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Spatial Exporters

By

Fabrice Defever, Benedikt Heid and Mario Larch

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The Authors

Fabrice Defever is a Lecturer in Economics at the University of Nottingham and a GEP research fellow. He is also a research associate at CEP at the LSE.

Benedikt Heid, Phd candidate at the University of Bayreuth and research fellow at ifo Institute.

Mario Larch, Professor of Economics, University of Bayreuth and research fellow at ifo Institute, CESifo and GEP.

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Abstract

In this paper, we provide evidence that expanding firms tend to serve new markets which are geographically close and culturally related to their prior export destinations. We quantify the impact of this spatial pattern using a Chinese firm-level data set. To ensure an exogenous set of potential new destinations (25 EU countries, US and Canada) and an exogenous timing of entry, we focus on firms that benefited from the abrupt end of the textile quota restrictions in 2005. Controlling for firm-product and destination specific effects and accounting for possible multiple new export destinations we show that the probability to export to a country increases by 15 to 38 percent for each prior export destination with a geographical or cultural link with this country.

JEL: classification: F12, F13, C25
Keywords: export destination choice; spatial correlation; firm-level customs data; MFA/ATC quota removal.

Outline

Non-Technical Summary

Firm exports exhibit a geographical pattern. Not only do different firms serve different numbers of countries but also the spatial distribution of those countries differs heavily across firms. In this paper, we provide evidence for a previously unexplored dimension of country-firm specific heterogeneity: Firms tend to enter new markets which are geographically close and culturally related to their prior export destinations. This spatial concentration of export markets may be due to the crucial need for gathering local information from trading partners. Different local information then may lead to different trade networks across firms. In addition, correlation of demand patterns across countries or common cultural aspects may lead firms to adapt their products to the preferences of their consumers. As a consequence, if trade barriers fall, firms will expand their export destinations not randomly but following a clear spatial pattern.

In this paper, we provide evidence that firms expand into new foreign markets which are geographically close and culturally related to their prior export destinations controlling for country-specific effects. We present a simple model of firm export behavior where the choice of new export destinations is driven by the firm export history. We derive a discrete choice model that explicitly takes into account the possibility of the simultaneous choices of new export destinations of firms. Exploiting a quasi-natural experiment, our empirical strategy will gauge the relative importance of the cross-country profit correlation due to both geographical proximity and cultural closeness measured by common language, similar income levels or shared colonial past. As we use reduced form regressions we do not rely on a specific channel imposed by an underlying structural model. Rather, we quantify the effects of any correlation in profits across destination markets on the probability to export to a specific country, irrespective of whether it arises from the demand or supply side. Controlling for firm-product and destination specific effects, we show that the probability to choose a country increases by 15 to 38 percent for each additional prior export destination with a geographical or a cultural link with this country.

Since 1974, exports of Chinese textile and clothing manufacturers to the EU countries, the US and Canada were restricted by binding import quotas under the MultiFiber Arrangement/Agreement on Textiles and Clothing (MFA/ATC) regime. The abrupt end of the quota restriction on Chinese textiles on January 1st, 2005 provides us with an exogenous increase of firms' possible export destinations, leading to a massive entry of firms. Our identification strategy relies on exporters which never had a chance to obtain a quota license from the Chinese government and could not enter these destinations despite large potential profits. For these firms, the end of the quota restriction generated an exogenous set of potential new destinations (25 EU countries, the US and Canada) for a large number of restricted products. This quasi-natural experiment provides us with a clean environment to study the influence of the previous export history of non-licensed firms on their export destination choices in an exogenous set of potential new destinations during the year 2005.

1 Introduction

Firm exports exhibit a geographical pattern. Not only do different firms serve different numbers of countries but also the spatial distribution of those countries differs heavily across firms. In this paper, we provide evidence for a previously unexplored dimension of country-firm specific heterogeneity: Firms tend to enter new markets which are geographically close and culturally related to their prior export destinations.[1] This spatial concentration of export markets may be due to the crucial need for gathering local information from trading partners.[2] Different local information then may lead to different trade networks across firms. In addition, correlation of demand patterns across countries or common cultural aspects may lead firms to adapt their products to the preferences of their consumers.[3] As a consequence, if trade barriers fall, firms will expand their export destinations not randomly but following a clear spatial pattern.

To quantify the cross-country correlation of firms export decisions, we rely on the frequency of new markets entered by a firm which are contiguous to one of its prior export destinations.[4] However, to ensure that this is a systematic pattern of the underlying firm decisions, we need to compare it with the probability that would arise if the firm were choosing its new destinations randomly (see Armenter and Koren, 2010). Each firm has a different probability to randomly choose a contiguous new destination which depends

[1]Recent theoretical and empirical contributions have identified the importance of country specific firm heterogeneity (see Kee and Krishna, 2008; Bernard et al., 2011 and Eaton et al., 2011).

[2]For instance, an exporting firm may gain access to a new export market via a multinational retailer which already serves a third country. As the network of subsidiaries of wholesalers and of multinational firms tends to expand spatially (see Basker, 2005 and Defever, forthcoming), this mechanism also implies a spread of exports to contiguous countries. In addition to geography, cultural closeness can also generate a similar pattern through networks of ethnically-related firms. For instance, networks may reduce search costs as firms may learn about potential suitable suppliers within their ethnic community (see for instance Rauch, 2001). Recently, Chaney (2011) has developed a model describing trade patterns as an international network. Firms tend to build on their network for finding new trading partners, similar to social interactions between individuals (see Jackson and Rogers, 2007).

[3]For example, if preferences among nearby countries are similar, firms profitability will be correlated geographically. In addition, common cultural aspects can generate such correlation (see Combes et al., 2005).

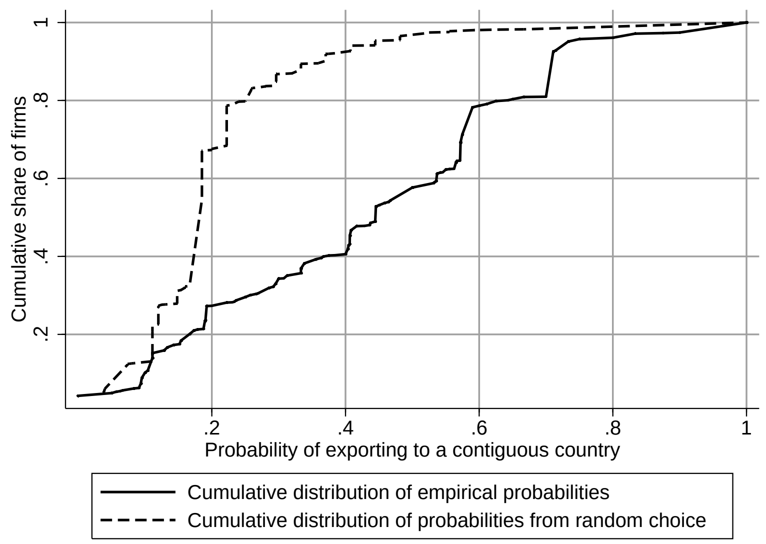
[4]The frequency would be equal to two-thirds for a firm entering three new destinations, from which two of them have a common border with one of its prior export markets.

on the number of potential new destinations, the number of these new markets which are contiguous with a prior export destination and also on the number of new market that the firm chooses to enter. Conditioning on these firm characteristics, one can easily calculate the probability for a randomly chosen country to be contiguous to a prior export destination, and compare it with the empirical probability observed in the data.[5] As an illustration, consider a sample of Chinese firms which have to decide which new markets to enter in a set of up to 27 new potential destinations (25 EU countries, US and Canada) and which have previously exported elsewhere.[6] Figure 1 plots the cumulative distributions of the empirical probabilities and the probabilities from random choice for a new export market to share a common border and/or a common language with one of the firm prior export destinations. It shows that the cumulative distribution of the empirical probabilities lies entirely to the right of the distribution of probabilities from random choice.[7] While a random choice model predicts than 90% of the firms would have less than 40% of their new destinations contiguous with a prior export market, the data show that only 40% of the firms have such a low contiguity frequency. Contiguity seems to be a pervasive pattern in firms' export behavior when compared to randomness. Note that this simple statistic does not control for country-specific variables generally known to influence bilateral trade flows from the gravity literature. This is done in the econometric exercise in the remainder of this paper.

[5]The probability for a randomly chosen country to be contiguous to a prior export destination ($\mathcal{P}^r$) depends on the number of potential new export destinations (J), the number of potential new export destinations contiguous with a prior export destination (k) (a subset of J) and the number of new markets that the firm decides to enter (m) (also a subset of J). This probability $\mathcal{P}^r$ is given by the expected proportion of contiguous destinations in a set of m randomly chosen countries. It is calculated using the hypergeometric distribution as $\mathcal{P}^r = \mu/m$ with $\mu = \sum_{n=0}^{m} n \frac{\binom{k}{n}\binom{J-k}{m-n}}{\binom{J}{m}}$. The empirical probability for a chosen country to be contiguous to a prior export destination ($\mathcal{P}^e$) is equal to the observed frequency of the chosen export markets which are contiguous to a prior export destination for any viable combination of J, m and k.

[6]This is the same subset of firms we use in our empirical analysis. We provide a detailed description of our sample in Section 4. For the sake of presentation, we have aggregated the data at the firm-destination level.

[7]In statistical terms, this means that the empirical cumulative distribution first order stochastically dominates the cumulative distribution of probabilities from random choice. This difference is also statistically significant at the 1 percent level using a two-sided Kolmogorov-Smirnov test.



The empirical probabilities and the probabilities from random choice are calculated as explained in footnote 5. Contiguity is measured by common border and/or a common language. The sample of firms is the same as the one used in our empirical analysis. We provide a detailed description of our sample in Section 4. For the sake of presentation, we have aggregated the data at the firm-destination level.

Figure 1: Cumulative distributions of empirical probabilities and probabilities from random choice for a new export to be contiguous to one of the firm prior export markets

In this paper, we provide evidence that firms expand into new foreign markets which are geographically close and culturally related to their prior export destinations controlling for country-specific effects. We present a simple model of firm export behavior where the choice of new export destinations is driven by the firm export history. We derive a discrete choice model that explicitly takes into account the possibility of the simultaneous choices of new export destinations of firms. Exploiting a quasi-natural experiment, our empirical strategy will gauge the relative importance of the cross-country profit correlation due to both geographical proximity and cultural closeness measured by common language, similar income levels or shared colonial past. As we use reduced form regressions we do not rely on a specific channel imposed by an underlying structural model. Rather, we quantify the effects of any correlation in profits across destination markets on the probability to export to a specific country, irrespective of whether it arises from the demand or supply side. Controlling for firm-product and destination specific effects, we show that the probability to choose a country increases by 15 to 38 percent for each additional prior export destination with a geographical or a cultural link with this country.

When studying the export decision of firms, one has to disentangle two different aspects of the firms' problem: i) when to enter a new destination, and ii) where to go. When profits are uncorrelated across destinations, the decision problem is simple: Every market entry decision can be analyzed on its own. Hence, the two problems of when and where to export can be separated.[8] However, if profits are correlated, these two decisions become intrinsically related. In the presence of entry costs, firms may enter new destinations gradually to learn about their profitabilities in these new markets or to adapt their products over time (see Albornoz et al., 2010; Nguyen, forthcoming; Morales et al., 2011). Empirically, this leads to a dynamic discrete choice problem. As explained by Morales et al. (2011), this problem is formulated in a straight-forward way theoretically but quickly leads to an empirically de facto unsolvable problem because it involves computing the expected profits for every possible combination of time paths of entries into destinations.[9] Instead of simultaneously studying the firm's timing decision of when to enter into a new market and its geographical location decision driven by varying degrees of correlation between profits across markets, we rely on an exogenous shock that has generated a massive entry of firms in a set of potential new and virgin destinations. This allows us to focus our attention on the choice of new destinations, given an exogenous timing of

[8]For instance, Das et al. (2007) structurally estimate the parameters of a firm's dynamic problem of when to start and stop exporting, irrespective of the specific export market choice.

[9]Therefore, Morales et al. (2011) do not solve this dynamic problem explicitly. Instead they resort to moment inequality estimators to obtain bounds on the parameters of interest in their structural empirical model. Their estimates based on firm-level export data for Chilean manufacturing firms in the chemicals sector show that startup costs of accessing a new country are significantly determined by the countries to which a firm had previously exported. Albornoz et al. (2010) and Nguyen (forthcoming) focus their analysis on the timing of entry only and assume a hierarchy between countries in term of profitability and a constant profit correlation across all export destinations. Together, these assumptions elude the question of where to go.

entry.

Since 1974, exports of Chinese textile and clothing manufacturers to the EU countries, the US and Canada were restricted by binding import quotas under the MultiFiber Arrangement/Agreement on Textiles and Clothing (MFA/ATC) regime. The abrupt end of the quota restriction on Chinese textiles on January 1st, 2005 provides us with an exogenous increase of firms' possible export destinations, leading to a massive entry of firms (Bernhofen et al., 2011; Khandelwal et al., 2011). Our identification strategy relies on exporters which never had a chance to obtain a quota license from the Chinese government and could not enter these destinations despite large potential profits.[10] For these firms, the end of the quota restriction generated an exogenous set of potential new destinations (25 EU countries, the US and Canada) for a large number of restricted products. This quasi-natural experiment provides us with a clean environment to study the influence of the previous export history of non-licensed firms on their export destination choices in an exogenous set of potential new destinations during the year 2005.

Not only were the MFA quotas abruptly abolished, providing us with an exogenous timing of entry, but also a new quota system was introduced, limiting the firms expansion for the years 2006 to 2008. Chinese exporters did not have time to gradually learn about their profitability in these new markets or to adapt their products over time. Already at the end of 2004, lobbying groups of the European textile industry pushed the EU commission to impose safeguard measures.[11] Additionally, it was unclear which specific textile products would be subject to a reintroduced safeguard measure. As a result, Chinese firms knew they had little time to expand and therefore strategic gradual entry into export markets was not a viable option. As a

[10]Francois and Woerz (2009) show that firms which were allocated quota licensed by the Chinese government were able to extract substantial quota rents from these restricted markets.

[11]Politicians also added their voices to the lobbying groups. Prominently, Jacques Chirac, the then French President, denigrated the removal of the import quotas and the subsequent surge in Chinese exports as "[a] brutal and unacceptable invasion of the European and US markets by Chinese textiles" (Financial Times, April 19 2005). Strikes of dock workers in Southern Europe in sympathy with unions from the apparel industry took the same line (see Bloom et al., 2011).

consequence, the EU countries, the US and Canada experienced a veritable tsunami of textile and apparel products (Harrigan and Barrows, 2009). Overall, the removal of the MFA quotas provides us with an exogenous event that allows to disentangle the question from when to export and where to export.

Our firm-level data allow us to identify new entrants into the European, US and Canadian markets for product categories where import quotas effectively prevented entry from non-licensed firms. Hence, these firms did not acquire knowledge via exporting to these markets. Nevertheless, many of them had previous export experience in other countries that were geographically close and culturally related. For example, a firm may have previously exported to Brazil. When the MFA quotas were removed in 2005, the firm could use the specific knowledge acquired in Brazil to enter Portugal — due to similarity of language and culture. We make use of the export history of Chinese exporters during the years 2000 and 2001 to identify the impact of closeness and similarities of their prior export decisions on their new export destination choices in 2005. The end of the quota restrictions was part of the WTO protocol signed at the very end of 2001. In addition, the entry of China into the WTO on December 11th, 2001 was uncertain, even at the end of the negotiation process. Adding the difficulty to anticipate the quota removal due to the possible use of safeguard systems, the export decisions made by firms in 2000 and 2001 are arguably exogenous to the destination choice made in 2005.

Learning about the spatial correlation of export decisions helps to understand cross-country correlation in profits of exporting firms which are a crucial ingredient of recent theoretical developments on export dynamics (see Albornoz et al., 2010; Nguyen, forthcoming; Morales et al., 2011). It could also contribute to explain the pattern of zero bilateral trade flows observed empirically (see Evenett and Venables, 2002). Understanding exporting firm behavior is also crucial from a policy perspective. If cross-country correlation in firm profits is important, it also has ramifications for trade liberalization policies — as reducing trade barriers between two countries can lead to more trade with other countries nearby, even though they did not lower their trade barriers. This gives rise to externalities across countries.[12] Therefore, our research highlights the potential for efficiency increases in trade liberalization through policy coordination between countries.

The remainder of the paper is organized as follows: Section 2 presents a highly stylized model of spatial exporters. Section 3 derives an econometric specification of the export destination choice from our model. Section 4 describes the data employed and the identification strategy. Section 5 presents our baseline empirical results. Section 6 presents additional evidence from multi-product firms while Section 7 distinguishes between entries and exits into contiguous markets. Section 8 contains further robustness checks. The last section concludes.

2 A simple model of spatial exporters

The decision of a firm to export a product to a *new* export destination j at time t depends on its expected per period profit π_{ijt} where we label every firm-product couple as i. For convenience, we introduce an indicator variable y_{ijt} which takes value 1 if the firm decides to export firm-specific product i to country j and 0 otherwise. Collect the set of export decisions of a single firm-product couple in the vector $\mathbf{y}_{it} = (y_{i1t}, \ldots, y_{ijt}, \ldots, y_{iJt})$ where J is the number of possible markets a firm may choose to serve product i. Our model can in principle also accommodate firm-product and time-specific numbers of destinations J_{it}. For ease of exposition we stick to the assumption of the same number of possible destinations across firms.

$$y_{ijt} = \begin{cases} 1 & \text{if} \quad \pi_{ijt} \geq 0, \\ 0 & \text{otherwise.} \end{cases} \tag{1}$$

As can be seen from (1), we assume that firms maximize their profit in each market independently of their decisions in other markets. Profit maximiza-

[12] For instance, Borchert (2008) finds that the growth of Mexican exports to Latin America was higher for products with a large reduction in the preferential U.S. tariff under NAFTA. Similarly, Molina (2010) identifies a strong positive effect of RTAs in promoting exports outside the bloc of liberalized countries. While it is difficult to explain these findings with standard trade models, they can easily be rationalized in the presence of firm-specific cross-country profit correlation.

tion at the firm level has to take into account the arising option value of waiting to enter an additional export market after a first export decision, see Morales et al. (2011).[13]

Taking into account the value of waiting considerably complicates the firm's problem and gives rise to a dynamic discrete choice problem. However, due to our identification strategy (discussed in detail in Section 4) we can stick to the assumption of a myopic firm in our analysis. While this significantly reduces the complexity of the problem, we can still take into account cross-country correlation in firm profits. Additionally, it allows a precise quantification of the effect of geographical and cultural proximity on the probability of entering a new export destination.

Alternatively, we could consider the firm as being completely passive, i.e. it is merely waiting for a foreign buyer to place her order as e.g. in Rauch and Watson (2003). In their model, a foreign importer chooses a long-term partner among a pool of potential exporters and maximizes its profit in its national market only. As the interdependencies of exporting profits across markets does not matter for the importer, the observed behavior is observationally equivalent to a profit-maximization of the exporter at the country level. There would be no value in delaying entry into an export destination and hence the firm would not have to solve a dynamic optimization problem.

In a given year, the net present value of the potential flow of profit π_{ijt} can be described as follows:

$$\pi_{ijt} \quad = \quad \exp(s_{ijt})\theta_j\theta_i - f_{ijt}. \tag{2}$$

π_{ijt} is equal to the operating profit minus a firm-product-time-specific fixed cost of supplying the market which is paid each period. The single term θ_j captures all the destination-specific variables generally known to influence bilateral trade flows from the gravity literature such as market size, price levels, and trade costs. θ_i captures all facets of firm-product-level heterogeneity such as productivity or quality as well as labor costs. Finally, $\exp(s_{ijt})$ is a strictly positive firm-product-destination specific time-variant profit shifter that captures the previous export history of firm i.

[13]For a general introduction to option value problems see Dixit and Pindyck (1994).

We assume that profit shifters s_{ijt} are correlated across export destinations. In order to introduce a vector of spatially correlated profit shifters in a very simple and stylized way, we assume that the vector of profit shifters for a firm-product i for all export markets $\mathbf{S}_{it}$ is given by

$$\mathbf{S}_{it} \equiv \begin{bmatrix} s_{i1t} \\ \vdots \\ s_{ijt} \\ \vdots \\ s_{iJt} \end{bmatrix} = \rho \mathbf{W} \mathbf{y}_{i,t-1} + \boldsymbol{\nu}_{it}, \tag{3}$$

where $\mathbf{y}_{i,t-1} = (y_{i1,t-1}, \ldots, y_{il,t-1}, \ldots, y_{iL,t-1})$ is a $(L \times 1)$ vector indicating the firm's export status across the L potential past destinations at time $t-1$ and $\boldsymbol{\nu}_{it}$ is a $(J \times 1)$ vector of *iid* type 1 extreme value error terms. $\mathbf{W}$ is a $(J \times L)$ contiguity matrix with typical element w_{jl} indicating the linkages between profit shifters between the J potential new export destinations and the L potential past destinations. Equation (3) implies that a firm's past exporting history conveys information to a firm about the profitability of its products in foreign markets it has not already served and therefore influences its export decisions in the future. We can now write the profit shifter for a firm-product couple i in a specific new export destination j as

$$s_{ijt} = \rho \sum_{l=1}^{J} w_{jl} y_{il,t-1} + \nu_{ijt}. \tag{4}$$

For simplicity, we assume $w_{jl} = 1$ if country j is contiguous to country l, and 0 otherwise.[14] Equation (4) reduces to

$$s_{ijt} = \rho N_{ij,t-1} + \nu_{ijt}, \tag{5}$$

where $N_{ij,t-1}$ is the number of contiguous past export destinations of firm-product i for the new export market j. ρ measures the strength of the correlation between profit shifters. For simplicity, we stick to the contigu-

[14] Note that the model can also accommodate a continuous metric of distance in order to construct $\mathbf{W}$.

ity matrix in our model. Our empirical results relax this assumption by providing evidence for different measures of contiguity.

3 Econometric specification

We estimate the parameters of the profit equation (2) using a discrete choice model.[15] The location choice literature makes extensive use of the conditional logit model (CLM). Taking the natural log of (2) while noting that s_{ijt} is given by equation (5) we receive:

$$\ln(\pi_{ijt} + f_{ijt}) \quad = \quad \rho N_{ij,t-1} + \tilde{\theta}_j + \tilde{\theta}_i + \nu_{ijt}, \qquad (6)$$

where $\tilde{\theta}_j = \ln(\theta_j)$ is captured by country fixed-effects controlling for time-invariant country characteristics such as market size and distance. $\tilde{\theta}_i = \ln(\theta_i)$ is a firm-product-specific effect which is the same across all possible export destinations.

Following McFadden (1974), the estimation of a Conditional Logit Model (CLM) requires error terms that are independent across the potential new export destinations of the firm. In our case, the crucial assumption of the independence of irrelevant alternatives is partially solved by the introduction of country-fixed effects which capture the unobserved country characteristics. What is left is a possible correlation across export destinations induced by destination-firm specific effects. We capture this aspect with the explanatory variable $N_{ij,t-1}$. Assuming that ν_{ijt} is an *iid* error term which is distributed type 1 extreme value with density $f(\nu_{ijt}) = \exp(-\nu_{ijt})\exp[-\exp(-\nu_{ijt})]$, a simple conditional logit would compare the probability that firm i chooses to export to destination $j^* \in J_{it}$ compared to the probability to choose another destination. Empirically, however, firms may choose to start to export to a multitude of new export destinations simultaneously.[16] In order

[15]Note that we use the quasi-natural setting to get rid of the dynamics. However, we are interested in the overall correlation in firm-destination profitability through contiguity between export destinations, not the differential impact of the end of MFA/ATC regime. Hence, the appropriate econometric model is a discrete choice model and not a difference-in-difference estimator.

[16]In our data set, we observe that firms which choose to export to new markets often do so in two or three markets (see Appendix A.1).

to reflect this behavior in our estimation procedure, we run a fixed effects logit due to Chamberlain (1980). Given that a firm exports its product in m_{it} new destinations from J_{it}, the set of all possible new export destinations for the firm, this estimator models the probability to choose a combination of countries compared to all the other possible combinations of the same number of countries. The joint density is given by

$$f\left(\mathbf{y}_{it}|m_{it}, N_{ij,t-1}, \rho, \widetilde{\theta}_j\right) = \frac{\exp\left([\sum_{j=1}^{J_{it}} y_{ijt}(\rho N_{ij,t-1} + \tilde{\theta}_j)]\right)}{\sum_{\mathbf{y}_{it} \in \mathbb{J}_{it}} \exp\left(\sum_{j=1}^{J_{it}} y_{ijt}(\rho N_{ij,t-1} + \tilde{\theta}_j)\right)}, \quad (7)$$

where $\mathbb{J}_{it}$ is the set of all possible combinations of export destinations given that the firm exports to m_{it} new destinations in total and y_{ijt} is equal to 0 or 1 with $\sum_{j=1}^{J_{it}} y_{ijt} = m_{it}$. As the number of potential new destinations may vary across products (depending on the number of restricted countries), the set of possible export destinations J_{it} is also firm-product-specific. Note that $\tilde{\theta}_i$ does not appear in (7) as the firm-product specific effect is constant across export destinations and hence does not affect the relative probability of choosing a destination. Hence, the within firm estimator also captures the firm-specific number of potential new export destinations.[17]

It is important to realize that $N_{ij,t-1}$ captures the connectedness between two foreign markets — and not between the home country of the firm and another export destination. All destination-specific effects known to be important determinants of bilateral trade flows are captured by the destination-specific fixed effects $\tilde{\theta}_j$. They also control for the general connectedness of a country, e.g. the number of common borders with neighboring countries of country j.

We report odds ratios of our regressions. In our case, odds ratios are $P(y_{ijt} = 1|N_{ij,t-1}+1, \cdot)/P(y_{ijt} = 1|N_{ij,t-1}, \cdot)$, i.e. the ratio of the conditional probability for firm i to go to country j in period t ($y_{ijt} = 1$) when firm i exported to $N_{ij,t-1} + 1$ contiguous export destinations in $t-1$ relative to the conditional probability when the same firm exported to $N_{ij,t-1}$ contiguous export destinations. Hence, the odds ratios reported in our results give

[17] For further details on fixed effects logit estimation see Cameron and Trivedi (2005), pp. 796.

the increase in the probability of exporting to country j controlling for the benchmark probability of randomly exporting to j. We cluster standard errors at the firm-level. This takes into account unobserved within-firm correlation across destinations.

4 Data and identification

To bring our model to the data, we use transaction level customs data on the universe of Chinese exporters. Our dependent variable is the firm-product specific vector of export indicators $\mathbf{y}_{it} = (y_{i1t}, \ldots, y_{ijt}, \ldots, y_{iJt})$ which indicates whether a firm exports to a specific destination j in $t = 2005$. Our data are defined at the firm-product-destination level.[18] We only keep products which fall in the Harmonized System (HS) chapters of textile and clothing products, i.e., chapters 50 to 63. For each firm-destination couple, we aggregate the HS-8 product level at the HS-6 digit product category, as the quota restrictions were defined at this level of disaggregation.

4.1 Identification strategy

As motivated in the introduction, we rely on an exogenous reduction in trade barriers which allows us to disentangle the timing of the firm's decision of expanding into a new market and its geographical location decision. Under the MultiFiber Arrangement/Agreement on Textiles and Clothing (MFA/ATC) regime, restrictions were upheld on many products even after China acceded to the WTO on December 11th, 2001. On January 1st, 2005 the abrupt removal of import quotas lead to the entry of a large number of firms in the then 25 EU countries, the US and Canada.[19] Figure 2 shows the average number of exporters into these markets across all restricted HS-6 products. While around 100 to 150 firms had been exporting a restricted MFA product while the import restrictions were still upheld, this number jumped to more

[18] In Section 2 we assumed single-product firms. Hence, in our baseline regressions we treat every product as being exported by an independent, individual firm. We relax this assumption in Section 6 by taking into account within-firm across-product correlation in profitability in new export destination markets. For a more detailed description of the data set used, see Manova and Zhang (2009).

[19] See Brambilla et al. (2010) and Khandelwal et al. (2011).

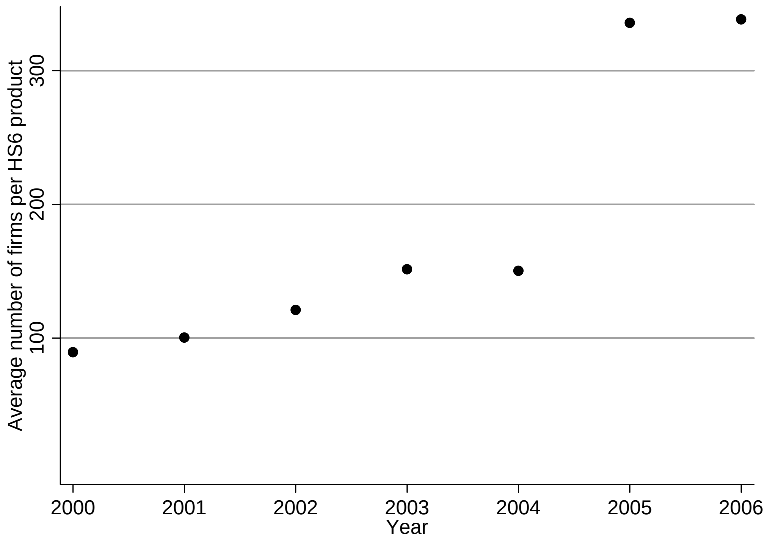
than 300 in 2005. This massive entry of new firms in a set of potential new destinations gives us a quasi-natural experiment which allows us to focus our attention on the choice of new destinations given an exogenous timing of entry. Our identification strategy relies on old exporters which never had a chance to obtain a quota license from their government, and could not enter these destinations despite large potential profits.

The exogenous timing of entry is ensured because the EU countries, the US and Canada had product-specific safeguard mechanisms which were not phased out until 2008. The possible use of these safeguard measures was extremely likely and it was unclear which products would be affected. The expectation of the re-introduction of a new quota system after 2005 largely limited the firms' planning horizon for a gradual geographical expansion into new export destinations. This limits the possibility to save sunk entry costs by delaying entry which is the driving force in the export dynamics literature. Figure 2 also reveals that the average number of exporters across products did not increase in 2006 so that there is no evidence of a gradual entry of firms on average. This can be explained by the new and transitional license system for textile exports that has been reintroduced in 2005 by the Chinese government. The intention was to limit the growth of Chinese exports of MFA products for the years 2006 to 2008. Looking back, the restrictions imposed in 2005 were largely ineffective. However, the new restrictions clearly had an impact on the growth of Chinese textile exports for 2006 to 2008.[20]

Our firm-level data allow us to identify new entrants into the European, US and Canada markets for product categories where import quotas effectively prevented entry from non-licensed firms.

First, we identify the restricted MFA products listed by the annex of the

[20] China and the EU agreed in June 2005 to re-impose quotas on some products. Despite the implementation of a new license system China did not restrict the number of the licenses nor the volume of exports. As a reaction, EU retailers ordered colossal amounts of Chinese textile products before the quota implementation. Only two months after the signing of this agreement import quotas were exhausted and 80 million items of textile and clothing products were stuck in European ports. A diplomatic solution was reached at the beginning of September 2005 putting an end to a situation the UK press called the "Bra Wars". The new agreement included more product categories and also relaxed the 2005 quota limits. It was decided to use the 2005 quota surplus to calculate the 2006 quotas. In November 2005, the US also imposed restrictions on many products. These new restrictions were set in place for the years 2006 to 2008.



Notes: Yearly average number of firms exporting to one EU country, the US or Canada for HS 6-digit products for which the quota fill rate was higher than 90 percent.

Figure 2: Average number of exporting firms to one EU country, the US or Canada per restricted MFA 6-digit product

WTO protocol. However, the quota restrictions vary largely across products. Hence, for each HS 6-digit product we calculate fill rates, i.e. total exports over the quota limit. Following Evans and Harrigan (2005), we define a quota to be binding if the fill rate is higher than 90 percent. In addition, we observe different degrees of restrictiveness in the EU countries, the US and Canada for different products. For instance, a product may have a fill rate higher than 90 percent in the US or in Canada without necessarily being bounded in the EU countries. To solve this issue, we calculate different fill rates for each product in each of the three distinct customs areas.[21]

Second, using the firm-level customs data we identify firms which had an export license for a restricted MFA product. For each HS 6-digit textile and clothing product we track each firm over the period 2000 to 2004 and identify if it has been able to export the product in any of the countries for which the fill rate was higher than 90 percent. By this we can identify firms

[21]In the case of Canada, we use the US fill rate. Historical fill rates for Canada are no longer available from Foreign Affairs International Trade Canada (personal communication with Chris Brock from FAITC).

which have never been able to export a restricted MFA product into the EU countries, the US or Canada.

Our dependent variable corresponds to the export destination choice of a restricted MFA product by a firm which did not export this product in any of the restricted countries during the years 2000 to 2004. As the degree of restrictiveness in the EU countries, the US and Canada may vary across products, the number of potential new export destinations is product specific. Overall, our sample is composed of 13,676 firms which are exporting one of their products in at least one new export destination in a set of 2, 25 or 27 possible new export destinations (25 EU countries, the US and Canada) during the year 2005.

4.2 Construction of the contiguity measures

To construct our contiguity measures, $N_{ij,t-1}$ i.e., the number of prior contiguous export destinations, we make use of export decisions made by the firm for a HS-6 digit product during the years 2000 and 2001. As the set of the previous export destinations are firm-product-specific, so are the contiguity variables. Using a four year lag between our dependent and our explanatory variables, we arguably render our explanatory variables exogenous to the choice of destinations made in 2005. In principle, there still could be some firm-product-destination learning mechanism which induces an anticipation effect that could influence our results. However, as the end of the quota restrictions was part of the WTO protocol signed at the very end of 2001, a forward-looking firm would have had to anticipate the entry of China into the WTO in the first place, which was a precondition for the removal of the MFA/ATC quotas. The entry of China into the WTO was uncertain, even at the end of the negotiation process (see Gertler, 2002, for a summary of the negotiation process and Liang, 2002, for an in-depth description). In addition, the end of the restrictions on MFA products in 2005 was conditional on China's progress in removing its own trade barriers. The firm would have had to anticipate that too. Adding the difficulty to anticipate the quota removal due to the possible use of safeguard systems, we believe that the export decisions made by firms before January 1st, 2002 are exogenous to the destination choice made in 2005.

As stressed above, the firm's profitability will be correlated not only in markets which are geographically proximate to its previous export destinations but also in markets which share some other form of closeness, be it because they share the same language, a common colonizer or other forms of a shared colonial past. Therefore, our concept of the spatial dimension is completely general and can refer to geographic as well as cultural cross-country correlation in profit shifters. In our model, we can gauge the relative importance of these different channels by adding different contiguity matrices:

$$\mathbf{S}_{it} \equiv \begin{bmatrix} s_{i1t} \\ \vdots \\ s_{ijt} \\ \vdots \\ s_{iJt} \end{bmatrix} = \rho_1 \mathbf{W}^{distancearea} \mathbf{y}_{i,t-1} + \rho_2 \mathbf{W}^{colony} \mathbf{y}_{i,t-1} + \cdots + \boldsymbol{\nu}_{it}. \quad (8)$$

This then implies the following empirical specification:

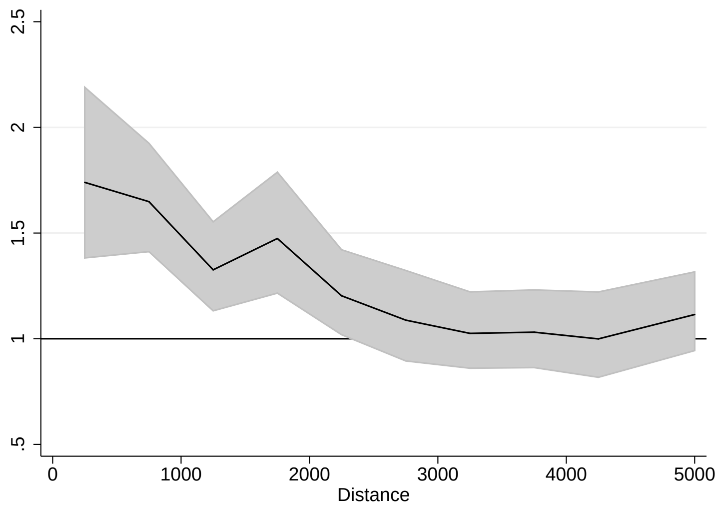
$$\ln(\pi_{ijt} + f_{ijt}) = \rho_1 N_{ij,t-1}^{distancearea} + \rho_2 N_{ij,t-1}^{colony} + \cdots + \tilde{\theta}_j + \tilde{\theta}_i + \nu_{ijt}. \quad (9)$$

$N_{ij,t-1}^{distancearea}$ characterizes the countries' geographical relationship to prior export destinations of the firm. It is defined as the number of prior export destinations for a firm-product couple whose capital city is less than 1,500 kilometers away from the capital city of the destination under consideration. We can also proxy for the geographical links between countries using a common border and a common continent dummy variable, which then capture the number of prior export destinations of a firm-product with a common land-border and within a common continent with each new possible export destination, respectively.

In addition to the contiguity matrices based on geography, we also consider cultural closeness measures such as common language and common colony between export destinations. Specifically, we include the number of all destinations to which a firm exported a specific product in previous periods with colonial ties with the newly considered possible export destination. Analogously, we construct a variable indicating the number of countries to which a firm exported a specific product and which share a common language with the potential new export destination in 2005. Finally, we include, as an additional contiguity measure, the impact of the number of export destinations which are in the same income group as a given destination (common income group). A detailed description of the variables and summary statistics for all variables can be found in the appendix.

5 Discussion of baseline results

Table 1 reports estimates of the conditional logit allowing for simultaneous exports to multiple destinations. Specifications (I) to (VII) give the estimated odds ratios for the choice between all possible new additional export destinations. We use standard errors clustered at the firm level for all our regressions. Looking at specification (I), the variable distance area controls for prior exports in countries located within a 1,500 kilometer radius around the capital of the chosen destination. The odds ratio of 1.346 implies an average increase of 34.6 percent in the probability of choosing a new export destination when we increase the number of prior export destinations which are in a 1,500 kilometers distance area ($N_{ij,t-1}^{distancearea}$) by one. Analogously, specification (II) implies that if we increase the number of contiguous export destinations that share a common border by 1, the probability of choosing a new destination increases on average by 38.2 percent (odds ratio of 1.382). In both cases, the estimated coefficient is significant on the 1 percent level. We run separate regressions where we construct the number of contiguous countries by various contiguity measures, i.e. when export countries are located on the same continent (specification III), share the same official language (specification IV), are in the same income group (specification V), or have common colonial ties (specification VI). Across all specifications, contiguity plays a significant role in firms' export location choice. In column (VII), we include all different contiguity measures at the same time to gauge the relative importance of the different measures. The size of some of the odds ratios decreases but all regressors are significant at least at the 5 percent level except the common border contiguity. As all the countries with a common border with a potential new destination are also located within a 1,500 kilometer radius, the common border variable presented in specification (VII) must be interpreted as the additional effect generated by a land border. The additional effect appears to be negligible. The distance measures and income groups of contiguity turn out to increase the odds ratio of choosing a country the most, with both increasing the probability by more than 25 percent.



Notes: The black solid line gives the estimated odds ratios from a conditional logit which includes as regressors the number of contiguous previous export destinations within 500 kilometers wide distance bands from 0 to 5,000 kilometers. The sample used is the same as in Table 1. The gray area denotes the 95 percent-significance band using clustered standard errors at the firm level.

Figure 3: Different distance bands ranging from 0 to 5,000 kilometers in 500 kilometers steps.

Of course, the 1,500 kilometers band used to estimate the impact of the number of previous export destinations in the same distance area is arbitrary. Therefore, we introduce simultaneously several distance area variables with different distance bands. Following this approach, Figure 3 reports the odds ratios of a single regression with country fixed-effects and with different distance bands ranging from 0 to 5,000 kilometers, in 500 kilometers steps. As expected, the odds ratio decreases with rising distance and dies out at more than 2,500 kilometers between capitals of export destinations.

Table 1: Conditional logit with country fixed effects. Baseline results

	Dependent Variable: Choice of new export destinations in 2005						
Specification	I	II	III	IV	V	VI	VII
$N_{ij,t-1}$ defined acording to…							
distance area	1.346^a						1.261^a
	(3.25)						(3.13)
common border		1.382^a					1.138
		(5.58)					(1.35)
common continent			1.337^a				1.193^b
			(4.33)				(2.32)
common income group				1.312^a			1.276^a
				(5.58)			(5.03)
common language					1.149^a		1.076^b
					(4.42)		(2.04)
common colony						1.207^a	1.139^a
						(6.45)	(3.90)
# of observations	1,304,363	1,304,363	1,304,363	1304363	1,304,363	1,304,363	1,304,363
# of firms	13,639	13,639	13,639	13,639	13,639	13,639	13,639
Log-Likelihood	-143,242	-143,224	-143,230	-143,219	-143,225	-143,211	-143,147
R^2	0.309	0.309	0.309	0.309	0.309	0.309	0.309

Notes: Odds ratios of conditional logit; robust z-statistics of the estimated coefficients in brackets using clustered standard errors at the firm-level. All regressions include country fixed effects. A detailed description of our sample is provided in Section 4. ^{a}: significant at 1 percent, ^{b}: significant at 5 percent, ^{c}: significant at 10 percent.

6 Multi-product firms

Until now our analysis treated all exports as single-product firm exports, i.e. we only considered an export destination as contiguous if the firm exported the very same HS-6 digit product to a contiguous market previously. In essence, we treated every product as if it were produced by a single product firm. It is well known that a substantial fraction of firms produce and export multiple products, and that multi-product firms make up for the majority of sales in a given industry, see Bernard et al. (2010) and Arkolakis and Muendler (2010). In our sample, 67% of firms export in more than one HS-6 product category. If there exists within-firm correlation of profitability across destination markets, then a firm can infer its profitability in a new market from its previously served export markets even though the firm sold different products in these markets.

There are both supply and demand side reasons which can explain across-product correlation in profitability. When costs for product adaptation are lower for other products within a firm once they have been incurred for a specific market and product, the additional cost of adapting the product for a similar market may be lower. In addition, when a firm sells its products under a single brand in order to benefit from brand loyalty of consumers, successful exports in one product category provide information about likely profitable exports across the whole product mix of a firm's brand.

We can easily extend our model to add the possibility of within firm correlation of export market profitability across different product categories. Specifically, we extend our contiguity matrix $\mathbf{W}$ to the dimension $(J \times LK)$ where K can either be the restricted product i or any other textile and clothing products including non-MFA products. The destination choice for the firm-specific product i is now not only affected by previous contiguous export destinations for product i but possibly also by all other products i'

sold by the same firm. Hence the profit shifter can be generalized to read:

$$\mathbf{S}_{it} \equiv \begin{bmatrix} s_{i1t} \\ \vdots \\ s_{ijt} \\ \vdots \\ s_{iJt} \end{bmatrix} = \rho_1 \mathbf{W}^{sameproduct}\mathbf{y}_{i,t-1} + \rho_2 \mathbf{W}^{otherproducts}\mathbf{y}_{i',t-1} + \boldsymbol{\nu}_{it}. \quad (10)$$

The empirical specification modifies to:

$$\ln(\pi_{ijt} + f_{ijt}) = \rho_1 N^{sameproduct}_{ij,t-1} + \rho_2 N^{otherproducts}_{ij,t-1} + \tilde{\theta}_j + \tilde{\theta}_i + \nu_{ijt}, \quad (11)$$

where $N^{sameproduct}_{ij,t-1}$ is the number of contiguous export destinations where the firm has exported product i before and $N^{otherproducts}_{ij,t-1}$ is the number of contiguous export destinations where the firm has previously exported products from other HS-6 digit categories during the year 2000-2001, including non-MFA products. A potential concern for our identification strategy is that multi-product firms which are constrained by the MFA/ATC quotas may also export products which do not fall under the import quotas. Hence these firms may already be present in European, US, and Canadian markets, and our results would pick up the effects of the mere presence of firms in these markets. We therefore only consider new export destinations where a multi-product firm did not sell any of its products previously.

In Table 2, we present the results for the multi-product specification. Overall we find that expected export profitabilities of a firm in contiguous countries are correlated across the firm's products but to a lesser extent than for exports in the same product category. Looking at specification (I) for distance area, we find that the probability of choosing a country increases by 39.7 percent when the number of contiguous countries where the firm previously exported the same HS-6 product increases by one, whereas if it exported other HS-6 products the probability is increased by 2.9 percent only. Similar conclusions hold for common border and common continent. Note that the odds ratios turn out to be close to one for other products in the specifications with common income group, common language and

Table 2: Conditional logit with country fixed effects. Multi-product firms

Specification		Dependent Variable: Choice of new export destinations in 2005						
		I	II	III	IV	V	VI	VII
$N_{ij,t-1}$ defined according to...								
distance area	$N_{ij,t-1}^{sameproduct}$	1.397^a						1.314^a
		(5.35)						(3.93)
	$N_{ij,t-1}^{otherproducts}$	1.029^a						1.018^c
		(3.54)						(1.52)
common border	$N_{ij,t-1}^{sameproduct}$		1.296^b					0.964
			(2.43)					(-0.33)
	$N_{ij,t-1}^{otherproducts}$		1.027^c					0.998
			(1.91)					(0.10)
common continent	$N_{ij,t-1}^{sameproduct}$			1.292^a				1.220^a
				(3.56)				(2.68)
	$N_{ij,t-1}^{otherproducts}$			1.045^a				1.040^a
				(4.73)				(3.37)
common income group	$N_{ij,t-1}^{sameproduct}$				1.432^a			1.377^a
					(5.92)			(5.35)
	$N_{ij,t-1}^{otherproducts}$				0.988^c			0.993
					(-1.78)			(-1.08)
common language	$N_{ij,t-1}^{sameproduct}$					1.206^a		1.067
						(4.71)		(1.50)
	$N_{ij,t-1}^{otherproducts}$					0.981^a		1.004
						(-2.84)		(0.51)
common colony	$N_{ij,t-1}^{sameproduct}$						1.305^a	1.222^a
							(6.70)	(4.69)
	$N_{ij,t-1}^{otherproducts}$						0.981^a	0.984^b
							(-3.13)	(-2.35)
# of observations		1,205,011	1,205,011	1,205,011	1,205,011	1,205,011	1,205,011	1,205,011
# of firms		13,608	13,608	13,608	13,608	13,608	13,608	13,608
Log-Likelihood		-130,769	-130,800	-130,765	-130,778	-130,784	-130,767	-130,672
R^2		0.314	0.314	0.314	0.314	0.314	0.314	0.315

Notes: Odds ratios of conditional logit; robust z-statistics of the estimated coefficients in brackets using clustered standard errors at the firm-level. All regressions include country fixed effects. A detailed description of our sample is provided in Section 4. ^{a}: significant at 1 percent, ^{b}: significant at 5 percent, ^{c}: significant at 10 percent.

common colonizer. In specification (VII), when adding all the explanatory variables together, the effects of prior exports but in a different product even became non-significant for all cases but common continent and common colony. To sum up, in contrast to within-firm-product correlation within-firm correlation of profitability across destination markets is much lower and statistically often not highly significant. This may hint at only small economies of scope for multi-product firms when entering new export markets with several products.

7 Successful entries and failures

We can extend our theoretical framework to distinguish between the impact of past successful entries and failures into export markets on new destination choices. A successful entry into a foreign market implies that a firm continues to export its product after its entry period. A failure corresponds to an entry followed by no export for this product during the following years. Accordingly, we define the indicator variables $\mathbf{y}^s_{i,t-1}$ for success and $\mathbf{y}^f_{i,t-1}$ for failure. Note that $\mathbf{y}_{i,t-1} = \mathbf{y}^s_{i,t-1} + \mathbf{y}^f_{i,t-1}$. We can then define a vector of profit shifters which indicate contiguity to export destinations with successful entries and failures respectively as

$$\mathbf{S}_{it} \equiv \begin{bmatrix} s_{i1t} \\ \vdots \\ s_{ijt} \\ \vdots \\ s_{iJt} \end{bmatrix} = \rho_s \mathbf{W}\mathbf{y}^s_{i,t-1} + \rho_f \mathbf{W}\mathbf{y}^f_{i,t-1} + \boldsymbol{\nu}_{it}, \tag{12}$$

where $\mathbf{W}$ can be any weighting matrix used above.

Two different mechanisms are plausible candidates in determining the sign of the coefficients ρ_s and ρ_f. A first mechanism relies on the uncertainty of firms' profitability across markets. Albornoz et al. (2010) and Nguyen (forthcoming) assume that demand patterns are correlated across countries. Following that assumption, a firm can infer about the profitability of its product in proximate markets from its previous exports. A failure in one market due to unexpectedly low profitability may signal that the product of this firm is likely not to be profitable in other similar markets. Then, a failure in a proximate market will lead to a decrease in the probability of entering a specific contiguous destination. We expect exactly the opposite in the case of a successful entry.

A second mechanism relies on the necessity for a firm to adapt its product when entering a new export market. Morales et al. (2011) assume that these adaptation costs are largely reduced if the firm already has entered markets which are relatively similar. Even if a firm realizes that a product may not be sold profitably in one market, and therefore decides to exit subsequently, it has already sunk the investment in adapting the product. Such a mechanism would thereby increase the probability of entering contiguous countries independently of the success or the failure of this specific entry.

In order to quantify the relative importance of these mechanisms, we report the estimates of the following specification in Table 3:

$$\ln(\pi_{ijt} + f_{ijt}) = \rho_s N^{success}_{ij,t-1} + \rho_f N^{failure}_{ij,t-1} + \tilde{\theta}_j + \tilde{\theta}_i + \nu_{ijt}. \qquad (13)$$

We define a success if we observe export transactions for a HS-6 digit product to a destination j at least once in 2000 and 2001 and another time between 2002 and 2004. A failure corresponds to an export transaction in 2000-2001 and no export reported for this product-destination during the year 2002-2004. In column (I), we use the distance area variable and find that the probability of entering a specific market increases by 67.5 percent when the number of successful exports in previous contiguous export destinations increases by 1 (odds ratio of 1.675). The estimate is significant at the 1 percent level. At the same time, even an additional failure in a contiguous market increases the odds of entering a specific market by 26 percent (odds ratio 1.26). A positive and significant impact of the number of failures suggests that the 'adaptation cost' mechanism described above is playing a role in the choice of new destinations. We estimate the same model but use different contiguity measures to construct the number of successes and failures, respectively, in columns (II) to (VI). For all other measures, additional previous successful entries in a proximate market increase the odds of en-

Table 3: Conditional logit with country fixed effects. Successful entries and failures

		Dependent Variable: Choice of new export destinations in 2005						
Specification		I	II	III	IV	V	VI	VII
$N_{ij,t-1}$ defined according to...								
distance area	$N^{success}_{ij,t-1}$	1.675^a						1.358^a
		(5.58)						(2.80)
	$N^{failure}_{ij,t-1}$	1.260^a						1.320^a
		(3.40)						(3.49)
common border	$N^{success}_{ij,t-1}$		1.908^a					1.262
			(4.24)					(1.31)
	$N^{failure}_{ij,t-1}$		1.028					0.846
			(0.23)					(-1.30)
common continent	$N^{success}_{ij,t-1}$			1.715^a				1.529^a
				(4.60)				(3.53)
	$N^{failure}_{ij,t-1}$			1.167^b				1.112
				(2.01)				(1.32)
common income group	$N^{success}_{ij,t-1}$				1.467^a			1.406^a
					(5.97)			(5.35)
	$N^{failure}_{ij,t-1}$				1.029			1.016
					(0.39)			(0.21)
common language	$N^{success}_{ij,t-1}$					1.276^a		1.142^a
						(5.67)		(2.76)
	$N^{failure}_{ij,t-1}$					0.966		0.953
						(-0.73)		(-0.80)
common colony	$N^{success}_{ij,t-1}$						1.350^a	1.218^a
							(6.76)	(4.00)
	$N^{failure}_{ij,t-1}$						1.034	1.073
							(0.73)	(1.17)
# of observations		1,304,363	1,304,363	1,304,363	1,304,363	1,304,363	1,304,363	1,304,363
# of firms		13,639	13,639	13,639	13,639	13,639	13,639	13,639
Log-Likelihood		-143,219	-143,234	-143,223	-143,211	-143,210	-143,200	-143,109
R^2		0.309	0.309	0.309	0.309	0.309	0.309	0.310

Notes: Odds ratios of conditional logit; robust z-statistics of the estimated coefficients in brackets using clustered standard errors at the firm-level. All regressions include country fixed effects. A detailed description of our sample is provided in Section 4. ^{a}: significant at 1 percent, ^{b}: significant at 5 percent, ^{c}: significant at 10 percent.

tering an export market by far more than previous failures. Odds ratios are substantially higher than in Table 1. In some specifications, like for common border, common income group and common language, the failures are not significant. In column (VII), we include all different contiguity measures in one regression. Again, estimated odds ratios decline. It turns out that an additional success in a proximate market increases the odds of serving a specific destination for all different contiguity measures. Being located on the same continent has the highest impact with an increase of the odds ratio by 52.9 percent. Interestingly, none of the failure variables except for distance area is significant. As we do not find a negative coefficient for failures and successes have a positive impact on the probability to enter, our results hint at the relative importance of the adaption cost mechanism.

8 Robustness checks

We now discuss several effects that could influence our results and which are unrelated to the cross-country correlation in export profitability we put forward in the preceding sections. Specifically, we investigate the impact of knowledge acquired through previous imports on the export destination choice, the role of direct transactions, trading agents, state-owned firms, foreign-owned firms and processing trade. Regression results pertaining to these robustness checks can be found in Table 4.

Import destinations: In addition to learning from its previous export experience, a firm may also gather useful information from its intermediate input suppliers from abroad. We therefore construct $N_{ij,t-1}^{import}$ defined as the number of contiguous previous import destinations and include it as an additional regressor. As imports were not restricted, firms may have imported products from export-restricted countries. Hence, we drop from our set of potential new destinations all the countries with prior imports by the firm. As can be seen from column (I) in Table 4, contiguity between export destinations still has a significant positive impact on a firm's exporting decision even when controlling for the impact of previous import destinations.[22]

[22]We do not report the coefficients associated with prior imports.

Table 4: Conditional logit with country fixed effects. Robustness checks

Specification	Dependent Variable: Choice of new export destinations in 2005					
	I	II	III	IV	V	VI
	controlling for imports	only direct transactions	drop trading agents	drop state owned firms	drop foreign owned firms	drop processing trade firms
$N_{ij,t-1}$ defined according to...						
distance area	1.305^a	1.257^a	1.568^a	1.548^a	1.306^a	1.232^a
	(4.18)	(2.99)	(3.62)	(3.45)	(4.26)	(2.75)
common border	1.016	1.103	0.918	1.038	0.934	0.845
	(0.15)	(0.98)	(-0.53)	(0.21)	(-0.68)	(-1.33)
common continent	1.270^a	1.175^b	1.100	1.294^b	1.220^a	1.383^a
	(3.40)	(2.05)	(0.80)	(2.10)	(2.98)	(3.79)
common income group	1.277^a	1.116^b	1.406^a	1.478^a	1.227^a	1.158^b
	(4.79)	(1.96)	(4.38)	(4.82)	(4.23)	(2.39)
common language	1.000	1.010	1.096^c	1.131^b	1.049	0.953
	(0.01)	(0.27)	(1.69)	(2.24)	(1.25)	(-0.95)
common colony	1.167^a	1.118^a	1.205^a	1.225^a	1.146^a	1.174^a
	(4.32)	(3.16)	(3.40)	(3.82)	(3.90)	(3.48)
# of observations	1,241,429	1,170,594	824,407	1,018,646	1,096,558	921,666
# of firms	13,394	12,670	9,763	11,560	11,320	10,625
Log-Likelihood	-135,561	-126,712	-86,911	-108,818	-120,447	-99,910
R^2	0.311	0.302	0.334	0.324	0.300	0.293

Notes: Odds ratios of conditional logit; robust z-statistics of the estimated coefficients in brackets using clustered standard errors at the firm-level. All regressions include country fixed effects. A detailed description of our original sample is provided in Section 4. ^{a}: significant at 1 percent, ^{b}: significant at 5 percent, ^{c}: significant at 10 percent.

Direct transactions: A lot of exports are processed via a transfer country. For example, lots of Chinese exports enter EU countries via Rotterdam harbor in the Netherlands. In principle, this would work against finding a spatial pattern in exports as contiguity should then only matter for previous exporting destinations and the Netherlands. This would greatly reduce the variation in our explanatory variables. Nevertheless, we exclude all transactions for which a firm uses a transfer country to export its products as a robustness check. As can be seen from column (II) in Table 4, considering only direct transactions hardly effects our results.

Trading agents: The raw data contains a number of trading agents ("intermediary firms") which mediate trade for other firms but do not directly engage in production. Inclusion of these firms could cause problems as their behavior is probably very different from that of production firms which are the objects of this study. For example, agents could rely on knowledge across a wide range of products and markets they acquire through their established business networks which they can pass on to their clients. To exclude the possibility that our results are driven by these trading agent business networks, we exclude trading firms which are identified by certain keywords in their names. Ahn et al. (2010) use the Chinese characters for "importer", "exporter", and "trading" to identify "intermediary firms". By contrast, we follow Bernhofen et al. (2011) and use a more comprehensive list of keywords which are typically used by various kinds of trading agents in China. These trading companies represent about 35 percent of our observations. Column (III) in Table 4 shows that dropping trading agents does not change our conclusions.

State-owned firms: Our identification strategy relies on the assumption that it was very uncertain for firms whether they would obtain a license to enter the EU countries, the US or Canada. As argued by Khandelwal et al. (2011), state-owned firms seem to have been more likely to obtain a license. Hence, the exogeneity of the timing of entry could be questioned for these firms as their higher probability of obtaining a license may have induced them to enter export markets gradually. We therefore re-run our regressions excluding state-owned firms. Again, our results shown in column (IV) of

Table 4 hold up excluding state-owned firms.

Foreign-owned firms: We exclude all foreign-owned firms and the processing trade exports as the choice of destinations of Chinese firms could be influenced by the foreign headquarters location or by the location of other foreign direct investments realized by the parent company. Results basically remain unchanged, see column (V) in Table 4.

Processing trade: Our data-set allows us to distinguish between processing and ordinary exports. The former refers to exports that are assembled in an export processing zone and use a high share of imported intermediate inputs. Note that foreign owned firms often engage in processing exports but not necessarily so. Processing exports may be special with respect to the export locations choice because they could be influenced by a third foreign party. In addition, Chinese processing trade firms may have less liberty in their export destination choice. Excluding processing trade export transactions leads to around 30 percent fewer transactions. Column (VI) in Table 4 shows that our results are not driven by processing exports.

9 Conclusions

How do firms choose new export destinations? While there are many factors that are important for this decision, one empirical regularity strikes out: Firms tend to choose new export markets that are geographically close and culturally related to their prior export destinations.

We quantify the effect of this spatial pattern using Chinese customs data. In order to focus on the spatial dimension of new export destination choices, we use the quasi-natural experiment of the abrupt end of the quota restrictions on Chinese textile exports to generate an exogenous set of potential new destinations (25 EU countries, the US and Canada). Our research design also provides us with an exogenous timing of entry. This allows us to study the choice of destinations without considering the impact of the timing of entry.

Our baseline results show that the probability to export to a country increases by 15 to 38 percent for each prior export destination with a geographical or cultural link with this country. We control for country-product and destination specific effects and account for possible multiple new export destinations. Our results are robust to considering multi-product firms, successful entry only, imports of exporting firms, the role of direct transactions, trading agents, state-owned firms, foreign-owned firms and processing trade.

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Appendices

A.1 Dependent variable

Our dependent variable reports firms exporting a product to at least one new destination during the year 2005. In Table 5, we aggregate our dependent variable at the firm-product level and count the number of new destinations. 22.16 percent of the firm-product couples report only one new destination, while 19.06 percent report 10 or more new destinations.

Table 5: Number of new export destinations per product-firm couple

# of new destinations per product-firm couple	Freq.	Percent	Cum.
1	12,400	22.16	22.16
2	7,558	13.51	35.67
3	5,697	10.18	45.85
4	4,688	8.38	54.23
5	3,810	6.81	61.04
6	3,336	5.96	67.00
7	2,863	5.12	72.12
8	2,432	4.35	76.47
9	1,998	3.57	80.04
10 and more	11,168	19.06	100.00

Notes: Table gives the number of new export destinations in 2005. A detailed description of our sample is provided in Section 4.

A.2 Explanatory variables

We construct different contiguity matrices **W** using distance area, common border, common continent, common language and common colony contiguity indicators from data provided by CEPII, see Head et al. (2010) and www.cepii.fr/anglaisgraph/bdd/distances.htm.

For the different contiguity measures, w_{jl}, a typical element of **W**, is defined as follows:

Distance area: $w_{jl} = 1$ if the bilateral distance between a pair of countries is less than 1,500 kilometers. Bilateral distance is calculated as the great circle distance between capital cities which uses latitudes and longitudes of the respective city of each country.

Common border: $w_{jl} = 1$ if two countries share a land border and 0 otherwise.

Common continent: $w_{jl} = 1$ if two countries belong to the same continent and 0 otherwise.
Common language: $w_{jl} = 1$ if two countries share a official language, and 0 otherwise.
Common colony: $w_{jl} = 1$ if two countries share a direct or indirect colonial tie, i.e. have or have had a common colonizer or a colonial relationship and 0 otherwise.
Common income group: $w_{jl} = 1$ if two countries are in the same income group. The 4 different categories (very low income, low income, medium income, high income) follow the World Bank's 2006 World Development Indicators (WDI) classification.

A.3 Descriptive statistics

Table 6: Descriptive statistics of dependent and explanatory variables

	Obs	Mean	Std. Dev.	Min	Max
dependent variable	1,304,363	0.059	0.236	0	1
distance area	1,304,363	0.016	0.165	0	9
common border	1,304,363	0.003	0.058	0	4
common continent	1,304,363	0.023	0.213	0	8
common income group	1,304,363	0.142	0.544	0	11
common language	1,304,363	0.021	0.192	0	11
common colony	1,304,363	0.014	0.158	0	13

Notes: Table gives descriptive statistics of the dependent and the explanatory variables used in our empirical analysis. A detailed description of our sample is provided in Section 4.