridge, Massachusetts.

A Data Appendix

A.1 Firm-Level Variables

Exports: For each firm the dataset provides information on the share of output exported and on the destination of these export sales. Export destinations are grouped into 8 major geographical areas: Europe (EU15 excluding Italy), other European countries (including Russia and Turkey), NAFTA countries (United States, Canada and Mexico), Central and South American countries, China, other Asian countries (excluding China), Africa, and Australia and Oceania. Therefore, knowing the total output (sales) we construct the values of sales to each area and use this as dependent variable for our export equations.

Unit Labour Costs: We obtain a measure of unit labour costs by dividing the total wage bill by a firm's value added. Note that this is equivalent to dividing averages wages by labour productivity.

Credit Constraints: The questionnaire includes information on the firms' access to credit. For our credit constraints dummy, we use a firm's answer (yes/no) to the question: "Did you ask your bank for more credit without obtaining it?".

R&D: Dummy equal to 1 when the firm has employees in Research and Development.

Family: Dummy equal to 0 when the firm is managed by the owner or some member of its family (note the inverse coding).

Multinational: Dummy equal to 1 if the firm has a share of foreign ownership greater than zero and/or the firm is part of an industrial group that has affiliates abroad and/or the firm has invested abroad in the period observed.

A.2 Industry classification

The industrial activity of each firm in the Capitalia dataset is described by a four-digit NACE Rev. 1 code. The market crowding and absorption measures are calculated from data reported at the three-digit level of ISIC Rev. 2 which we map into NACE using official correspondences. ISIC three-digit is less detailed than NACE four-digit which implies that firms in different NACE sectors may have identical values for absorption or crowdedness. All standard errors reported in this paper are thus clustered at the more aggregated ISIC-level. Industry fixed effects are also at the ISIC-level in order to properly control for industry variation in our destination-specific variables (we have also experimented with using three-digit or four-digit NACE dummies but results were very similar).

A.3 List of Countries used for Calculation of Competition Measure

Argentina, Australia, Austria, Belgium, Bulgaria, Bolivia, Brazil, Canada, Switzerland, Chile, China, Côte d'Ivoire, Cameroon, Colombia, Cyprus, Czech Republic, Germany, Denmark, Algeria, Ecuador, Egypt, Spain, Finland, France, United Kingdom, Ghana, Greece, Hong Kong, Honduras, Croatia, Hungary, Indonesia, India, Ireland, Iran, Israel, Italy, Jordan, Japan, Kenya, Korea, Kuwait, Sri Lanka, Morocco, Moldova, Mexico, Macedonia, Mauritius, Malawi, Malaysia, Nigeria, Netherlands, Norway, New Zealand, Panama, Peru, Poland, Portugal, Romania, Russian Federation, Singapore, Slovakia, Slovenia, Sweden, Syrian Arab Republic, Thailand, Trinidad and Tobago, Tunisia, Turkey, Taiwan, Ukraine, Uruguay, United States of America, Venezuela, South Africa, Zambia, Zimbabwe.

B Derivations of Propositions

B.1 Proxying Marginal by Unit Labour Cost - Sufficient Conditions

Assuming that value-added production functions are Cobb-Douglas with constant returns to scale allows us to rewrite the weighted sum of marginal cost from section 2 as

$$n_{jns}^{-1}\int_{i_{jns}} c_{i_{jns},LCU_j}^{1-\sigma_s}\,di = n_{jns}^{-1}\int_{i_{jns}} \left(\gamma_{i_{js}}^{-1} w_{js}^{\alpha_1} i_{js}^{1-\alpha_1}\right)^{1-\sigma_s} di$$

where γ_{ijs} is total factor productivity of firm i in sector s, country j, and w_{js} and i_{js} are the wage rate and cost of capital it faces. We further assume that all firms within a given sector and country have the same level of total factor productivity, $\gamma_{ijs} = \gamma_{js}$ and that the costs of capital are equalized across countries and sectors, e.g. because capital is freely mobile.[15] Thus,

$$n_{jns}^{-1}\int_{i_{jns}} \left(\gamma_{i_{js}}^{-1} w_{js}^{\alpha_1} i_{js}^{1-\alpha_1}\right)^{1-\sigma_s} di = \left(w_{js}^{\alpha_1} i^{1-\alpha_1}\gamma_{js}^{-1}\right)^{1-\sigma_s}$$

Under the same assumptions, it also holds that $\gamma_{ijs} = x_{ijs}\left(l_{ijs}^{\alpha_1} k_{ijs}^{1-\alpha_1}\right)^{-1}$ where x_{ijs} is value added of firm i and l and k are labour and capital used by the firm. Solving for labour and capital demand given factor prices w_{js} and i_{js}, this simplifies to $\gamma_{ijs} = \gamma_{js} = \left(\frac{i}{w_{js}}\right)^{1-\alpha_1}\frac{x_{js}}{l_{js}}$. Thus, $\left(w_{js}^{\alpha_1} i^{1-\alpha_1}\gamma_{js}^{-1}\right)^{1-\sigma_s} = \left(\frac{w_{js}l_{js}}{x_{js}}\right)^{1-\sigma_s}$. Collecting results we obtain:

$$n_{jn}^{-1}\int_{i_{jns}} c_{i_{jns},LCU_j}^{1-\sigma_s}\,di = \left(\frac{w_{js}l_{js}}{x_{js}}\right)^{1-\sigma_s}$$

where $\frac{w_{js}l_{js}}{x_{js}}$ are the unit labour costs of country j, sector s (sectoral wage bill divided by value added).

B.2 Derivation of the Gravity Equation

We start from the expression for total sectoral exports from j to n, $R_{jns} = \sum_j \int_{i_{jns}} p_{jn}^{1-\sigma_s} P_{ns}^{\sigma_s-1} E_{ns} di$. With prices set under monopolistic competition as before, this becomes

$$R_{jns} = \left(\frac{\sigma_s}{\sigma_s-1}\right)^{1-\sigma_s} e_{jn}^{\sigma_s-1}\tau_{jns}^{1-\sigma_s} n_{jns}\left(n_{jns}^{-1}\int_{i_{jns}} c_{i_{jns}}^{1-\sigma_s} di\right) P_{ns}^{\sigma_s-1} E_{ns}$$

With the same empirical proxies for $\tau_{jns}^{1-\sigma_s}$, $e_{jn}^{\sigma_s-1}$, n_{jns}, and $(n_{jns}^{-1}\int_{i_{jns}} c_{i_{jns}}^{1-\sigma_s} di)$ outlined in section 2.2, this can be written as:

$$R_{jns} = A_s ex_{jn}^{\alpha_1(\sigma_s-1)} \nu_{jns}^{\alpha_2} uc_{js}^{\alpha_3(1-\sigma_s)} \tau_{jns}^{1-\sigma_s} P_{ns}^{\sigma_s-1} E_{ns}$$

where $A_s = \Pi_{z=1}^{8}\mu_z \times \left(\frac{\sigma_s}{\sigma_s-1}\right)^{1-\sigma_s}$.

[15] Assuming that the costs of capital are proportional to the wage rate or TFP yields the same results.

Table 1: Estimation of Parameters – Gravity Equation

	Dep. Var. Bilateral Exports			
Specification	Pooled	Sector-specific		
		Min	Median	Max
ln(exchange rate)	0.053 (6.19)**	-0.030 (0.03)	0.041 (0.77)	0.144 (4.28)**
ln(establishments_exporters)	0.669 (48.72)**	0.347 (5.47)**	0.665 (8.75)**	0.889 (12.36)**
ln(unitcost_exporter)	-0.251 (8.00)**	-1.119 (5.76)**	-0.303 (1.80)+	0.000 (0.00)
ln(distance)	-0.222 (6.57)**	-0.680 (3.83)**	-0.318 (1.96)*	0.173 (1.39)
ln(1+tariff)	-1.202 (1.85.)+	-7.843 (3.68)**	-0.584 (0.16)	8.201 (1.52)
Common language	0.554 (5.90)**	0.041 (0.08)	0.572 (2.01)*	1.234 (3.89)**
Colonial ties after 1945	1.199 (20.26)**	0.517 (0.64)	1.234 (4.44)**	2.307 (5.20)**
Internal trade flow dummy	0.234 (3.84)**	-0.462 (1.00)	0.590 (2.09)*	1.918 (6.05)**
Fixed Effects	Importer-Industry-Year	Importer-Year	Importer-Year	Importer-Year
Observations	73476	2538	2736	2772

Notes: Table displays coefficients and t-statistics for Poisson QMLE (based on standard errors clustered on exporter-importer-industry pairs in column 1 and exporter-importer pairs in columns 2-4). Column one pools all sectors while columns 2-4 present results for sector specific regressions. For each regressor, we display the minimum, median and maximum coefficient estimate across regressions, as well as the minimum, median and maximum number of observations (estimates and number of observations in a given column can thus come from different regressions). * and ** signify statistical significance at the 5% and 1% levels

Table 4: Baseline Results - Heckman

	1)			2)			3)		
	ln(exp)	d(exp>0)	ME	ln(exp)	d(exp>0)	ME	ln(exp)	d(exp>0)	ME
ln(CR)	-0.253	-0.125	-0.277	-0.190	-0.127	-0.266	-0.242	-0.118	-0.264
	(4.75)**	(5.45)**	(5.88)**	(3.67)**	(5.40)**	(5.59)**	(4.59)**	(5.12)**	(5.57)**
ln(ex. rate)	0.643	0.299	0.672	0.584	0.302	0.664	0.629	0.294	0.662
	(14.21)**	(13.27)**	(14.12)**	(12.66)**	(13.17)**	(13.98)**	(13.69)**	(12.96)**	(13.89)**
ln(absorption)	0.514	0.239	0.537	0.455	0.240	0.526	0.499	0.234	0.525
	(14.02)**	(15.11)**	(16.36)**	(11.97)**	(14.83)**	(15.92)**	(13.43)**	(14.64)**	(15.96)**
ln(1+tariff)	-2.378	-1.589	-3.323	-2.000	-1.603	-3.269	-2.186	-1.506	-3.141
	(5.54)**	(7.68)**	(7.89)**	(4.79)**	(7.46)**	(7.63)**	(5.21)**	(7.27)**	(7.48)**
ln(distance)	-0.556	-0.345	-0.731	-0.493	-0.347	-0.721	-0.544	-0.348	-0.735
	(14.86)**	(20.88)**	(20.54)**	(12.09)**	(20.73)**	(20.46)**	(13.70)**	(20.99)**	(20.68)**
ln(unitcost)	-0.767	-0.086	-0.333	-0.751	-0.073	-0.305	-0.791	-0.096	-0.355
	(13.83)**	(3.88)**	(7.30)**	(14.06)**	(3.19)**	(6.59)**	(13.97)**	(4.26)**	(7.73)**
Travel time to Milan								-0.033	-0.057
								(8.67)**	(8.43)**
Credit constraint dummy					-0.092	-0.157			
					(4.85)**	(4.80)**			
Fixed effects		Year			Year			Year	
Observations		64256			61592			62312	

Notes: Table displays coefficients and t-statistics for Heckman selection models (based on standard errors clustered on industry-destination-years). The three columns display results for outcome and selection equation and marginal effects evaluated at sample means, respectively. * and ** signify statistical significance at the 5% and 1% levels.

Table 5: Robustness Checks

	(1) ME	(2) ME	(3) ME	(4) ME	(5) ME	(6) ME	(7) ME	(8) ME	(9) ME
ln(CR)	-0.289	-0.741	-0.198	-0.605	-0.348	-0.767	-0.769	-0.384	-0.387
	(4.11)**	(9.71)**	(3.62)**	(10.83)**	(8.34)*	(4.60)**	(5.04)**	(6.71)**	(6.31)**
ln(ex. rate)	0.783	0.937	0.304	0.866	0.749	1.005	1.006	0.832	0.833
	(12.75)**	(15.94)**	(2.90)**	(21.02)**	(20.33)**	(11.30)**	(12.35)**	(16.44)**	(15.44)**
ln(absorption)	0.647	0.829	0.313	0.752	0.623	0.947	0.948	0.628	0.629
	(12.31)**	(16.59)**	(7.47)**	(20.84)**	19.98)**	(9.68)**	(10.83)**	(15.35)**	(14.41)**
ln(1+tariff)	-3.058	-3.557	-1.433	-3.842	-3.973	-2.139	-2.149	-3.534	-3.540
	(8.25)**	(8.69)**	(3.27)**	(12.17)**	(11.25)**	(3.19)**	(3.59)**	(11.40)**	(10.71)**
ln(distance)	-0.731	-0.753		-0.736	-0.714	-0.751	-0.751	-0.819	-0.819
	(21.76)**	(21.32)**		(34.39)**	(33.34)**	(16.50)**	(17.34)**	(27.29)**	(25.61)**
ln(unitcost)	-0.355	-0.375	-0.338	-0.660	-0.661	-0.811		-0.653	
	(8.02)**	(8.28)**	(7.44)**	(16.27)**	(16.26)**	(7.15)**		(15.18)**	
ln(absorb_Italy)		-0.462							
		(7.23)**							
ln(CR_Italy)		0.573							
		(8.45)**							
ln(absorb_RoW)	-0.244								
	(7.35)**								
ln(CR_RoW)	-0.041								
	(0.78)								
Fixed effects	Year	Year	Destin.-Year	Industry-Year	Industry-Year	Industry-Year	Firm-Year	Industry-Year	Firm-Year
Estimation Method	Heckit	Heckit	Heckit	Heckit	Heckit	Poisson	Poisson	OLS	OLS
Observations	64256	64256	64256	64256	64256	64256	64256	64256	64256

Notes: Table displays coefficients and t-statistics based on standard errors clustered on industry-destination-years. Estimation methods are Heckit (columns 1-5), Poisson (columns 6-7) and OLS (columns 8-9). For Heckit, we report marginal effects evaluated at sample means. * and ** signify statistical significance at the 5% and 1% levels.

Table 6: Non-Theory-Based Measures

	(1)	(2)	(3)	(4)
	ME	ME	ME	ME
ln(AvgTariff)	0.172	-0.012		
	(4.68)**	(0.51)		
ln(Herfindahl)			0.032	-0.046
			(2.25)*	(1.98)*
ln(exchange rate)	0.679	0.543	0.593	0.482
	(11.87)**	(14.42)**	(12.37)**	(10.25)**
ln(absorption)	0.445	0.402	0.446	0.326
	(15.07)**	(20.60)**	(13.55)**	(7.38)**
ln(1+tariff)	-4.298	-3.407	-3.114	-3.438
	(8.34)**	(9.45)**	(7.15)**	(9.81)**
ln(distance)	-0.699	-0.697	-0.717	-0.688
	(18.22)**	(31.28)	(19.89)**	(28.38)**
ln(unitcost)	-0.388	-0.663	-0.373	-0.662
	(8.61)**	(16.18)**	(8.22)**	(15.68)**
Fixed effects	Year	Industry-Year	Year	Industry-Year
Estimation Method	Heckit	Heckit	Heckit	Heckit
Observations	64256	64256	64256	64256

Notes: Table displays coefficients and t-statistics for marginal effects obtained via Heckit (t-statistics based on standard errors clustered on industry-destination-years). Marginal effects are evaluated at sample means. +, * and ** signify statistical significance at the 10%, 5% and 1% levels.

Table 7. Firm Heterogeneity

	(1a) ln(exp)	(1b) d(exp>0)	(1c) ME	(2a) ln(exp)	(2b) d(exp>0)	(2c) ME	(3a) ln(exp)	(3b) d(exp>0)	(3c) ME	(4a) ln(exp)	(4b) d(exp>0)	(4c) ME
Ln(CR)	-0.331	-0.355	-0.653	-0.285	-0.323	-0.610	-0.266	-0.344	-0.612	-0.311	-0.370	-0.654
	(5.27)**	(11.63)**	(11.68)**	(4.62)**	(10.76)**	(10.72)**	(4.27)**	(11.09)**	(10.89)**	(5.09)**	(11.52)**	(11.60)**
Ln(exchange rate)	0.696	0.441	0.869	0.662	0.426	0.867	0.678	0.442	0.857	0.674	0.453	0.860
	(15.23)**	(19.74)**	(21.23)**	(14.47)**	(19.64)**	(21.05)**	(15.47)**	(19.63)**	(20.96)**	(16.14)**	(19.67)**	(21.17)**
Ln(absorption)	0.561	0.387	0.753	0.528	0.375	0.752	0.544	0.389	0.745	0.537	0.399	0.745
	(12.88)**	(19.57)**	(21.01)**	(12.15)**	(19.58)**	(20.87)**	(12.98)**	(19.59)**	(20.82)**	(13.35)**	(19.53)**	(20.97)**
Ln(1+tariff)	-1.578	-2.118	-3.805	-1.494	-2.075	-3.843	-1.504	-2.138	-3.775	-1.396	-2.175	-3.752
	(4.97)**	(12.53)**	(12.16)**	(4.71)**	(12.50)**	(12.12)**	(4.76)**	(12.36)**	(11.93)**	(4.53)**	(12.36)**	(11.94)**
Ln(distance)	-0.503	-0.384	-0.736	-0.472	-0.374	-0.736	-0.496	-0.387	-0.729	-0.486	-0.395	-0.729
	(15.59)**	(34.15)**	(34.05)**	(14.59)**	(34.25)**	(34.26)**	(16.80)**	(34.28)**	(34.03)**	(17.58)**	(34.06)**	(33.90)**
Ln(unit costs)	-0.908	-0.227	-0.565	-0.984	-0.264	-0.662	-0.939	-0.243	-0.591	-0.871	-0.216	-0.524
	(16.69)**	(10.43)**	(14.44)**	(17.49)**	(12.09)**	(16.33)**	(17.73)**	(11.07)**	(15.26)**	(17.20)**	(9.93)**	(13.99)**
Ln(CR)*R&D	0.024	0.018	0.035							0.018	0.016	0.029
	(1.75)*	(3.25)**	(3.34)**							(1.34)	(2.76)**	(2.81)**
R&D	0.256	0.081	0.187							0.222	0.066	0.149
	(2.71)**	(2.19)*	(2.70)**							(2.40)*	(1.69)	(2.15)*
Ln(CR)*non-family				0.095	0.002	0.022				0.069	0.001	0.015
				(2.45)*	(0.06)	(0.63)				(1.78)*	(0.02)	(0.44)
Non-family dummy				0.188	0.145	0.299				0.179	0.068	0.149
				(0.69)	(1.15)	(1.15)				(0.67)	(0.54)	(0.63)
Ln(CR)*MNC							-0.002	0.023	0.037	-0.001	0.016	0.026
							(0.07)	(1.49)	(1.34)	(0.03)	(1.00)	(0.92)
MNC dummy							1.361	0.515	1.317	1.118	0.478	1.152
							(6.03)**	(4.98)**	(5.36)**	(4.99)**	(4.45)**	(4.72)**
Fixed Effects		Industry-by-year			Industry-by-year			Industry-by-year			Industry-by-year	
Observations		63672			64256			64099			63515	

Notes: Table displays coefficients and t-statistics for Heckman selection models (based on standard errors clustered on industry-destination-years). Marginal effects are evaluated at sample means and for variations from 0 to 1 for dummy variables. * and ** represent statistical significance at the 5% and 1% levels.

Table 8: Counterfactual Experiments I

Counterfactual	Annualised counterfactual change in aggregate export growth rate (%) Heckman (Industry-Year FE) "Intensive"	"Extensive"	Total	Poisson (Industry-Year FE)	OLS (Industry-Year FE)
Absorp. unchanged	-3.31%	-0.93%	-3.99%	-5.26%	-3.12%
- EU15 only	-1.20%	-0.14%	-1.33%	-1.99%	-1.17%
- Europe_other only	-0.72%	-0.22%	-0.85%	-1.05%	-0.69%
- NAFTA only	-0.17%	-0.05%	-0.22%	-0.28%	-0.15%
Unit lab. costs unchanged	1.18%	0.09%	1.37%	0.86%	0.45%
Exch. rates unchanged	1.46%	0.26%	2.00%	2.65%	1.50%
- C&S America only	0.69%	0.18%	1.01%	1.19%	0.61%
- All except C&S America	0.70%	0.06%	0.90%	1.39%	0.64%
Tariffs unchanged	-0.21%	-0.14%	-0.34%	-0.27%	-0.32%
CR unchanged	0.12%	0.04%	0.17%	0.35%	0.15%
- No. exporters	0.04%	0.00%	0.04%	0.13%	0.06%
- Exch. rates	-0.01%	0.00%	-0.01%	-0.02%	-0.01%
- Tariffs	0.03%	0.01%	0.04%	0.07%	0.03%
- Unit lab. costs	0.06%	0.03%	0.08%	0.15%	0.06%

Notes: Table reports annualised differences in growth rates between the counterfactual scenario indicated in the first column and actual export growth rates. Results are based on coefficient estimates obtained via the estimation method indicated at the top of each column. See text for details.

Table 9: Counterfactual Experiments II

Counterfactual	Annualised counterfactual change in aggregate export growth rate				
	Heckman (Industry-Year FE)			Poisson (Industry-Year FE)	OLS (Industry-Year FE)
	"Intensive"	"Extensive"	Total		
Chinese counterfactuals	-0.13%	-0.10%	-0.20%	-0.17%	-0.09%
- Absorption growth	-0.09%	-0.06%	-0.13%	-0.13%	-0.05%
- Market crowding	0.01%	0.00%	0.02%	0.03%	0.01%
- Chinese import tariffs	-0.04%	-0.05%	-0.09%	-0.06%	-0.04%
- EUR/RMB exch. rate	-0.01%	-0.01%	-0.01%	-0.01%	-0.00%
Higher abs. growth EU15	0.45%	0.05%	0.51%	0.78%	0.49%

Notes: Table reports annualised differences in growth rates between the counterfactual scenario indicated in the first column and actual export growth rates. Results are based on coefficient estimates obtained via the estimation method indicated at the top of each column. See text for details.