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Product relatedness and firm exports in China*

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Abstract

We propose the first evaluation using micro-level data of the expected growth gains from the consistency of activities with local comparative advantage. Using firm level data from Chinese customs over 2000-2006, we investigate the relationship between the export performance of firms and how their products relate to local comparative advantage. Our key indicator measures the density of the links between a product and the local product space. It hence combines information on the intrinsic relatedness of a good with that on the local pattern of specialization. Our results indicate that exports grow faster for goods that have denser links with those currently produced in the firm's locality. The density of links between products thus seems to yield export-enhancing spillovers. We however also show that this positive effect of product relatedness on export performance is mainly limited to ordinary trade activities and domestic firms. It is also stronger for more productive firms, suggesting that spillover diffusion may be hindered by insufficient absorptive capacity.

JEL: J10, J14, O14
Keywords: product space, density, spillovers, export performance, China.

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1 Introduction

One of the most impressive dimensions of China's stellar export performance is the rapid diversification of the exports of its products. Since the 1980s, products "Made in China" have pervaded all sectors of world trade, including those that are typically considered to belong to the specialization areas of more developed countries, such as high-tech electronics and computers (Rodrik, 2006; Schott, 2008). China's rapid export upgrading is especially puzzling as the production of goods requires capabilities and products which vary greatly in their knowledge requirements (Hausmann and Hidalgo, 2011). Since countries can only diversify by building on what they already have, China's export diversification suggests a particularly efficient ability to capitalize on its existing productive knowledge and exploit the links between products. Recent work has argued that the main factor behind successful upgrading is the consistency of the new industries with the country's latent (and evolving) comparative advantages (Lin, 2012).

We here empirically test this proposition using 2000-2006 Chinese firm-level data to investigate the link between export performance and the consistency of products with the local productive structure. The density of links between a product and the local product space is calculated by combining information on the local pattern of specialization and the intrinsic relatedness of the product. We thus contribute to the recent revival of literature on the role of structural transformation as an engine of economic growth (McMillan and Rodrik, 2011). The main argument is that not all products have the same degree of relatedness (and hence the same position in the product space); as a result products have different potential, notably as platforms for jumping up to new economic activities (Hausmann and Klinger,

2007a; Hidalgo et al., 2007). Greater link density between products is predicted to yield positive spillovers, such as knowledge externalities and economies of scale and scope. This relationship between production structure and economic performance has been found in a number of macro-level pieces of work: countries which are specialized in products with dense connections to other goods grow faster (Kali et al., 2010; Hidalgo et al., 2007).

The analysis we propose here is micro-level. We exploit Chinese firm-level data to see whether the product space also matters at the level of individual exporters. To the best of our knowledge, this is the first analysis of the efficiency gains from product spillovers on firm export performance. Analogously to the country-level effect, we expect link density between products to yield a premium for products that are close to those in the local export basket. The underlying idea is that they will then share similar requirements in terms of institutions, infrastructure, resources, technology, or some combination thereof. Products with denser connections to the local productive structure should grow faster as they can capitalize on existing local capabilities.

We focus on export growth to measure economic performance. Our analysis thus connects the macro literature on the links between productive structure and development to the micro literature on firm-level export performance. Our work follows recent efforts to understand the drivers of firm product mix (Bernard et al., 2010) and is consistent with models of endogenous within-firm (between products) activity reallocation. We focus on the role of product spillovers in the dynamics of product-level exports. By doing so, we confirm the findings in Bernard et al. (2010) that the within-firm allocation of export activity between products reflects not only firm- and product-level determinants but also factors combining these firm and product dimensions.

Our analysis differs from this existing cross-country work in a number of dimensions. First, we conduct micro-level analysis based on firm-level export data, and hence propose a mechanism via which the productive structure can fuel greater per capita GDP growth. Second, we analyze China to shed light on the country's export performance and rapid upgrading. Our work helps us to understand the ongoing increasing specialization of China's exports (Amiti and Freund, 2010) and highlights the role of product consistency with the local productive structure. Our empirical results suggest that products that are closer to the local export basket receive a premium in firm export bundles. This is consistent with economies of scale and scope and knowledge spillovers from product-level relatedness. Product spillovers produce export upgrading as producers move through the product space by reallocating their activity towards these connected goods.

Third, we consider potential heterogeneity in the impact of product-level connections with the local productive structure according to firm ownership (foreign or domestic)[1], trade type (processing or ordinary) and firm productivity. We thus contribute to the recent literature on the particularities of processing trade (Manova and Yu, 2012; Dai et al., 2011). A number of pieces of work have emphasized the lack of connection between ordinary activities and those based on imported technology and foreign affiliates (Lemoine and Unal-Kesenci, 2004; Hale and Long, 2011; Blonigen and Ma, 2010). It is argued that this may explain the disappointing results obtained in terms of technological diffusion from processing and foreign activities in China. Fewer spillover gains may emanate from processing and foreign activities as they are less embedded in the local economy. In addition, the distinct functioning of

[1]Here and in the rest of the article, we define "foreign firms" as those with some foreign capital ownership: i.e. wholly foreign-owned firms as well as joint ventures (this latter including equity and non-equity joint ventures, and joint cooperatives).

foreign firms, which are mainly engaged in export-platform activities using imported inputs, may limit the spillovers they generate and from which they can benefit. We further investigate whether the gains from product consistency with the local structure are contingent on firm productivity. Potential spillovers may not be realized if firms do not undertake the appropriate technological effort or have limited absorptive capacity (Crespo and Fontoura, 2007). In the context of China, Li (2011) shows that firms more easily absorb domestic technological knowledge than that from foreign technology, and identify a complementarity between in-house and imported technology. We will check these relationships in the density-performance nexus and see whether the benefits from product relatedness depend on the firm ownership and firm productivity. This allows us to determine whether there are firm-level prerequisites for growth-enhancing spillovers from product specialization. Our results also establish the appropriate reference group in terms of the local productive structure for the consistency of specialization in order to maximize spillovers.

We confirm that product-level relatedness with the local productive structure plays a significant role in the export performance of Chinese firms. We show that within a firm's export basket, export growth is systematically higher for products characterized by greater consistency with local capabilities. Our estimations control for unobservable firm and product characteristics and account for agglomeration effects as well as local revealed comparative advantage. The results are robust to a variety of checks and are not confined to the most trade-oriented locations or to the firms that are the most export-orientated. The positive effect of product relatedness on firm export performance is however mainly limited to ordinary trade activities and domestic firms. Our results hence suggest that the export good basket of domestic firms is the key indicator for capabilities and spillover potential at the local

level. We further suggest that the export benefits from consistency with local comparative advantage are greater for high-productivity firms. This is consistent with impediments to spillovers related to the limited absorption capacity of firms. Product spillovers are hence no substitute for insufficient productivity.

The remainder of the paper is structured as follows. The next section presents the data and variable construction. Section 3 then presents our empirical specification and discusses the results. Last, Section 4 concludes.

2 Indicators and Data

Our objective here is to quantify the relatedness between products that are traded in the global economy and to analyze its role in the reshaping of the structure of production in the particular case of China. We hence compute the bilateral relatedness between products and link this to the productive structure of Chinese cities.

2.1 Product relatedness

To calculate the intrinsic relatedness between products, we appeal to the Product Space representation developed by Hausmann and Klinger (2007a) and Hidalgo et al. (2007). The Product Space is a network that formalizes the notion of relatedness between products traded in the global economy.

We use the Hidalgo et al. (2007) indicator of proximity based on co-exporting probabilities in the world. A product being co-exported with another product by many countries is held to be an outcome-based measure of relatedness. This reflects the idea that

co-exporting shows similar requirements in terms of institutions, infrastructure, resources, technology, or some combination thereof. Producing and exporting computers is, for example, expected to require competencies, technology, inputs and production factors which are similar to those used to produce televisions. Hence, most countries should export both computers and televisions, yielding considerable proximity between the two products. Alternatively, since the necessary requirements for the production and export of products like cheese or natural gas are very different from those for computers, the proximity value between these two products and computers is likely only low.

Bilateral proximity (for each pair of products i and j) is calculated based on the probabilities that countries with comparative advantage in one of the goods (i or j) also have comparative advantage in the other. Revealed comparative advantages are defined using the index in Balassa (1964). A country is said to export a good with comparative advantage when the ratio of the export share of that product in the country's export basket to the analogous worldwide export share is greater than 1. We define $\Pr(i|j)$ as the ratio of the number of countries with RCA in both i and j over the number of countries with RCA in i, and $\Pr(j|i)$, the ratio of the number of countries with RCA in both i and j over the number of countries with RCA in j. We calculate proximity as the minimum of those two pair-wise conditional probabilities:[2]

$$\phi_{i,j} = min[Pr(i|j), Pr(j|i)] \tag{1}$$

This bilateral relatedness $\phi_{i,j}$ between products i and j is calculated for 5016 products,

[2]Taking the minimum of the conditional probabilities eliminates the problem arising when a country is the sole exporter of one particular good: the conditional probability of exporting any other good given this one equals one for all of the other goods exported by that country.

Table 1: Summary statistics on proximity

	Mean	Median	Bottom 5%	Top decile
Whole sample	0.14	0.13	0	0.32
Animal and vegetable products	0.11	0.10	0	0.22
Textile	0.24	0.23	0.06	0.46
Machinery / Electrical products	0.22	0.21	0.6	0.41

using data for 239 countries in 2000 from the BACI[3] world trade dataset (Gaulier and Zignago, 2010).[4] The matrix of these proximities characterizes the world product space.[5]

Table 1 provides some summary statistics while Table 2 sets out the proximity measures for some particular product pairs, providing illustrative examples of how products are related to each other. Digital computers have a proximity value of 0.02 with oil, so that over the whole sample of countries exporting computers or oil, only 2% export the other product at the same time. This low value clearly indicates distinct requirements needed for the export of the two products. On the contrary, computers have relatively high proximity (0.32) to cars, suggesting that the requirements for computer and car export are quite similar.

2.2 Product density

Our main variable of interest is density, which measures for each locality-product pair the density of links to the local productive structure. As in Hidalgo et al. (2007) and Kali et al. (2010), density for good i and locality l (Density_i^l) is calculated as the average of

[3]This dataset, constructed using original COMTRADE data, provides bilateral trade flows. The BACI dataset is downloadable from http://www.cepii.fr/anglaisgraph/bdd/baci.htm

[4]The flow dataset is constructed using an original procedure that reconciles the declarations of exporters and importers. The harmonization procedure enables us to extend considerably the number of countries for which trade data are available, as compared to the original dataset.

[5]The product-space framework has been used in different papers on industrial policy and economic development in developing countries. The countries covered include Chile (Hausmann and Klinger, 2007b), South Africa (Hausmann and Klinger, 2008), Ecuador (Hausmann and Klinger, 2010), Algeria (Hausmann et al., 2010) and the Kyrgiz Republic (Usui and Abdon, 2010).

Table 2: Bilateral proximity: selected pairs

	Rice	Cotton T-shirt	Colour TV	Digital computer	Cars, spark ignition engine <1000 cc
Oil	0.15	0.08	0.07	0.02	0.02
Rice		0.09	0.04	0	0.09
Cotton T-shirt			0.12	0.06	0.08
Colour TV				0.03	0.4
Digital Computer					0.32

good i's bilateral proximities with the other goods that locality l exports with comparative advantage. The indicator is calculated using the Chinese customs data aggregated to the city level:

$$Density_i^l = \frac{\sum_{j \in RCA^l=1, j \neq i} \phi_{i,j}}{\sum_{j \neq i} \phi_{i,j}} \tag{2}$$

The numerator above is the sum of good i's proximities to the products j in which locality l has revealed comparative advantage ($RCA^l = 1$), while the denominator is the sum of proximities to all of the other products that exist in the world product space. For robustness, we check that the results continue to hold when we use the Chinese instead of the World product space as the reference in order to calculate the RCAs. We also verify that similar findings are obtained when only ordinary trade flows are considered and when all products are taken into account. In this latter check we compute the density index as:

$$Density_i^l = \sum_{j, j \neq i} \frac{export_j^l}{\sum_j export_j^l} \phi_{i,j} \tag{3}$$

High density values indicate that locality l has comparative advantage in many goods

that are closely related to product i: this product is then densely connected to its locality's product structure. As in Kali et al. (2010)[6] and Hidalgo et al. (2007) density is considered as a proxy for product spillovers emanating from consistent specialization, such as knowledge externalities and economies of scale and scope spillovers.

3 Empirical estimations

3.1 Empirical specification

Our estimations focus on the impact of product-level density of links to the local product space on the export performance of Chinese firms between 2000 and 2006 compiled by the Chinese Customs Trade Statistics (CCTS)[7].

Our dependent variable is the log of the export value of product k from firm f in locality l in 2006. This is regressed on the 2000 value of the same variable, the first year in our sample, and the density indicator for locality l and product k in 2000, as presented in Section 2. Our specification is:

$$\ln X^f_{k,2006} = \alpha \ln X^f_{k,2000} + \beta \ln Density^l_{k,2000} + \gamma Z^l_{k,2000} + \delta_f + \eta_k + \epsilon^f_k \tag{4}$$

We consider, in line with Bernard et al. (2010), three broad determinants of firm product-level export performance: factors that are product-specific but common to all firms; factors that are specific to firms but common to products; and factors that are idiosyncratic to firm-

[6]In Kali et al. (2010) the key indicator is a weighted average of density across products measured at the location level. This differs from our density measure which has both location and product dimensions.

[7]This records all merchandise transactions passing through Chinese customs and contains basic firm information (name, address, ownership, etc.), product code (8-digit), and destination country. We collapse the data to 6-digit products for consistency with the international trade data from BACI.

product pairings. The first product-specific category corresponds to factors such as changes in relative demand (i.e. evolving tastes) or relative supply (i.e. technological changes). The second firm-specific category includes factors such as firm size, productivity, diversity of the export basket or the charisma of their founder. We account for these firm- and product-characteristics via fixed effects (δ_f and η_k respectively). Since firms do not change locations, the firm fixed effects indirectly account for any location-specific features, such as endowments, governance, income or export performance.

The third category of explanations, into which our density indicator falls, includes firm-product characteristics. Since the density indicator is calculated as the average of good k's bilateral proximities with the other goods that locality l exports with comparative advantage, the export value of product k from firm f does not enter in the computation. The coefficient β on the density indicator captures the influence that product-level linkages with the local productive structure have on firm-level performance. The firm- and product-specific fixed effects already capture any scope economies common to all firms for a given product or to all products for a given firm. An abundant empirical literature on export spillovers (Aitken et al., 1997; Greenaway et al., 2004) have evidenced the positive impact of the number of surrounding exporters and foreign firms on firm-level export performance. These dimensions are captured in the firm fixed effects. The firm dummies also capture the impact of the typical proxies for scope economies in the firm export basket: the number of products the firm exports, its total export volume etc. Our estimations thus focus on density of the linkages between a product and the local specialization (which is a product-locality specific feature). Moulton (1990) showed that a regression of individual variables on aggregate variables may produce a downward bias in the estimed standard errors. All of our regressions are thus

clustered at the level of aggregation of the density indicator (locality-product).

Our conditioning set Z is made of two categories of variables in the Z vector. All indicators are computed using values for 2000, the initial year of our sample. We first include proxies for product-specific export spillovers and scope economies in the firm export bundle. Koenig et al. (2010) suggest that agglomeration effects are product specific. We include the number of exporters in the locality which export the same product to account for market and non-market interactions between exporting firms. We also want to account for the externalities occurring in the firm export basket for a given product. These can emerge from cost-sharing devices or information transfers between the various destinations of the firm's exports. We introduce the number of countries to which a firm exports the product under consideration.

Second, we control for supply-side determinants by introducing proxies for local export intensity and comparative advantage. Although the firm fixed effects control for overall export-orientation and the particular conditions of the firms' locality, they do not account for the possibility that firms in locality l enjoy a systematic advantage in exporting a given product k, due to a specific ability that the locality developed over time or specific development strategies implemented by local authorities for this product. Firm fixed effects only take into account these unobserved factors if they affect firms' export performance equally for all products. To control for the possibility that local endowments influence product-level exports differentially, we further introduce the log of the locality product export sales in 2000. As an alternative proxy for local specialization, we also use the Balassa index of revealed comparative advantage at the locality-product level. A higher Balassa index reflects a greater comparative advantage of locality l in product k, with respect to the rest of China.

Our final sample covers 107,663 product observations for 11,458 firms located in 294 cities. The summary statistics of all of the variables used in the regressions appear in Table 9 in the Appendix.

3.2 Results

3.2.1 Benchmark

Table 3 shows the estimation results for Equation 4. Our benchmark regression is in Column 1, where we regress the firm-level export value in 2006 on the initial export value in 2000 and product density in 2000. Columns 2 to 4 add controls for agglomeration and comparative advantage. The values of all explanatory variables refer to those in the first year of our data (2000).

Overall, the coefficients on the control variables have the expected signs. That on initial export value is positive and significant with a value below 1 indicating convergence across products in the firm's export basket. This finding is in line with that in Hwang (2007). Our measure of agglomeration economies (number of exporters of the same product in the locality) enters with a positive and significant coefficient. Whether proxied by local export sales or revealed comparative advantage, local specialization positively and significantly affects export performance. In column 4, we further add the number of destinations to which the firm exports the product. This helps to account for scope economies (across destinations) and also acts as a proxy for the firm's export performance for a given product. The firm-product level proxy of export performance enters with the expected positive and significant sign.

Table 3: Density and firm-level exports (2000-2006)

Dependent variable	Ln Firm-product level export value in 2006						
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Initial Ln Firm export (HS6 product)	0.394^a	0.374^a	0.391^a	0.319^a	0.319^a	0.320^a	0.316^a
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Ln Product density (city, w/r World)	1.446^a	0.847^a	1.295^a	1.123^a		1.056^a	0.650^a
	(0.155)	(0.158)	(0.157)	(0.155)		(0.157)	(0.159)
Ln Product density (city, w/r China)					1.179^a		
					(0.125)		
Ln city-product export	0.182^a						
	(0.008)						
RCA index (city-product)			0.00006^a	0.00005^a	0.00004^a	0.00005^a	0.00005^a
			(0.00002)	(0.00002)	(0.00001)	(0.00002)	(0.0002)
No. of exporters (city-product)		0.001^a	0.002^a	0.002^a	0.002^a	0.002^a	0.002^a
		(0.0003)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0004)
No. of countries (firm-product)				0.066^a	0.066^a	0.066^a	0.065^a
				(0.002)	(0.002)	(0.002)	(0.002)
Av. density (firm-other products)						-0.671^a	
						(0.229)	
Av. proximity (firm-other products)							0.819^a
							(0.058)
Fixed effects	Firm fixed effects and product (HS6) fixed effects						
R^2	0.31	0.31	0.31	0.32	0.32	0.32	0.32
Observations	107,663						
Number of firms	11,458						

Notes: heteroskedasticity-robust standard errors are shown in parentheses; ^{a}, ^{b} and ^{c} respectively denote significance at the 1%, 5% and 10% levels; the regressions are corrected for clustering at product-locality level. The values of all explanatory variables refer to those in the first year of our data (2000).

In all of the specifications, the coefficient on the density indicator is positive and significant at the 1% level. This indicates that for a given firm export performance is higher for products with denser connections to the local productive structure. In columns 1 to 4, the density indicator is computed for each prefecture using the World Product Map, i.e. the numerator in Equation 2 only considers the products for which the prefecture has a comparative advantage with respect to the World. In column 5, we instead rely on the China Product Map, so that prefecture-level comparative advantage is calculated using China as the reference. Our results do not seem to depend on the reference (the World or China) chosen to define comparative advantage: the density variable has virtually the same coefficient in columns 4 and 5. In column 6, we further include the firm-specific weighted average of

the density of the other products in order to account for potential scope economies across products within the firm.[8] This enters with a significant negative coefficient suggesting that competition rather than positive feedback prevails between products in the firm's export basket. This new variable does not alter the size and significance of the density indicator. In column 7, we control for the average proximity between the good i under consideration and the other goods j exported by the firm. It is computed as the average of bilateral proximities $\phi_{i,j}$ as defined in Equation 1. This measure of product-level scope economies enters with the expected positive sign indicating that greater proximity between a product and the rest of the firm export bundle yields export growth gains. These benefits however exist in parallel to the positive effect of density of links with the local structure.

We can interpret the magnitude of the estimated coefficients. Using results of Column 4 as our preferred specification, we compute that, holding other factors constant, a 10% increase in product density raises the export value 6-year later by about the same magnitude.

3.2.2 Robustness checks

In Table 4 we check the robustness of our results. We first see whether our results hold after excluding some particular geographic zones. As emphasized in the literature on Chinese export performance (Amiti and Freund, 2010; Wang and Wei, 2010), a number of Chinese localities are clearly different from the others, in terms of location and policy particularities which have made them richer, faster-growing, more open, and more likely to host firms with rapid export growth. Four prefectures (Beijing, Tianjin, Shanghai and Chongqing), known as the four "super cities", have for example been granted province-level status. In column

[8]The weights for each product correspond to its share in the firm's residual exports.

1 of Table 4 we verify that our results continue to hold when excluding those locations that are characterized by enhanced political autonomy and smaller size.

Table 4: Density and firm-level exports - Robustness checks

Dependent variable	Ln Firm-product level export value in 2006										
	No 4 super cities	No interior cities	No policy zones	W/o top & bottom 1% exporting cities	W/o cities with average density in top & bottom decile	only cities with no. of exporters >2	W/o firms in top & bottom 1% in export	W/o firms in top & bottom 1% in terms of exports growth	W/o firms with average density in top & bottom decile	No agric. or mining	Period 2000-01 to 2005-06
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Initial Ln Firm export	0.32^a	0.32^a	0.30^a	0.30^a	0.33^a	0.31^a	0.32^a	0.32^a	0.32^a	0.32^a	0.41^a
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Ln Product density	1.11^a	1.09^a	1.62^a	0.65^a	1.32^a	1.39^a	0.65^a	1.23^a	1.50^a	1.14^a	0.83^a
	(0.16)	(0.17)	(0.22)	(0.18)	(0.19)	(0.19)	(0.10)	(0.16)	(0.18)	(0.16)	(0.13)
RCA index	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
No. of exporters	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
No. of countries	0.07^a	0.07^a	0.07^a	0.07^a	0.07^a	0.07^a	0.07^a	0.07^a	0.07^a	0.07^a	0.06^a
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	Firm fixed effects and product (HS6) fixed effects										
R^2	0.32	0.32	0.32	0.32	0.34	0.32	0.32	0.33	0.33	0.32	0.37
Observations	104530	100336	79675	89342	81640	95732	79495	101142	86117	104746	143113

Notes: heteroskedasticity-robust standard errors are shown in parentheses; ^{a}, ^{b} and ^{c} respectively denote significance at the 1%, 5% and 10% levels; the regressions are corrected for clustering at the product-locality level. The values of all explanatory variables refer to those in the first year of our data (2000).

Column 2 checks in turn that the results are not driven by observations from interior provinces. The literature on China has underlined an interior-coast divide. Interior locations are considered to be significantly different from the rest of the country: they have more inward-oriented economies and limited success in attracting foreign investment.

Despite the smaller number of firms when observations from those zones are dropped, the firm-level growth elasticity of density remains significant and of the same size as before, so that the relationship between product relatedness to local productive structure and export growth is not driven by these particular locations. Column 3 reports the results after focusing on special policy zones which account for a dominant share of exports in China. As described in Wang and Wei (2010), such zones were created by the government, starting in 1979 in Guangdong, in order to promote industrial activity, innovation and exports.[9] They offer low-tax regimes and faster administrative procedures to favor industrial clustering. Since special policy zones contain most Chinese export activity, we should check that our results hold for exporters in these locations. Our estimates are again robust to restricting the sample to these most trade-oriented locations. The coefficient on product density is higher here at 1.62. In the following three columns we exclude cities according to different criteria to see whether that extreme values are behind our results. In column 4 the criterion is the level of total exports in 2000 (excluding the top and bottom percentiles of exporting cities) and in column 5 average density (excluding observations in the top and bottom deciles).[10] In column 6, we exclude observations when there are fewer than three firms exporting the product considered

[9] We use the list established by Wang and Wei (2010). It includes the four types of policy zones established by the Chinese government: special economic zones (SEZs), Economic and Technological Development Areas(ETDAs), Hi-Technology Industry Development Areas (HTIDA), and Export Processing Zones (EPZs).

[10] The average density in a given location is computed as the weighted average of the product density in the city's export basket, with the weights being the product's export share.

in the city. Our results are robust to these tests. We also consider robustness with respect to excluding outlying firms. Column 7 deletes observations from top and bottom percentile exporting firms in 2000. In column 8 the criterion is the growth in the firm's exports between 2000 and 2006. In column 9, we drop observations in the top and bottom deciles of the average density at the firm level.[11] Our density variable remains positive and significant throughout, attesting to the robust association between export growth and consistency with local comparative advantage. In column 10, we delete observations for agricultural and mining products. The point estimate of the coefficient on the density variable is unchanged, indicating that our results do not simply reflect local natural endowments. The final column of Table 4 addresses the issue of zero export flows. As has been well-documented, there is a great deal of churning in firms' export activities (Eaton et al., 2008). Our regressions consider only firm-product pairs for which the export value is positive in 2000 and 2006. We find that 6.3% of the firm-product pairs with positive exports in 2000 but reporting zero exports in 2006 have non-zero exports in 2005. The figure is 3.1% for firms exporting in 2006 reporting zero exports in 2000 but strictly positive exports in 2001. We want to make sure that our finding of a significant effect of density on export growth is not only capturing a particular time event between 2000 and 2006. In column 10, we look at the export growth rate between the average value in 2000 and 2001 and the average export value in 2005 and 2006. As expected the sample size increases but our results (for our variable of interest and the control variables) remain similar. Overall, our results are consistent with the idea that products that are closer to those constituting the local export basket are put at an

[11]The firm's average density is computed as the weighted average of the product density in the firm's export basket in 2000, with the weights being the product's export share.

advantage within a firm's export bundle: they are characterized by faster export growth as firms reallocate their activities towards them.[12]

3.2.3 Firm-ownership type and trade type heterogeneity

We now assess whether the relationship between product relatedness and exports depends on the ownership type (domestic or foreign) of exporting firms and the trade regime (processing or ordinary). One interesting feature of the customs dataset is that it allows us to identify whether the export flows emanate from domestic or foreign firms,[13] and correspond to processing or ordinary trade.[14] Processing trade includes all that from firms operating in the assembly sector, which import inputs in order to process them in China and re-export the final products (these producers benefit from a preferential tax regime on imported inputs). In 2006, 53% of Chinese exports were from the processing-trade sector. The processing trade is dominated by foreign entities: in 2006, these accounted for roughly 80% of processing-trade exports.

A number of pieces of work have emphasized the disconnection between ordinary activities and those based on imported technology and foreign affiliates (Lemoine and Unal-Kesenci, 2004; Hale and Long, 2006; Blonigen and Ma, 2010). We suspect that firms engaged in the latter activity are less embedded in their local environment, and consequently that their export performance relates less to the adequation between their products and the local

[12]In unreported results available upon request, we check that our main message holds when defining products at the 4-digit level of the harmonized system instead of the 6-digit level.

[13]The data are reported separately by firm type, including foreign-owned firms, Sino-foreign joint ventures, collective firms, private firms and state-owned firms. We consider the first two categories as foreign and the other three as domestic.

[14]The data also refer to a third ("Others") category that covers other flows such as Aid, border trade and consignment. This overall represents less than 1% of total trade value. When we consider the processing/ordinary trade distinction, this category is dropped.

productive structure.

Table 5 distinguishes between domestic firms and foreign firms when looking at product spillovers and exports. In columns 1 and 2 we calculate two density indices according to whether the city's domestic or foreign export bundle is used as the reference to identify the revealed comparative advantage in Equation 2. We continue to find a positive (although weaker) association between density and export performance when the former is calculated using the specialization pattern of domestic firms. By way of contrast the impact is negative when we use foreign firms as the reference. The following columns in Table 5 consider the association between product density and export performance separately for domestic (columns 3 to 6) and foreign (columns 7 to 10) firms.

The results are robust whatever the time span considered, and suggest that consistency of the firm's products with the local productive structure is export-enhancing only for domestic firms. Table 6 explores one possible explanation for the lack of any relationship for foreign firms: a considerable proportion of foreign-firm trade is made up of processing trade. In Table 10 we check that this result holds when we use alternative definition of the density of linkages between products. In column 1 the density measure is computed as the weighted average of bilateral proximities following Equation 3. In columns 2 and 3, the density indicator follows Equation 2 but only takes into account ordinary trade flows. While in column 2 the comparative advantage index is computed based on all trade flows, it only covers ordinary trade flows in column 3. The positive association between density and export performance remains when looking at all firms and when focusing on domestic firms (columns 4 to 6). However as with the benchmark indicator, when restricting the sample to foreign firms the coefficient on product density becomes insignificant. The lack of association

between density and export performance may then simply reflect that the growth in the value of foreign-firm exports relates mainly to the value and quality of their imported inputs and to strategies used in the international division of production. As firms engaged in processing trade "simply" import inputs and re-export the transformed product, we can imagine that they are less embedded in their direct environment and consequently do not react to product-level externalities.

Table 6 distinguishes exports by type: columns 1 and 2 cover all firms and refer to ordinary (ODT) and processing (PCS) export flows respectively, while columns 3 and 4 focus on domestic firms, and columns 5 and 6 foreign firms.

Table 5: Density and firm-level exports: ownership heterogeneity

Dependent variable	Ln Firm-level export value									
Time period	2000-2006									
Firm ownership type	All		Domestic				Foreign			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Initial Ln Firm export	0.32^a	0.32^a	0.26^a	0.26^a	0.26^a	0.26^a	0.40^a	0.40^a	0.40^a	0.40^a
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Ln Product density			1.38^a				0.16			
			(0.17)				(0.36)			
Ln Product density - Domestic	0.04^c			0.43^a		0.43^a		-0.01		-0.01
	(0.03)			(0.11)		(0.11)		(0.03)		(0.03)
Ln Product density- Foreign		-0.08^a			-0.07^a	-0.07^a			0.25	0.25
		(0.01)			(0.01)	(0.01)			(0.16)	(0.16)
RCA index	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a		0.01^a	0.01^a	0.01^a	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)	
RCA index - Domestic						0.01				0.01
						(0.01)				(0.01)
RCA index - Foreign						0.01				0.01
						(0.01)				(0.01)
No. of exporters	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a	0.01^a
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
No. of countries	0.07^a	0.07^a	0.07^a	0.07^a	0.07^a	0.07^a	0.07^a	0.07^a	0.07^a	0.07^a
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
	Firm fixed effects and product (HS6) fixed effects									
R^2	0.32	0.32	0.32	0.32	0.32	0.32	0.42	0.42	0.42	0.42
Observations	107663	107663	71642	71642	71642	71642	35468	35468	35468	35468

Note: heteroskedasticity-robust standard errors are shown in parentheses; ^{a}, ^{b} and ^{c} respectively denote significance at the 1%, 5% and 10% levels; the regressions are corrected for clustering at the product-locality level. The values of all explanatory variables refer to those in the first year of our data (2000).

The results consistently show that the positive effect of product density on export growth is mainly found for the ordinary export activities of domestic firms. There is seemingly no export value growth premium for processing (PCS) trade flows: the estimated coefficients are either insignificant (for all firms or for foreign firms) or only significant at the 10% confidence level when restricting the sample to domestic firms. We verify in Table 11 that our main results are robust to the exclusion of intermediary firms. We follow Ahn et al.'s (2011) approach to identify them based on Chinese characters that have the English-equivalent meaning of "importer", "exporter", and/or "trading" in the firm's name.[15] The density of links between the exported product and the local productive structure is on the contrary linked with faster export growth for ordinary transactions. The decomposition by firm type shows that the average export premium is only relevant for domestic firms. Our results are consistent with ordinary trade activities being more embedded in the Chinese industrial context. They thus support work recommending that assembly trade and foreign entities be distinguished from ordinary trade and domestic exporters for the analysis of the structure, determinants and consequences of Chinese export performance (Schott, 2008; Jarreau and Poncet 2012). More concretely, our findings underline the distinctive functioning of the export-platform activities of foreign firms compared to the ordinary exports of domestic firms. From a policy perspective, they suggest that export promotion should concentrate on products which correspond to local domestic core competencies.

[15]In pinyin (Romanized Chinese), these phrases are: "jin4chu1kou3", "jing1mao4', "mao4yi4", "ke1mao4" and "wai4jing1".

Table 6: Density and firm-level exports - Trade type heterogeneity

Dependent variable	Ln Firm level export value in 2006					
Firm ownership type	All firms		Domestic firms		Foreign firms	
Trade type	ODT	PCS	ODT	PCS	ODT	PCS
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Initial Ln Firm export (HS6)	0.245^a	0.404^a	0.216^a	0.390^a	0.345^a	0.391^a
	(0.005)	(0.009)	(0.005)	(0.014)	(0.014)	(0.011)
Ln Product density (city, w/r World)	0.889^a	0.469	0.969^a	0.874^c	1.004	0.365
	(0.188)	(0.354)	(0.202)	(0.486)	(0.615)	(0.542)
RCA index (city, w/r World)	0.001^a	0.001	0.001^a	0.001	0.001	0.001^b
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
No. of exporters (city HS6)	0.004^a	0.002^a	0.004^a	0.003^a	0.002^b	0.001^a
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Firm-product level nb of countries	0.075^a	0.045^a	0.075^a	0.033^a	0.078^a	0.052^a
	(0.002)	(0.003)	(0.002)	(0.003)	(0.007)	(0.007)
	Firm fixed effects and product (HS6) fixed effects					
Observations	78087	31205	61904	10131	16183	21074
R^2	0.299	0.427	0.307	0.557	0.423	0.398

Notes: heteroskedasticity-robust standard errors are shown in parentheses; ^{a}, ^{b} and ^{c} respectively denote significance at the 1%, 5% and 10% levels; the regressions are corrected for clustering at product-locality level. The values of all explanatory variables refer to those in the first year of our data (2000).

3.2.4 The role of firm-level efficiency

We now investigate heterogeneity in the effect of product density as a function of the exporting firm's productivity. This is an important issue. As foreign firms have been shown to be much more productive than domestic firms in China, an alternative interpretation of weak effect of product density for foreign firms (and in processing trade, which is dominated by foreign firms) is that adequation with the local productive structure is unimportant for the export performance of the most productive firms. We can test this argument by comparing high- and low-productivity firms. Another rationale for this test relates to absorptive capacity. A number of pieces of work have identified limited absorptive capacity and the absence of appropriate technological effort as undermining spillovers (Crespo and Fontoura, 2007).

As absorptive capacity is likely proportional to productivity, we expect the link between density and export performance to rise with firm efficiency. We consider three alternative proxies for firm-level efficiency in the customs dataset: the number of product-country pairs covered by the firm's exports; the number of products the firm exports; and the number of countries to which the firm exports. These are calculated for the year 2000.

Table 7 splits the sample by initial exporter productivity. We use two alternative cut-offs: the mean and the median. The estimated coefficient in odd columns (high-productivity exporters) is always higher than that in even columns (low-productivity exporters). The product-level spillovers related to adequation with the local productive structure are thus especially important for high-productivity exporters. Table 8 reproduces Table 7 for domestic firms only, where the respective cut-offs now also only refer to domestic firms. The results are unchanged, with the estimated coefficient being roughly four times higher for high-

productivity firms. In unreported results we considered heterogeneity for foreign-owned firms.[16] These confirm the insignificance of product density for foreign firms whatever the productivity level. The conditional effect of product density by initial exporter productivity is thus particular to domestic firms. Our findings therefore suggest that spillover diffusion can indeed be hindered by insufficient absorptive capacity.

[16]Firms are here split into high and low productivity using the cut-offs calculated using only foreign firms.

Table 7: Heterogeneity by firm productivity: all firms

Dependent variable:	Ln Firm Export value of product k in 2006												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
		No. product/country				No. products				No. of countries			
		Mean		Median		Mean		Median		Mean		Median	
		$<$	$\geq$	$<$	$\geq$	$<$	$\geq$	$<$	$\geq$	$<$	$\geq$	$<$	$\geq$
Initial Ln Firm export (product)	0.320^a	0.338^a	0.232^a	0.375^a	0.243^a	0.340^a	0.234^a	0.379^a	0.240^a	0.367^a	0.236^a	0.370^a	0.242^a
	(0.004)	(0.005)	(0.008)	(0.006)	(0.006)	(0.005)	(0.008)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Ln product density	1.123^a	0.658^a	2.665^a	0.735^a	1.598^a	0.670^a	2.302^a	0.755^a	1.610^a	0.589^a	1.737^a	0.487^b	1.831^a
(city, w/r World)	(0.155)	(0.185)	(0.294)	(0.240)	(0.208)	(0.189)	(0.279)	(0.247)	(0.204)	(0.228)	(0.219)	(0.242)	(0.209)
RCA index (city, w/r World)	0.001^a	0.001^a	0.004^a	0.001^a	0.001^a	0.001^a	0.003^a	0.001^a	0.001^a	0.001^b	0.001^a	0.001^a	0.001^a
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
No. of exporters (city-product)	0.002^a	0.002^a	0.004^a	0.001^a	0.004^a	0.002^a	0.005^a	0.001^a	0.003^a	0.002^a	0.003^a	0.001^a	0.003^a
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
No. of countries	0.066^a	0.073^a	0.059^a	0.078^a	0.067^a	0.071^a	0.060^a	0.071^a	0.067^a	0.090^a	0.068^a	0.096^a	0.068^a
(firm-product)	(0.002)	(0.003)	(0.002)	(0.004)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.004)	(0.002)	(0.004)	(0.002)
Observations	107663	78879	28784	53821	53842	78042	29621	53771	53892	57159	50504	53821	53842
R^2	0.321	0.328	0.397	0.370	0.337	0.333	0.385	0.380	0.331	0.360	0.345	0.361	0.345

Notes: heteroskedasticity-robust standard errors are shown in parentheses; ^{a}, ^{b} and ^{c} respectively denote significance at the 1%, 5% and 10% levels; the regressions are corrected for clustering at product-locality level. The values of all explanatory variables refer to those in the first year of our data (2000).

Table 8: Heterogeneity by firm productivity: domestic firms

Dependent variable:	Ln Firm Export value of product k in 2006												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
		No. product/country				No. products				No. of countries			
		Mean		Median		Mean		Median		Mean		Median	
		$<$	$>$	$<$	$>$	$<$	$>$	$<$	$>$	$<$	$>$	$<$	$>$
Initial Ln Firm export (product)	0.263^a	0.255^a	0.251^a	0.270^a	0.238^a	0.267^a	0.233^a	0.271^a	0.235^a	0.274^a	0.232^a	0.276^a	0.231^a
	(0.005)	(0.006)	(0.009)	(0.007)	(0.007)	(0.006)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Ln product density	1.399^a	0.822^a	3.267^a	0.550^b	2.359^a	0.778^a	2.635^a	0.583^b	2.388^a	1.010^a	1.931^a	0.994^a	1.915^a
(city, w/r World)	(0.172)	(0.199)	(0.379)	(0.243)	(0.256)	(0.218)	(0.302)	(0.243)	(0.256)	(0.239)	(0.255)	(0.240)	(0.255)
RCA index (city, w/r World)	0.001^a	0.001^a	0.004^a	0.001^a	0.002^a	0.001^a	0.004^a	0.001^a	0.002^a	0.001^a	0.001^a	0.001^a	0.001^a
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
No. of exporters (city-product)	0.003^a	0.003^a	0.005^a	0.003^a	0.004^a	0.003^a	0.005^a	0.002^a	0.005^a	0.003^a	0.004^a	0.003^a	0.004^a
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
No. of countries	0.069^a	0.076^a	0.056^a	0.080^a	0.063^a	0.075^a	0.060^a	0.078^a	0.062^a	0.086^a	0.064^a	0.086^a	0.065^a
(firm-product)	(0.002)	(0.003)	(0.002)	(0.004)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.004)	(0.002)	(0.004)	(0.002)
Observations	71890	51023	20867	35869	36021	44526	27364	35867	36023	35435	36455	34 668	37222
R^2	0.318	0.308	0.436	0.328	0.368	0.318	0.395	0.334	0.362	0.330	0.366	0. 331	0.364

Notes: heteroskedasticity-robust standard errors are shown in parentheses; ^{a}, ^{b} and ^{c} respectively denote significance at the 1%, 5% and 10% levels; the regressions are corrected for clustering at product and locality level. The values of all explanatory variables refer to those in the first year of our data (2000).

4 Conclusion

We here propose the first evaluation using micro-level data of the expected growth gains from the consistency of activities with local comparative advantage. Using firm level data from Chinese customs over 2000-2006, we investigate the relationship between the export performance of firms and how their products relate to local comparative advantage. Our key indicator measures the density of the links between a product and the local product space. It hence combines information on the intrinsic relatedness of a good with that on the local pattern of specialization. Our results indicate that exports grow faster for goods that have denser links with those currently produced in the firm's locality. This is consistent with the density of links between products giving rise to export-enhancing spillovers. We however find that this positive export effect is mainly limited to domestic firms and ordinary trade activities. This is consistent with the firms (mostly foreign) which are engaged in processing trade activity being less embedded in their local environment, and consequently their export performance being less related to the adequation of their products to the local productive structure. Moreover, this relationship is stronger for more productive firms, indicating that spillover diffusion is contingent upon sufficient absorptive capacity.

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Appendix

Table 9: Summary statistics N=107663

Variable	Mean	Std. Dev.	Min.	Max.
Firm-product export value 2006 (million $)	1.4	25.7	0.1	4,480
Firm-product export value 2000 (million $)	0.7	5.41	0.1	517
RCA index (product-locality)	33.84	628.10	0.1	87,589
City-product export value (million $)	18	105	0.1	338
Density (product-locality)	0.198	0.076	0.002	0.46
Density (product-locality) Domestic	0.207	0.077	0.002	0.44
Density (product-locality) Foreign	0.112	0.044	0.001	0.28
No. exporters (product-locality)	39.33	63.39	1	754
No. countries (firm-product)	3.56	5.41	1	91

Table 10: Density and firm-level exports (2000-2006) Alternative indicators

Dependent variable	Ln Firm-product level export value in 2006								
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Density	Share	ODT	ODT	Share	ODT	ODT	Share	ODT	ODT
Firm ownership	All firms			Domestic			Foreign		
Initial Ln Firm export (HS6)	0.320^a	0.315^a	0.315^a	0.263^a	0.258^a	0.258^a	0.405^a	0.402^a	0.402^a
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.008)	(0.008)	(0.008)
Ln Product density (city, w/r World) Weighted sum	0.643^a			0.806^a			-0.279		
All products	(0.073)			(0.080)			(0.172)		
Ln Product density (city, w/r World) ODT		0.871^a	0.871^a		1.018^a	1.019^a		0.328	0.328
		(0.162)	(0.162)		(0.179)	(0.179)		(0.376)	(0.377)
RCA index (city, w/r China)	0.000^a	0.000^a		0.000^a	0.000^a		0.000	0.000	
	(0.000)	(0.000)		(0.000)	(0.000)		(0.000)	(0.000)	
RCA index ODT (city, w/r China)			0.000^a			0.000^a			0.000
			(0.000)			(0.000)			(0.000)
Nb of exporters (city HS6)	0.002^a	0.002^a	0.002^a	0.004^a	0.004^a	0.004^a	0.001^a	0.001^a	0.001^a
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Firm-product level nb of countries	0.066^a	0.067^a	0.067^a	0.069^a	0.070^a	0.070^a	0.069^a	0.071^a	0.071^a
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.005)	(0.005)
Fixed effects	Firm fixed effects and product (HS6) fixed effects								
Observations	107612	105271	105271	72053	70927	70927	35559	34344	34344
R^2	0.321	0.320	0.320	0.321	0.319	0.319	0.418	0.418	0.418

Notes: heteroskedasticity-robust standard errors are shown in parentheses; ^{a}, ^{b} and ^{c} respectively denote significance at the 1%, 5% and 10% levels; the regressions are corrected for clustering at product-locality level. The values of all explanatory variables refer to those in the first year of our data (2000).

Table 11: Density and firm-level exports (2000-2006) without wholesalers

Dependent variable	Ln Firm-product level export value in 2006								
Model:	(1)	(2) Total	(3)	(4) ODT	(5) PCS	(6) ODT	(7) PCS	(8) ODT	(9) PCS
Firm ownership	All	Domestic	Foreign	All firms		Domestic		Foreign	
Initial Ln Firm export (HS6)	0.383^a	0.324^a	0.405^a						
	(0.006)	(0.009)	(0.008)						
Initial Ln Firm ODT export (HS6)				0.295^a		0.239^a		0.345^a	
				(0.008)		(0.011)		(0.014)	
Initial Ln Firm PCS export (HS6)					0.404^a		0.388^a		0.392^a
					(0.009)		(0.016)		(0.011)
Ln Product density (city, w/r World)	0.981^a			1.418^a	0.287	1.601^a	0.602	1.020^c	0.345
	(0.198)			(0.315)	(0.362)	(0.395)	(0.523)	(0.616)	(0.542)
Ln Product density DOM (city, w/r China)		0.853^a	-0.003						
		(0.190)	(0.029)						
Ln Product density FOR (city, w/r China)		-0.056^a	0.263						
		(0.017)	(0.161)						
Nb of exporters (city HS6)	0.002^a	0.003^a	0.001^a	0.003^a	0.002^a	0.003^a	0.003^a	0.002^b	0.001^a
	(0.0003)	(0.001)	(0.0003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.0003)
Firm-product level nb of countries	0.066^a	0.065^a	0.069^a	0.082^a	0.048^a	0.085^a	0.034^a	0.078^a	0.052^a
	(0.002)	(0.003)	(0.005)	(0.004)	(0.003)	(0.004)	(0.003)	(0.007)	(0.007)
RCA index DOM (city, w/r China)		0.000^a	-0.000^c						
		(0.000)	(0.000)						
RCA index FOR (city, w/r China)		-0.000	0.000^b						
		(0.000)	(0.000)						
RCA index (city, w/r World)	0.0001^a			0.0001	0.0001	0.0001^a	-0.0001	0.0001	0.0001^b
	(0.00001)			(0.0001)	(0.0001)	(0.00001)	(0.0001)	(0.0001)	(0.0001)
Fixed effects	Firm fixed effects and product (HS6) fixed effects								
Observations	61635	26110	35525	33917	29393	17766	8363	16151	21030
R^2	0.374	0.410	0.418	0.351	0.434	0.390	0.589	0.423	0.398

Notes: heteroskedasticity-robust standard errors are shown in parentheses; ^{a}, ^{b} and ^{c} respectively denote significance at the 1%, 5% and 10% levels; the regressions are corrected for clustering at product-locality level. The values of all explanatory variables refer to those in the first year of our data (2000).

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