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Maria Bas, Pamela Bombarda

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Chinese Trade Reforms, Market Access and Foreign Competition: the Patterns of French Exporters *

Maria Bas Pamela Bombarda †

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Abstract

A unilateral trade reform has two opposite effects on firms' export patterns: (i) expansion of export opportunities for foreign firms exporting to that destination and (ii) intensification of foreign competition in the liberalized market. The main contribution of this paper is to investigate the trade-off between market access growth and the strengthening of competitive pressures. Using French firm-product-destination data, we explore how the margins of French exports react to an exogenous variation in Chinese import tariff cuts relative to tariff changes in other Asian destinations. Our findings suggest that over the period 1999-2005 the average 7 percentage points decline in Chinese tariffs results in an increase of French firms' exported products by almost 6 log points and an expansion of export sales by 14 log points more than with respect to the other Asian countries. These results are robust when accounting for foreign competition of third countries faced by French firms in the liberalized market.

Keywords: unilateral trade liberalization, market access, foreign competition, export margins and firm level data.

JEL Classification: F12, F13, L11.

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†CEPII (Centre d'Etudes Prospectives et d'Informations Internationales) and Université de Cergy-Pontoise and THEMA. Tel: +33 1 53 68 55 77. FAX: +33 1 53 68 55 01. E-mail: maria.bas@cepii.fr and pamela.bombarda@u-cergy.fr. Postal address: 113, rue de Grenelle, 75007 Paris, France.

1 Introduction

Unilateral trade liberalization is at the core of economic reform packages implemented in several emerging economies in the last decades.¹ Microeconomic effects of trade reform episodes have received a lot of attention recently. Empirical works have concentrated on how trade openness shapes firms' productivity (Pavcnik (2002), Trefler (2004), Amiti and Konings(2007), Lileeva and Trefler (2010) and Bas and Ledezma (2010) among others). Bernard et al.(2010), using firm-product level data, also show that trade liberalization affects multiproduct firms' export patterns.² However, there is scarce evidence on the different mechanisms through which unilateral trade liberalization in a country affects the export performance of firms located in other countries.

This paper sheds new light on intra-firm adjustments due to trade integration combining the unilateral trade liberalization process experienced by China at the end of the 90s with firm-product-destination data for French firms (1999-2005). After a unilateral trade reform, two opposite forces are at stake: market access expansion and strengthening of competitive pressures in the liberalized market. The main contribution of this paper to the literature is to investigate this trade-off. On the one hand, tariff reductions increase foreign demand and induce firms to export more products. We expect French firms exporting to multiple destinations to expand the amount of products exported to the liberalized markets. On the other hand, we also expect an intensification of foreign competition in each market. This channel is related to the tougher competition of third countries in the liberalized market that might affect negatively the expansion of French exports to that destination.³

¹Baldwin (2011) proposes a political economy study which disentangles the theoretical mechanisms through which a unilateral liberalization affects developing countries.

²Berthou and Fontagné (2009) also explore how firms adjust their product mix and exported value as a consequence of a reduction of trade costs.

³Using Belgian firm-level data, Mion G. et al. (2010) study the effect of foreign competition from China and other low-wage countries on Belgium firm performance. Their findings suggest that foreign competition and outsourcing to China reduce firm employment growth and induce skill upgrading.

Addressing the trade-off between market access expansion and tougher competition, we can evaluate French firms' export strategies in the event of a unilateral trade liberalization.⁴ We give specific attention to the France-China trade relationship so to account for the role of China in the global trading system and its trade policy commitment. Using French micro-level data, our empirical strategy consists in investigating how French firms' product scope and export sales changed as a consequence of China's largest tariff liberalization vis-à-vis Asian trade liberalization. We focus on a sample of Asian countries as a group of comparison. This sample represents a homogeneous group of countries in terms of trade integration and geographical proximity.

To capture the effect of market access expansion, we rely on changes in applied tariffs at HS6 level from TRAINS. To relate these tariff measures to the firm level dimension, we construct the average tariff faced by each firm by taking the simple average of tariff over all the HS6 products exported by a firm to a country in a given year. Since we are interested in unilateral trade liberalization episode, we use the Most Favorite Nation (henceforth MFN) applied tariffs set by each Asian country to the rest of the world. To enter the WTO, each country sets the same tariff cuts with respect to all countries according to a multilateral negotiation. For this reason, it is unlikely that French firms have influenced tariff cuts negotiations. Therefore, these tariff measures allow us to exploit an exogenous variation of tariff across firm-country pairs. To account for the intensification of competition faced by each firm in the liberalized markets, we need to use a proxy of foreign competition at the firm-country level. This proxy is the inverse of the Herfindahl index constructed using data of imports at the HS6 product level by country of origin. We construct a concentration index in terms of the number of countries from which each HS6 product is imported by each Asian country. The average of the Herfindahl index at the firm level is computed by matching the index defined

⁴Our sample includes: China, India, Indonesia, Korea, Japan, Philippines and Singapore.

at the product, country and year with French firms' exports dataset.

Our results present novel insights on product turnover associated to trade reforms. Our findings indicate that: the expansion of French exported products and sales to China after tariff cuts is stronger relative to other Asian destinations. All the specifications suggest that the increase in foreign competition in the liberalized market has a negative effect on the number and the value of products exported by French firms to the Asian countries. Once we account for foreign competition in the liberalized market, our estimates indicate that the 3 percentage points decline in the average MFN tariff for all Asian countries in our sample is associated with more than 1 log point expansion in the average firm export product scope to Asia. These results also hold for firms' export sales: the average Asian tariff cuts lead to an increase of the intensive margin of about 4 log points. Focusing on the effect of Chinese liberalization reveals that the average Chinese tariff cuts is associated to a larger expansion in the number of exported products (6 log points) and in export sales (14 log points) for the average firm when compared to the Asian sample.

We next investigate which are the exported products that firms are expanding the most. We split the sample into intermediate and final good products using the Broad Economic Category (BEC) classification from United Nations. Our findings suggest that Chinese liberalization has no effect on the subsample of firms exporting final goods. Only the Chinese tariff cuts affect the expansion of exports of intermediate goods. This result continues to hold when we control for foreign competition. These findings highlight the relevance of intermediate goods exports to China. This result can further be related to the predominant role of multinational firms. To explore this feature, we split the sample into a multinational firms subsample. Our point estimates imply that a 7 percentage points decline in Chinese MFN tariff increases more than twice the number of exported products by multinational firms located in France relative to other exporting firms. Finally, in order to address the potential reverse

causality issue between Asian tariff changes and French firms export patterns, we carry out robustness checks using an alternative tariff measure at the firm level by taking the average of tariffs over a fixed basket of HS6 products exported by firm in the initial year (1999) to each country. Our findings are robust to this alternative tariff measure.

Our paper contributes to the little but growing body of literature on micro-economic effects of trade liberalization. Recent developments in international trade theory focus on the patterns of multi-product firms and the “within-firm” adjustments to trade liberalization. Mayer et al. (2009) and Bernard et al. (2010) introduce multi-product firms in heterogeneous firms’ models based on the pioneering work of Melitz (2003).⁵ Recent empirical studies using disaggregated data at the firm-product level focus on the impact of trade liberalization on export choices of multi-product firms. Iacovone and Javorcik (2010) study the patterns of the export boom of Mexican firms in 1994-2003. They find a huge product turnover within firms, an expansion of the number of traded products and a growth in the volume of pre-existing products. Baldwin and Gu (2009), by the means of plant-product level data for Canada, show that the Canada-US Free Trade Agreement (CUSFTA) has reduced the product diversification and size of non-exporting Canadian plants. Using also the CUSFTA as a case of bilateral trade liberalization process, Bernard et al. (2010) test their model based on firm-product level data for the US using a difference-in-difference framework. Their findings show that firms concentrate their production in their core competencies (their best selling products) after trade liberalization.⁶ Using French firm-product level data, Berthou and Fontagné (2009) investigate the role of a reduction of trade costs on the product mix of French exporters using the introduction of the euro as a proxy for trade barriers. Dhingra (2009) tests her monopolistic competition model

⁵Multi-product firms’ models include Allanson and Montagna (2005), Baldwin and Gu (2009), Feenstra and Ma (2008), Eckel and Neary (2009), Nocke and Yeaple (2008), Bernard et al. (2009), Mayer et al. (2009), Arkolakis and Mandler (2008) and Dhingra (2009).

⁶They find that firms that experienced larger Canadian tariff cuts (above the median) reduce the number of products they produced for the domestic market relative to firms experiencing below median Canadian tariffs reductions.

of brand differentiation by examining Thai trade liberalization process (2003-2006).⁷ The main contribution of this paper is to disentangle the effects of market access expansion vs. foreign competitive pressures after a unilateral trade liberalization episode in a fast growing developing country like China.

The rest of the paper is organized as follows. Section 2 provides stylized facts about China's trade liberalization and the patterns of French multi-product exporters. Section 3 presents the empirical strategy and Section 4 depicts the econometric evidence based on firm-product-level data for French exporters. Section 5 presents two robustness tests dealing with omitted variable concerns and potential endogeneity issues. Section 6 concludes.

2 A First Glance at the Data

Unilateral trade liberalization took place in several Asian countries in the 1990s. Most of the Asian countries considered in this study entered the WTO in 1995.⁸ The main exception is China that joined the WTO at the end of 2001, but the government launched tariff reductions at the end of the 90s. Between 1999 and 2005, the average MFN tariff applied by China falls 7 percentage points, while the reduction in the average MFN tariff applied by the other Asian countries in our sample is of the order of 3 percentage points.⁹

Comparing to other Asian destinations, Europe is China's largest export market and Europe's largest source of imports. During the 2000s, EU-China trade increased dramatically, doubling between 1999 and 2005. Despite China being one of the most important challenges for EU trade policy, little is known about the behavior of multiproduct firms and the im-

⁷Her findings point out that Thai tariffs cut has a negative effect on process and product innovation among exporters, while it has a positive effect on product innovation of less export-oriented firms.

⁸India, Indonesia, Japan, Korea, Philippines and Singapore.

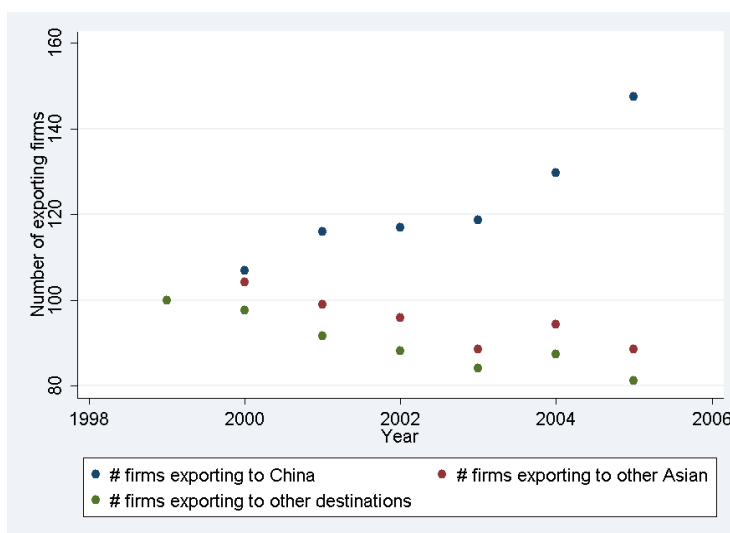
⁹There is a lot of heterogeneity across other Asian destinations. For example, the average MFN tariff applied by Korea, Japan and Singapore is not changing over time, while Indonesia's and Philippines's average tariff falls by 3 percent and India's MFN tariff falls more than 10 percent.

portance of product turnover *vis-à-vis* China’s liberalization. To stress the role of China, this section presents descriptive evidence on the evolution of French extensive and intensive margins after the Chinese unilateral trade reform.

In order to join WTO, from the mid 1990s China has agreed to undertake a series of important commitments to open and liberalize its regime in order to be better integrated into the world economy and offer a more predictable environment for trade and foreign investment in accordance with WTO rules. China gradually eliminated trade barriers and expanded market access to goods from foreign countries from the end of the 90s.¹⁰

Figure 1 plots the average growth of the number of French firms exporting to China, to other Asian destinations and to the rest of the world during 1999-2005.¹¹ As one can easily remark, while the number of French exporting firms’ to China increases 60 percent between 1999 and 2005, the number of exporting firms to other Asian destinations and to the rest of the world decreases almost 20 percent over the same period.

Figure 1: Number of exporting firms (1999=100)



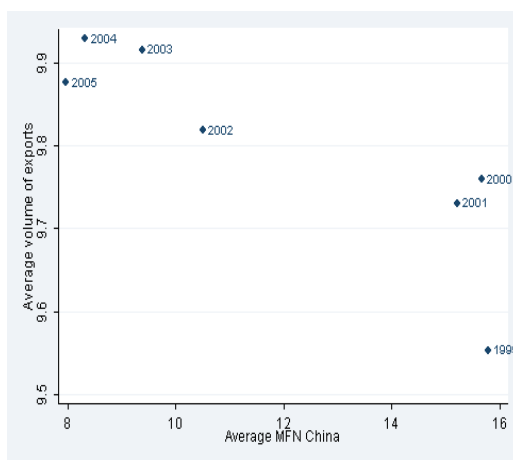
Note: authors calculations based on French customs dataset for 1999-2005, where the base year is 1999.

¹⁰For industrial goods the average bound tariff level will go down to 8.9 percent with a range from 0 to 47 percent.

¹¹Other Asian destinations includes: India, Indonesia, Korea, Japan, Philippines, Singapore. The rest of the world is composed by European Union, North and Latin American destinations.

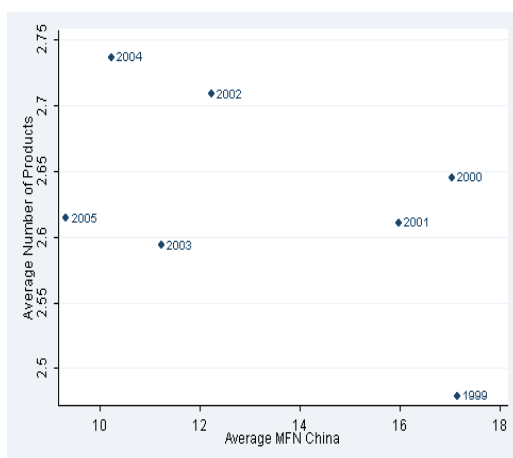
To understand the effect of Chinese trade reforms on the exporting behavior of French firms, Figures 2 and 3 show the relationship between the average number of exported products and export sales to China, on the one hand, and the correspondent Chinese applied MFN tariff, on the other hand. These figures clearly show that as Chinese tariffs were reduced, French firms expanded export sales as well as the number of exported products to this liberalized market over the period.

Figure 2: Evolution of Intensive margin with respect to Chinese tariffs



Note: authors calculations based on French customs dataset for 1999-2005. Chinese MFN tariffs are from TRAINS dataset.

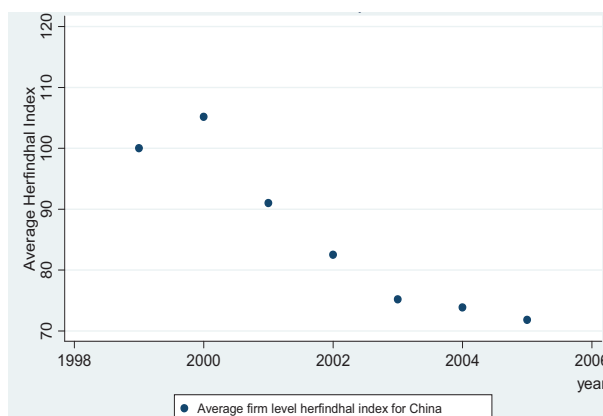
Figure 3: Evolution of Extensive margin with respect to Chinese tariffs



Note: authors calculations based on French customs dataset for 1999-2005. Chinese MFN tariffs are from TRAINS.

Since China’s unilateral liberalization consisted in applying the same tariff reductions to all countries, French firms exporting to China might also suffer from tougher competition. We use as a proxy of foreign competition faced by French firms in the Chinese market the inverse of the Herfindahl index constructed using data of imports at the HS6 product level by country of origin from the CEPII and COMTRADE. For each HS6 product, we compute a concentration measure in terms of the number of countries from which each product is imported by China. Then, by matching this index defined at the HS6 product, country and year with the French firms’ exports dataset, we construct an average of the concentration Herfindahl index at the firm level. Figure 4 plots the evolution of average firm level Herfindahl index for China from 1999 to 2005. This figure shows that the Herfindahl index decreases almost 30 percent in the period. A lower Herfindahl index implies less concentration in the number of countries exporting the same product line than the average French firm to China. This descriptive evidence indicates an increase in competitive pressures faced by French firms in the Chinese market after the unilateral trade liberalization.

Figure 4: Intensification of foreign competition faced by French firms in China



Note: authors calculations.

To sum up, this descriptive empirical evidence highlights that French firms expanded their exports to China after Chinese unilateral trade reforms. Nevertheless, they also faced stronger

competitive pressures of other countries exporting the same product line in China. To evaluate the net effect of Chinese unilateral liberalization on French firms' export patterns, we should take into account explicitly the role of foreign competition of third countries in the liberalized market.

We present in the Appendix a simple theoretical framework consistent with these empirical facts based on Chaney (2008). This set-up allows to rationalize the empirical facts described in this section by highlighting the channels of market access expansion and intensification of foreign competition after a unilateral trade reform. In the next section, we present the data and the econometric identification strategy that disentangles these two opposite channels through which unilateral trade liberalization affects firms' export patterns.

3 Empirical Evidence

3.1 Data Description

We use individual export data on manufacturing goods for France, collected by French Customs.¹² These data contain the value of exports by product, firm and destination over the time period 1999-2005. This database classifies export flows at the firm level within 8 digit product categories. We restrict our analysis to manufactured products.

We use MFN applied tariffs at the HS6 product level collected from TRAINS.¹³ From this database, we consider the tariffs applied over the period 1999 to 2005 by our set of Asian countries, such as: China, India, Indonesia, Korea, Japan, Philippines, Singapore. We exclude Hong Kong and Taiwan from our analysis since they are financial and trade centers, where the wholesale activity is very important. The next section explains how we construct the firm

¹²Export information is collected in the following way: exports outside EU are reported if firms' annual trade value exceeds 1,000 Euros or a weight of a ton.

¹³The source of MFN applied tariffs is from TRAINS: <http://unctad-trains.org>.

level tariff. We also control for country size using GDP and population from the Penn World Tables and the real exchange rate. We use the bilateral real exchange rate between France and other countries using producer prices of France and importer countries from the International Financial Statistics (IFS) of the IMF.

To proxy for foreign competition, we construct a Herfindahl index using the BACI dataset of imports at the HS6 product level by country of origin.¹⁴ This index indicates from how many countries a HS6 product is imported by each Asian destination market. The higher the index the lower the number of competitors that French exporters face in the foreign market.

In order to keep a constant sample throughout the paper and to establish the stability of the point estimates, we keep the sample of firms that has information on all control variables. In the main specifications, this leaves us with around 4,000 firm-country pairs for 6 Asian countries in the period 1999-2005, a total of almost 28,000.

In the robustness check exercises we use two additional firm level datasets. First, in order to identify French multinational firms, we match our main dataset with firm level dataset on multinational groups located in France from the Enquete Echanges Internationaux Intra-Groupe produced by the French Office of Industrial Studies and Statistics (SESSI). These data provide a good representation of the activity of international groups located in France. They account for around 82 percent of total trade flows by multinationals, and for 55 and 61 percent of total French imports and exports respectively. Second, to add information on firms' characteristics, we merge our main dataset with the Annual French Business Surveys (EAE), available from INSEE. EAE is a survey conducted every year that provides detailed firm-level information for all French firms with more than 20 employees whose main activity is in manufacturing. This survey allows us to have information on firms' employment and

¹⁴The BACI dataset is provided by the CEPII and constructed based on COMTRADE dataset from the UN. This dataset provides bilateral trade flows at the 6-digit product level (Gaulier and Zignago, 2008). BACI is downloadable from <http://www.cepii.fr/anglaisgraph/bdd/baci.htm>.

labor productivity (value added per worker).

3.2 Identification strategy

3.2.1 Market Access: firm level tariff measures

To identify the impact of Asian’s trade liberalization on firms’ export patterns, we use tariffs at the HS6 product level to construct a firm level measure of tariff which varies by year and country of origin. For each firm f and country of destination j , we generate a simple average tariff over all HS6 products exported by that firm to that country in year t .¹⁵ Thus, tariffs for each firm-country-year, τ_{fjt} , are computed in the following way:

$$\tau_{fjt} = \frac{\sum_{g \in G} \tau_{gjt}}{N_{fjt}} \quad (1)$$

where G is the set of products exported by firm f and N_{fjt} is the number of products that firm f exports to country j in year t . Previous empirical works focus on tariff variations across industries where the firm produces. One of the few exceptions is the work of Teshima (2009), who uses plant-level tariffs in his study of import competition and R&D in Mexico.

Focusing on firm-level tariff changes allows us to capture differences in market access across firms depending on the type of HS6 products that they produce and export. Since Asian’s tariff changes were mainly due to negotiations to allow entrance into WTO, these tariff changes are likely to be exogenous to French firms. We exploit this exogenous variation in tariffs across firms and countries to identify how changes in market access affect French firms’ export patterns.

¹⁵To avoid possible endogeneity issues, we use the simple average of the tariffs faced by each firm in a particular country, instead of using the weighted average.

3.2.2 Foreign competition: Herfindahl index at the firm-country level

Since our measure of market access varies at the firm level across countries, the foreign competition proxy in the liberalized market should also vary at the firm-country level. We thus build a firm-level version of the Herfindahl index for each Asian destination country. The inverse of this index will be a proxy of the competition faced by each French firm in each of its destination markets. This index is computed using import flows at the HS6 product level and country of origin from BACI for 198 developed and developing countries.

We compute the Herfindahl index for all the Asian countries used in our main analysis for the period 1999-2005. This index captures, product by product, the geographical concentration of imports in each Asian country. More precisely, this index measures from how many countries an HS6 product is imported by each of our possible destination country. For each importer country j , HS6 product g and time t , we compute the concentration in terms of the number of exporting countries, k , from which a product is imported,

$$H_{gj} = \sum_{k=1}^{n_{kg}} (m_g/\mu_g^j)^2 \quad (2)$$

where time subscripts are omitted for simplicity. In this expression, $\mu_g^j = \sum_{k=1}^{n_{kg}} m_g^j/n_{kg}$, and m_g^j is the import value of product g imported by country j from country k and n_{kg} is the total number of countries k exporting the product g .

The next step is to match this index by HS6 product, country of destination and year with information on French exports at the firm-product and country of destination level over the period 1999-2005. This allows us to compute the average of the Herfindahl index at the firm level. Similar to the average tariffs faced by a firm, we generate for each firm f and country of destination j a simple average Herfindahl index over all HS6 products, g , exported by that firm to that country in year t . This measure varies thus at the firm-country of destination

and year:

$$H_{fjt} = \frac{\sum_{g \in G} H_{gjt}}{N_{fjt}} \quad (3)$$

where N_{fjt} is the same as in section 3.2.1. The inverse of this measure captures the level of foreign competition faced by a firm in each Asian destination market. For example, consider a firm that exports three different HS6 products to China in a given year. This foreign competition proxy indicates the average number of foreign competitors of the three products this firm is facing in the Chinese market. The number of foreign competitors is proxied by the number of countries exporting the same product line towards China.

3.3 Empirical Specification

3.3.1 Baseline Specification

In this section we exploit the exogenous variation in tariffs across firm-country pairs to analyze the role of Chinese unilateral trade liberalization on French firms' export behavior relative to tariff changes in other Asian destinations. To capture these effects, we will then estimate the following equation:

$$\ln X_{fjt} = \alpha \tau_{fj,t-1} + \beta (\tau_{fj,t-1} \times \text{China}_j) + \gamma Z_{jt} + \mu_{fj} + v_t + \epsilon_{fjt} \quad (4)$$

where the dependent variable, X_{fjt} , is the number of products exported by firm f to country j in year t . In an alternative specification, we also explore how the intensive margin of trade is affected by Chinese tariff reductions using as a dependent variable firms' export sales. $\tau_{fj,t-1}$ is the average tariff faced by firm f when exporting to country j in year $t - 1$.¹⁶ China_j is

¹⁶To further address the potential endogeneity issue between import tariff and export patterns, we use lagged tariff measures.

a dummy variable equal to one if the country of destination, j , is China. $\tau_{fj,t-1} \times \text{China}_j$ is an interaction term between the average lagged tariff faced by each firm and the dummy variable for China. The coefficient of this interaction term, β , captures how China's trade liberalization affected French exports. The comparison between the coefficients α and β indicates the impact of Chinese unilateral liberalization on French exports relative to the average effect of liberalization occurring in the Asian destinations. We focus on a particular subsample of Asian countries, which we believe represents a homogeneous group in terms of trade integration and geographical proximity.¹⁷ Z_{jt} are controls at the country level that vary over time. μ_{fj} and v_t are respectively a full set of firm, country and year fixed effects. Finally, ϵ_{fjt} is the random error term.

This equation disentangles the variation in the extensive (intensive) margin of exports due to changes in China's trade barriers. The theoretical framework presented in the Appendix predicts a negative and significant effect for our coefficient of interest, α : tariff reduction in destination j increases the number of products exported (extensive margin of trade) and export sales (intensive margin of trade) towards each Asian destination. For what concern, our other coefficient of interest, β , we expect it to be larger than α . This result will indicate that Chinese tariff reduction induces French firms to expand by a larger amount their exports towards China relative to the comparison group. Since our variable of interest (tariff measure) varies at the firm-country level, in all the estimations, disturbances are corrected for clustering across firm-country pairs.

We control for macroeconomic shocks, firm and destination unobservable characteristics that might affect French exports, by using year, firm and destination fixed effects. It is important to stress that the outstanding role of China in the world trading system is not only related to trade liberalization, but also to its remarkable economic growth which has taken

¹⁷The subsample of other Asian countries includes: India, Indonesia, Korea, Japan, Philippines and Singapore. These countries entered WTO in 1995.

place during the same period. Thus, failing to control for country observable characteristics that might evolve over time can generate misleading results. To deal with this issue, we include the GDP, the population and real exchange rates (RER) for each destination country. We control for variations in real GDP across countries over time using the logarithm of lagged real GDP to capture differences across countries in terms of economic development. We also include the population of each destination country to control for market size differences. Finally, we take into account the effect of bilateral variations in RER. To do this, we compute the bilateral real exchange rate between France and each Asian destination country using producer prices in France and in the importing country.

3.3.2 Controlling for Foreign Competition

To account for third country competition effect faced by each firm in the destination country, the previous reduced form equation in (4), becomes:

$$\ln X_{fjt} = \alpha \tau_{fj,t-1} + \beta (\tau_{fj,t-1} \times \text{China}_j) + \gamma Z_{jt} + \rho H_{fjt} + \mu_{fj} + v_t + \epsilon_{fjt} \quad (5)$$

where H_{fjt} represents the firm-country Herfindahl index, which controls for foreign competition that each French firm is facing in each destination market. More precisely, the average firm Herfindahl index is computed over all products exported by that firm, as indicated in equation (3).¹⁸

¹⁸Section 3.2.2. gives the details about the methodology to compute this index at the firm level.

4 Results

4.1 Baseline results: Market Access and Export Patterns

In this section we present the results of the baseline estimations which explores how asian tariff changes affect firms' export performance. Estimation results of equation (4) are reported in Tables 1 and 2. The former reports the results using the number of exported products as a dependent variable, while the latter focus on export sales per firm. In every Table presented we control for unobserved firm and destination fixed effects. We start with the extensive margin of exports.

Column (1) in Table 1 shows that tariff reductions increase the number of French exported products across all destinations. In columns (2) and (3) we include country level controls. Column (2) shows that our results are also robust to cross countries price variations, proxied by the real exchange rate at the country level (RER). The coefficient of RER is negative though not significant. Column (3) introduces real GDP to capture differences across countries in terms of economic growth and development, and population size. As expected the coefficient of real GDP is positive and significant. Surprisingly, the coefficient on population is negative, although it becomes non significant in column (4) when introducing the China dummy variable. The coefficient on tariffs remains stable and robust to the inclusion of country observable characteristics varying over time. This finding implies that tariff changes are not picking up effects of market size, economic growth or price variations across countries. The point estimate indicates that the 3 percentage points decline in the average MFN tariff across Asian countries in our sample is associated to almost 1,5 log points expansion in the average firm export product scope.

Column (4) includes our main variable of interest: the interaction term between the average tariff at the firm level and the dummy equal to one when the importer country is China.

The coefficient is negative and statistically significant, at the 1% confidence level. This result indicates that China's tariff cuts have, as expected, a positive effect on the amount of exported products towards this destination. Comparing the coefficient of Chinese tariff reductions with the average tariff coefficient (i.e. comparing β and α in equation (4)), we find that Chinese tariff cuts lead to a larger expansion of export product scope compared to tariff reductions experienced by other Asian destinations.

The point estimate implies that a 10 percentage points fall in Chinese tariff results in 8,4 log-points expansion more when a firm exports to China rather than to the Asian sample. During our period of analysis, from 1999 to 2005, Chinese tariffs declined on average 7 percentage points. Thus, according to our results, this would imply that the average firm experiences an additional expansion of almost 6 log-points in the number of products exported when exporting to China, other things equal.

Table 2 reports similar results for the intensive margin of exports. After controlling for observable country level characteristics in column (3), the average reduction of Asian tariffs leads to more than 3,5 log points increase in French firms' export sales. From column (4), comparing the effect of average Asian tariff cuts with Chinese tariff cuts, shows a larger effect due to Chinese liberalization. This allow us to conclude that China's tariff reductions increase by a larger amount export sales of French firms towards this destination relative to the others: Chinese tariff cuts boost by 14 log points French export sales.

4.2 Unilateral Trade Liberalization and Foreign competition

The findings presented in the previous section might suffer from an important omitted variable bias related to foreign competition faced by each firm in the destination market. To control for this issue, the baseline specification in (4) is extended to include our firm-level measure of foreign competition. This measure is constructed averaging the Herfindahl index in (2)

over all products exported by each firm to each destination in time t . This will be our proxy measure for foreign competition which, similarly to our tariff measure, varies at the firm-country level.¹⁹ The inverse of this firm-level measure captures foreign competition faced by each firm in the destination market. A positive and significant coefficient of the firm-level Herfindahl index implies that an increase in foreign competition in destination j faced by each firm (i.e. a reduction in the firm level Herfindahl concentration index) reduces the number of products exported and export sales to that destination.

Table 3 reports the estimation results of equation (5). Columns (1) to (3) show the results for the number of exported products, while columns (4) to (6) report the results for the intensive margin of exports. As expected the coefficient on the Herfindahl index is positive and significant in all specifications, suggesting that the higher the competitive pressures faced by the average French firm in a destination market, the lower will be export sales and the number of products exported to that destination. Once we take into account country level observable characteristics in columns (2) and (5), the coefficient of the average Asian tariff cuts are negative and significant as expected. In columns (3) and (6) we introduce our main variable of interest: the interaction of the tariff with the dummy for China. The coefficient of this interaction is negative, larger in magnitude and statistically significant, indicating that the effect of tariff reductions on the French extensive and intensive margins of exports is almost four times greater for China's tariff cuts relative to other Asian countries.

Findings in Table 3 indicate that once we address the possible omitted variable issue, by controlling explicitly for foreign competition at the firm-country level, our coefficient of interest remains stable and robust.

¹⁹Section 3.2.2 describes in detail how this measure is constructed.

4.3 Disentangling Input and Output trade liberalization

A further question worthwhile exploring is related to the types of goods: which are the French exported products that are affected the most by Asian liberalization? To test the relationship between market access and types of traded products, we estimate equation (5) by splitting the sample into firms producing intermediate and final goods.²⁰

To classify HS6 products into intermediate and final products, we use BEC (Broad Economic Categories) classification from United Nations. In line with section 3.2.1, we then construct firm-level tariff for both intermediate and final goods using information at the HS6 product level to classify products.

Table 4 report the estimate results for our two subsamples of firms: firms exporting intermediate and final products respectively. When controlling for the China's effect, as in columns (3) and (6), we find that for French export of intermediate products only Chinese tariff cuts are significant. Our point estimate implies that a 10 percentage points fall in Chinese applied tariff, increases by almost 7.5 log points the number of intermediate products exported to China and by almost 20 log points French export sales to China. When we restrict the sample to firms exporting only final goods, interestingly we do not find any significant effect of Asian or Chinese liberalization on French extensive and intensive margins (the bottom part of columns (3) and (6) in Table 4).

4.4 The Role of Multinational Firms

The evidence presented in the previous section emphasizes the importance of French intermediate goods exports during Chinese liberalization. This result can be explained by considering the predominant role of multinational firms and intra-firm trade in the world economy. To

²⁰Serious missing information problems prevented us from considering a more disaggregated product level dimension.

account for this important dimension, in this section we propose to split our sample into multinational firms located in France which export to Asian countries on the one side, and the remaining exporting firms on the other side.

To identify multinational firms, we combine our main dataset with the *Enquete Echanges Internationaux Intra-Groupe* produced by the French Office of Industrial Studies and Statistics (SESSI). This latter dataset is based on a firm-level survey of manufacturing firms belonging to groups with at least one affiliate in a foreign country and with international transactions totaling at least one million euros for the year 1999.

Columns (1) to (3) of Table 5 show the results for the subsample of multinational firms located in France, and columns (4) to (6) for the subsample of ordinary exporters. Comparing the results of these two subsamples of firms, it is straightforward to notice the larger effect of both Asian and Chinese liberalization on multinational firms' extensive margin: the effect of liberalization is two times larger for MNFs. Our point estimate suggests that a 10 percentage points fall in Chinese tariff results in almost 12 log points expansion for products exported to China by multinational firms (column (3)). While the amount of products exported by non-multinational exporters increases only by 6 log points more for the average exporting firm (column (6)). In bottom part of table 5 we present the results for the intensive margin of trade. In line with our previous findings, the effect of Chinese tariff reductions on export sales is more pronounced for multinational firms than for non-multinational exporting firms (columns (3) and (6)).

5 Robustness checks

5.1 Firm level controls

In this section we explicitly deal with potential omitted variable concerns that might affect the previous results. To test that our main variable of interest, firm-level tariff, is not picking up the effects of observable firm characteristics which varies over time, we carry on an additional robustness check. In specification (5) we include two additional control variables: firms' size and labor productivity.

To add information on firms' characteristics, we match our main customs dataset with the Annual French Business Surveys (EAE), available from INSEE. This survey allows us to have information on firms' employment and labor productivity (value added per worker). Since this implies restricting the sample to exporters with more than 20 employees which have manufacturing as their main activity, the number of observations is reduced by a half.²¹

Table 6 reports the results where we account for firms' size (employment) and firms' labor productivity. Despite the reduction in the number of observations, our coefficients of interest remain negative and significant implying that Asian as well as Chinese tariff reductions increase both the number of exported products (columns (1) and (2)) as well as export sales (columns (3) and (4)). These findings confirm that the previous results do not suffer from omitted variable concerns.

5.2 Potential endogeneity issues and alternative tariff measures

Tariff measure used in the previous estimations is constructed as a simple average of HS6 tariffs over all products exported by a firm to destination. In the estimation procedure, to avoid the potential endogeneity bias between tariff measure and the number of exported products

²¹We have no firm-level information for the Food and Beverages industry (corresponding to ISIC 15). This restricted sample covers around 14,000 observations, while the main sample has almost 28,000 observations.

at each point in time, we used tariffs lagged by one period. In this section we propose an alternative way of dealing with this endogeneity issue. The new tariff measure will now be based on the basket of all HS6 products exported by each firm in a specific year, 1999, to each specific destination. This basket is then kept fixed over the all period of analysis (1999-2005). This strategy should avoid that the tariff changes as a result of the increase in export products.

Table 7 reports the estimation results. Since the basket of products is kept constant over the period, the number of observations is reduced to almost 20,000. Our results remain robust when using this alternative tariff measure. Asian trade liberalization has a positive effect on both the number of products exported and export sales by French firms. In this specification, the effect of Chinese liberalization is even stronger. Nevertheless, the overall trade liberalization effect is smaller if compared with the results obtained in Table 3.

6 Conclusion

In this paper, we analyze the effects of Asian unilateral liberalization on French multi-product exporters. We test firm responses to a specific trade liberalization episode using detailed French firm-level data over the period 1999-2005. Our paper contributes to the literature on the microeconomic effects of trade reform by disentangling and identifying two channels through which a unilateral trade liberalization episode affects firms' export performance: the expansion of market access and the intensification of foreign competitive pressures. This paper quantifies the different effect of Chinese *versus* Asian tariff cuts on French exporters.

Our findings can be summarized as follows. First, we find a positive effect of Chinese unilateral liberalization on both the extensive and intensive margins of French exporting firms. We also show that this effect is robust when controlling for foreign competitive pressures at

the firm level in the destination market. Indeed, the number of exported products and export sales by French firms towards China increased by a larger amount when compared to other Asian destinations. Second, our findings suggest that the effect of Chinese tariff reductions is more important for firms exporting intermediate goods. Finally, in line with the previous finding, we show that multinational firms play a predominant role in explaining the positive effect of Chinese liberalization on the expansion of French firms' product scope.

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Appendices

The part A of the Appendix presents a simple model that relies on the theoretical framework developed by Chaney (2008). We exploit this model to show how a unilateral trade liberalization episode affects firms' export revenues and the number of exported varieties. In part B to D we provide proofs of the main equilibrium variables. In part D we present the regressions results.

A Theoretical Motivation

A.1 Demand

Preferences across varieties have the standard C.E.S. form, thus the demand of a representative consumer for a particular variety is given by: $c_i = A_i p_i(\varphi)^{-\sigma}$, where $A_i \equiv \frac{Y_i}{P_i^{1-\sigma}}$. The subscript i indicates the country, φ the unit labor productivity, A_i is the demand shifter and $p_i(\varphi)$ is the price paid to a firm with productivity φ .²²

A.2 Production

There are potential asymmetric countries that produce goods using only labor. Each country is endowed with labor, L , which is supplied inelastically. In each country there is one differentiated sector which produces a continuum of horizontally differentiated varieties, $q(v)$. Each variety v is supplied by a Dixit-Stiglitz monopolistically competitive firm which produces under increasing returns to scale which arise from a fixed cost. The fixed cost is paid in units of labor. Without loss of generality, we assume that wages paid in all countries are equal and they are normalized to one.

Each firm compares the profit levels of alternative strategies. In relation to fixed and variable trade costs, a firm in country i can decide to: (i) not supply a market, (ii) supply only the domestic market, or (iii) supply via exports. The optimal firm's strategy depends on a firm's productivity. Denoting with i and j the origin and the destination countries respectively, two cases are relevant:

Case (a). If the firm in country i decides not to supply a market and exits, the operating profit is zero.

Case (b). If the firm in country i decides to supply market j via exports, the profit from exporting to market j is linearly decreasing in the tariff rate, $\tau_{ij} \geq 1$:

$$\pi_{ij} = \left[p_{ij} - \frac{d_{ij}\tau_{ij}}{\varphi} \right] q_{ij} - f_{ij} \quad (6)$$

where q_{ij} represents the quantity exported, f_{ij} is the fixed cost of exporting and d_{ij} is the dis-

²² A_i is exogenous from the perspective of the firm and composed by the aggregate level of spending on the differentiated good, Y_i divided by the CES price index, $P_i^{1-\sigma}$.

tance between the two countries.²³ Substituting the standard equilibrium price and quantity we have:

$$\pi_{ij} = \frac{1}{\sigma} \left(\frac{\sigma}{\sigma-1} \right)^{(1-\sigma)} Y_j (d_{ij} \tau_{ij})^{1-\sigma} / (\varphi P_j)^{1-\sigma} - f_{ij} \quad (7)$$

Following Chaney (2008), we assume that the total mass of potential entrants in country i is proportional to its labor income, L_i .

A.3 Unilateral trade liberalization, market access and foreign competition

To compute the equilibrium of the overall economy, we solve for the selection of firms into different types.²⁴ We generate predictions for firm level export revenues and export product scope with three asymmetric countries.

Proposition 1 (Intensive margin of trade) Using the demand function, the equilibrium price as well as equilibrium price index, export sales per firm can be written as:

$$x_{ij}^X = p_{ij}^X q_{ij}^X = \lambda_3 \times \theta_j^{\sigma-1} \times \left(\frac{Y_j}{Y} \right)^{\frac{\sigma-1}{\gamma}} \times (d_{ij} \times \tau_{ij})^{1-\sigma} \times \varphi^{\sigma-1} \quad (8)$$

where λ_3 is a constant.²⁵ The parameter γ is the shape parameter of the Pareto distribution. Equation (2) is a function of fundamentals only: the relative country size, Y_j/Y , trade barriers, τ_{ij} , geographical distance, d_{ij} . θ_j collects the following terms:

$$\theta_j^{-\gamma} = \sum_{k=1}^N \left(\frac{Y_k}{Y} \right) \times (d_{kj} \tau_{kj})^{-\gamma} \times f_{kj}^{-(\frac{\gamma}{\sigma-1}-1)} \quad (9)$$

where Y is the world output. θ_j is an aggregate index of j 's remoteness from the rest of the world. We follow Chaney (2008) in interpreting θ_j as the *multilateral trade resistance* introduced by Anderson and van Wincoop (2003). It shows the role of third country effect *vis á vis* the destination country j . θ_j is a decreasing function of the relative weighted GDP of third countries with respect to country j .

Remark 1 *Market size of destination country j 's, Y_j , and multilateral trade resistance, θ_j , increase French export flows to the j -destination country.*²⁶

Equation (8) allows us to examine the specific relationship between France and each Asian destination. We would like to account for the fact that unilateral trade reform brings on two

²³This model of supply collapses to domestic production when $i = j$, since $\tau_{ii} = 1$. Thus, the equation (2) also includes the situation in which the local market is supplied by domestic firm sales.

²⁴See part B, C and D in Appendix for details.

²⁵ $\lambda_3 = \sigma \lambda_4^{1-\sigma}$, $\lambda_4 = \frac{\lambda_1}{\lambda_2} \frac{1}{Y^{\frac{1}{\sigma}}}$, $\lambda_1 = \sigma^{\frac{1}{\sigma-1}} \frac{\sigma}{\sigma-1}$ and $\lambda_2 = \frac{\gamma-(\sigma-1)}{\gamma} \sigma^{\frac{\gamma}{\sigma-1}-1} \left(\frac{\sigma}{\sigma-1} \right)^{\gamma} \frac{1+\pi}{Y}$.

²⁶The third country competition effect comes from the inverse relationship between the GDP of country k , Y_k , and θ_j .

opposite forces in this framework: (i) market access expansion and (ii) foreign competition pressures.

Take as an example a country like China (C) which reduces its tariffs with respect to countries A and B by the same proportion, so that $\tau_{AC} = \tau_{BC}$. For a firm that exports from France to China, the Chinese tariff reductions increase its market access, stimulating an expansion of export sales (market access channel). On the other hand, other countries exporting to China will also expand their exports towards this market. In this framework, θ_j captures trade relationships between China and the rest of the world (RoW). Since tariff reductions were homogeneous across countries, they also affect third countries through θ_j . From the first proposition, we derive the following testable prediction on the effect of unilateral trade liberalization on the intensive margin of trade:

Testable prediction on firm export revenues: *A unilateral trade liberalization episode in country j increases expected export revenues for firms located in country i exporting to country j (market access channel). Since also other countries will take advantage of Chinese liberalization, foreign competitive pressures in market j increase as well (foreign competition channel).*

The increase in the expected export revenues allows more firms to be able to afford the fixed exporting cost and so to sell their products in the export market. The channels through which a unilateral trade liberalization process affects the export selection process can be analyzed by looking at the determinants of the number of exporting firms in a destination market j .

Proposition 2 (Number of Exporters) Using the equilibrium productivity thresholds ($\bar{\varphi}_{ij}$), we derive the aggregate number of exporters, which is:

$$n_{ij}^X = L_i \int_{\bar{\varphi}}^{\infty} dG(\varphi) = L_i \bar{\varphi}_{ij}^{-\gamma} \quad (10)$$

Remark 2 *The market size of destination country j , Y_j , and third country competition, θ_j , increase the number of French exporters to the j -destination country.*²⁷

Testable prediction on export scope: *A unilateral trade liberalization episode in country j increases demand in j and thereby, export profits allowing more firms located in country i to export to j and to sell more varieties into the market j . Since this effect also holds for a third country exporting to market j , unilateral trade liberalization results in tougher competition in market j .*

Two opposite forces affect the export revenues and the number of exported products after a unilateral liberalization process. The net global effect depends on the relative strength of these forces. In the next section, we present the empirical strategy to disentangle these two opposite effects of unilateral trade liberalization.

²⁷The third country competition effect comes from the inverse relationship between $n_{X,ij}$ and Y_k , which is included in θ_j . See Appendix D for details.

B Productivity Threshold

Following Chaney (2008), productivity shocks are assumed to be drawn from a Pareto distribution. From equation 7, we derive the productivity threshold of the least productive firm in country i able to export to country j :

$$\varphi_{ij} = \lambda_4 \frac{Y^{1/\gamma}}{Y_j} \frac{d_{ij} \tau_{ij}}{\theta_j} f_{ij}^{\frac{1}{\sigma-1}} \quad (11)$$

where λ_1 is a constant described in the text.

C Equilibrium Price Index

Since the number of potential entrants is exogenously given, the price index will depend only on country j 's characteristics,

$$P_j = \lambda_2 \times Y_j^{\frac{1}{\gamma} - \frac{1}{\sigma-1}} \times \theta_j \quad (12)$$

The expression for θ_j is given in the text.

D Equilibrium Cut-offs

Plugging the general equilibrium price index from (12) into the productivity threshold, we get:

$$\bar{\varphi}_{ij} = \lambda_4 \frac{\tau_{ij} d_{ij}}{\theta_j} f_{ij}^{\frac{1}{\sigma-1}} \left(\frac{Y}{Y_j} \right)^{\frac{1}{\gamma}} \quad (13)$$

where λ_4 is a constant.²⁸ The productivity threshold in (13) is unambiguously positively affected by distance and trade costs.

²⁸ $\lambda_4 = \frac{\lambda_1}{\lambda_2} \frac{1}{Y^{\frac{1}{\gamma}}}$

E Regression Results

In what follows we present all the tables with different specifications.

Table 1: The impact of Chinese unilateral trade liberalization on the extensive margin of exports

Dependent variable	Log Exported products of firm f in country j in year t			
	(1)	(2)	(3)	(4)
Tariff $_{fj}(t-1)$	-0.514*** (0.093)	-0.513*** (0.093)	-0.485*** (0.094)	-0.207* (0.111)
Tariff $_{fj,t-1} \times \text{China}_j$				-0.845*** (0.178)
RER(j)(t-1)		-0.099 (0.089)	-0.032 (0.098)	-0.079 (0.099)
GDP(j)(t-1)			0.179*** (0.051)	0.130** (0.053)
Population(j)(t-1)			-0.836** (0.420)	-0.639 (0.421)
Firm fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	27999	27999	27999	27999
R^2	0.577	0.577	0.577	0.578

Notes: The regressions are OLS estimations of equation (4) for the period 1999-2005. The dependent variable is the logarithm of the number of products exported to country j in year t by firm f . Fixed effects by firm, country and year and a constant are included in all specifications. The destinations are China and other Asian countries that already integrate WTO such as India, Indonesia, Korea, Japan, Philippines and Singapore. Tariff $_{fjt}$ is the natural log of the tariff measure faced by firm f when exporting to country j in year t . Using HS6 product level tariff data from TRAINS, we construct the firm level tariff by taking the simple average of tariff over all the HS6 products exported by firm f to country j in year t . Tariff $_{fjt} \times \text{China}_j$ is an interaction term between the firm level tariff measure and a dummy variable equal to one when the country of destination of exports is China and zero otherwise, China_j . GDP $_{jt}$ is the natural log of the GDP of country j and Population(j)($t-1$) is the natural log of population of country j from the Penn World Tables. RER $_{jt}$ is the bilateral real exchange rate between France and China and countries in the control group using producer prices of France and importer countries from the International Financial Statistics (IFS) of the IMF. Heteroskedasticity-robust standard errors clustered by firm-country pairs are reported in parentheses. ***, **, and * indicate significance at the 1, 5 and 10 percent levels respectively.

Table 2: The impact of Chinese unilateral trade liberalization on the intensive margin of exports

Dependent variable	Log Export sales of firm f in country j in year t			
	(1)	(2)	(3)	(4)
Tariff _{fj} (t-1)	-1.250*** (0.204)	-1.247*** (0.204)	-1.224*** (0.206)	-0.543** (0.231)
Tariff _{fj,t-1} × China _j				-2.074*** (0.377)
RER(j)(t-1)		-0.299 (0.191)	-0.151 (0.209)	-0.265 (0.209)
GDP(j)(t-1)			0.137 (0.105)	0.018 (0.108)
Population(j)(t-1)			0.146 (0.858)	0.629 (0.864)
Firm fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	27999	27999	27999	27999
R^2	0.606	0.606	0.606	0.607

Notes: The regressions are OLS estimations of equation (4) for the period 1999-2005. The dependent variable is the logarithm of firm f 's export sales to country j in year t . Fixed effects by firm, country and year and a constant are included in all specifications. The destinations are China and other Asian countries that already integrate WTO such as India, Indonesia, Korea, Japan, Philippines and Singapore. Tariff_{fjt} × China_j is an interaction term between the firm level tariff measure and a dummy variable equal to one when the country of destination of exports is China and zero otherwise, China_j. GDP_{jt} is the natural log of the GDP of country j and Population(j)($t - 1$) is the natural log of population of country j from the Penn World Tables. RER_{jt} is the bilateral real exchange rate between France and China and countries in the control group using producer prices of France and importer countries from the International Financial Statistics (IFS) of the IMF. Heteroskedasticity-robust standard errors clustered by firm-country pairs are reported in parentheses. ***, **, and * indicate significance at the 1, 5 and 10 percent levels respectively.

Table 3: Third country effects: firm-country Herfindahl index

Dependent variables	Log number of exported products			Log export sales		
	(1)	(2)	(3)	(4)	(5)	(6)
Third country effect: Herfindahl(ijt)	0.091*** (0.011)	0.096*** (0.011)	0.093*** (0.011)	0.062*** (0.022)	0.065*** (0.022)	0.058*** (0.022)
Tariff _{fj} (t-1)		-0.490*** (0.093)	-0.235** (0.111)		-1.228*** (0.205)	-0.561** (0.231)
Tariff _{fj,t-1} × China _j			-0.776*** (0.177)			-2.030*** (0.378)
Country level controls	No	Yes	Yes	No	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	27999	27999	27999	27999	27999	27999
R ²	0.578	0.580	0.581	0.605	0.606	0.607

Notes: The regressions are OLS estimations of equation (5) for the period 1999-2005. In columns (1) to (4) the dependent variable is the logarithm of the number of exported products to country j by firm f in year t , and in columns (5) to (8) the dependent variable is the logarithm of the export sales in country j by firm f in year t . Fixed effects by firm, country and year and a constant are included in all specifications. The destinations are China and other Asian countries that already integrate WTO such as India, Indonesia, Korea, Japan, Philippines and Singapore. $\text{Tariff}_{jt} \times \text{China}_j$ is an interaction term between the firm level tariff measure and a dummy variable equal to one when the country of destination of exports is China and zero otherwise, China_j . The inverse of the average Herfindahl index at the firm-country level captures the level of foreign competition faced by a firm in each Asian destination market. GDP_{jt} is the natural log of the GDP of country j and $\text{Population}(j)(t-1)$ is the natural log of population of country j from the Penn World Tables. REER_{jt} is the bilateral real exchange rate between France and China and countries in the control group using producer prices of France and importer countries from the International Financial Statistics (IFS) of the IMF. Heteroskedasticity-robust standard errors clustered by firm-country pairs are reported in parentheses. ***, **, and * indicate significance at the 1, 5 and 10 percent levels respectively.

Table 4: Subsample of firms exporting intermediate and final goods

Dependent variable	Log number of exported intermediate products			Log export sales of intermediate products		
	(1)	(2)	(3)	(4)	(5)	(6)
Tariff _{fj} (t-1)	-0.469** (0.210)	-0.428** (0.214)	-0.229 (0.235)	-1.103** (0.445)	-1.061** (0.453)	-0.531 (0.497)
Tariff _{fj} (t-1) × China _j			-0.748* (0.432)			-1.995** (0.968)
Third country effect: Herfindahl(ijt)		0.129*** (0.020)	0.128*** (0.020)		0.121*** (0.041)	0.120*** (0.041)
Observations	9157	9157	9157	9157	9157	9157
R ²	0.599	0.604	0.604	0.625	0.626	0.626
Dependent variable	Log number of exported final goods products			Log export sales of final goods		
	(1)	(2)	(3)	(4)	(5)	(6)
Tariff _{fj} (t-1)	-0.007 (0.152)	0.005 (0.153)	0.066 (0.174)	-0.757** (0.362)	-0.765** (0.364)	-0.621 (0.430)
Tariff _{fj} (t-1) × China _j			-0.212 (0.299)			-0.496 (0.650)
Third country effect: Herfindahl(ic)		0.097*** (0.024)	0.095*** (0.024)		0.043 (0.040)	0.040 (0.041)
Observations	7367	7367	7367	7367	7367	7367
R ²	0.703	0.705	0.705	0.713	0.713	0.713
Country level controls	No	Yes	Yes	No	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The regressions are OLS estimations of equation (5) for the period 1999-2005 for the subsample of firms exporting intermediate and final goods (in the bottom part of the table). In columns (1) to (3) the dependent variable is the logarithm of the number of exported products to country j by firm f in year t , and in columns (4) to (6) the dependent variable is the logarithm of the export sales in country j by firm f in year t . Control variables definitions are reported in table 3. Heteroskedasticity-robust standard errors clustered by firm-country pairs are reported in parentheses. ***, **, and * indicate significance at the 1, 5 and 10 percent levels respectively.

Table 5: Extensive, Intensive Margin and Multinational Firms

Dependent variable	Log number of exported products by firm f to country j in year t					
	MNF subsample			Non-MNF subsample		
	(1)	(2)	(3)	(4)	(5)	(6)
Tariff $_{fj}(t-1)$	-0.835*** (0.168)	-0.803*** (0.169)	-0.488*** (0.182)	-0.356*** (0.110)	-0.332*** (0.110)	-0.109 (0.137)
Tariff $_{fj,t-1} \times \text{China}_j$			-1.224*** (0.371)			-0.622*** (0.199)
Third country effect: Herfindahl(ic)		0.084*** (0.021)	0.085*** (0.021)		0.100*** (0.013)	0.097*** (0.013)
Observations	7385	7385	7385	20614	20614	20614
R^2	0.542	0.545	0.546	0.582	0.585	0.585
Dependent variable	Log export sales by firm f in country j in year t					
	MNF subsample			Non-MNF subsample		
	(1)	(2)	(3)	(4)	(5)	(6)
Tariff $_{fj}(t-1)$	-1.735*** (0.371)	-1.697*** (0.373)	-1.053*** (0.400)	-1.024*** (0.242)	-1.003*** (0.243)	-0.283 (0.275)
Tariff $_{fj,t-1} \times \text{China}_j$			-2.498*** (0.733)			-2.008*** (0.444)
Third country effect: Herfindahl(ic)		0.111** (0.047)	0.112** (0.047)		0.044* (0.024)	0.034 (0.024)
Observations	7385	7385	7385	20614	20614	20614
R^2	0.498	0.499	0.501	0.607	0.607	0.608
Country level controls	No	Yes	Yes	No	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The regressions are OLS estimations of equation (5) for the period 1999-2005 for the subsample of MNF and ordinary exporters. The dependent variable is the logarithm of the number of exported products (export sales) to country j by firm f in year t . Control variables definitions are reported in table 3. Heteroskedasticity-robust standard errors clustered by firm-country pairs are reported in parentheses. ***, **, and * indicate significance at the 1, 5 and 10 percent levels respectively.

Table 6: Robustness checks: firm level controls

Dependent variable	Log number of exported products		Log export sales	
	(1)	(2)	(3)	(4)
Tariff _{fj} (t-1)	-0.420** (0.176)	0.164 (0.199)	-1.266*** (0.424)	0.051 (0.467)
Tariff _{fj,t-1} × China _j		-1.634*** (0.328)		-3.686*** (0.822)
ln labor productivity(f) (t-1)	0.034 (0.021)	0.034* (0.021)	0.205*** (0.044)	0.206*** (0.044)
ln size(f) (t-1)	0.091*** (0.032)	0.091*** (0.032)	0.196*** (0.064)	0.195*** (0.064)
Third country effect: Herfindahl(fjt)	0.099*** (0.015)	0.098*** (0.015)	0.061* (0.033)	0.059* (0.033)
Country level controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	14016	14016	14016	14016
R ²	0.537	0.539	0.546	0.547

Notes: The regressions are OLS estimations of equation (5) for the period 1999-2005. In columns (1) and (2) the dependent variable is the logarithm of the number of exported products to country j by firm f in year t , and in columns (3) and (4) the dependent variable is the logarithm of the export sales in country j by firm f in year t . Country level control variables definitions are reported in table 3. Firm size_{ft} represents the logarithm of employment at the firm level and firm labor productivity_{ft} is measured by value added per worker. Heteroskedasticity-robust standard errors clustered by firm-country pairs are reported in parentheses.***, **, and * indicate significance at the 1, 5 and 10 percent levels respectively.

Table 7: Robustness checks: alternative tariff measures

Dependent variable	Log number of exported products				Log export sales			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tariff $_{fj(t-1)}$	-0.267*** (0.087)	-0.264*** (0.088)	-0.162* (0.093)	-0.171* (0.094)	-0.539*** (0.172)	-0.524*** (0.175)	-0.305 (0.193)	-0.313 (0.194)
Tariff $_{fj,t-1} \times \text{China}_j$			-0.423** (0.184)	-0.401** (0.182)			-0.912*** (0.332)	-0.893*** (0.332)
Third country effect				0.102*** (0.014)				0.087*** (0.027)
Herfindahl($f_j, t-1$)								
Country level controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19864	19864	19864	19864	19864	19864	19864	19864
R ²	0.613	0.614	0.614	0.616	0.632	0.632	0.632	0.633

Notes: The regressions are OLS estimations of equation (5) for the period 1999-2005. In columns (1) to (4) the dependent variable is the logarithm of the number of exported products to country j by firm f in year t , and in columns (5) to (8) the dependent variable is the logarithm of the export sales in country j by firm f in year t . Fixed effects by firm, country and year and a constant are included in all specifications. Tariff $_{fjt}$ is the tariff measure faced by firm f when exporting to country j in year t . Using HS6 product level tariff data from TRAINS, we construct the firm level tariff by taking the average of tariff over the basket of all the HS6 products exported by firm f in the initial year (1999) to country j . This basket is kept fixed over the period. Country level control variables definitions are reported in table 3.