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Export performance of China's domestic firms: the role of foreign export spillovers

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EXPORT PERFORMANCE OF CHINA'S DOMESTIC FIRMS: THE ROLE OF FOREIGN EXPORT SPILLOVERS

NON-TECHNICAL SUMMARY

In this paper we seek to understand what is driving the diversification of exports into new (more sophisticated) goods focusing on the possibility that foreign firms act as export catalysts, fostering the creation of new export transactions by domestic firms. There is growing evidence that most of Chinese export rise is due to foreign firms. Several studies argue that foreign firms, typically engaged in processing trade, fully drive the skill content upgrading of exports observed in China (Amiti and Freund, 2010; Xu and Lu, 2009). Amiti and Freund (2010) find that the skill content of China's manufacturing exports remained unchanged once processing trade is excluded.

Growing evidence of FDI spillovers point at the possibility that foreign exporters presence benefit to domestic firms indirectly. Possible channels are information externalities, cost-sharing opportunities and mutualized actions on export markets. Being close to foreign exporters may facilitate the flow of export-specific information, valuable to domestic firms seeking international outlets for their products. The literature so far (see Görg and Greenaway (2004) for a survey) has used rather aggregated industry-level information (2-digit to 4-digit ISIC) instead of fine product level customs nomenclature. Moreover, none of these papers exploit the information on the destination country of exports. Yet, export spillovers have been shown to be stronger when product and destination specific. Based on French firm-level export data, Koenig et al. (2010) show that export spillovers (although they do not distinguish between export activity in MNEs and domestic firms) are stronger when they are product and destination specific, while they are not significant when considered on all products-all destinations.

Our study further departs from the previous literature by looking at the decision to start exporting, and not just the export status. Focusing on the creation of new export linkages is consistent with our focus on the impact of FDI as a catalyst for upgrading the export portfolio of domestic firms. Concretely, we use provincial data at a much more disaggregated product dimension (HS 4-digit), and we exploit information on the destination country of exports over the period 1997-2007. We believe that exploitation of the detailed product and destination information provide two benefits. First, it allows to investigate spillovers at a more adequate level. Indeed, informational flows are likely to be product and country specific. Second, it provides us valuable information to assess the nature of spillovers. We will discriminate between aggregate foreign presence likely to provide direct productivity gains to domestic firms and export spillovers (informational gains) that are likely to be product-destination specific. We believe our study makes three additional contributions. First, we differentiate between ordinary and processing trade in order to see which trade type is more likely to generate and benefit from export spillovers. Second, we study whether export benefits from foreign exporters depend on the technology-content of the exported goods. We aim at verifying that positive information spillovers might be more intense for more sophisticated products. Since Jarreau and Poncet (2010) have shown that the sophistication of domestic exports positively impacts on GDP per capita growth at the province level, this would point at an indirect role of multinational firms on local growth. Third, we investigate the potential conditionality of foreign export spillovers, depending on the technology gap between foreign and domestic firms. Assuming that the capacity to absorb and exploit information on export opportunities depends on the technological

distance between the domestic firm and the foreign source of inspiration, foreign export spillovers are expected to be higher when the technological leadership of foreign firms is not too high.

Our results indicate that domestic firms' capacity to start exporting a given product to a given country positively relates to the export performance of neighboring foreign firms for that same product-country pair. We find that foreign export spillovers are limited to the ordinary trade activities of foreign firms. Processing trade activities do not generate export spillovers. More, export spillovers are stronger for sophisticated products, indicating that proximity to foreign exporters may help domestic exporters to upgrade their exports. However we observe that foreign export spillovers are weaker when the technology gap between foreign and domestic firms is large, suggesting that the enlargement of the export portfolio of domestic Chinese firms may not occur in locations and sectors where foreign firms have already a strong edge.

ABSTRACT

We investigate how the creation of new export linkages (extensive margin of trade) by domestic firms in China is influenced by their proximity to multinational exporters. Using panel data from Chinese customs for 1997-2007, we show that there is evidence that domestic firms' capacity to start exporting new varieties to new markets positively relates to the export performance of neighboring foreign firms for that same product-country pair. We find that foreign export spillovers are limited to ordinary trade activities. No foreign export spillovers are found for processing trade. More, export spillovers are stronger for sophisticated products indicating that proximity to foreign exporters may help domestic exporters to upgrade their exports. However we observe that foreign export spillovers are weaker when the technology gap between foreign and domestic firms is large, suggesting that upgrading may not occur in locations and sectors where foreign firms have already a strong edge.

JEL Classification: F1

Keywords: Export performance, spillovers

LA PERFORMANCE EXPORTATRICE DES ENTREPRISES CHINOISES DOMESTIQUES: L'INFLUENCE DES ENTREPRISES ÉTRANGÈRES

RÉSUMÉ NON TECHNIQUE

Dans cet article, nous étudions les déterminants de la diversification des exportations vers de nouveaux produits (plus sophistiqués) et notamment la possibilité que les entreprises étrangères environnantes agissent comme des catalyseurs à l'exportation, favorisant la création de nouvelles transactions d'exportation par les entreprises nationales. Différents travaux indiquent que la hausse des exportations chinoises est en grande partie attribuable aux entreprises étrangères. Plusieurs études font valoir que les entreprises étrangères, généralement engagées dans le commerce d'assemblage, sont à l'origine de la plupart de l'amélioration du contenu des exportations observée en Chine (Amiti et Freund, 2010 ; Xu et Lu, 2009). Amiti et Freund (2010) trouve que le niveau technologique des exportations manufacturières de la Chine est en fait resté inchangé une fois que l'on exclut le commerce de transformation.

Différentes preuves des retombées positives des investissements directs étrangers (IDE) suggèrent la possibilité d'un impact indirect des exportateurs étrangers sur la performance exportatrice domestique. Des canaux possibles sont les externalités d'informations, le partage de coûts et la mutualisation d'actions sur les marchés d'exportation. Etre proche d'exportateurs étrangers peut faciliter la circulation d'informations précieuses pour les entreprises nationales en quête de débouchés internationaux pour leurs produits. La littérature existante sur ce sujet (voir Görg et Greenaway (2004) pour une revue) utilise principalement des données agrégées notamment la nomenclature SITC à 2 chiffres ou 4 chiffres au lieu de données plus désagrégées comme la nomenclature douanière. En outre, elle n'exploite pas les informations sur le pays de destination des exportations. Pourtant, les externalités à l'exportation se sont avérées être plus fortes quand elles sont spécifiques au produit et à la destination. A partir de données d'exportations françaises au niveau des entreprises, Koenig et al. (2010) montre que les externalités à l'exportation (bien qu'ils ne distinguent pas l'activité d'exportation des entreprises multinationales de celles des entreprises nationales) sont plus fortes quand elles sont spécifiques au produit et à la destination, alors qu'elles ne sont pas importantes quand elles sont considérées tous produits et / ou toutes destinations.

Notre étude s'écarte encore de la littérature précédente en examinant la décision de commencer à exporter, et pas seulement le statut d'exportation. Mettre l'accent sur la création de liens nouveaux à l'exportation est cohérent avec notre accent sur l'impact des IDE en tant que catalyseur pour l'exportation des entreprises nationales. Concrètement, nous utilisons des données provinciales au niveau produit relativement fin (nomenclature à 4 chiffres), et nous exploitons des informations sur le pays de destination des exportations sur la période 1997-2007. Ce choix a deux avantages. Premièrement, il permet d'étudier les retombées à un niveau plus adéquat. En effet, les flux d'information sont susceptibles d'être spécifique au produit et au pays. Deuxièmement, il nous fournit de précieuses informations pour évaluer la nature des retombées. Nous distinguons entre l'impact global de la présence étrangère sur les entreprises nationales (notamment l'effet de concurrence ou de productivité) et leur influence spécifique en termes d'exportation (les gains d'information) qui est susceptible d'être spécifique au produit-destination. La contribution de notre étude est de trois ordres. Tout d'abord, nous distinguons entre le commerce ordinaire et celui

d'assemblage afin de voir quel type de commerce est plus susceptible de générer et de profiter des externalités à l'exportation. Deuxièmement, nous étudions si ces retombées en provenance des exportateurs étrangers dépendent du contenu technologique des marchandises exportées. Notre objectif est de vérifier que les externalités à l'exportation existent bien pour les produits les plus sophistiqués. Jarreau et Poncet (2010) ayant montré que la sophistication des exportations nationales a un impact positif sur la croissance du PIB par habitant au niveau de la province, l'observation d'externalités positives pour des produits sophistiqués suggérerait un possible rôle indirect des entreprises multinationales sur la croissance locale. Troisièmement, nous étudions comment les externalités à l'export dépendent de l'écart technologique entre les entreprises étrangères et nationales. En supposant que la capacité d'absorber et d'exploiter des informations sur les possibilités d'export dépend de la distance technologique entre l'entreprise étrangère source et l'entreprise nationale récipiendaire, on s'attend à ce que les possibilités d'externalités soient plus élevées lorsque le leadership technologique des entreprises étrangères n'est pas trop élevé.

Nos résultats indiquent que la capacité des entreprises nationales à exporter un produit donné vers un pays donné dépend positivement de la performance à l'exportation des entreprises étrangères voisines pour cette même paire de produit-pays. Nous trouvons que les externalités d'exportation sont limitées aux activités commerciales ordinaires des sociétés étrangères, les activités commerciales d'assemblage ne générant pas d'effet. Les externalités apparaissent en outre plus fortes pour les produits sophistiqués, ce qui indique que la présence d'exportateurs étrangers peut aider les exportateurs nationaux à monter en gamme. On observe cependant que les externalités à l'exportation sont plus faibles lorsque l'écart technologique entre les entreprises étrangères et nationales est important, ce qui suggère que l'élargissement du portefeuille d'exportation des entreprises nationales chinoises ne peut pas se produire lorsque les entreprises étrangères ont déjà une forte avance.

RÉSUMÉ COURT

Nous étudions comment la création de liens nouveaux à l'exportation (marge extensive du commerce) par les entreprises nationales en Chine est influencée par leur proximité aux exportateurs étrangers. En utilisant des données de panel de douanes chinoises pour la période 1997-2007, nous montrons que la capacité des entreprises nationales à exporter de nouvelles variétés vers de nouveaux marchés dépend positivement de la performance à l'exportation des entreprises étrangères environnantes pour cette même paire de produit-pays. Nous trouvons que les externalités d'exportation sont limitées aux activités commerciales ordinaires des sociétés étrangères, les activités commerciales d'assemblage ne générant pas d'effet. Les externalités apparaissent en outre plus fortes pour les produits sophistiqués, ce qui indique que la présence d'exportateurs étrangers peut aider les exportateurs nationaux à monter en gamme. On observe cependant que les externalités à l'exportation sont plus faibles lorsque l'écart technologique entre les entreprises étrangères et nationales est important, ce qui suggère que l'élargissement du portefeuille d'exportation des entreprises nationales chinoises ne peut pas se produire lorsque les entreprises étrangères ont déjà une forte avance.

Classification JEL : F1

Mots clés : Performance à l'exportation, externalités à l'export.

EXPORT PERFORMANCE OF CHINA'S DOMESTIC FIRMS: THE ROLE OF FOREIGN EXPORT SPILLOVERS

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1. INTRODUCTION

There is growing evidence that most of Chinese export rise is due to foreign firms. The share of foreign enterprises in China's exports has increased speedily from 26 percent in 1992 to 57 percent in 2007 (China Statistical yearbook, 2008). This domination is even stronger for high technology products. The share of foreign firms rose from 68 percent to 84 percent over the period. Several studies argue that foreign firms, typically engaged in processing trade, fully drive the skill content upgrading of exports observed in China (Amiti and Freund, 2010; Xu and Lu, 2009).¹ Amiti and Freund (2010) find that the skill content of China's manufacturing exports remains unchanged once processing trade is excluded. However, estimations of growth equations indicate that income gains from export performance and export upgrading are confined to improvements made by domestic firms. Jarreau and Poncet (2009) find that the positive association between GDP per capita growth and export sophistication at the province level is limited to ordinary export activities undertaken by domestic firms. While there are no direct gains from foreign firms export upgrading, there may still be room for indirect effects of foreign firms on domestic ones through emulation or export spillovers. By favoring the entry of domestic firms on export markets for more sophisticated goods, foreign firms could have an indirect impact on GDP per capita growth in Chinese provinces. In this paper we focus on the possibility that foreign firms act as export catalysts, fostering the creation of new export transactions by domestic firms. We also investigate the heterogeneity of these export spillovers from foreign firms according to the sophistication of exported products.

Since the pioneering study of Caves (1974), the existence of FDI spillovers has been widely investigated (Crespo and Fontoura, 2006). Most studies, whether applied to China or not, have focused on the spillovers from foreign to domestic firms in terms of productivity. The empirical evidence surveyed in Görg and Greenaway (2004) and Blomström and Kokko (1998) is mixed. In the Chinese context, while several articles suggest a significant and positive impact of foreign presence on domestic firms' productivity (Cheung and Lin, 2004; Liu, 2001; Li et al., 2001; Hu

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¹Xu and Lu (2009) find that previous results on the insignificant role of foreign firms and processing trade on Chinese export sophistication (Wang and Wei, 2010) may be due to the heterogeneity of Foreign Direct Investment (in terms of origin and contract form). They find that FDI matters for China's exports upgrading when it originates from OECD countries and comes under the form of wholly foreign owned enterprises.

and Jefferson, 2002), Hale and Long (2010) argue that the effect disappears when the various sources of estimation biases are controlled for (aggregation bias, selection bias, downward bias in standard errors).

Here, we concentrate on another source of benefits stemming from foreign presence, export spillovers. We investigate the presence of foreign export spillovers on the extensive margin of domestic firms, that is their creation of new trade transactions. This focus is coherent with our interest in the determinants of export upgrading of Chinese domestic firms. We seek to understand what drives the diversification of exports into new (more sophisticated) goods. Our approach is complementary to studies on the export quality of domestic firms (Harding and Smarzynska Javorcik, 2010).² Using data on Chinese exports at the city-product level, Chen and Swenson (2009) suggest that proximity to multinational firms is associated with higher quality (unit value) of new export transactions by domestic private Chinese traders. Bloningen and Ma (2010) find nevertheless that the share of foreign firms in Chinese exports by product category as well as the ratio of foreign to domestic unit values are increasing over time, both results running against the idea that Chinese firms are catching up.

In the economic literature, growing evidence has emerged on positive export spillovers from foreign to domestic firms. Possible channels are information externalities, cost-sharing opportunities and mutualized actions on export markets. Being close to foreign exporters may facilitate the flow of export-specific information, valuable to domestic firms seeking international outlets for their products. In a pioneer study, Aitken et al. (1997) find that the export decision of local firms in Mexico in the period 1986-1990 is positively influenced by the proximity to multinational exporters, even after controlling for the overall industrial activity in the region and for local export concentration. The role of foreign exporting firms as “catalysts” for domestic exporters has since been confirmed by Kneller and Pisu (2007) on UK data and Kemme et al. (2009) on India.³ By contrast, Barrios et al. (2003) do not find clear evidence of such export spillovers from foreign firms in Spain, while Ruane and Sutherland (2005) find that the export intensity of foreign-owned enterprises is negatively associated with the export decision and export intensity of domestic firms in Irish manufacturing. They argue that this result suggests that no (and even negative) export spillovers derive from third-country export-platform FDI. This prediction bodes ill for China where foreign firms are mostly engaged in processing trade.

²Harding and Smarzynska Javorcik (2010) find, based on a panel of 116 countries over the period 1984-2000, a positive effect of FDI on unit values of exports in developing countries, but not in developed countries, suggesting that FDI can help bridge the technological gap in production and marketing techniques between developing and high income countries. Our paper is applied to China, the country that everyone has in mind when thinking of the capacity to rapidly upgrade in international markets. Also, contrary to most studies, the Chinese data allow to focus not only on FDI *per se* but on export activities of foreign companies. Since we also have information on exports realized by domestic producers, our analysis can differentiate between the upgrading induced by multinationals themselves and that resulting from the past experience of domestic firms.

³Kokko et al. (2001) also investigate the existence of spillovers from MNEs on the export decision of domestic firms in Uruguay, using cross-sectional firm-level data for 1998. However, their measure of spillovers is a simple measure of the presence of multinationals (not export activity) in terms of the output share of MNEs in an industry. The measured impact of multinationals' presence could thus be due to R&D spillovers for example and not to export spillovers.

However, it is noteworthy that these papers use rather aggregated industry-level information (2-digit to 4-digit ISIC) instead of fine product level customs nomenclature. Moreover, none of these papers exploit the information on the destination country of exports. Yet, export spillovers have been shown to be stronger when product and destination specific. Based on French firm-level export data, Koenig et al. (2010) show that export spillovers are magnified when they are product and destination specific, while they are not significant when considered on all products-all destinations. Our study further departs from the previous literature by looking at the decision to start exporting, and not just the export status. Focusing on the creation of new export linkages is consistent with our focus on the impact of FDI as a catalyst for upgrading the export portfolio of domestic firms.

In the context of China, three studies (Ma, 2006; Swenson, 2008; Chen and Swenson, 2009) investigate export spillovers emanating from foreign firms. Ma (2006) studies how the probability that a province exports in a given 2-digit SITC industry relates to the contemporaneous foreign export activity concentration in this industry. Her probit estimations over the period 1993 to 2000 suggest some positive link. Swenson (2008) focuses on the city-level value (or count) of the new HS2 product trade transactions made by private firms between 1997 and 2003. She finds a positive impact of same HS2 foreign export value (or count) in the previous year. Finally, Chen and Swenson (2009) show that, within a HS2 product-category, the number of new trade transactions is positively influenced by the level of exports or the count of export transactions made by multinational firms at the HS2-city level. These papers have two main characteristics in common: while the information is available at a finer product category, they re-aggregate the data and measure export spillovers at a broader activity level (less than 100 categories); they moreover do not investigate the specificity of export spillovers according to the destination country of exports.

In our paper, we use provincial data at a much more disaggregated product dimension (1213 4-digit HS), and we exploit information on the destination country of exports over the period 1997-2007. We believe that exploitation of the detailed product and destination information provide two benefits. First, it allows to investigate spillovers at a more adequate level. Indeed, informational flows are likely to be product and country specific. Second, it helps to assess the nature of spillovers. We will discriminate between aggregate foreign presence likely to provide direct productivity gains to domestic firms and export spillovers (informational gains) that are likely to be product-destination specific. We believe our study makes three additional contributions. First, we differentiate between ordinary and processing trade in order to see which trade type is more likely to generate and benefit from export spillovers. Second, we study whether export benefits from foreign exporters depend on the technology-content of the exported goods. We aim at verifying that positive information spillovers might be more intense for more sophisticated products. Since Jarreau and Poncet (2009) have shown that the sophistication of domestic exports positively impacts on GDP per capita growth at the province level, this would point at an indirect role of multinational firms on local growth. Third, we investigate the potential conditionality of foreign export spillovers, depending on the technology gap between foreign and domestic firms. Assuming that the capacity to absorb and exploit information on export opportunities depends on the technological distance between the domestic firm

and the foreign source of inspiration, foreign export spillovers are expected to be higher when the technological leadership of foreign firms is not too high.

Using panel data from Chinese customs for 1997-2007, we show that domestic firms' capacity to start exporting new varieties to new markets positively responds to the export activity of neighboring foreign firms for that same product-country pair. We find that foreign export spillovers are limited to ordinary trade activities. No foreign export spillovers are found for processing trade. More, export spillovers are stronger for sophisticated products indicating that proximity to foreign exporters may help domestic exporters to upgrade their exports. However we observe that foreign export spillovers are weaker when the technology gap between foreign and domestic firms is large, suggesting that upgrading may not occur when foreign firms have already a strong edge.

The rest of the paper is organized as follows. Section 2 describes the data, our empirical approach, and our measure of export spillovers. Section 3 presents and discusses our results. Section 4 concludes.

2. DATA AND INDICATORS

2.1. Trade data sources

The main data source is a database collected by the Chinese Customs. It contains Chinese export flows aggregated by province, year, product and destination country, over the 1997-2007 period.⁴ In our estimations, we explain the creation of new export linkages based on a product classification at the 4-digit level. A feature of interest to us in this dataset is that it allows to differentiate between domestic and foreign trading firms, and between processing trade and ordinary trade.⁵ Processing trade includes all trade flows by firms operating in the assembly sector, that is, importing inputs to process them in China and re-export the finished products (these producers benefit from a preferential tax regime on imported inputs). We can imagine that firms engaged in this kind of activity are less embedded in their local environment, and consequently generate less (and possibly benefit less from) externalities.

2.2. Empirical approach

Our estimations focus on the impact of foreign firms' export activities on the creation of new trade linkages by Chinese domestic firms. The creation of a new linkage (product k /country j) by domestic firms of province i at year $t + 1$ is regressed on our proxy of foreign export

⁴The original data are identified by a 8-digit code. As there were major reclassifications in the international HS 6-digit classifications in 1996 and 2002, we convert them to the same HS 6-digit classifications used in 1992, to avoid problems related to codes reclassification. In order to avoid classifying a product as a new variety just because there has been a new product code or previous codes were split, we drop product lines that changed classification at the 6-digit level over the period due to nomenclature changes.

⁵The data also refer to a third category ("Others") that groups other flows such as aid, border trade and consignment, representing overall less than 1% of total trade value in each year. When considering the processing/ordinary trade distinction, this category is dropped.

spillovers in the previous year t and various controls (measured in t and in $t - 1$). The relation we finally bring to data is the following:

$$\text{Prob}(\text{new dom. link}_{ikj,t+1}) = \text{Prob}(\alpha \text{foreign_spill}_{ikj,t} + \beta_1 Z_{j,t} + \beta_2 Z_{j,t-1} + \eta_{ikj} + \mu_t + \epsilon_{ikj,t} > 0) \quad (1)$$

The identification of foreign export spillovers in China relies on a conditional logit estimation, all regressions including fixed effects at the province-product-country level η_{ikj} . Year fixed effects μ_t are also added. The foreign export spillovers are thus identified based on the within (time) dimension of our data. Time invariant aspects such as bilateral trading distance, product specificity, province geography are hence controlled for. The conditioning set Z is described below in Section 2.4. It is made of three categories of variables. First, following the gravity literature, we control for demand side determinants of new export linkages by introducing destination country demand and GDP per capita. Second, we control for supply side determinants by introducing proxies for provincial and Chinese comparative advantages and export intensity. Third, since we are worried that the decision to start exporting by domestic firms captures the intrinsic dynamics at the product level or country level, we include the lag of all the variables described above that aim at capturing local and Chinese export intensity at the product or destination country level.

2.3. Explained variable: creation of new export linkages

We investigate the determinants of new export transactions by Chinese domestic firms. We measure the creation of a new export transaction as a dummy which takes the value 1 if domestic firms in a province i start exporting product k at time t to country j and 0 otherwise. We restrict our sample to province-product-country series of zeros followed by a decision to start exporting. For a given province-product-country we can have several starts. As in Koenig et al. (2010), ceasing and continuing export flows are not explained. For example, the subsequent export statuses 00011001111 become in our sample .001..01..., with . denoting a missing value. Note that all our results are robust when we consider “durable starts” only, that is cases corresponding to provinces that start exporting a product to a country for at least two years (coded in the data as a sequence “011”).⁶

We construct a specific database, incorporating the set of alternatives faced by each province. For a given province, these are defined as the product-country pairs for which we observe at least one export start over the 1997-2007 period.⁷ Since our estimations will include province-product-country fixed-effects, taking into account a broader definition of possible exported

⁶These results are available upon request.

⁷since we are interested in the probability that a province starts exporting a given product to a given country, all province-product-destination country triads for which we observe positive domestic export flows in each year of the period are excluded from our sample by definition. Regarding triads for which we do not observe any positive domestic export flow, they could be, strictly speaking, taken into account. However, two main issues arise: first, from a computational point of view, this would increase dramatically the number of observations so that the database would become hardly tractable. Second, from an economic point of view, it is absolutely not sure that a province can potentially export all the products to all the countries. There can be good reasons why we

Table 1 – Summary statistics on domestic exports and foreign presence: number of observations

Year	Domestic Exports>0			Domestic Exports==0		Total	
	Foreign Exports =0	>0	Share Foreign export>0	Foreign Exports =0	>0	Total	Share Foreign export>0
1997	148728	40780	0.215	837730	22918	1050156	0.061
2000	205471	59359	0.224	757474	27852	1050156	0.083
2003	255308	88998	0.258	669855	35995	1050156	0.119
2006	354655	141129	0.285	509791	44581	1050156	0.177
Total	2730325	957461	0.260	7493638	370292	11551719	0.115

Table 2 – Summary statistics on domestic starts and foreign presence: number of observations

Year	Domestic Starts=1			Domestic starts=0		Total	
	Foreign Exports =0	>0	Share Foreign export>0	Foreign Exports =0	>0	Total	Share Foreign export>0
1997	78130	5688	0.068	759600	17230	860648	0.027
2000	100001	7889	0.073	657473	19963	785326	0.035
2003	136288	11211	0.076	533567	24784	705850	0.051
2006	146317	13001	0.082	363474	31580	554372	0.080
Total	1174078	94690	0.075	5833347	226741	7328856	0.044

products or destination countries would not change the final sample used for the estimations. Our dataset covers 220 countries and 1213 HS4 products. As reported in Table 1, it includes 1,050,516 observations each year, resulting in a total of 11,551,719 (province/product/country/year) observations over the period 1997-2007. Around 32% of our observations correspond to strictly positive export flows by domestic firms.

We identify, as shown in Table 2, a total of 1,268,768 export starts by domestic firms.

2.4. Foreign export spillovers and control variables

In our empirical analysis, we explain the probability that domestic firms in province i start exporting a product k to country j in year $t + 1$ on various characteristics of the province i , product k and country j at time t . The structure and the determinants of international trade flows are now commonly studied using gravity equations. We detail in this section the explanatory variables we take into account in this gravity framework.

Foreign export spillovers

Our focus is on export spillovers, that are supposed to reduce the bilateral fixed export cost. There are two channels through which export spillovers can act: foreign firms can bring specific information on export markets, valuable to domestic firms to pay their fixed export cost

do not observe any positive domestic export flow for a given province-product-destination country triad over the period, these reasons being not directly linked to export spillovers from foreign firms (provincial specializations, geopolitics etc.).

(information about the tastes of foreign consumers, on the distribution networks abroad etc.). On the other hand, it could be the case that export spillovers are linked to the mutualization of some fixed export costs (participation to international fares, marketing etc.). In both cases, export spillovers could be linked to the presence of foreign exporters *per se* and/or to the value of exports by foreign firms. We thus decompose foreign export spillovers in a province into a dummy that identifies the presence of foreign exporters and the log of the value of exports made by foreign firms. As displayed in Table 1, 11.5% of the observations in our sample have non-null product-country specific foreign export flows. The share rises to 26% if we consider observations for which domestic firms report positive exports. When focusing on domestic starts, we compute in Table 2 that foreign firms export the same product to the same country the previous year in 7.5% of the cases. Table 9 in the Appendix indicates that the proportion is 69.8% when considering non-null foreign exports of the same product to other countries and 88.63% when looking at non-null foreign exports of other products to the same country.

We follow Koenig et al. (2010) and consider different types of spillovers. Depending on the type of information needed to enter successfully on export markets, the export spillovers could be destination specific, product specific or both. For a given triad province-product-destination country ikj , we thus distinguish four types of spillovers: product (HS4) and destination country specific (presence in province i of foreign firms exporting product k to country j and value of these exports), country specific (presence in province i of foreign firms exporting other products than k to country j and value of these exports), product specific (presence in province i of foreign firms exporting product k to countries other than j and value of these exports) and general spillovers (presence in province i of foreign firms exporting other products than k to other countries than j and value of these exports). In our estimations, the coefficient on these spillovers variables will capture the net effect of the positive externalities described above and some negative effects, such as the competition exerted by foreign firms on domestic ones on local labor markets (possibly increasing wages) and congestion effects, such as the possible saturation of transport infrastructures etc.

Time-invariant determinants of exports

Several determinants, invariant across time, can explain the ability of firms in province i to export product k to country j , whether they are domestic or foreign. Not controlling for these determinants would bias our estimation of foreign export spillovers. First, province i can have better transport infrastructure for example, which will impact, all over the period, on the export performance of domestic firms located in province i , whatever their activity and the countries they trade with. It can also influence the attractiveness of the province in terms of FDI and the ability of foreign firms to export. Second, province i can have specific relationships with country j , due to distance, to migrants networks, to the presence of a common border, to specific business partnerships between provincial authorities and country j etc. Again, these non-observed determinants, specific to the dyad ij , can impact on the export performance of both domestic and foreign firms. Third, province i can have a comparative advantage in product k , due to a specific ability developed across time or to specific development strategies implemented by local authorities. This would affect the export activities of both domestic and foreign

firms.

In order to take into account these unobserved determinants of export performance of domestic and foreign firms at the local level, we introduce a fixed effect for each triad province i -product k -destination country j .

This empirical strategy raises some issues about the interpretation of our results on export spillovers. First, given the definition of our dependent variable, the inclusion of the fixed effect means that we are in reality interested in the timing of entry: conditioning on the fact that domestic firms of province i will start exporting product k to country j over the period, we relate the year of entry to the evolution of export activities of foreign firms in the province. Second, our empirical approach exploits the within dimension of our data and is thus focused on short-run determinants of the entry on export markets. Indeed, we study how the creation of export linkages by domestic firms in $t+1$ can be explained by the activity of surrounding foreign exporters in year t , once time-invariant province-product-country fixed effects are controlled for. We believe that this approach is interesting, especially from a public policy point of view, since policy-makers, when implementing strategies aimed at attracting FDI, generally expect quick returns to investment. However, the impact of foreign firms could be different in the long-run: a positive impact of foreign exporters on the probability that domestic firms start exporting in the short-run could become null or negative in the long-run if foreign firms exert a competitive pressure on local wages or on foreign markets, forcing domestic firms to exit export markets more rapidly. In the case of China however, Chen and Swenson (2009) show that the presence of foreign exporters positively impact on the duration of new export flows, casting doubt on the existence of strong negative effects of foreign firms in the long-run.

Time-varying determinants of exports

Our empirical approach so far does not account for determinants of the entry on export markets that vary across time, such as the foreign partner's demand. We need to account for the demand capacity of the destination country at the product level, which may determine simultaneously foreign and domestic export performance. The country's import value defined at the 4-digit product level is taken from the BACI world trade dataset.⁸ Our regressions will also include the GDP per capita of the importing country.⁹

Although the province-product-destination country fixed effects control for specific ability of province i for product k that is fixed over time, they do not account for the reshaping of China's comparative advantages relating to its rapid economic transformation and liberalization over the period 1997-2007, among which the entry in WTO. To control for time varying comparative advantages, we further introduce the log of province total export sales, province-product export sales and China-product export sales in year t . Since we also include year fixed effects

⁸This dataset, which is constructed using COMTRADE original data, provides bilateral trade flows at the 6-digit product level (Gaulier and Zignago, 2010). BACI is downloadable from <http://www.cepii.fr/anglaisgraph/bdd/baci.htm>.

⁹World countries real GDP per capita in PPP are taken from the World Development Indicators database (World Bank).

that account for the evolution of total Chinese exports, controlling for these variables amounts to introducing the elements of a Balassa index of “revealed comparative advantage” at the province-product level. Indeed, the Balassa index is calculated as follows:

$$B_{ijt} = \frac{X_{ikt}/X_{it}}{X_{China,kt}/X_{China,t}} \quad (2)$$

where X denotes exports. An increase of the Balassa index reflects an increased comparative advantage of province i in product k , with respect to the rest of China. Since we introduce the elements of the Balassa separately, each of them controls for the fact that a potential positive association between the export activity of foreign firms and the probability that domestic firms start exporting simply reflects a specific ability of export activities in the province or in China. We also introduce total exports of province i to country j and total Chinese exports to country j to control for specific relationships between the province/China and the destination country. This is important given the use of business and trade agreements by Chinese authorities to manage their diplomacy. Finally, we also control for province GDP per capita to take into account supply-side determinants of exports such as workers' skills.¹⁰

We need to make sure that our results are not biased because our measure of multinational presence proxies for omitted unobservable growth in local economic opportunities at the product-level or destination country-level. Indeed, China has grown dramatically over the 1997-2007 period and the entry of domestic firms on foreign markets could be driven not only by current comparative advantages but by specific trends. We thus include the lagged value of all four variables described above (HS4 world demand of country j , total exports of the province, product-level exports of the province, country-level exports of the province). We also include the lagged value of China's exports at the product level and the lagged value of China's exports at the destination level to account for overall Chinese dynamics specific to the product and the destination country respectively.

Last, in order to further verify that our foreign export spillovers are not simply proxying for export spillovers between domestic firms or for past experience of domestic firms, we further control for the local export activities undertaken by domestic firms in year t . By construction, since we look at the creation of new linkages at the product-country level, there is no export activity by domestic firms in the previous year for the given product-country pair. We need however to account for export activities in other products for the same country, in other countries for the same product and in other products and other countries respectively. We control for both the presence (through a dummy) and the value of these export activities (through the log of export value).

We adopt a similar strategy for the foreign export activities when investigating the nature of foreign export spillovers. Checking the specificity of foreign export spillovers is necessary. Indeed, if spillovers from foreign exporters exist at the product level or at the destination country level, not controlling for foreign export activities on these segments could lead to an overes-

¹⁰Provincial GDP per capita are taken from the China Statistical yearbooks.

timation of the impact of our measure of product-country specific export foreign spillovers. Finally, note that if larger foreign presence leads to congestion effects on the use of local inputs and/or competition, this could negatively affect domestic firms' export performance. Our estimation will thus measure the net effect of positive externalities and congestion effects.

3. ESTIMATION OF FOREIGN EXPORT SPILLOVERS

3.1. Nature of foreign export spillovers

In Table 3, we explore the existence and the nature of foreign export spillovers in China. We rely on a conditional logit estimation. Moulton (1990) showed that regressing individual variables on aggregate variables could induce a downward bias in the estimation of standard-errors. All regressions in this Table and the following are thus clustered at the province level. We first use the value of exports by foreign firms as a proxy for foreign export spillovers. We successively estimate the impact of four different spillover variables, in increasing order of specificity, controlling for the demand in the destination country and for supply-side determinants of exports in the province and in China the year before the entry. In column 1, we rely on the most aggregated measure of local foreign export activity, the total value of exports by foreign firms (all products-all destinations). This general spillover variable is significant but enters negatively, possibly due to crowding out effect: since we also control for total exports in province i in year t , the more these exports are covered by foreign firms, the less probable is the entry of domestic firms on foreign markets the following year. In column 2, we focus on country-specific spillovers (all products-same destination), while in column 3, we rely on a product-specific measure (same product-all destinations). These two spillover variables attract a negative sign but are not significant. In column 4 we use the most precise measure of foreign spillovers (same product-same destination). Interestingly, the product-country spillover variable is positive and significant at the 1% confidence level attesting that the entry of domestic firms on export markets for product k and country j in year $t + 1$ is positively influenced by export activities of foreign firms for product k and country j in year t .

To assess further the specificity of export spillovers, for a given province-product-destination country triad ikj , we decompose in column 5 the overall foreign export value in province i in its four complementary components: exports of the same product k to the same country j , exports of the same product k to other countries, exports of other products to the same country j and exports of other products to other countries. In this column, we also control for the dynamics in demand-side and supply-side determinants of entry on export markets by introducing relevant controls in $t - 1$. As can be seen in column 5, the country/product specific spillover measure is the only one to be positive and significant. Column 6 adds a final category of controls to ensure that the measured impact of foreign export spillovers does not simply reflect past experience of domestic firms on export markets for product k or country j . Indeed, scope economies across destinations or across products may be at work for domestic exports. If the export performance of domestic firms on a destination country j (for other products than k) is correlated to foreign export performance and explains the entry of domestic firms on the product-country pair kj then, our estimation of foreign export spillovers will be biased. We thus include proxies for

Table 3 – Nature of foreign export spillovers

Explained variable	Domestic new export link in t+1					
	(1)	(2)	(3)	(4)	(5)	(6)
Foreign export spillovers Year t	All product-country Foreign export	-0.338 ^b				
		(0.154)				
	Country all products for. export		-0.003			
			(0.003)			
	Product all countries for. export			-0.003		
				(0.002)		
	Same product-country for. export				0.020 ^a	0.020 ^a
				(0.002)	(0.002)	(0.001)
Other product same country for. export					-0.001	0.004
					(0.003)	(0.003)
Same product other country for. export					-0.003	0.007 ^a
					(0.002)	(0.002)
Other product/country for. export					-0.331 ^b	-0.313
					(0.147)	(0.202)
Demand Year t	Ln country-product total imports	0.083 ^a	0.083 ^a	0.083 ^a	0.082 ^a	0.080 ^a
		(0.007)	(0.007)	(0.007)	(0.007)	(0.006)
	Ln country gdp per capita	0.758	0.601	0.606	0.585	0.746
		(0.718)	(0.912)	(0.915)	(0.912)	(0.704)
Supply Year t	Ln Export province	0.690 ^a	0.533 ^b	0.535 ^b	0.530 ^b	0.475 ^b
		(0.210)	(0.212)	(0.211)	(0.211)	(0.192)
	Ln Export province-product	0.178 ^a	0.181 ^a	0.182 ^a	0.179 ^a	0.169 ^a
		(0.007)	(0.006)	(0.007)	(0.006)	(0.007)
	Ln Export province-country	0.143 ^a	0.146 ^a	0.144 ^a	0.143 ^a	0.138 ^a
		(0.017)	(0.016)	(0.015)	(0.015)	(0.016)
	Ln Export China-product	0.418 ^a	0.415 ^a	0.416 ^a	0.413 ^a	0.354 ^a
	(0.017)	(0.019)	(0.019)	(0.019)	(0.018)	
Ln Export China-country	0.210 ^a	0.208 ^a	0.207 ^a	0.207 ^a	0.197 ^a	
	(0.030)	(0.031)	(0.032)	(0.032)	(0.028)	
Ln Province gdp per capita	-0.540	-0.378	-0.384	-0.365	-0.545	-0.581
	(0.721)	(0.922)	(0.925)	(0.923)	(0.708)	(0.663)
Macro lags Year $t-1$	Lag Ln country-product total imports				0.009 ^b	0.009 ^b
					(0.004)	(0.004)
	Lag Ln Export province				0.261 ^c	0.255
					(0.158)	(0.155)
	Lag Ln Export province-product				0.027 ^a	0.027 ^a
					(0.006)	(0.006)
	Lag Ln Export province-country				0.013	0.011
				(0.010)	(0.009)	
Lag Ln Export China-product				0.079 ^a	0.074 ^a	
				(0.013)	(0.013)	
Lag Ln Export China-country				0.020	0.019	
				(0.015)	(0.016)	
Domestic presence Year t	0/1 other products/same country Domestic export					-1.220 ^a
						(0.391)
	0/1 same product/other countries Domestic export					-1.391 ^a
						(0.087)
	Ln Other countries-same product Domestic export					0.172 ^a
					(0.007)	
Ln Other products-same country Domestic export					0.139 ^a	
					(0.038)	
Ln Other prod./country Domestic export					-0.014	
					(0.611)	
Observations				3575935		
R-squared	0.121	0.120	0.120	0.120	0.122	0.123
Fixed effects	province-product (nc4)-country triad & by year					

Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the province level. ^a, ^b and ^c indicate significance at the 1%, 5% and 10% confidence level.

the domestic export performance on other product-country pairs. We decompose past export performance of domestic firms in province i into three non-overlapping variables: domestic exports of product k to countries other than j , exports of products other than k to country j and exports of other products to other countries. Our main result holds: the coefficient on foreign product-country specific export spillovers even slightly increases to reach 0.023. Local foreign exports of product k to other countries enter with a positive and significant coefficient, but very small in magnitude (0.007).

In Table 4, we investigate further the appropriate way of accounting for foreign export spillovers. Columns 1 and 2 are benchmarks: Column 1 reproduces column 6 of Table 1 and column 2 focuses on product-country specific foreign export spillovers, controlling for the overall activity of foreign exporters (all destinations and all products) in the province. In columns 3 to 8 of Table 4, we address the need to account for the large number of zero foreign presence. Indeed, in only 2.4% of the final sample observations, do we observe positive foreign export flows for the product-country specific spillovers variable. We adopt two strategies to deal with this issue. First, we verify that our results hold when restricting our sample to cases where we observe non zero foreign presence for product k and country j in year t (columns 3 and 4).

In this subsample, the average probability of new linkage creation by domestic firms rises from 0.23 to 0.38 (as reported at the foot of the columns). Also, the size of the coefficient is increased and is equal now to 0.047 (column 4). In columns 5 and 6, we further restrict our sample to province/product/country triads for which positive foreign exports are observed in 1997 (the first year of the sample). Overall, despite the reduction in the number of observations (84789 in columns 3 to 4 and 60928 in columns 5 to 6) our finding of a positive and significant impact of the product-country specific spillovers variable is confirmed.

The second way to deal with the zero foreign export flows, which is used in the rest of the paper, is to keep the full sample but to measure simultaneously the impact of the mere presence of foreign exporters for a given product-country pair and the value of their exports. In columns 7 and 8, foreign export spillovers are apprehended based not only on the foreign export value as previously, but also on a dummy indicating whether foreign exports are strictly positive. This allows us to disentangle what is due to the scale of export activities by foreign firms from the more general effect due to the presence of foreign exporters. In column 8, we use this approach to study the impact of foreign export spillovers for other products and/or other destinations. As can be seen in column 8, we find that product-country specific foreign export spillovers are linked to both the presence of foreign firms and the value of their export activities for the product-country pair kj . For the product-specific and the country-specific spillovers, the dummy enters with a negative and significant coefficient while the value of exports is on the contrary positively correlated to the entry of domestic firms on foreign markets. This means that foreign exports of the same product k (to other countries) or to the same country j (of other products) have a positive impact above a certain threshold only. However, results in column 1 show that the overall average effect is close to zero. Our results on the export spillovers for other products and countries confirm that there is no cross-products or cross-markets benefits

Table 4 – Specification on foreign export spillovers

Explained variable	Domestic new export link in t+1								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
	Benchmark		Positive foreign exports in year t			Add dummies for exports >0			
Foreign export spillovers	Same product-country	0.023 ^a (0.001)	0.023 ^a (0.001)	0.047 ^a (0.008)	0.047 ^a (0.008)	0.022 ^a (0.003)	0.022 ^a (0.003)	0.016 ^a (0.004)	0.016 ^a (0.004)
	Other product same country	0.004 (0.003)		0.011 (0.014)		0.009 (0.001)			0.021 ^b (0.009)
	Same product other country	0.007 ^a (0.002)		0.006 (0.006)		0.015 ^a (0.005)			0.016 ^a (0.004)
	Other product/country	-0.313 (0.202)		-0.021 (0.331)		-0.323 (0.326)			-0.321 (0.200)
	All product-country		-0.308 (0.207)		-0.018 (0.372)		-0.398 (0.342)		-0.308 (0.207)
	0/1 same product/country							0.072 ^b (0.036)	0.067 ^c (0.035)
	0/1 other prod./same country								-0.191 ^c (0.104)
	0/1 same prod./other country								-0.102 ^b (0.041)
	Domestic presence	Same product other country	0.172 ^a (0.007)	0.161 ^a (0.007)	0.156 ^a (0.018)	0.154 ^a (0.018)	0.146 ^a (0.017)	0.138 ^a (0.018)	0.161 ^a (0.008)
Other product same country		0.139 ^a (0.038)	0.123 ^a (0.034)	0.126 ^b (0.052)	0.113 ^b (0.049)	0.146 ^a (0.066)	0.123 ^b (0.059)	0.123 ^a (0.034)	0.166 ^a (0.038)
Other product/country		-0.014 (0.611)	-0.010 (0.621)	0.203 (0.779)	0.208 (0.821)	0.099 (0.629)	0.002 (0.688)	-0.010 (0.621)	-0.006 (0.602)
0/1 other prod./same country		-1.220 ^a (0.391)	-1.088 ^a (0.374)	-1.797 ^b (0.745)	-1.678 ^b (0.756)	-0.308 (1.285)	-0.084 (1.253)	-1.087 ^a (0.374)	-1.486 ^a (0.410)
0/1 same prod./other country		-1.391 ^a (0.087)	-1.317 ^a (0.089)	-1.316 ^a (0.211)	-1.302 ^a (0.213)	-1.263 ^a (0.175)	-1.212 ^a (0.178)	-1.314 ^a (0.090)	-1.456 ^a (0.101)
Control for GDPs	yes	yes	yes	yes	yes	yes	yes	yes	
Control for Macro export	yes	yes	yes	yes	yes	yes	yes	yes	
Control for Macro export lags	yes	yes	yes	yes	yes	yes	yes	yes	
Share of domestic starts	0.233		0.384			0.305		0.233	
Observations	3575935		84789			60928		3575935	
R-squared	0.123	0.123	0.169	0.169	0.106	0.106	0.123	0.123	
Fixed effects	by province-product (nc4)-country triad & by year								

Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the province level. ^a, ^b and ^c indicate significance at the 1%, 5% and 10% confidence level.

from foreign export activities on the creation of a new export linkage.¹¹

If we now try to have an idea of the magnitude of these product and destination country spillovers, we can make several thought experiments. Consider a province where there are no firms, neither foreign nor domestic, exporting product k to country j at year t and another province, where there are foreign firms exporting product k to country j , but in negligible quantities: the sole presence of foreign exporting firms raises the probability that domestic firms start exporting product k to country j in $t + 1$ by 6.9% in the latter province compared to the former.¹² Considering the average probability to start exporting in the sample, equal to 23.3%, as a reference, the presence of foreign firms exporting product k to country j increases the average probability that domestic firms in the province start exporting the same product to the same country in $t + 1$ by 1.6 percentage point. As summarized in Table 10, the marginal impact of the value of foreign exports is on the other hand much more modest, since a 10% increase in the value of foreign exports of product k to country j raises the probability that domestic firms start exporting the same product to the same country by 0.04 percentage point.¹³

3.2. Ordinary versus processing trade

Our results tend to show so far that domestic Chinese firms benefit from foreign export spillovers, but at a very specific level: the probability that domestic firms start exporting product k to country j is positively associated with surrounding foreign firms' exports of the same product to the same country the year before.

Other export activities of foreign firms have overall no significant or very marginal impact. However, one remaining question is whether the results hold when we account for the important role of processing trade. Indeed, since firms engaged in processing trade “simply” import inputs and re-export a transformed product, we can imagine that they are less embedded in their direct environment and consequently generate less externalities. In Table 5, we thus further decompose our foreign export spillovers into the two trade regimes (ordinary and processing). Also, in order to identify whether export spillovers affect differently the creation of new linkages depending on the trade regimes used by domestic firms, we study separately ordinary (ODT) export creation (columns 3 and 4) and processing (PCS) export creation (columns 5 and 6). Columns 1 and 2 indicate that foreign export spillovers in the assembly sector has no predictive power on the likelihood of domestic firms to create new linkages. The coefficients on both the dummy for the presence of foreign exporters and their export value are insignificant. By contrast, the two measures attract a positive and significant sign when export spillovers emanate from foreign exporters engaged in ordinary trade. More interestingly, the comparison between columns 3 and 4 (restricted to ordinary export flows creation) and 5 and 6 (restricted to pro-

¹¹Note that the dummy 0/1 indicating whether foreign firms export is always 1 for other products and countries, this is why it does not appear in column 8.

¹²Given the form of the logistic function, the increase in probability generated by the sole presence of foreign firms exporting product k to country j is equal to $[e^{0.067} - 1]\%$.

¹³If we consider a reference value \bar{x} for variable x , the increase in probability generated by a 10% increase in x is equal to $(1.1^{\beta_x} - 1)$, β_x being the coefficient on x . The increase expressed in percentage point of probability is equal to $(1.1^{\beta_x} - 1)P_{\bar{x}}$.

Table 5 – Ordinary versus Processing trade (1999-2007)

Explained variable: new domestic export link in t+1	All		Ordinary		Processing	
	(1)	(2)	(3)	(4)	(5)	(6)
ODT same prod./country for. export	0.015 ^a (0.004)	0.013 ^a (0.004)	0.017 ^a (0.004)	0.016 ^a (0.004)	-0.017 ^c (0.010)	-0.018 ^c (0.010)
0/1 ODT same prod./country for. export	0.086 ^a (0.029)	0.083 ^a (0.029)	0.065 ^b (0.030)	0.063 ^b (0.030)	0.279 ^b (0.112)	0.274 ^b (0.112)
PCS same prod./country for. export	0.006 (0.006)	0.006 (0.006)	0.007 (0.006)	0.007 (0.006)	0.009 (0.015)	0.009 (0.015)
0/1 PCS same prod./country for. export	0.080 (0.049)	0.068 (0.050)	0.040 (0.045)	0.028 (0.046)	0.201 (0.168)	0.195 (0.169)
ODT same prod. other country for. export		0.021 ^a (0.005)		0.021 ^a (0.005)		0.010 (0.010)
0/1 ODT same prod. other country for. export		-0.132 ^a (0.046)		-0.139 ^a (0.045)		0.031 (0.088)
ODT other prod. same country for. export		0.021 ^b (0.009)		0.021 ^b (0.009)		-0.027 (0.021)
0/1 ODT other prod. same country for. export		-0.186 ^b (0.093)		-0.185 ^b (0.088)		0.382 ^c (0.231)
ODT other prod./country for. export		0.025 (0.102)		0.017 (0.105)		0.226 (0.162)
PCS same prod. other country for. export		0.022 ^a (0.004)		0.021 ^a (0.005)		0.036 ^a (0.010)
0/1 PCS same prod. other country for. export		-0.214 ^a (0.040)		-0.207 ^a (0.044)		-0.269 ^a (0.099)
PCS other prod. same country for. export		0.010 (0.007)		0.007 (0.007)		0.040 (0.026)
0/1 PCS other prod. same country for. export		-0.122 (0.084)		-0.101 (0.085)		-0.341 (0.257)
PCS other prod./country for. export		-0.116 (0.118)		-0.121 (0.123)		-0.198 (0.139)
0/1 PCS other prod./country for. export		2.355 ^c (1.373)		2.417 ^c (1.434)		2.148 (1.539)
0/1 other prod./same country dom. export	-1.163 ^a (0.430)	-1.464 ^a (0.448)	-1.083 ^b (0.453)	-1.354 ^a (0.467)	-1.168 ^c (0.650)	-1.551 ^b (0.693)
0/1 same prod./other country dom. export	-1.325 ^a (0.088)	-1.543 ^a (0.100)	-1.319 ^a (0.088)	-1.534 ^a (0.099)	-1.636 ^a (0.267)	-1.901 ^a (0.292)
Same prod. other country Domestic export	0.162 ^a (0.008)	0.189 ^a (0.010)	0.162 ^a (0.007)	0.189 ^a (0.009)	0.183 ^a (0.030)	0.214 ^a (0.032)
Other product same country Domestic export	0.130 ^a (0.040)	0.163 ^a (0.042)	0.127 ^a (0.042)	0.157 ^a (0.043)	0.128 ^a (0.049)	0.170 ^a (0.056)
Other prod./country Domestic export	0.555 (0.408)	0.460 (0.510)	0.602 (0.420)	0.483 (0.511)	-0.894 ^a (0.313)	-0.898 ^b (0.439)
Control for GDPs	yes	yes	yes	yes	yes	yes
Control for Macro export	yes	yes	yes	yes	yes	yes
Control for Macro export lags	yes	yes	yes	yes	yes	yes
Average probability of domestic start	0.233		0.235		0.274	
Observations	3575935		3425094		222838	
R-squared	0.123	0.124	0.123	0.124	0.138	0.139
Fixed effects	province-product (nc4)-country triad & by year					

Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the province level. ^a, ^b and ^c indicate significance at the 1%, 5% and 10% confidence level.

cessing export new linkages) suggest that foreign export spillovers only derive from ordinary export activities from foreign firms and mainly apply to ordinary export activities of domestic firms. It seems thus that processing trade activities are driven by different determinants. In the end, the presence *per se* of foreign firms exporting product k to country j increases the average probability that domestic firms of the province start exporting this product to this country by 1.52 percentage point¹⁴ while a 10% increase in the value of foreign exports increases the average probability that domestic firms start exporting by 0.04 percentage point¹⁵. These results are in line with previous findings on the heterogeneous impact of export upgrading depending on trade type. Jarreau and Poncet (2009) for example argue that processing exports performance must not be taken as signalling a process of technological adoption in China, but rather as an artefact due to China's participation in the increasing fragmentation of production processes.

4. HETEROGENEITY OF FOREIGN EXPORT SPILLOVERS

We now investigate the robustness of our results and the potential heterogeneity of export spillovers according to the sophistication of exported products and the sophistication gap between foreign and domestic firms. Given the results obtained in the previous section, we focus on ordinary trade activities.

4.1. Robustness checks

We verify that our results are robust to several modifications aimed at excluding potential outliers. While the first column of Table 6 reproduces the benchmark specification (corresponding to column 4 of Table 5), columns 2 and 3 drop country-product pairs for which China accounts for more than 45% and 85% respectively of the total imports. The figures of 45 and 85% correspond to the top quartile and top decile respectively of the distribution China's share in imports at the destination country-product level. In column 4, we exclude from our sample observations for the three main exporters (Guangdong, Shanghai and Jiangsu). These three provinces account for around 60% of China's total exports over the period. We verify that the significance of foreign export spillovers is not restricted to these outward-oriented locations. In column 5, we drop observations for clothing, textile and footwear sectors (HS2 codes from 50 to 67). In these sectors, the WTO entry has resulted in massive reductions in tariffs and quotas that may explain jointly the surge in both domestic and foreign exports.

Despite the sharp reduction in sample size induced by these various restrictions, we confirm the positive and significant impact of foreign export spillovers limited to the same product/destination case. Column 6 reproduces column 1 adding product-year fixed-effects defined at the SH2 level. Results are obtained from a linear probability model since it was impossible to account in a logit model for both the province-product-country triadic fixed-effects and for product-year fixed-effects. We find that the product-country foreign export spillovers resist the inclusion of product-year fixed effect controlling for product specific factors that vary over time such as tariffs. The final column of Table 6 includes lags (by one year) of the variables

¹⁴This figure corresponds to $[exp^{0.063} - 1] \times 0.233$ from column 4.

¹⁵This figure corresponds to $(1.1^{0.016} - 1) \times 0.233$ from column 4.

Table 6 – Robustness check on the impact of foreign export spillovers

Explained variable:	Domestic ordinary new export link in t+1							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
	benchmark	China's share <45%	<85%	No top 3 provinces	No Textile Clothing	Additional controls		
Ordinary trade Foreign Spillovers	Same prod/country	0.016 ^a (0.004)	0.018 ^a (0.004)	0.016 ^a (0.004)	0.016 ^a (0.004)	0.014 ^a (0.004)	0.006 ^a (0.001)	0.018 ^a (0.005)
	0/1 Same prod/country	0.066 ^b (0.030)	0.048 ^c (0.028)	0.059 ^b (0.029)	0.065 ^b (0.028)	0.079 ^b (0.034)	0.013 ^c (0.001)	0.109 ^b (0.047)
	Same prod. other country	0.021 ^a (0.005)	0.022 ^a (0.005)	0.022 ^a (0.005)	0.014 ^a (0.004)	0.023 ^a (0.006)	0.003 ^a (0.001)	0.020 ^a (0.005)
	0/1 Same prod. other country	-0.144 ^a (0.047)	-0.155 ^a (0.048)	-0.149 ^a (0.047)	-0.075 ^c (0.039)	-0.155 ^a (0.049)	-0.027 ^a (0.010)	-0.125 ^a (0.048)
	Other prod. same country	0.021 ^b (0.009)	0.022 ^b (0.009)	0.021 ^b (0.009)	0.011 (0.008)	0.019 ^b (0.009)	0.004 ^b (0.002)	0.018 ^b (0.009)
	0/1 Other prod. same country	-0.192 ^b (0.092)	-0.182 ^c (0.095)	-0.193 ^b (0.093)	-0.080 (0.081)	-0.156 ^c (0.093)	-0.053 ^a (0.018)	-0.175 ^c (0.094)
	Other product/country	0.031 (0.101)	0.042 (0.097)	0.037 (0.100)	0.041 (0.095)	-0.005 (0.098)	0.016 (0.018)	0.037 (0.097)
	Lag same prod/country							-0.006 (0.005)
	Lag 0/1 same prod/country							0.220 ^a (0.042)
	Lag same prod. other country							0.009 ^b (0.004)
	Lag 0/1 same prod. other country							-0.062 (0.038)
	Lag same country other prod.							0.010 (0.007)
	0/1 Other prod same country							-0.085 (0.073)
	lag Other prod/country							-0.026 (0.062)
	Domestic presence	0/1 Other prod./same country	-1.297 ^a (0.473)	-1.462 ^a (0.539)	-1.396 ^a (0.475)	-1.072 ^a (0.303)	-1.232 ^a (0.464)	-0.177 ^b (0.069)
0/1 Same prod./other country		-1.436 ^a (0.091)	-1.460 ^a (0.103)	-1.436 ^a (0.096)	-1.297 ^a (0.091)	-1.444 ^a (0.094)	-0.182 ^a (0.015)	-1.567 ^a (0.102)
Same product other country		0.177 ^a (0.008)	0.180 ^a (0.008)	0.177 ^a (0.008)	0.164 ^a (0.007)	0.182 ^a (0.008)	0.018 ^a (0.001)	0.196 ^a (0.009)
Other product same country		0.152 ^a (0.044)	0.170 ^a (0.049)	0.160 ^a (0.045)	0.134 ^a (0.028)	0.150 ^a (0.048)	0.001 (0.006)	0.161 ^a (0.049)
Other country/product		0.702 (0.466)	0.689 (0.450)	0.696 (0.465)	0.935 ^b (0.391)	0.628 (0.449)	0.079 (0.054)	0.889 (0.551)
Control for GDPs	yes	yes	yes	yes	yes	yes	yes	
Control for Macro export	yes	yes	yes	yes	yes	yes	yes	
Control for Macro export lags	yes	yes	yes	yes	yes	yes	yes	
SH2-year Fixed effects	non	no	no	no	no	yes	no	
Fixed effects	by province-product (nc4)-country triad & by year							
Observations	3425094	2568573	3239186	2689057	2782764	4387492	2860539	
R-squared	0.123	0.125	0.126	0.113	0.131	0.019	0.178	

Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the province level. ^a, ^b and ^c indicate significance at the 1%, 5% and 10% confidence level.

capturing the different foreign export spillovers (same product-country, same product other countries, other products same country and other products other countries). We verify that our results hold. Also all our findings are confirmed when we restrict our sample to durable starts, defined as export starts followed by a least two consecutive years of positive export values.¹⁶

4.2. Foreign export spillovers and product sophistication

One argument often advanced by policy-makers to justify policies aiming at attracting FDI is that foreign firms may help domestic ones to improve their processes, to adopt technology and then to increase their productivity and upgrade the quality of their products. Jarreau and Poncet (2009) show that the export sophistication of domestic exports is favorable to provincial growth, but not the sophistication of foreign exports. However, if the export spillovers generated by foreign firms are stronger for more sophisticated products, this would be consistent with an indirect impact of foreign firms' export activities on local income growth. In Table 7, we thus check whether the magnitude of foreign export spillovers depends on the product sophistication level. As in the previous section, we focus on domestic starts and foreign exports in ordinary trade. We follow Hausmann, Hwang and Rodrik (2007) and assume that each good k that a country can potentially produce and export has an intrinsic level of sophistication¹⁷ associated to it, $PRODY_k$, that is the weighted average of the income levels of this good k 's exporters, where the weights correspond to the revealed comparative advantage of each country j in good k :¹⁸

$$PRODY_k = \frac{1}{C_k} \sum_j \frac{x_{jk}}{X_j} \times Y_j, \quad (3)$$

where x_{jk} is the value of exports of good k by country j , X_j is the total value of country j 's exports and Y_j is the per capita level of income of country j , measured as the real GDP per capita, in 2000 PPP dollars. C_k is a normalization term used to have the coefficients sum to 1. The bigger share a given good k weighs in the exports of rich countries, the higher its $PRODY$, the more sophisticated it is.

We compute the product(HS4)-level sophistication level for the year 1997, the initial year of our sample. The average sophistication value of goods exported by China across the 1213 exported HS4-products in 1997 is 12813\$ with a minimum of 971 and a maximum of 32000\$.¹⁹

In Table 7, we use two alternative cut-offs. Columns 1 to 4 rely on the value of 13775\$ which ensures a split in almost two equal subsamples. Columns 5 to 8 use a lower value, equal to 11000\$.

¹⁶Results are available upon request from the authors.

¹⁷While Hausmann, Hwang and Rodrik (2007) use the word "productivity" to describe sophistication at the good level, we prefer terms like sophistication, high quality or technological advancement.

¹⁸The numerator of the weight, x_{jk}/X_j , is the value-share of the commodity in the country j 's overall export basket while the denominator of the weight, $C_k = \sum_j (x_{jk}/X_j)$, aggregates the value-shares across all countries exporting the good.

¹⁹The statistical distribution of sophistication value is reproduced in Figure 1 in the Appendix. Values are in constant 2000 PPP dollars. For example sophistication values of 5000\$ correspond to cotton fabrics and fresh fish, sophistication values of 10000\$ correspond to woven fabrics in synthetic staple fibers and stranded wires in aluminium. At values of 15000\$, one finds children printed books and sewing machines.

Table 7 – Heterogeneity impact of foreign export spillovers depending on product sophistication

Explained variable:	Domestic ordinary trade new export link in t+1								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
	Product HS-4 sophistication								
	≥ 13775	< 13775	< 13775	≥ 13775	< 13775	≥ 11000	< 11000	≥ 11000	< 11000
ODT same prod./country for. export	0.012 ^b (0.005)	0.025 ^a (0.005)	0.009 ^c (0.005)	0.024 ^a (0.005)	0.015 ^a (0.004)	0.024 ^a (0.008)	0.013 ^a (0.004)	0.023 ^a (0.008)	0.023 ^a (0.008)
0/1 ODT same prod./country for. export	0.095 ^b (0.040)	0.016 (0.044)	0.100 ^b (0.040)	0.015 (0.044)	0.070 ^b (0.030)	0.024 (0.071)	0.074 ^b (0.030)	0.021 (0.071)	0.021 (0.071)
All product-country Foreign export	0.042 (0.110)	0.059 (0.101)			0.037 (0.112)	0.074 (0.093)			
ODT same prod. other country for. export			0.026 ^a (0.006)	0.016 ^a (0.006)			0.023 ^a (0.006)	0.018 ^a (0.005)	0.018 ^a (0.005)
ODT other prod. same country for. export			0.020 ^b (0.010)	0.022 ^b (0.009)			0.019 ^b (0.010)	0.024 ^b (0.010)	0.024 ^b (0.010)
ODT other prod./country for. export			0.023 (0.108)	0.034 (0.099)			0.017 (0.110)	0.047 (0.091)	0.047 (0.091)
0/1 ODT other prod. same country for. export			-0.181 ^c (0.097)	-0.191 ^b (0.095)			-0.173 ^c (0.097)	-0.208 ^b (0.100)	-0.208 ^b (0.100)
0/1 ODT same prod. other country for. export			-0.186 ^a (0.052)	-0.091 ^c (0.048)			-0.151 ^a (0.050)	-0.120 ^b (0.049)	-0.120 ^b (0.049)
Same prod. other country dom. export	0.164 ^a (0.010)	0.161 ^a (0.009)	0.180 ^a (0.011)	0.175 ^a (0.010)	0.160 ^a (0.008)	0.162 ^a (0.010)	0.176 ^a (0.009)	0.178 ^a (0.011)	0.178 ^a (0.011)
Other product same country dom. export	0.129 ^b (0.051)	0.127 ^a (0.037)	0.151 ^a (0.053)	0.153 ^a (0.039)	0.139 ^a (0.045)	0.107 ^a (0.039)	0.160 ^a (0.047)	0.136 ^a (0.042)	0.136 ^a (0.042)
Other prod./country Domestic export	0.726 (0.525)	0.696 (0.450)	0.737 (0.515)	0.674 (0.442)	0.754 (0.503)	0.641 (0.443)	0.757 (0.492)	0.614 (0.435)	0.614 (0.435)
0/1 Other prod./same country dom. export	-0.929 ^c (0.501)	-1.192 ^a (0.434)	-1.121 ^b (0.521)	-1.422 ^a (0.447)	-1.126 ^b (0.451)	-0.987 ^b (0.494)	-1.313 ^a (0.468)	-1.240 ^b (0.508)	-1.240 ^b (0.508)
0/1 Same prod./other country dom. export	-1.302 ^a (0.127)	-1.352 ^a (0.106)	-1.430 ^a (0.135)	-1.461 ^a (0.108)	-1.295 ^a (0.108)	-1.361 ^a (0.113)	-1.416 ^a (0.114)	-1.486 ^a (0.117)	-1.486 ^a (0.117)
Control for GDPs	yes	yes	yes	yes	yes	yes	yes	yes	yes
Control for Macro export	yes	yes	yes	yes	yes	yes	yes	yes	yes
Control for Macro export lags	yes	yes	yes	yes	yes	yes	yes	yes	yes
Share of domestic starts	0.234	0.236	0.234	0.236	0.234	0.237	0.234	0.237	0.237
Observations	1712219	1710931	1712219	1710931	2352760	1070390	2352760	1070390	1070390
R-squared	0.147	0.101	0.147	0.101	0.143	0.084	0.143	0.084	0.084
Fixed effects	by province-product (nc4)-country triad & by year								

Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the province level. ^a, ^b and ^c indicate significance at the 1%, 5% and 10% confidence level.

Both cut-offs provide a similar message: export spillovers are systematically stronger for higher product sophistication levels. When we consider results obtained in columns 3 and 4, the sole presence of foreign exporters increases the probability that domestic firms start exporting sophisticated product k to country j in year $t+1$ by 10.5% with respect to the average productivity to start exporting, i.e. by 2.5 percentage point. Foreign presence has no impact *per se* for less sophisticated products. As reported in Table 10, the difference in the marginal impact of foreign exports value between both samples is negligible (0.02 for sophisticated products and 0.05 for less sophisticated ones). The effect of the presence *per se* of foreign exporters is equal to 1.8 percentage point when the sophistication threshold is set at 11000\$ (in this case, the marginal impact of foreign exports value is equal to 0.03 percentage point for sophisticated products and 0.05 for the others).

This result is suggestive that foreign export spillovers can be beneficial to the upgrading of Chinese domestic exports. At least the positive impact of foreign exporters is not restricted to products of low sophistication level, which could have resulted in a “low-sophistication” trap for domestic exporters.

4.3. Foreign export spillovers and sophistication gap

We now investigate another source of heterogeneity of foreign export spillovers. In order to benefit from the experience of foreign firms, the activity of domestic firms might need to be quite similar to the one of foreign firms. It is indeed likely that a too large technological distance reduces the capacity for domestic firms to benefit from export spillovers, due to limited absorption capacity. Consistently with the theoretical model of Rodriguez-Clare (1996), Havranek and Irsova (2010) find in a meta-analysis on technology spillovers from FDI that greater positive impact of foreign firms presence on domestic firms' productivity is generated by investors that have a slight technological advantage over local firms.

One way to measure the distance between the goods produced by foreign and domestic firms is to compare their degree of sophistication. In Table 8, we thus investigate the potential heterogeneity of the role of foreign export spillovers depending on the sophistication gap between foreign and domestic exporters. We compute the average difference in sophistication level at the province-SH2 level for the year 1997. This average difference is computed as the ratio between the weighted average sophistication of HS4-products exported by foreign firms of province i within a given HS2 category, and this weighted average for domestic firms. The median value of this sophistication gap over the 1715 province-HS2 pairs was 1.008 in 1997.²⁰ To verify that export spillovers are not restricted to cases where foreign exporters display no technological advantages over local firms, we split our sample depending on whether the ratio of sophistication level between foreign and domestic entities is lower (column 1) or higher (column 2) than one.

²⁰The statistical distribution of sophistication gap across the province-HS2 pairs is reported in Figure 2 in the Appendix.

Table 8 – Heterogeneity impact of foreign export spillovers depending on sophistication gap

Explained variable:	Domestic ODT new export link in t+1					
	(1)	(2)	(3)	(4)	(5)	(6)
	Ratio Foreign/Domestic ordinary sophistication (sh2-province 1997)					
	< 1	≥ 1	≥ 1 & < 1.07	≥ 1 & < 1.09	≥ 1.07	≥ 1.09
ODT same prod/country for. export	0.015 ^b (0.006)	0.017 ^a (0.003)	0.013 ^c (0.007)	0.013 ^b (0.007)	0.021 ^a (0.004)	0.021 ^a (0.005)
0/1 ODT same prod/country for. export	0.082 (0.053)	0.053 ^b (0.026)	0.092 ^c (0.048)	0.086 ^c (0.049)	0.010 (0.042)	0.010 (0.048)
ODT same prod. other country for. export	0.018 ^a (0.005)	0.024 ^a (0.006)	0.036 ^a (0.007)	0.035 ^a (0.007)	0.014 ^b (0.006)	0.012 ^b (0.006)
ODT other prod. same country for. export	0.023 ^b (0.011)	0.020 ^b (0.009)	0.027 ^a (0.009)	0.029 ^a (0.009)	0.013 (0.010)	0.010 (0.011)
ODT other prod./country for. export	-0.135 (0.230)	0.074 (0.123)	0.298 (0.223)	0.191 (0.251)	-0.035 (0.095)	-0.005 (0.097)
0/1 ODT other prod. same country for. export	-0.184 ^c (0.111)	-0.192 ^b (0.090)	-0.278 ^a (0.095)	-0.291 ^a (0.090)	-0.119 (0.096)	-0.090 (0.098)
0/1 ODT same prod. other country for. export	-0.105 ^b (0.047)	-0.169 ^a (0.057)	-0.266 ^a (0.068)	-0.254 ^a (0.065)	-0.089 (0.057)	-0.081 (0.058)
Control for GDPs	yes	yes	yes	yes	yes	yes
Control for Macro export	yes	yes	yes	yes	yes	yes
Control for Macro export lags	yes	yes	yes	yes	yes	yes
Share of domestic starts	0.233	0.230	0.235	0.234	0.227	0.2265
Observations	1427612	1995538	870664	983733	1124874	1011805
R-sq	0.1289	0.1200	0.1329	0.1313	0.1107	0.1097
Fixed effects	by province-product (nc4)-country triad & by year					

Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the province level. ^a, ^b and ^c indicate significance at the 1%, 5% and 10% confidence level.

We find that spillovers are stronger when the HS4-products exported by foreign firms of the province are on average as sophisticated or more sophisticated than the products exported by domestic firms (column 2 compared to column 1). In this case, the presence of foreign exporters increases the average productivity that domestic firms start exporting a given product k to country j by 5.3% (i.e. 1.25 percentage point). The presence of foreign firms *per se* has no effect when domestic firms of the province export products that are more sophisticated than foreign firms' exported products. In columns 3 to 6, we further split the sample of column 2 depending on the level of the sophistication advance of foreign firms. We use two alternative values 1.07 and 1.09. Interestingly, we find that the export spillovers effect is much higher when foreign exporters have a slight technological advantage over domestic firms (in columns 3 and 5).

Overall, our results suggest that the magnitude of foreign export spillovers is greatest when the average difference in sophistication between foreign and domestic firms is positive but lower than 10%. In this case, the presence of foreign exporters in the province increases the probability that domestic firms start exporting product k to country j by around 9% (i.e. 2.26 percentage point). The presence of foreign exporters *per se* has no impact when the technological advance of foreign firms is too big. Regarding the marginal impact of the foreign exports value, the difference between both samples is again negligible (0.03 percentage point when sophistication gap is small (columns 3 and 5) vs 0.05 when it is big (columns 4 and 6)). This result is coherent with empirical findings obtained on foreign spillovers on productivity. Our results are in line with theoretical and empirical evidence on technology spillovers from FDI (Rodriguez-Clare (1996), Havranek and Irsova (2010)) suggesting that the positive impact from foreign firms presence on domestic firms' productivity is greatest when the technological advantage of foreign investors over local firms is moderate. This last finding suggests that the optimistic result obtained previously about the magnification effect of export spillovers with product level sophistication should be qualified. While proximity to foreign exporters can help domestic exporters to create new export linkages, especially for sophisticated products, this is restricted to instances where the technological advantage of foreign firms is not too high.

5. CONCLUSION

We investigate how the creation of new export linkages (extensive margin of trade) by domestic firms in China is influenced by their proximity to multinational exporters. Using panel data from Chinese customs for 1997-2007, we show that domestic firms' capacity to start exporting new varieties to new markets positively responds to the export activity of neighboring foreign firms for that same product-country pair. We find that foreign export spillovers are limited to ordinary trade activities. No foreign export spillovers are found for processing trade. More, export spillovers are stronger for sophisticated products indicating that proximity to foreign exporters may help domestic exporters to upgrade their exports. However we observe that foreign export spillovers are weaker when the technology gap between foreign and domestic firms is large, suggesting that upgrading may not occur when foreign firms have already a strong edge.

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Table 9 – Summary statistics on domestic starts and foreign presence nature

Year	Domestic Start=1					Domestic start=0				
	Total	Foreign Exports>0				Total	Foreign Exports=0			
		Same product		Other product			Same product		Other product	
		Same country	Other country	Same country	Other country		Same country	Other country	Same country	Other country
1997	83818	5688	55047	71753	83818	776830	17230	444238	581812	776830
2006	159318	13001	118686	146838	159318	395054	31580	250577	358320	395054
Total	1268768	94690	885055	1123626	1268768	6060088	226741	3674106	4956347	6060088
Share (%)	100	7.5	69.8	88.6	100	100	3.7	60.6	81.8	100

7. APPENDIX

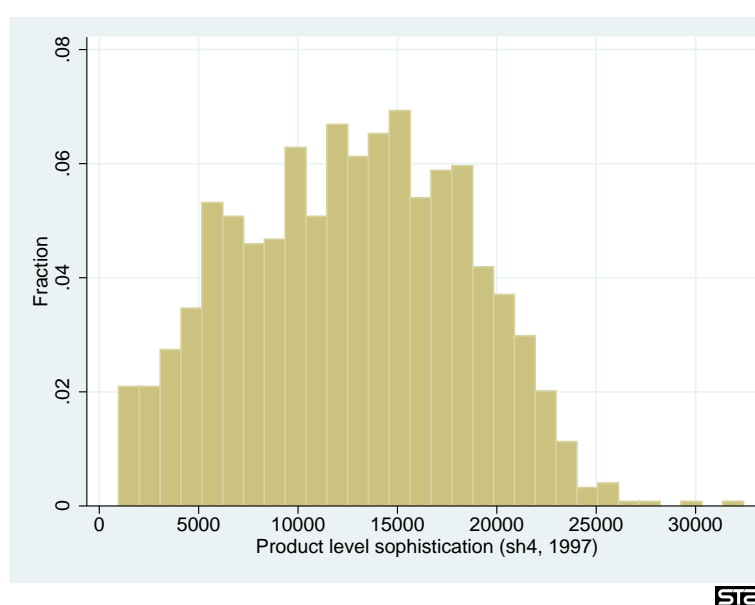
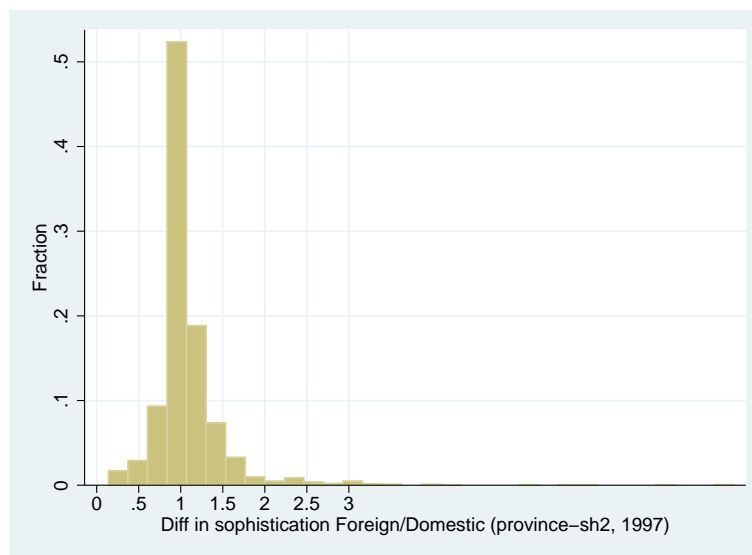


Figure 1 – Density of product-level export sophistication, 1997. Source: Authors' computations based on Chinese customs, BACI and WDI.



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Figure 2 – Density of Foreign-Domestic ODT export sophistication, 1997. Source: Authors' computations based on Chinese customs, BACI and WDI.

Table 10 – Marginal impact-Summary

	All sample	ODT	PCS	Soph.	Not soph.	Low soph. gap	High soph.gap
	Col. 8	Col. 4	Col. 6	Col. 4	Col. 5	Col. 3	Col. 5
	Tab. 4	Tab. 5	Tab. 5	Tab. 7	Tab. 7	Tab. 8	Tab. 8
Foreign presence <i>per se</i>	1.6	1.53	n.s.	2.5	n.s.	2.26	n.s.
Foreign exp. val	0.04	0.04	n.s.	0.02	0.05	0.03	0.05

Figures correspond to the increase in the average probability that domestic firms start exporting in a product/country pair when foreign firms' exports are positive for this product/country pair (first row) and when foreign firms' exports rise by 10% (second row).

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