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Unilateral trade reform, Market Access and Foreign
Competition:
the Patterns of Multi-Product Exporters

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UNILATERAL TRADE REFORM, MARKET ACCESS AND FOREIGN COMPETITION: THE PATTERNS OF MULTI-PRODUCT EXPORTERS

NON-TECHNICAL SUMMARY

This work sheds new light on the micro-economic effects of a unilateral trade liberalization process. Two opposite forces are at stake after a unilateral trade reform: market access expansion and strengthening of competitive pressures. Unilateral tariff reductions increase foreign demand and induce foreign firms to produce more products for the liberalized market. We also expect an intensification of foreign competition in the liberalized market after the unilateral trade liberalization episode since other countries will also expand their exports towards this destination.

This paper addresses this trade-off between market access expansion and the intensification of competition in the liberalized market after a unilateral trade reform. We use detailed firm-product-destination data for French firms (1998-2005) to examine how the margins of French exports react to a particular trade liberalization process. More precisely, we use the trade liberalization process experienced by Asian countries after the 90s. To account for the role of China in the global trading system and its trade policy commitment, we will give specific attention to the France-China trade relationship.

The empirical strategy consists in investigating whether there was a trade re-orientation process vis-à-vis China relative to other Asian destinations after Chinese tariff reductions while taking into account foreign competition of third countries in China. For this purpose, we use as a proxy of market access expansion variations in tariffs at the firm level across countries. Moreover, we use two alternative proxies of third country effects. The first proxy is a distance-weighted GDP of other countries exporting to China. The second proxy is the inverse of the Herfindahl index constructed using data of imports at the hs6 product level by country of origin and matching it with the main dataset at the firm-product level. Our results present novel insights on product turnover associated to trade reforms. We find that French firms expanded their exported products and the volume of exports to China relative to other Asian destinations after Chinese tariff cuts. Our findings also suggest that the increase in foreign competition in the Chinese market has a negative effect on the amount and the volume of products exported by French firms to this destination. Once we take into account third country effects, the 7 percent decline of Chinese tariff on average during the period 1998-2005, results in almost 6% expansion of a firm's export product scope. These results also hold for firms' export volume. We also find that the expansion of French exported products and sales to China after tariff cuts is stronger relative to other Asian destinations.

ABSTRACT

Recent findings in international trade using detailed firm level surveys emphasize the microeconomic effects of trade liberalization episodes. 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 this trade-off between market access growth and tougher competitive pressures in the export market. Using detailed firm-product-destination data for French firms (1999-2005), we explore how the margins of French exports react to unilateral trade liberalization of Asian countries, with particular attention given to China. We exploit the exogenous variation in Chinese import tariff cuts relative to tariff changes in other Asian countries. Our findings suggest that French firms expanded the range of their exported products and the volume of exports to China relative to other Asian destinations after Chinese tariff liberalization. These results are robust when we explicitly account for foreign competition of third countries in the liberalized market. Quantitatively, a 7 percent decline of Chinese tariff on average during the period 1999-2005, results in almost 6 log points expansion of a firm's export product scope and 14 log points of firms' export sales.

JEL Classification: F12, F13, L11.

Keywords: Unilateral trade liberalization, market access, foreign competition, export margins and Multi-product exporters.

OUVERTURE COMMERCIALE UNILATÉRALE, ACCÈS AU MARCHÉ ET CONCURRENCE ÉTRANGÈRE : LES FIRMES EXPORTATRICES MULTI-PRODUITS

RÉSUMÉ NON TECHNIQUE

Ce travail apporte de nouveaux résultats sur les effets microéconomiques de la libéralisation commerciale unilatérale. Deux forces opposées sont en jeu dans le cas d'une ouverture unilatérale : l'élargissement de l'accès au marché et l'intensification de la concurrence. La réduction des droits de douane augmente la demande adressée à l'étranger et incite les firmes étrangères à exporter davantage de produits vers le marché libéralisé. Mais dans la mesure où les différents pays cherchent tous à accroître leurs exportations vers cette destination, l'ouverture commerciale unilatérale conduit aussi à une intensification de la concurrence étrangère sur le marché libéralisé. Cet article étudie ce double effet. Nous utilisons une base de données d'entreprises françaises détaillée par produits et pays de destination des exportations sur les années 1998-2005 pour étudier comment le nombre de produits exportés par firme et le montant des exportations réagissent à un processus d'ouverture commerciale. Nous nous focalisons sur réforme commerciale unilatérale engagée par la Chine à la fin des années 1990.

Pour chaque firme française, nous utilisons comme proxy de l'accès au marché la moyenne des droits de douane NPF appliqués aux produits exportés par la firme. Nous utilisons l'indice d'Herfindahl comme proxy de la concurrence étrangère. Cette mesure est calculée par produit (au niveau HS6), et indique le nombre moyen de pays concurrents auquel la firme fait face.

Nos résultats mettent en lumière les effets positifs de la libéralisation commerciale sur les exportations des entreprises multi-produits : après la réduction des droits de douane chinois, les entreprises françaises ont augmenté le nombre de produits exportés vers la Chine relativement aux autres destinations asiatiques. Mais l'augmentation de la concurrence étrangère sur le marché chinois a un effet négatif sur le nombre de produits exportés et sur le montant des exportations des entreprises françaises sur ce marché. Au total, pour une firme française, la réduction moyenne des droits de douane sur le marché chinois est de 7% entre 1999 et 2005 et conduit à une augmentation de 6 points logarithmiques du nombre des produits exportés et de 14 points logarithmiques du montant des exportations.

RÉSUMÉ COURT

Plusieurs travaux récents utilisant des données d'entreprises mettent en évidence les effets microéconomiques de la libéralisation commerciale. Une libéralisation unilatérale menée par un pays a deux implications opposées pour les firmes étrangères : (i) elle élargit le marché accessible à leurs exportations (ii) elle intensifie la concurrence sur le marché libéralisé. Ce papier étudie le résultat de ce double effet. En utilisant une base de données d'entreprises françaises détaillée par produits et pays de destination des exportations sur les années 1999-2005, nous étudions comment les marges des exportations françaises réagissent à l'ouverture unilatérale pratiquée par la Chine à la fin des années 1990. Nos résultats montrent qu'après la réduction des droits de douane chinois, en prenant en compte l'effet de la concurrence accrue sur le marché libéralisé, les entreprises françaises ont augmenté le nombre de produits exportés et le montant de leurs exportations vers la Chine relativement aux autres destinations asiatiques. Entre 1999-2005, pour une firme française, la réduction moyenne des droits de douane sur le marché chinois est de 7% et l'augmentation du nombre des produits exportés est de 6 points logarithmiques tandis que l'augmentation ventes sur le marché chinois est de 14 points logarithmiques.

Classification JEL : F12, F13, L11.

Mots clés : Libéralisation unilatérale, accès au marché, concurrence étrangère et firmes exportatrices multi-produits.

UNILATERAL TRADE REFORM, MARKET ACCESS AND FOREIGN COMPETITION: THE PATTERNS OF MULTI-PRODUCT EXPORTERS¹

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1. INTRODUCTION

Unilateral trade liberalization is at the core of economic reform packages implemented in several emerging economies in the last decades.² Microeconomic effects of trade reform episodes have received a lot of attention recently. Theoretical works emphasize different firms' responses to trade integration depending on firms' initial productivity level (Bernard et al.(2003) and Melitz (2003)). Empirical works have concentrated on how trade openness affects firms' export choices and shapes firms' performance in terms of productivity or size (Pavcnik (2002), Trefler (2004), Amiti and Konings(2007), Lileeva and Trefler (2010) and Bas and Ledezma (2010) among others).³

This paper sheds new light on intra-firm adjustments to trade integration using the unilateral trade liberalization process experienced by Asian countries after the 90s and detailed 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. Tariff reductions increase foreign demand and induce firms to export more products. For French firms exporting to multiple destinations, we expect that they 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.⁴

Addressing the trade-off between market access expansion and tougher competition, we can evaluate French firms' export strategies in the event of Asian liberalization. To account for the

1. We have benefited from discussions with Agnès Benassy-Quéré, Antoine Berthou, Sebastien Jean, Lionel Fontagné, Elisa Gamberoni, Thierry Mayer, Cristina Mitaritonna and Sandra Poncet. We are responsible for any remaining errors.

*. CEPII. maria.bas@cepii.fr. 113 rue de Grenelle, 75011 Paris.

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

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

4. Using 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.

role of China in the global trading system and its trade policy commitment, we will give specific attention to the France-China trade relationship. Using French micro-level data, our empirical strategy consists in investigating how French firms' product scope and export value 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 economic development, 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 the Asian countries 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. It is unlikely that French firms have an influence on tariffs cuts negotiations. Therefore, these tariff measures allow us to exploit an exogenous variation of tariff across firm-country pairs to explore the micro-economic effects of Asian countries unilateral trade reforms on French firms export patterns. As an additional robustness checks to address the potential reverse causality issue between Asian tariff changes and French firms export patterns, we construct 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.

To account for the intensification of foreign competition in the Asian markets, we use a proxy of foreign competition. This proxy is 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 the concentration in the number of countries from which a product is imported by each Asian country. Then we construct an average of the Herfindahl index at the firm level, by matching this index at the HS6 product, country and year with our main French firms' exports micro-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 this destination. Once we account for foreign competition in the liberalized market, our estimates indicate that the 3 percent decline in the average MFN tariff for all Asian countries in our sample is associated with almost 1 log points expansion in the average firm export product scope to Asia. These results also hold for firms' export volume: 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 Chinese tariff reductions have a greater impact on French firms export patterns. Chinese tariff cuts are associated to an

expansion of 6 log points in the number of exported products and 14 log points in export sales of the average firm.

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 Asian liberalisation has no effect on the subsample of firms exporting final goods. More precisely, only the Chinese tariff cuts have a significant impact on 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 applied tariffs increases on average the number of exported products more than twice for multinational firms located in France (9 log points) relative to other exporting firms (4,4 log points).

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.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. The results for exporting plants appeared to be not related to tariff cuts. 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. They also show the role of increased competitive pressures after this reduction of trade costs. Dhingra (2009) tests her monopolistic competition model of brand differentiation by examining Thai trade liberalization process

5. Multi-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 Mundler (2008) and Dhingra (2009).

6. They 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 tariff reductions.

(2003-2006).⁷ Relative to the previous literature, 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 a first look at the empirical relationship between China's trade liberalization and the patterns of French multi-product exporters. Section 3 describes a simple theoretical framework that rationalizes the main features of the data. Section 4 presents the empirical strategy and Section 5 depicts the econometric evidence based on firm-product-level data for French exporters. 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. Between 1999 and 2005, the average MFN tariff applied by China falls 7 percent, while the reduction in the average MFN tariff applied by other Asian countries is of the order of 3 percent in this period.⁹

Comparing to other Asian destinations, Europe is China's largest export market; China is Europe's largest source of imports. EU-China trade increased dramatically in the 2000s, 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 importance of product turnover *vis-à-vis* China's liberalization. To stress the role of China, this section presents descriptive evidence on the evolution of the extensive and intensive margin of trade of French exporters to China 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 better integrate in 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.¹⁰ Between 1999 and 2005, MFN applied Chinese tariffs declined on average by 7 percent.¹¹

7. Her 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.

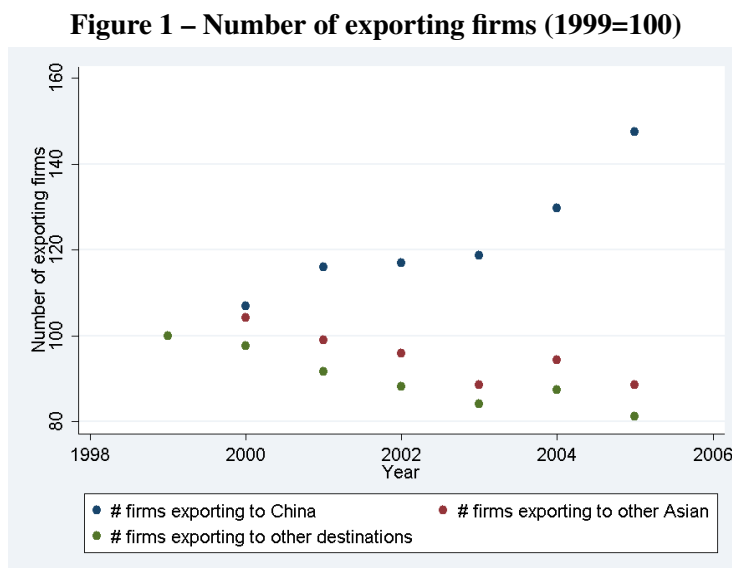
8. India, Indonesia, Japan, Korea, Philippines and Singapore

9. There 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.

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

11. China was implementing tariffs reductions of its own before its entrance to WTO. For example, the average applied tariff of China on French (or EU) products drops from 37 percent in 1992, the first year tariff data is available, to 17 in 2001.

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 1999-2005.¹² As one can easily remark, while the number of French exporting firms' to China increases 60% between 1999 and 2005, the number of exporting firms to other Asian destinations and to the rest of the world decreases over the same period.



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

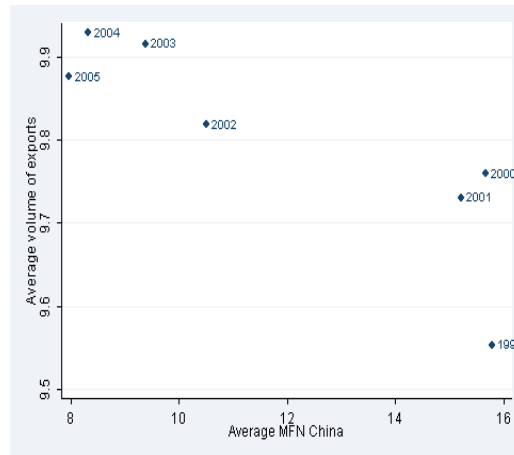
To understand the effect of Chinese trade reforms on the exporting behavior of French firms, Figures 2 and 3 show the relationship between the average number of exported products and the volume of exports to China, on the one hand, and the correspondent Chinese applied MFN tariff, on the other hand.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

In our econometric analysis, we use the MFN tariffs applied by each Asian destination country to the rest of the world as a proxy of market access expansion. From the point of view of French firms, these measures represent an exogenous variation shock. We exploit this variation of tariff across firm-country pairs to investigate the within firm adjustments to Chinese unilateral trade liberalization episode.

To sum up, the descriptive empirical evidence presented in this section highlights that French firms exporting to China before the reform expand their exports to this liberalized destination relative to other markets. The next section presents a simple theoretical framework consistent with these empirical facts.

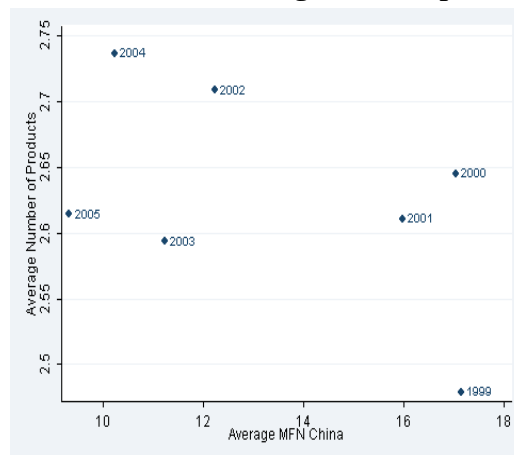
12. Other Asian destinations includes: India, Indonesia, Korea, Japan, Philipines, Singapore. The rest of the world is composed by European Union, North and Latin American destinations.

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.

3. THEORETICAL MOTIVATION

This section relies on the theoretical framework developed by Chaney (2008). This set-up allows to rationalize the empirical facts described in the previous section by highlighting the channels of market access expansion and intensification of foreign competition. We exploit this model to show how a unilateral trade liberalization episode affects firms' export revenues. We also provide an additional results concerning the effects of market access expansion and foreign competition on export scope.

3.1. 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 .¹³

3.2. 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, $\tau_{ij} \geq 1$:

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

where q_{ij} represents the quantity exported, f_{ij} is the fixed cost of exporting and d_{ij} is the distance between the two countries.¹⁴ Substituting the standard equilibrium price and quantity we have:

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

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

13. 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, $P_i^{1-\sigma}$.

14. This 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.

3.3. 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.¹⁵ We generate predictions for firm level volume of export 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, the volume of exports per firm can be written as:

$$x_{ij}^X = p_{ij}^X q_{ij}^X = \lambda_3 \times \theta_j^{\sigma-1} \times \left(\frac{Y_j}{Y} \right)^{\frac{\sigma-1}{\gamma}} \times (d_{ij} \times \tau_{ij})^{1-\sigma} \times \varphi^{\sigma-1} \quad (2)$$

where λ_3 is a constant.¹⁶ 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:

$$\theta_j^{-\gamma} = \sum_{k=1}^N \left(\frac{Y_k}{Y} \right) \times (d_{kj} \tau_{kj})^{-\gamma} \times f_{kj}^{-(\frac{\gamma}{\sigma-1}-1)} \quad (3)$$

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 .

Market size of destination country j 's, Y_j , and multilateral trade resistance, θ_j , increase French export flows to the j -destination country.¹⁷

Equation (2) allows us to examine the specific relationship between France and each destination market as a consequence of Asian liberalization, accounting for third country effects included in θ_j . The unilateral trade reform brings on two 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

15. See part A, B and C of Appendix for details.

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

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

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 . When θ_j decreases, we expect a negative effect on export flows from France to China. Similarly, an increase in the RoW's market size weighted by the distance reduces trade flows from France to China (foreign competition channel). 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 volume: *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:

$$n_{ij}^X = L_i \int_{\bar{\varphi}}^{\infty} dG(\varphi) = L_i \bar{\varphi}_{ij}^{-\gamma} \quad (4)$$

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.¹⁸

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 volume 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.

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

4. EMPIRICAL EVIDENCE

4.1. Data Description

We use individual export data on manufacturing goods for France, collected by French Customs. 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.¹⁹

We use MFN applied tariffs at the HS6 product level applied by several Asian countries (China, India, Indonesia, Korea, Japan, Philippines, Singapore) for the period 1999 to 2005. We exclude of our analysis Hong Kong and Taiwan since they are financial and trade centers, where the wholesale activity is very important. MFN tariffs are collected from TRAINS.²⁰ The next section explains how we construct the firm level tariff. We control for country size using GDP 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.²¹ This index indicates from how many countries is imported a HS6 product 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). 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 (ape) is in manufacturing. This survey allows us to have information on firms' employment and labor productivity (value added per worker).

19. Export 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.

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

21. The 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>.

4.2. Identification strategy

4.2.1. Market Access: firm level tariff measures

We use tariffs at the HS6 product level to construct a firm level measure of tariff by country of origin and year to identify the impact of Asian's trade liberalization on firms' export patterns. For each firm f and country of destination j , we generate a simple average tariff over all HS6 products, g , exported by that firm to that country in year t .²² Thus tariffs for each firm-country-year (τ_{fjt}) are computed in the following way:

$$\tau_{fjt} = \frac{\sum_{g \in G} \tau_{gjt}}{N_{fjt}} \quad (5)$$

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 firms' export patterns.

4.2.2. Measure of Foreign competition: Herfindahl index

As a measure of foreign competition at the firm-country level, we use the Herfindahl index. The inverse of this index is 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 of Asian countries across origin countries. 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 and HS6 product g , we compute the concentration in the number

22. To 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.

of exporting countries k from which a product is imported in year. Time subscripts are omitted for simplicity.

$$H_{gj} = \sum_{k=1}^{n_{kg}} (m_g / \mu_g^j)^2 \quad (6)$$

where $\mu_g^j = \sum_{k=1}^{n_{kg}} m_g^j / n_{kg}$, where 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 .

Next we match this index by HS6 product g , country j and year t with exports at the firm-product and country of destination level from France 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:

$$H_{fjt} = \frac{\sum_{g \in G} H_{gjt}}{N_{fjt}} \quad (7)$$

where N_{fjt} is the number of products that firm f exports to country j in year t .

The inverse of this measure captures the level of foreign competition faced by a firm in an 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.

4.3. Empirical Specification

4.3.1. Baseline Specification

Asian unilateral trade liberalization should have boosted market access possibilities of French firms exporting to these destinations. It is unlikely that French firms could influence Asian unilateral trade reforms which were based on a multilateral negotiation. Thus, we exploit the exogenous variation in tariffs across firm-country pairs. We take into account the outstanding role of China in the global economy, by looking at the effect of Chinese tariff cuts on firms export behaviour. We estimate the following equation:

$$\ln X_{fjt} = \alpha \tau_{fj,t-1} + \beta (\tau_{fj,t-1} \times \text{China}_j) + \gamma Z_{jt} + \mu_{fj} + v_t + \epsilon_{fjt} \quad (8)$$

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 volume. $\tau_{fj,t-1}$ is the average tariff faced by firm f when exporting to country j in year $t - 1$.²³ $China_j$ is a dummy variable equal to one if the country of destination, j , is China. $\tau_{fj,t-1} \times China_j$ 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 subsample of Asian countries, which represents a homogeneous group in terms of economic development and trade integration.²⁴ 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 predicts a negative and significant effect for our coefficient of interest β : tariff reduction in destination j increases the number of products exported (extensive margin of trade) and the volume of exports (intensive margin of trade) towards that destination that opens up to trade. We also expect that $\beta > \alpha$, which indicates that Chinese tariff reduction induces French firms to expand by a larger amount their exports towards China relative to other similar destinations. Disturbances are corrected for clustering across countries.

Macroeconomic shocks and firm-destination characteristics (observables and unobservables) that might affect French exports, are captured by year, firm and destination fixed effects. Therefore, our analysis should be able to interpret the impact of China's unilateral trade liberalization. Notice that failing to control for country observable characteristics that might evolve over time can generate misleading results. The interaction term between firm level tariffs and the dummy variable for China might pick up the effects of economic development, price variations or trade exposure across countries. We also control for variations in the real GDP across countries over time using the logarithm of country j real GDP in the previous year.²⁵ Next, we also take into account the effect of bilateral variations in real exchange rates (RER). To do this, we compute the bilateral real exchange rate between France and the asian destination countries using producer prices in France and in the importing countries. These data are from the International Financial Statistics (IFS) of the IMF.

The outstanding role of China in the world trading system is not only related to trade liberalization, but also to other important economic reforms and to its remarkable economic growth which have taken place during the same period. To deal with this issue, we not only include the

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

24. The subsample of Asian countries includes: China, India, Indonesia, Korea, Japan, Philipines and Singapore.

25. *GDP* measure comes from the Penn World Tables.

GDP variable, but also a specific time trend for China to ensure that our variable of interest is not picking up omitted variables effect. This trend is constructed as an interaction term between each year and the dummy variable for China.

4.3.2. *Controlling for Foreign Competition*

To account for third country competition effect and market access in the destination country, the previous reduced form equation in (8), becomes:

$$\ln X_{fjt} = \alpha \tau_{fj,t-1} + \beta (\tau_{fj,t-1} \times \text{China}_j) + \gamma Z_{jt} + \rho H_{fjt} + \mu_{fj} + v_t + \epsilon_{fjt} \quad (9)$$

where H_{fjt} represents the firm country Herfindahl index, which controls for foreign competition that French firms are 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 (7).²⁶

5. RESULTS

5.1. Baseline results: Trade Liberalization, Market Access and Export Patterns

In this section we present the results of the baseline estimations on how tariff changes for a particular destination affect firms' export performance. Estimation results of equation (8) are reported in Tables .1 and .2. The former reports the results using as a dependent variable the number of exported products, while the latter focus on the volume of exports per firm. We start with the extensive margin of exports.

Column (1) in Table .1 shows that tariff reductions increase the number of exported products across all destinations, once we control for unobserved firm and destination fixed effects. In columns (2) and (3) we include two country level controls. Column (2) shows that our results are robust to accounting for differences across countries related to 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. As expected the coefficient of real GDP is positive and significant. Thus, tariff changes are not picking up effects of economic growth or price variations across countries. The point estimates indicate that the 3 percent decline in the average MFN tariff for all 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 variable of interest: the interaction term between the average tariff faced by each firm and the dummy equal to one if 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 a positive effect on the amount of exported products towards this

26. Section 4.2.3. gives the details about the methodology to compute this index at the firm level.

destination. Comparing the coefficient of Chinese tariff reductions ($Tariff_{fj,t-1} \times China$) with the average tariff coefficient ($Tariff_{fj,t-1}$), we find Chinese tariff cuts lead to a larger expansion of export product scope towards China relative to other possible destinations in Asia.

The point estimate implies that a 10 percentage fall in Chinese tariff results in 9 log-points expansion for a firm's export product scope. During 1999-2005, Chinese tariffs declined on average 7 percentage points. Thus, according to our results, this would imply that the average firm experiences more than 6 log-points expansion in the number of products exported to China, other things equal.

Table .2 reports the results for the intensive margin of exports. These results are similar to those described for Table .1. Once we control for observable country level characteristics, the average reduction of Asian tariffs leads to 3,6 log points increase in French firms' export sales (column (3)). Comparing the results for average Asian tariff cuts with Chinese's tariff cuts, we observe a larger effect due to Chinese liberalization. We find that tariff reductions in China increase on average the volume of exports towards this destination relative to other destinations (column (4)). Chinese tariff cuts are associated with an expansion of export sales by 14 log points. These findings are robust to the inclusion of country level controls.

5.2. Unilateral Trade Liberalization and Foreign competition

5.2.1. Herfindahl Index

The previous findings might suffer from an important omitted variable bias related to foreign competition in the destination market. The theoretical framework predicts that after a unilateral trade liberalization episode, firms in other countries exporting to the j-market, they can all expand their exports to this destination.

Here the baseline specification in equation (8) is extended to include the average of the Herfindahl index over all products exported by a firm to each destination country and year. This is a proxy measure of foreign competition that varies at the firm-country level like the tariff measure.²⁷

The inverse of this index captures foreign competition faced by each firm in the destination market. A positive and significant coefficient of the average Herfindahl index implies that an increase in foreign competition (a reduction of the Herfindahl concentration index) reduces the number of products exported (and the volume of exports) to that destination market.

Table .3 reports the results of estimations of equation (9). 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 that the average firm faces in destination markets the lower the number of products it exports. Once we take into

27. Section 4.2.2 describes in detail how this measure is constructed.

account country level observable characteristics (RER and GDP) in columns (2) and (5), the coefficient of the average Asian tariff cuts is negative and significant as expected. In columns (3) and (6) we introduce our variable of interest: the interaction of the tariff with the dummy variable indicating whether the destination country is China. The coefficient is negative and statistically significant indicating that Chinese tariff reductions increase the number of products exported and export sales.

As in the previous regressions, comparing the coefficients of the tariff variables reveals that the effect of tariff reductions on the extensive and intensive margins of exports is four times greater for Chinese applied tariff cuts relative to other Asian countries. Our results are robust to the inclusion of all other controls at the country level.

These findings 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 remain stable and robust.

5.3. Disentangling Input and Output trade liberalization

The previous findings highlight an expansion of French firms' product export scope and export volumes after Asian trade liberalization. These results are particularly strong for the Chinese market. We now explore which are the exported products that firms are expanding the most. To test the relationship between market access and the type of traded products, we estimate equation (9) by splitting the sample into firms producing intermediate and final goods.

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

Tables .4 and .5 report the estimate results for subsample of firms exporting intermediate and final products respectively. Comparing China's tariff reductions with the average tariff cuts for the Asian region, reveals that the effect of tariff cuts on the expansion of exported intermediate products is only significant for Chinese trade liberalization (columns (3) and (6) in Table .4). Our point estimates imply that a 10 percentage fall in Chinese applied tariff results in 9,4 log points expansion of intermediate products exported to China and 16 log points increase in export sales to this destination (columns (3) and (6) in Table .4).

When we restrict the sample to firms exporting only final goods, we do not find any significant effect for Asian and Chinese applied tariff cuts for the extensive and intensive margins (columns (3) and (6) in Table .5).

5.4. The Role of Multinational Firms

The evidence presented in the previous section emphasizes the importance of intermediate goods exports. This can be explained by considering the predominant role of multinational

firms and intra-firm trade in the world economy. This section explores this feature by splitting the sample into multinational firms located in France and exporting to Asian countries, and other exporting 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. 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.

Table .6 reports the results for the extensive margin of trade. Columns (1) to (3) 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 from both subsamples of firms, one can easily note that the effect of Asian and also Chinese tariff reductions on the number of exported products is twice larger for multinational firms. Our point estimates suggest that a 10 percentage fall in Chinese tariff results in 13 log points expansion of 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 for the average exporting firm (column (6)).

In table .7 we present the results for the intensive margin of trade. In line with our previous results, the effect of Chinese tariff reductions on the volume of exports is more pronounced for multinational firms than for non-multinational exporting firms (columns (3) and (6)).

5.5. Robustness checks

5.5.1. Firm level controls

To test that our main variable of interest, firm-level tariff, is not picking up the effects of unobservable firm characteristics which varies over time, we carry on an additional robustness check. In specification (9) 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.²⁸

28. We 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.

Table .8 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 and also Chinese tariff reductions increase both the number of exported products (columns (1) and (2)) as well as the volume of exports (columns (3) and (4)).

5.5.2. *Alternative tariff measure*

Tariff measure used in the previous estimations is constructed as the weighted average of HS6 tariffs over all products exported by a firm to destination. To account for the potential endogeneity bias between tariff measure and the number of exported products at each point in time, in the baseline specification we used tariffs lagged by one period. As an alternative way of dealing with this issue, we construct a tariff measure based on the basket of all the HS6 products exported by each firm in year 1999 to each particular destination. This basket is then kept fixed over the period (1999-2005). This strategy avoids that the increase in export products affect tariff changes.

Table 9 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 the amount of products exported and the export sales by French firms, with the effect of Chinese liberalization even stronger. Nevertheless, the overall effect is smaller if compared with the results obtained in the baseline specification.

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. We quantify the difference between China and others Asian partners.

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 the volume of exports 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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APPENDIX

Appendices

In part A to C we provide proofs of the main equilibrium variables. In part D we present the regressions results.

8. PRODUCTIVITY THRESHOLD

Following Chaney (2008), productivity shocks are assumed to be drawn from a Pareto distribution. From equation 1, we derive the productivity threshold of the least productive firm in country i able to export to country j :

$$\varphi_{ij} = \lambda_4 \frac{Y^{1/\gamma}}{Y_j} \frac{d_{ij} \tau_{ij}}{\theta_j} f_{ij}^{\frac{1}{\sigma-1}} \quad (10)$$

where λ_1 is a constant described in the text.

9. EQUILIBRIUM PRICE INDEX

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

$$P_j = \lambda_2 \times Y_j^{\frac{1}{\gamma} - \frac{1}{\sigma-1}} \times \theta_j \quad (11)$$

The expression for θ_j is given in the text.

10. EQUILIBRIUM CUT-OFFS

Plugging the general equilibrium price index from (11) into the productivity threshold, we get:

$$\bar{\varphi}_{ij} = \lambda_4 \frac{\tau_{ij} d_{ij}}{\theta_j} f_{ij}^{\frac{1}{\sigma-1}} \left(\frac{Y}{Y_j} \right)^{\frac{1}{\gamma}} \quad (12)$$

where λ_4 is a constant.²⁹ The productivity threshold in (12) is unambiguously positively affected by distance and trade costs.

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

11. 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)	-0.488*** (0.094)	-0.204* (0.111)
Tariff _{fj,t-1} × China _j				-0.863*** (0.177)
RER(j,t-1)		-0.099 (0.089)	0.047 (0.094)	-0.019 (0.095)
GDP(j,t-1)			0.154*** (0.050)	0.110** (0.051)
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 (I) 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 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} × 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 c 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)	-0.547** (0.231)
Tariff _{fj,t-1} × China _j				-2.057*** (0.375)
RER(j,t-1)		-0.299 (0.191)	-0.165 (0.205)	-0.324 (0.206)
GDP(j,t-1)			0.141 (0.100)	0.037 (0.101)
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 (I) 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 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} × 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 c 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	0.091*** (0.011)	0.093*** (0.011)	0.091*** (0.011)	0.062*** (0.022)	0.065*** (0.022)	0.059*** (0.022)
Herfindahl($f_j, t-1$)						
Tariff_ $f_j(t-1)$		-0.494*** (0.093)	-0.229** (0.111)		-1.228*** (0.205)	-0.563*** (0.231)
Tariff $_{f_j, t-1} \times \text{China}_j$			-0.804*** (0.177)			-2.018*** (0.376)
RER($j, t-1$)		0.087 (0.094)	0.024 (0.095)		-0.137 (0.205)	-0.296 (0.206)
GDP($j, t-1$)		0.176*** (0.050)	0.134*** (0.051)		0.156 (0.100)	0.053 (0.101)
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	0.580	0.605	0.606	0.607

Notes: The regressions are OLS estimations of equation (1) 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 Asian countries that already integrate WTO such as India, Indonesia, Korea, Japan, Philippines and Singapore. Tariff $_{f_j, t}$ 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 simple average of tariff over all the HS6 products exported by firm f to country j in year t . Tariff $_{f_j, t} \times \text{China}_j$ 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 $_{j, t}$ is the natural log of the GDP of country c from the Penn World Tables. RER $_{j, t}$ 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 goods

Dependent variable	Log number of exported products			Log export sales		
	(1)	(2)	(3)	(4)	(5)	(6)
Tariff _{fj} (t-1)	-0.394* (0.210)	-0.338 (0.215)	-0.077 (0.240)	-0.989** (0.450)	-0.931** (0.456)	-0.469 (0.498)
Tariff _{fj(t-1) × China_j}			-0.940** (0.415)			-1.662* (0.912)
Third country effect		0.129*** (0.020)	0.129*** (0.020)		0.106*** (0.040)	0.106*** (0.040)
Herfindhal(f _j ,t-1)		0.013 (0.198)	-0.064 (0.200)		-0.537 (0.424)	-0.673 (0.428)
RER(j,t-1)		0.201** (0.096)	0.162* (0.097)		0.138 (0.194)	0.069 (0.198)
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	9188	9188	9188	9188	9188	9188
R ²	0.610	0.614	0.614	0.627	0.628	0.628

Notes: The regressions are OLS estimations of equation (1) for the period 1999-2005. 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 . Fixed effects by firm, country and year and a constant are included in all specifications. The destinations are Asian countries that already integrate WTO such as India, Indonesia, Korea, Japan, Philippines and Singapore. 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 simple average of tariff over all the HS6 products exported by firm f to country j in year t . 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_{j,t-1} is the natural log of the GDP of country c from the Penn World Tables. RER_{j,t-1} 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 5 – Subsample of firms exporting final goods

Dependent variable	Log number of exported products			Log export sales		
	(1)	(2)	(3)	(4)	(5)	(6)
Tariff _{fj} (t-1)	-0.039 (0.152)	-0.033 (0.152)	0.004 (0.173)	-0.775** (0.374)	-0.774** (0.377)	-0.647 (0.442)
Tariff _{fj} (t-1) × China _j			-0.131 (0.296)			-0.452 (0.654)
Third country effect		0.110*** (0.023)	0.109*** (0.023)		0.046 (0.040)	0.043 (0.040)
Herfindhal(_{fj} ,t-1)		0.074 (0.269)	0.058 (0.269)		-0.764 (0.532)	-0.819 (0.540)
RER(_j ,t-1)		0.145 (0.121)	0.132 (0.125)		0.069 (0.233)	0.022 (0.239)
GDP(_j ,t-1)						
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	7363	7363	7363	7363	7363	7363
R ²	0.699	0.702	0.702	0.715	0.715	0.716

Notes: The regressions are OLS estimations of equation (1) for the period 1999-2005. In columns (1) to (3) the dependent variable is the logarithm of the number of exported products to country c by firm i 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 . Fixed effects by firm, country and year are included in all specifications. The destinations are Asian countries that already integrate WTO such as India, Indonesia, Korea, Japan, Philippines and Singapore. 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 simple average of tariff over all the HS6 products exported by firm f to country j in year t . 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_{j,t} is the natural log of the GDP of country c from the Penn World Tables. RER_{ct} 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 .6 – Robustness checks: Extensive 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)	-0.811*** (0.168)	-0.478*** (0.182)	-0.356*** (0.110)	-0.335*** (0.110)	-0.106 (0.137)
Tariff _{fj,t-1} × China _j			-1.288*** (0.370)			-0.639*** (0.199)
Third country effect		0.081*** (0.021)	0.082*** (0.021)		0.098*** (0.013)	0.095*** (0.013)
Herfindhal(fj,t-1)		0.182 (0.156)	0.081 (0.159)		0.059 (0.118)	0.007 (0.119)
RER(j,t-1)		0.203*** (0.093)	0.133 (0.096)		0.163*** (0.059)	0.130*** (0.060)
GDP(j,t-1)						
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	7385	7385	7385	20614	20614	20614
R ²	0.542	0.544	0.546	0.582	0.585	0.585

Notes: The regressions are OLS estimations of equation (1) for the period 1999-2005. The dependent variable is the logarithm of the number of exported products to 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 Asian countries that already integrate WTO such as India, Indonesia, Korea, Japan, Philippines and Singapore. Tariff_{fjt} is the tariff measure faced by firm i 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} × 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_{j,t} is the natural log of the GDP of country j from the Penn World Tables. RER_{j,t} 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 7 – Robustness checks: Intensive margin and Multinational Firms

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 $_f$ ($t-1$)	-1.735*** (0.371)	-1.705*** (0.374)	-1.044*** (0.401)	-1.024*** (0.242)	-0.998*** (0.243)	-0.293 (0.275)
Tariff $_{f,t-1} \times$ China $_j$			-2.561*** (0.734)			-1.958*** (0.441)
Third country effect		0.107** (0.047)	0.109** (0.047)		0.046* (0.024)	0.038 (0.024)
Herfindhal($f_j,t-1$)		0.150 (0.376)	-0.051 (0.378)		-0.290 (0.238)	-0.448* (0.240)
RER($j,t-1$)		0.253 (0.203)	0.114 (0.205)		0.139 (0.113)	0.038 (0.115)
GDP($j,t-1$)						

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	7385	7385	7385	20614	20614	20614
R^2	0.498	0.499	0.500	0.607	0.607	0.608

Notes: The regressions are OLS estimations of equation (1) for the period 1999-2005. 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 Asian countries that already integrate WTO such as India, Indonesia, Korea, Japan, Philippines and Singapore. Tariff $_{f,t}$ 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 simple average of tariff over all the HS6 products exported by firm f to country j in year t . Tariff $_{f,t} \times$ 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 $_{j,t}$ is the natural log of the GDP of country j from the Penn World Tables. RER $_{j,t}$ 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 .8 – Robustness checks: firm level controls

Dependent variable	Log number of exported products		Log export sales	
	(1)	(2)	(3)	(4)
Labor productivity($f,t-1$)	0.031 (0.020)	0.030 (0.020)	0.155*** (0.045)	0.153*** (0.045)
Size(i) ($t-1$)	0.087*** (0.031)	0.085*** (0.031)	0.207*** (0.062)	0.205*** (0.062)
Tariff $_{fj}(t-1)$	-0.421** (0.176)	0.177 (0.200)	-1.277*** (0.426)	-0.013 (0.468)
Tariff $_{fj,t-1} \times \text{China}_j$		-1.665*** (0.327)		-3.521*** (0.814)
Third country effect	0.100*** (0.015)	0.100*** (0.015)	0.054 (0.033)	0.054 (0.033)
Herfindhal($fj,t-1$)				
RER($j,t-1$)	0.166 (0.120)	0.041 (0.122)	-0.018 (0.267)	-0.282 (0.274)
GDP($j,t-1$)	0.170*** (0.066)	0.099 (0.067)	0.302** (0.138)	0.153 (0.144)
Firm fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	14031	14031	14031	14031
R^2	0.537	0.538	0.545	0.546

Notes: The regressions are OLS estimations of equation (I) 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 . Fixed effects by firm, country and year and a constant are included in all specifications. The destinations are Asian countries that already integrate WTO such as India, Indonesia, Korea, Japan, Philippines and Singapore. 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 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 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. 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 9 – Robustness checks: alternative tariff measures

Dependent variable	Log number of exported products				Log export sales			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tariff _{<i>fj,t-1</i>}	-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 _{<i>fj,t-1</i>} × China _{<i>j</i>}			-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)
Herfindhal(<i>fj,t-1</i>)		0.145 (0.112)	0.151 (0.112)	0.196* (0.112)		0.020 (0.233)	0.033 (0.234)	0.072 (0.233)
GDP(<i>j,t-1</i>)		0.288*** (0.060)	0.285*** (0.060)	0.308*** (0.060)		0.295** (0.117)	0.288** (0.116)	0.308*** (0.117)
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 (1) 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_{*fj,t*} 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. Control variables are the same as in Table 8.