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French Firms Penetrating Asian Markets : Role of Export Spillovers

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Abstract

In this study, we explore the role of export spillovers on the capacity of French firms to penetrate Asian markets. We confirm previous results, that is, the presence of other exporters raises the probability that firms start exporting a given product to a given country in the case of France. We find that export spillovers are more important for exports to Asia than to other destinations. Moreover, the presence of other exporters appears particularly beneficial to small and less productive firms. More intense benefits for start-up companies are observed in tough Asian markets characterized by low GDP per capita and tough administrative procedures on imports.

JEL Classifications: F14, R12, L25
Key Words: Extensive margin of trade, Spillovers, FDI

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I. Introduction

The rise of Asia in international trade over the past twenty years has been well documented (IMF, 2007). The strong and rapid economic growth of several Asian countries such as Thailand, Indonesia, Malaysia, the four Tigers[1], and in the past ten years China, explains largely the increased role of Asian countries. In fact, the supply-side of Asian integration in trade has been often emphasized. It is true that a quick glance at the data tells that the share of Asia in total manufacturing exports increased from 31.9% in 1995 to 37.2% in 2007. This is even more striking for China, which almost tripled its international market share in twelve years (4.4% in 1995 against 12.7% in 2007). Europe, on the opposite, saw its market share slightly decline from 45.9% to 44.4%.[2]

However, Asia has not only become a major exporter, it is also a more and more interesting destination market for exporting firms. Even though much less spectacular than the export rise, the share of Asia in world imports has also increased in the past fifteen years, from 27.9% in 1995 to 29.1% in 2007. Again, China exhibited a more rapid growth than the rest of Asia, its share in the world demand for manufacturing goods having more than doubled, from 2.6% in 1995 to 5.5% in 2007. As a comparison, the share of Europe in world demand remained more or less stable, 44.0% in 1995 and 44.4% in 2007.

This is why penetrating Asian markets has become a priority for European firms and governments. In a document edited in 1996 by the French ministry of Industry, Asia was defined as "a market to conquer".[3] The objective of French public authorities at that time was to increase French market share in Asia from 2% to 6% in ten years. The share of Asia in French total manufacturing exports actually increased over the period from 13.9% to 14.9%. However, this increased importance of Asia in French exports is not linked to an increased penetration of French products on Asian markets: the share of France in total Asian imports rather decreased from 2.8% in 1995 to 2.2% in 2007. Note, however, that this is a general movement in Europe, since the share of Europe in Asian manufacturing imports decreased from 24.0% to 23.1% between 1995 and 2007. It is explained by the fact that the share of Asian manufacturing goods in total Asian manufacturing imports has increased from 55.0% to 62.4% over the same period.

Penetrating Asian markets might not be an easy task for French firms. Apart from the competition exerted by other exporting countries, Asia can be seen as a less penetrable market for French firms, i.e. a market for which the fixed export cost is high. Indeed, the differences in terms of language, culture, business negotiations rules are often pointed as important

[1] Hong-Kong, Singapore, South-Korea and Taiwan

[2] These data come from authors' calculations based on the BACI database provided by CEPII. This 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 at http://www.cepii.fr/anglaisgraph/bdd/baci.htm.

[3] "Exporter vers l'Asie", 1996, Cahier Industries, French Ministry of Industry.

difficulties French entrepreneurs must face when they want to develop their business in Asia. Policy-makers take this issue seriously. For example, some French universities propose training courses to learn how to develop business relationships with Asian countries.[4] In the same vein, Asian consumers might have specific tastes that French producers have to accommodate before being able to export to these countries. Consequently, helping French firms to pay or to reduce this fixed export cost might be a way to increase French market shares on Asian markets.

In this paper, we investigate one mechanism through which the entry of French firms on Asian markets could be facilitated, *export spillovers*. The idea is that exporting firms located in the same region might be able to share information about export markets or to mutualize some costs linked to export activities, like participation to international fares to promote their products for example. Besides these positive externalities, the agglomeration of exporters in the same area may give rise to higher competition on the export market. The competition effect is expected to operate at a disaggregated level and hence to be especially present when considering export at the product-level. Our estimation procedure captures the net effect of positive externalities and higher competition effect on the export market associated with the agglomeration of exporters. We are unfortunately not in a position to disentangle the various positive and negative forces. Findings of a positive net effect from the presence of neighboring exporters would suggest that positive externalities are large enough to more than compensate for the negative competition effects.

Very few theoretical studies exist on export spillovers. Krautheim (2010) is the only one to build a model in which fixed export cost, specific to a destination country, decreases in the number of firms exporting to that country. According to him, this might explain part of the distance puzzle observed in the trade literature. The empirical literature on export spillovers is much richer. In a pioneer work, Aitken *et al*., (1997) show that export activities of multinational firms positively influence the export performance of Mexican domestic firms. Greenaway *et al*., (2004), Kneller and Pisu (2007) and Greenaway and Kneller (2008), all find the evidence of export spillovers on UK data, emanating from multinational firms or from all types of exporting firms. Barrios *et al*., (2003) and Bernard and Jensen (2004) are by contrast much more skeptical about the existence of export spillovers in Spain and in the US.

However, because of the lack of data, these studies do not investigate the specificity of export spillovers depending on the destination country of exports. It might be the case that export spillovers are very specific in terms of product or destination country. This could explain the conflicting results in the literature. Koenig (2009) shows export spillovers on the decision to start exporting do exist French firms, export spillovers being mainly destination specific. Koenig *et al*., (2010a) go one step further. They also study the decision to start exporting by using the French firm-level data at the HS4-digit level. They rely on a narrower definition of export activities than previous studies that were handling at best the industrial sector of the

[4] Training proposed by Sciences-Po in October 2011, "Asian capitalism and business: Oppositions and differences with Occident".

firm. They show that export spillovers operate at a very disaggregated level, by product and by destination. In another study, Koenig *et al*., (2010b) show that these export spillovers are greater for entries on less penetrable markets, as measured by the International Country Risk Guide(ICRG) index and some proxies for the toughness of administrative procedures imposed by destination countries on imports. ICRG produces political, economic, and financial risk ratings for countries important to international business. ICRG now monitors 140 countries. Refer to http://www.prsgroup.com/icrg.aspx.

In this paper, we build on these two latter studies and focus on the creation of new export linkages of French firms on Asian markets. We show that impact of export spillovers is more significant for exports to Asia than for exports to other countries. Moreover, it seems that export spillovers matter more for small and less productive firms when focusing on entries on Asian markets, while they are not significantly heterogeneous across firms when considering export starts to other destinations. Finally, it seems that proximity to other exporters is especially beneficial to firms eager to penetrate Asian countries characterized by low GDP per capita and tough administrative procedures on imports. It thus appears that export spillovers mainly help small firms to enter the less penetrable Asian markets. These results improve our understanding of the channel through which export spillovers influence a firm's behavior; they are consistent with the idea that exposure to other exporters helps to reduce the fixed rather than the variable cost of exporting.

II. Data and Empirical Strategy

We investigate the impact of surrounding exporters on the decision of French firms to start exporting, with a specific interest for Asian destinations.

A. Data

We use firm-level data from the French customs recording export flows at the firm, product (8-digit level) and destination country level for the period 1998~2003.[5] We merge this dataset with balance-sheet data from the French Annual Business surveys. This dataset contains, among others, firm-level employment, capital, sales and address for firms bigger than 20 employees.

[5] Within the EU, French customs collect information on the product (CN8 categories) exported by firms when the annual cumulated value of all shipments of a firm (in the previous year) is above 100,000 Euros from 2001 onwards. This threshold was 99,100 Euros in 2000 and 38,100 Euros before. For extra-EU exports, all shipments above 1,000 Euros are reported. As regards intra-EU exports, we consequently restrict our attention to flows from firms with an annual cumulated value of intra-EU15 shipments above 100,000 Euros in order to avoid the bias due to the evolution in the reporting thresholds imposed to exporting firms by the French customs.

We limit our analysis to manufacturing industries. Thanks to the address, we are able to identify the employment area where firms are located. Employment areas are statistical zonings based on daily commuting of workers. There are 341 employment areas in metropolitan France excluding Corsica. We choose this geographic level of analysis for export spillovers because it is a fine level based on economic, and not on administrative, considerations. As a comparison, there are 21 administrative regions and 94 administrative départements in continental France. We drop the firms that change location over the period, in order to be sure that our controls correctly take into account all the local determinants that could be correlated to both export starts of a given firm and export activities of surrounding exporters (see below). We also drop observations with negative sales, value-added or employment.

Several remarks need to be made about our sample. By merging the customs data with the Annual Business Surveys, we lose all the very small manufacturing exporters, the balance sheet data we have being available only for firms bigger than 20 employees or firm which turnover exceeds 5 million Euros. Moreover, among these latter firms, some multi-plant firms have business units in different employment areas. However, the information on export flows exists at the firm level, but not at the plant level. Consequently, assessing the role of local environment on the export behavior of multi-plants firms raises some measurement issues to which no evident solution exists. This is why we decide to focus on single plant firms only, both as beneficiaries and as sources of export spillovers. Indeed, there is no measurement issue in this case. Note that several public reports showed that the difficulties to export in France were concentrated on small and medium sized firms (see Artus and Fontagné 2006). Hence, focusing on single plant firms makes sense in terms of policy relevance of our analysis.

To study the heterogeneity of export spillovers depending on country-level characteristics, we use information on GDP per capita and on administrative procedures imposed by destination countries from, respectively, the World Development Indicators and the Doing Business database edited by the World Bank.

We define Asian destinations following the decomposition by continent in the geographic dataset provided by CEPII[6]. The 196 destination countries represented in our final dataset of French export flows are divided into the five different continents as follows: Africa for 49 countries, America for 44 countries, Asia for 47 countries, Europe for 39 countries and Pacific for 18 countries. Table 1A in the Appendix presents the list of the 47 Asian countries with their respective share in the final regression sample.

B. Estimated equation

We study the decision of French firms to start exporting a given product to a given country

[6] http://www.cepii.fr/anglaisgraph/bdd/distances.htm.

within a gravity framework. We build on Koenig *et al*., (2010a) and assume that the probability that firm *i* exports product *k* to country *j* in year *t+1*, while it did not in year *t*, writes as follows:

$$Prob_{ikj,t+1} = Prob(\alpha_0\, empl_{i,t} + \alpha_1\, demand_{kj,t} + \alpha_2\, dist_j + \alpha_3\, spill_{i,t} + \varepsilon_{ikj,t+1} > 0) \quad (1)$$

where $empl_{i,t}$ is the log of the number of employees of firm *i* at time *t*, $demand_{kj,t}$ is the log of total imports of product *k* by country *j* at time *t*, taken from the International Trade Database at the Product-Level(BACI) database[7], $dist_j$ is the log of distance in kilometers between France and country *j* provided by Research and Expertise on the World Economy(CEPII)[8], and $spill_{i,t}$ is the spillover variable for firm *i* at time *t*.

Several endogeneity issues arise with the estimation of Equation (1). First, besides export spillovers, it could be the case that the agglomeration of firms improves their export performance through external economies of scale and productivity spillovers (see Rosenthal and Strange, 2004; Combes *et al*., 2010; Martin *et al*., 2011). Firms located in denser areas could also be more productive, and thus more likely to export, due to selection effects (Melitz and Ottaviano, 2008). To rule out this possibility, all our regressions will thus include firm-level TFP, thanks to production functions estimated by sector (2-digit level) following the Levinsohn and Petrin (2003) methodology.

The size of the area might also be an issue. More populated areas might be areas where the local demand and where congestions effects (higher wages, saturation of transport infrastructures) are higher. If the spillover variable is positively correlated to the size of the area, the estimation of export spillovers could be downward biased. We will thus include in the estimation the size of the population in the employment area estimated by the French national institute of statistics from the 1999 Census of population.

Many other determinants, fixed across time, could explain both the existence of export starts and the agglomeration of exporters in an area. For example, employment areas with good transport infrastructures could attract many exporting firms because transport infrastructures are good for the insertion of firms on international markets. In this case, spatial agglomeration would not induce exports but the reverse would be true. The existence of a common border or of migrant networks could also explain why many firms in a given area start exporting or already export to a given country. Finally, firms with a strong expertise in a given product might agglomerate in specific places, due to the presence of specific resources or to accidents of history. Clocks and watches are mainly produced in a region close to Switzerland, the Franche-Comté, while Northern France still exhibits a specialization in textile industry. Those local comparative advantages could again explain both export starts and the spatial concentration of exporters.

[7] See footnote 2.

[8] See footnote 5.

In order to take into account these unobserved characteristics specific to the employment-area, to the employment area/destination country dyad and to the product/destination country dyad, we introduce a firm-product-destination country fixed effect. By doing so, we estimate the impact of our independent variables in the within time dimension only, thanks to a conditional logit estimation. This means that we explain in reality the timing of entry: conditioning on the fact that firm *i* will start exporting product *k* to country *j* at some point over the period, we relate the choice of the entry year to the presence of surrounding exporters the year before. This also means that we measure short-run determinants of entry on export markets. Since we observe a lot of starts and exits on export markets at the firm, product and destination country level, focusing on short-run determinants of exports at this very detailed level does make sense. However, regarding export spillovers, this might be an issue if the impact of surrounding exporters is not the same in the short and in the long run. Other exporters in the employment area might help to reduce the fixed export cost in the short-run, but could become competitors in the longer-run, and have in this case a net negative impact on the durability of export flows. Chen and Swenson (2009) show that it is not the case for export spillovers generated by foreign firms in China, as foreign exports actually increase the durability of the new export linkages created by Chinese domestic firms. We do not have such insights in the case of France, and leave this issue for further research. In any case, the coefficient we will obtain on the spillover variable will be the net effect of positive (information spillovers, cost-sharing etc.) and negative (competition effect on inputs markets or on export markets, saturation of transport infrastructures etc.) externalities exporters might generate for their neighbors in the short-run.

C. Definition of variables

The explained variable in our estimations is a dummy equal to 1 if firm *i* starts exporting product *k* to country *j* at time *t+1* and 0 otherwise. Ceasing and continuing export flows are not explained. We are thus interested in series of 0 followed by a 1. For a given firm-product-country, we can have several starts. For example, the subsequent export statuses 011001 (with 0 denoting no export and 1 denoting strictly postitive exports) become in our sample .1...01, with "." denoting a missing value. For a given firm, we focus on product-destination country couples for which we observe at least one export start over the period. Defining a broader set of alternatives would be useless since in the presence of firm-product-country fixed effects, firm-product-country triads with no export starts or positive export flows all over the period would be dropped out.

The spillover variable is defined as the count of surrounding exporters in the employment area of firm *i* at time *t*. As in Koenig *et al*., (2010a), we define four types of spillover variables, with different degree of specificity: general spillovers (the number of other exporting firms in the area), destination specific spillovers (the number of other firms in the area exporting to the

same destination), product specific spillovers (the number of other firms in the area exporting the same product) and product and destination specific spillovers (the number of other firms in the area exporting the same product to the same destination). In terms of product nomenclature, we re-aggregate export data at the 4-digit level of the harmonized system. Indeed, it is still a detailed level of activity, but it is sufficiently aggregated to avoid having spillover variables with zeros only. For example, the chapter 91 (2-digit), which corresponds to clocks and watches and parts thereof, is decomposed into 14 different 4-digit products, differentiating wrist-watches in precious metal from wrist-watches in base-metal, alarm clocks, wall clocks, and time registers.

We will first confirm that the effect of proximity to other exporters are much stronger when product and destination country specific. In the rest of the paper, we will explore the specificities of export spillovers for export starts to Asia focusing on this very specific spillover variable.

D. Descriptive statistics

We first present in Table 1 some simple descriptive statistics on the whole sample of firms we have. For almost 85% of observations the firm we observe has no neighbor the year before exporting the same product to the same country. In around 9% of cases the product/destination country specific spillover variable is equal to 1, and finally for 6% of the observations it is bigger than 1. The distribution of spillover variables is clearly more balanced for the product specific and the destination specific spillover variable.

Table 1. Statistical distribution of agglomeration variable

	Number of other firms in the area			
	same product - same country	all products - same country	same product - all countries	all products - all countries
0	84.8%	12.1%	43.1%	0.1%
1	9.4%	10.1%	18.7%	0.2%
2	2.7%	8.2%	9.9%	0.3%
3-5	2.2%	17.3%	13.3%	2.1%
6-10	0.7%	16.9%	7.9%	6.8%
> 10	0.2%	35.4%	7.1%	90.5%
Number of observations	645,268			

(Note) Statistics based on single-plant exporting firms in manufacturing industries, continental France.
(Sources) Customs and Annual Business Surveys.

As displayed in Table 2A in Appendices, the share of non-zero product/destination country specific spillover is highest in the case of European destination (19%). The lowest values are found for Asia and Pacific with shares of 9%.

In terms of size, Table 2 shows that firms in the sample have 77 employees on average.[9] This average size both reflects the fact that we neither have in our sample the smallest firms (below 20 employees) nor the biggest ones, since we focus on single plant firms only. Each firm exports on average 11 products to 11 countries. There is a clear gradation in the export spillover variable: having a neighbor exporting the same product to the same country is much rarer than having a neighbor exporting the same product whatever the destination, which is itself much rarer than having a neighbor exporting to the same destination, whatever the product.

Table 2. Firm-level descriptive statistics

Variable	Mean	Standard-Error	Minimum	Maximum
Number of employees	77.1	170.9	2.5	6166
Total employment in the employment area	181556.8	283560.8	4630.75	1689989
Value added	3751.1	12196.5	219.1	575363
Imports of product k by destination country j	351897.5	1474511	0.6	4.62×10^7
Distance	3107.2	3451.3	262.4	19263.9
Number of exported products by the firm	11	13.8	1	277
Number of destination countries of the firm	10.5	12.9	1	116
Number of other firms in the employment area, all products-all countries	58.8	72.9	0	350
Number of other firms in the employment area, all products-same country	18	30.1	0	223.3
Number of other firms in the employment area, same product-all countries	3	6.6	0	62
Number of other firms in the employment area, same product-same country	0.47	1.7	0	35.5
Number of firms	8,071			

(Note) Statistics based on single-plant exporting firms in manufacturing industries, continental France.
(Sources) Customs and Annual Business Surveys.

This paper focuses on the beneficial effect of proximity to other exporters on the capacity

[9] When we split the sample to investigate heterogeneity of the effect depending on firm-level characteristics, we use firm-level average size/TFP so as not to split the observations of a firm that would be above or below the threshold depending on the years. We thus present statistics for firm-level average size and TFP over the period (1998~2003). This is why the minimum size observed is not an integer.

of French firms to penetrate Asian markets. While the proportion of export starts for Asian destinations is similar to that for the whole sample (30.8%), it is important to stress the different dimensions in which firms starting to export to Asia differ from firms exporting to other continents in our sample. As displayed in Table 3, firms starting to export to Asia appear to be slightly more efficient (measured in terms of TFP) and larger in size.

Table 3. Firms' particularities of Asia sample

Variable	Total sample	Asia
Average share of export start	0.307	0.308
Log (TFP of exporting firms)		
mean	4.04	4.08
median	3.99	4.04
Number of employees of exporting firms		
mean	77.1	79.8
median	64.7	68

Statistics in Table 4 suggest that part of these differences may directly reflect the greater difficulties French entrepreneurs face when they develop their business in Asia. Asian markets turn out to be characterized by an average GDP per capita 30% lower than that of the total sample. Their access seems to be hindered by larger trade impediments as evidenced by more numerous documents and longer import procedures at their customs. In line with the heterogeneous firms trade literature, greater fixed export costs relating to lower income and larger trade impediments, exporting to Asia should impose a higher cut-off in the selection of exporters (Melitz, 2003).

Table 4. Country particularities of Asia sample

Variable	Total sample	Asia
GDP per capita ($)		
Mean	16,840	12,246
Median	16,650	11,615
Top quartile	3,166	1,842
Bottom quartile	27,918	20,712
Number of documents required to import		
mean	6.7	7.8
Median	6	7.7
Number of days required to import		
Mean	17.8	20.2
Median	14	14

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III. Results

We first replicate the results obtained by Koenig *et al*. (2010a) on the assessment of export spillovers in France, and compare them to those we obtain on Asian destinations only. We then investigate several dimensions along which the beneficial effect of proximity to other exporters might vary depending on firms' characteristics and destination countries. All regressions are clustered at the employment area level (Moulton, 1990).

A. Export spillovers across continents

In the first four columns of Table 5, we replicate previous results obtained by Koenig *et al*. (2010) in the context of France, and show the positive impact of the presence of other local exporters on the probability that a firm starts exporting a given product to a given country.

Four different spillover variables are used alternatively: all products–all destinations, all products–same destination, same product–all destinations, and same product–same destination. The main message is that export spillovers operate at a very fine level, since they are not significant when considered on all products-all destinations (column 1) and are much stronger when specific, by product and destination (column 4). This hierarchy is confirmed when focusing on European destinations (columns 5 to 8) and Asian destination (columns 9 to 12). Interestingly, the coefficient on the product and destination country specific spillovers, equal to 0.051 on average, is equal to 0.039 only for European destinations and rises to 0.062 for Asian destinations. For these later destinations, another interesting finding is that the country-specific characteristic is key for a significant effect of agglomeration, while it is less the case for export starts to European destinations.

These primary results confirm a beneficial effect of proximity to other exporters on the capacity of French firms to penetrate Asian markets. An additional neighbor exporting a given product to a given country increases the probability to start exporting the same product to the same country by roughly 1.32 percentage points.[10] Export spillovers appear more important for export starts to Asia than for export starts to other countries, notably to Europe where the corresponding impact is 0.83 percentage points. In what follows, we suggest one explanation of this heterogeneity, related to the important difficulties French entrepreneurs face to penetrate Asian markets. But first, we investigate the heterogeneous effect of proximity to other exporters

[10] This figure is obtained from the derivative of the choice probabilities (Train, 2003). The change in the probability that a firm i chooses alternative x (start exporting) given a change in an observed factor $z_{i,x}$, entering the representative utility of that alternative (and holding the representative utility of other alternatives (no exporting) constant) is $\beta_z * P_{i,x} * (1-P_{i,x})$, with $P_{i,x}$ being the average probability that firm i chooses alternative x (starts exporting). Our results, based on an average probability to start exporting of 30.8%, suggest that the derivative of starting exporting with respect to an additional neighbor is *1.32=0.062*0.308* (1-0.308)*.

depending on firms' characteristics. To our knowledge, almost no work has so far explored the existence of such heterogeneity of agglomeration economies on exports.

Table 5. Export spillovers by continent

	Explained variable: Domestic new export link in *t+1*											
Explaining variables	**All destinations**				**Europe**				**Asia**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ln ($Employment_{it}$)	0.570*** (0.074)	0.570*** (0.075)	0.568*** (0.075)	0.570*** (0075)	0.636*** (0.097)	0.636*** (0.098)	0.635*** (0.098)	0.637*** (0.098)	0.612*** (0.119)	0.614*** (0.120)	0.613*** (0.119)	0.613*** (0.119)
ln (TFP_{it})	0.118*** (0.035)	0.119*** (0.035)	0.119*** (0.035)	0.118*** (0.035)	0.204*** (0.039)	0.205*** (0.039)	0.205*** (0.039)	0.204*** (0.039)	0.067 (0.051)	0.068 (0.052)	0.066 (0.051)	0.066 (0.051)
ln (*Total Employment in area t*)	0.869 (0.582)	0.842 (0.586)	0.874 (0.586)	0.884 (0.585)	0.889 (0.820)	0.865 (0.821)	0.887 (0.821)	0. 907 (0.819)	1.318 (1.037)	1.206 (1.050)	1.346 (1.040)	1.331 (1.040)
ln ($Imports_{jkt}$)	0.176*** (0.013)	0.172*** (0.013)	0.175*** (0.013)	0.174*** (0.013)	0.241*** (0.028)	0.237*** (0.027)	0.239*** (0.028)	0.240*** (0.028)	0.161*** (0.027)	0.153*** (0.027)	0.161*** (0.027)	0.159*** (0.027)
Firms in area - all products-countries	0.001 (0.001)				0.002 (0.003)				0.001 (0.002)			
Firms in area - all products-same country		0.008*** (0.003)				0.007* (0.004)				0.019*** (0.004)		
Firms in area - same product-all country			0.012** (0.005)				0.019*** (0.005)				-0.003 (0.006)	
Firms in area - same product-country				0.051*** (0.009)				0.039*** (0.011)				0.062*** (0.020)
Observations	645268	645268	645268	645268	329912	329912	329912	329912	111942	111942	111942	111942
R^2	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09

(Note) Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the employment area level. ***, ** and * indicate significance at the 1%, 5% and 10% confidence level. Conditional logit estimations in all columns.

B. Export spillovers and firm-level characteristics

Tables 6 and 7 explore whether export spillovers depend on two characteristics of the prospective exporters: productivity and size measured in terms of the number of employees. They focus respectively on non-Asian and Asian destinations.

The empirical strategy consists in running Equation (1) with the most specific export spillover variable, as in column 4 of Table 5, and in splitting the sample according to firms' average productivity (columns 2 to 5) or average size (columns 6 to 9) over the period. Splits are made with respect to the average and to quartiles in the sample during the period. Columns 2 and 3 of Table 6 (non-Asia sample) indicate that the impact of proximity to other exporters does not seem to be significantly different for firms with average TFPs below or above the sample mean. Similar findings are obtained when comparing firms in the top and bottom quartiles. If anything, it would be the more productive firms that benefit most from spillovers.

Results in columns 6 to 9 further suggest that the coefficient on the variable of agglomeration of exporters is not statistically different across firms of different size. Hence, estimates based on the non-Asia sample confirm the results obtained by Koenig *et al*. (2010b) for all destinations reached by French exporters: Export spillovers have a similar impact regardless of the efficiency/size of firms. By extension, the need for information on targeted non-Asian export markets does not seem to be different across firms with different size or productivity.

The results obtained for the Asian subsample (Table 7) convey a strikingly different message. They suggest a significant heterogeneity of spillovers when firms are divided according to their efficiency or the size of their workforce. The presence of other exporting firms appears especially beneficial to less productive and small firms eager to penetrate Asian countries. Results based on quartiles suggest that the most productive and larger prospective exporters in fact do not extract significant gains from their exposure to other exporting firms in the area.

Table 6. Heterogeneity of export spillovers according to firm characteristics : Non-Asia sample

	Explained variable: Domestic new export link in $t+1$								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Reference for split		**TFP**				**Employment**			
Explaining variables	All firms	mean		Quartile		mean		Quartile	
		≤	>	bottom	top	≤	>	bottom	top
ln ($Employment_{it}$)	0.560***	0.578***	0.507***	0.56 7***	0.547***	0.465***	0.751***	0.328**	0.640***
	(0.078)	(0.100)	(0.134)	(0.150)	(0.143)	(0.088)	(0.143)	(0.131)	(0.210)
ln (TFP_{it})	0.132***	0.131***	0.128**	0.120**	0.209***	0.144***	0.103*	0.039	0.144*
	(0.036)	(0.042)	(0.060)	(0.058)	(0.079)	(0.046)	(0.059)	(0.070)	(0.084)
ln (*Total Employment in area t*)	0.811	0.820	0.804	-0.602	1.015	1.675*	-0.443	2. 025	-0.175
	(0.613)	(0.847)	(0.982)	(1.066)	(1.637)	(0.971)	(1.162)	(1.630)	(1.731)
ln ($Imports_{jkt}$)	0.182***	0.179***	0.184***	0.157***	0.180***	0.178***	0.188***	0.191***	0.199***
	(0.014)	(0.019)	(0.020)	(0.028)	(0.029)	(0.020)	(0.019)	(0.030)	(0.027)
Firms in area - same product-country	0.050***	0.042***	0 .061***	0.039***	0.067***	0.048***	0.053***	0.041***	0.046**
	(0.010)	(0.012)	(0.014)	(0.014)	(0.014)	(0.012)	(0.019)	(0.011)	(0.020)
Observations	533326	286603	246723	136628	131097	303149	230177	135935	131066
R^2	0.09	0.09	0.10	0.09	0.10	0.10	0.09	0.10	0.08

(Note) Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the employment area level. ***, ** and * indicate significance at the 1%, 5% and 10% confidence level. Conditional logit estimations in all columns.

Table 7. Heterogeneity of export spillovers according to firm characteristics : Asia sample

	Explained variable: Domestic new export link in *t+1*								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Reference for split		**TFP**				**Employment**			
Explaining variables	All firms	mean		Quartile		mean		Quartile	
		≤	>	bottom	top	≤	>	bottom	top
ln (*Employment*$_{it}$)	0.613***	0.602***	0.623***	0.54 7**	0.581**	0.550***	0.773***	0.529***	0.543
	(0.119)	(0.151)	(0.169)	(0.228)	(0.237)	(0.121)	(0.223)	(0.186)	(0.365)
ln (*TFP*$_{it}$)	0.066	0.100	0.027	0.174**	0.042	0.133**	-0.023	0.272**	0.020
	(0.051)	(0.068)	(0.079)	(0.086)	(0.095)	(0.064)	(0.070)	(0.125)	(0.087)
ln (*Total Employment in area t*)	1.331	2.370 c	0.304	1.769	0.201	2.549*	-0.259	4. 480**	-0.326
	(1.040)	(1.294)	(1.299)	(2.192)	(1.773)	(1.322)	(1.236)	(1.844)	(1.558)
ln (*Imports*$_{jkt}$)	0.159***	0.163***	0.155***	0.101	0.132***	0.209***	0.115***	0.168**	0.109***
	(0.027)	(0.038)	(0.039)	(0.062)	(0.043)	(0.039)	(0.037)	(0.068)	(0.040)
Firms in area - same product-country	0.062***	0.079***	0 .041*	0.086*	-0.005	0.064***	0.059*	0.054*	0.067
	(0.020)	(0.030)	(0.023)	(0.044)	(0.030)	(0.021)	(0.036)	(0.030)	(0.046)
Observations	111942	55528	56414	24474	30113	60258	51684	25403	30164
R^2	0.09	0.10	0.09	0.10	0.09	0.10	0.09	0.11	0.08

(Note) Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the employment area level. ***, ** and * indicate significance at the 1%, 5% and 10% confidence level. Conditional logit estimations in all columns.

C. Export spillovers and destination country accessibility

As a first step to investigate the potential heterogeneity of export spillovers depending on the destination country accessibility, we distinguish countries according to their GDP per capita. As evidenced in Table 4, Asian countries are on average poorer than non Asian countries. Several reasons can explain why export spillovers might be more important for these destination countries (as suggested in Table 4). First, poor countries import less varieties than rich countries (Hummels and Klenow, 2002), which could make them less accessible for French firms. Also, lower quality of the infrastructures and under-development of the retail and wholesale sector may impose further constraints of the capacity of French exporters to reach their final consumers. In this particular case, specific information on the appropriate partners/distributors that emanate from other exporters would be more valuable for prospective exporters. Another explanation relates to the toughness of import procedures. Since rich countries have better institutions and better functioning customs than poor countries on average, they might be easier targets for French firms. The overall conjecture relating to the heterogeneous influence of income per capita is confirmed by results presented in Table 8. In this table, we run separate regressions for low and high GDP per capita destination countries. In columns 1 to 6, a country is considered a high GDP per capita country if its GDP per capita is higher than 16,840 US dollars (the mean value for our sample) otherwise it is classified as a

low-GDP per capita country. In columns 7 and 8, we restrict the sample to Asian destinations and rely on the Asian average GDP per capita (12,246 US dollars) as the cut-off line. Results in columns 1 to 3 on the total world sample show that the probability of entry on a given market is positively impacted by the number of other firms exporting the same product to the same country, especially for poorer destinations. The measured coefficient is four times greater than for richer countries. When focusing on Asian destinations, the heterogeneity is even greater as export spillovers are significant for export starts to countries poorer than the average only.

In a final step, we specifically study the heterogeneity of the impact of export spillovers among Asian countries, depending on the toughness of import procedures in destination countries. Findings of higher export spillovers in the case of low-accessibility markets would be consistent with the idea that other exporters allow reducing the fixed cost of creating new trade linkages. We rely on the Doing Business database elaborated by the World Bank. Several variables related to country-level regulations of economic activities are recorded in this database. We use in our empirical work two of them, the number of documents and the number of days that are needed to import in a given country the commodities transported by a standard cargo. The number of documents is calculated from the signature of the contract to the delivery of goods, while the time needed is calculated from the arrival of the cargo in the harbor. Both variables appear as good proxies for the toughness of procedures an exporter has to face to sell its goods to a given foreign country. They have been used in the two studies we are aware of that show that export spillovers are greater for less penetrable markets (Koenig *et al*., 2010b; Mayneris and Poncet, 2011).

Mayneris and Poncet (2011) study the creation of new export linkages by Chinese domestic firms and observe that their exposure to foreign exporting firms is associated with a 10% increase of their probability to start exporting the year after. They find that this figure is around 50% higher when the targeted destination country is identified as less penetrable. They interpret their results as suggesting that the presence of foreign exporting firms in China helps Chinese domestic firms to diversify their exports towards previously inaccessible destinations.

Koenig *et al*. (2010b), whose results are reproduced in Table 3A in the Appendix, find that an additional exporting neighbor increases the likelihood that a French firm starts exporting the same product to the same country by 1.95[11] percentage point when it comes to a country where the formalities in terms of documents are higher than the average, and 0.69 point when these procedures are less cumbersome than the average. These figures are respectively 2.10 and 0.69 when looking at the cost of export in terms of days.

[11] As explained in footnote 10, the effect is computed as $0.093 \times P_{i,x} \times (1-P_{i,x})$.

Table 8. Heterogeneity of export spillovers according to GDP per capita

	Explained variable: Domestic new export link in *t+1*									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	All countries			Asian countries						
Reference for split	**World mean GDP per capita (16,840 US $)**			**World mean GDP per capita (16,840 US $)**			**Asia mean GDP per capita (12,246 US $)**			
Explaining variables	All	≤	>	All	≤	>	≤	>	Bottom quartile (1841 US $)	Top quartile (20712 US $)
ln (*Employment*$_{it}$)	0.570***	0.588***	0.549***	0.616***	0.723***	0.504***	0.750***	0.511***	0.905***	0.509***
	(0.075)	(0.077)	(0.095)	(0.119)	(0.138)	(0.149)	(0.134)	(0.146)	(0.184)	(0.150)
ln (*TFP*$_{it}$)	0.115***	0.034	0.206***	0.063	0.004	0.136**	0.019	0.099	-0.047	0.164**
	(0.035)	(0.037)	(0.046)	(0.052)	(0.060)	(0.068)	(0.056)	(0.065)	(0.069)	(0.075)
ln (*Total Employment in area t*)	0.866	0.979	0.735	1.271	1.029	1.574	1.998*	0. 608	0.880	2.527*
	(0.593)	(0.669)	(0.810)	(1.045)	(1.194)	(1.260)	(1.193)	(1.322)	(1.419)	(1.372)
ln (*Imports*$_{jkt}$)	0.177***	0.187***	0.112***	0.159***	0.110***	0.172***	0.099***	0.193***	0.067	0.136**
	(0.013)	(0.015)	(0.028)	(0.028)	(0.032)	(0.049)	(0.035)	(0.043)	(0.048)	(0.064)
Firms in area - same product-country	0.050***	0.114***	0 .024***	0.063***	0.138***	-0.009	0.128***	0.021	0.105**	-0.003
	(0.010)	(0.023)	(0.007)	(0.020)	(0.038)	(0.031)	(0.040)	(0.025)	(0.044)	(0.028)
Observations	641030	323749	317281	111603	64388	47215	55606	55997	27346	32861
R^2	0.09	0.10	0.09	0.09	0.11	0.08	0.11	0.08	0.11	0.09

(Note) Results in this table are restricted to observations for which data on GDP per capita are available. Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the employment area level. ***, ** and * indicate significance at the 1%, 5% and 10% confidence level. Conditional logit estimations in all columns.

In Tables 9 and 10, we adopt the same strategy as Koenig *et al*. (2010b) and we split the sample restricted to Asian destinations according to the country's level of import impediments. In Table 9, the cut-offs are defined based on the entire world sample while in Table 10 they are calculated on the sample of Asian destinations as reported in Table 4. Our results clearly show that spillovers deriving from proximity to other exporters are more important for less penetrable markets.

We confirm the order of magnitude of Koenig *et al*. (2010b)'s results. The probability of the creation of a new export linkage with an Asian market increases by as high as 2.25 percentage point with an additional neighboring exporter when it takes more than 20 days to clear the customs in the targeted country. By contrast, the impact is insignificant for lower durations. The identified heterogeneous effect of export spillovers depending on the toughness of administrative procedures on imports points at a possible role of other exporters on the geographic diversification of French exporters toward previously inaccessible Asian destinations.

Table 9. Heterogeneity of export spillovers according to country trade barriers: Asia

(split according to world average)

	Explained variable: Domestic new export link in *t+1*								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Reference for split		**Number of documents to import**				**Time required to import**			
Explaining variables	All firms	mean (6.7)		median (6)		mean (17.8)		median (14)	
		≤	>	≤	>	≤	>	≤	>
ln (*Employment*$_{it}$)	0.627***	0.513***	0.692***	0.507***	0.693***	0.497***	0.786***	0.497***	0.786***
	(0.121)	(0.145)	(0.138)	(0.146)	(0.138)	(0.150)	(0.140)	(0.150)	(0.140)
ln (*TFP*$_{it}$)	0.066	0.073	0.059	0.076	0.058	0.125**	-0.010	0.125**	-0.010
	(0.052)	(0.069)	(0.059)	(0.069)	(0.059)	(0.063)	(0.060)	(0.063)	(0.060)
ln (*Total Employment in area t*)	1.173	0.486	1.446	0.543	1.421	0.521	1.792	0. 521	1.792
	(1.038)	(1.202)	(1.207)	(1.210)	(1.212)	(1.243)	(1.300)	(1.243)	(1.300)
ln (*Imports*$_{jkt}$)	0.161***	0.115*	0.133***	0.119*	0.132***	0.212***	0.085**	0.212***	0.085**
	(0.030)	(0.067)	(0.033)	(0.072)	(0.033)	(0.052)	(0.036)	(0.052)	(0.036)
Firms in area - same product-country	0.061***	-0.027	0.126***	-0.026	0.125***	0.025	0.119***	0.025	0.119***
	(0.019)	(0.027)	(0.027)	(0.027)	(0.027)	(0.024)	(0.035)	(0.024)	(0.035)
Observations	108835	32871	75964	32725	76110	55597	53238	55597	53238
R^2	0.09	0.08	0.10	0.08	0.10	0.08	0.11	0.08	0.11

(Note) Results in this table are restricted to observations for which data on trade impediments are available. Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the employment area level. ***, ** and * indicate significance at the 1%, 5% and 10% confidence level. Conditional logit estimations in all columns.

Table 10. Heterogeneity of export spillovers according to country trade barriers: Asia

(split according to Asia average)

	Explained variable: Domestic new export link in *t+1*								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Reference for split		**Number of documents to import**				**Time required to import**			
Explaining variables	All firms	mean (7.8)		median (7.7)		mean (20.2)		median (14)	
		≤	>	≤	>	≤	>	≤	>
ln (*Employment*$_{it}$)	0.627***	0.554***	0.738***	0.554***	0.738***	0.517***	0.812***	0.497***	0.786***
	(0.121)	(0.154)	(0.144)	(0.154)	(0.144)	(0.151)	(0.136)	(0.150)	(0.140)
ln (*TFP*$_{it}$)	-0.017	0.125**	-0.010	-0.113	0.066	0.048	0.790	0.048	0.790
	(0.052)	(0.063)	(0.061)	(0.063)	(0.061)	(0.058)	(0.064)	(0.063)	(0.060)
ln (*Total Employment in area t*)	-0.131	2.972**	0.861	1.603	0. 521	1.792	-2.566	1.173	-0.131
	(1.038)	(1.147)	(1.478)	(1.147)	(1.478)	(1.125)	(1.427)	(1.243)	(1.300)
ln (*Imports*$_{jkt}$)	0.264***	0.068*	0.264***	0.068*	0.194***	0.066*	0.212***	0.085**	0.139
	(0.030)	(0.049)	(0.038)	(0.049)	(0.038)	(0.043)	(0.038)	(0.052)	(0.036)
Firms in area - same product-country	0.061***	0.045**	0.102***	0.045**	0.102***	0.035	0.106***	0.025	0.119***
	(0.019)	(0.021)	(0.039)	(0.021)	(0.039)	(0.024)	(0.040)	(0.024)	(0.035)
Observations	108835	63588	45247	63588	45247	63529	45306	55597	53238
R^2	0.09	0.08	0.10	0.08	0.10	0.08	0.11	0.08	0.11

IV. Conclusion

In this study, we explore the possibility of a beneficial effect of proximity to other exporters on the capacity of French firms to penetrate Asian markets. We confirm previous results about the positive impact of other local exporters on the probability that a firm starts exporting a given product to a given country. Our results in fact suggest that exposure to other exporters is an especially efficient mechanism for French firms contemplating exporting to Asia relative to other destinations. This seems to relate to the fact that Asian countries are particularly difficult markets for French firms, i.e. markets with high fixed export cost. Our results hence confirm existing evidence of a heterogeneous effect of export spillovers. Overall, we find that the presence of exporting firms appears especially beneficial to small and less productive firms that are eager to penetrate Asian countries characterized by low GDP per capita and tough administrative procedures on imports. These results improve our understanding of the channel through which export spillovers influence a firm's behavior; they are clearly consistent with the idea that the exposure to other exporters helps to reduce the fixed rather than the variable cost of exporting. From a policy point of view, our results suggest that policies should help to foster the cooperation of exporters and encourage them to share information in order to exploit export spillovers. Also, devices aimed at promoting exports to Asia should be concentrated on specific firms and markets. They are not effective for all firms as their impact are found to be limited to small and less productive ones.

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Appendices

Table 1A. List of Asian Countries

Country	Number of observations	Share of observations (%)	*Country*	Number of observations	Share of observations (%)
Afghanistan	24	0.02	*Lebanon*	4,399	3.93
Armenia	146	0.13	*Macau (Aomen)*	181	0.16
Azerbaijan	346	0.31	*Malaysia*	4,096	3.66
Bahrain	1,072	0.96	*Maldives*	67	0.06
Bangladesh	455	0.41	*Mongolia*	25	0.02
Brunei Darussalam	117	0.1	*Nepal*	96	0.09
Burma	140	0.13	*Oman*	981	0.88
Cambodia	246	0.22	*Pakistan*	1,263	1.13
China	9,062	8.1	*Philippines*	2,027	1.81
Georgia	152	0.14	*Qatar*	1,441	1.29
Hong Kong	8,134	7.27	*Russian Federation*	5,940	5.31
India	5,600	5	*Saudi Arabia*	4,719	4.22
Indonesia	2,334	2.09	*Singapore*	6,182	5.52
Iran	2,456	2.19	*Sri Lanka*	839	0.75
Iraq	173	0.15	*Syrian Arab Republic*	1,403	1.25
Israel	7,241	6.47	*Taiwan*	5,130	4.58
Japan	11,051	9.87	*Tajikistan*	18	0.02
Jordan	1,566	1.4	*Thailand*	4,036	3.61
Kazakstan	506	0.45	*Turkmenistan*	74	0.07
Korea	7,710	6.89	*United Arab Emirates*	6,053	5.41
Korea Dem. People's Rep. of	199	0.18	*Uzbekistan*	172	0.15
Kuwait	1,685	1.51	*Viet Nam*	1,875	1.67
Kyrgyzstan	46	0.04	*Yemen*	372	0.33
Lao People's Democratic Republic	92	0.08	*Total (Asia)*	111,942	100

Table 2A. Exporters agglomeration variable by continent

Continent	Number of observations	Share with other exporter (same product - same country) in the area
Africa	101,264	0.10
America	78,887	0.17
Asia	111,942	0.09
Europe	329,912	0.19
Pacific	23,263	0.09
Total	645,268	0.15

Table 3A. Heterogeneity of export spillovers according to country trade barriers

(all sample)

	Explained variable: Domestic new export link in *t+1*								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Reference for split		**Number of documents to import**				**Time required to import**			
Explaining variables	All firms	mean		median		mean		median	
		≤	>	≤	>	≤	>	≤	>
ln Employment$_{it}$	0.566***	0.553***	0.578***	0.561***	0.570***	0.555***	0.580***	0.538***	0.598***
	(0.075)	(0.093)	(0.080)	(0.094)	(0.080)	(0.098)	(0.077)	(0.097)	(0.076)
ln TFP$_{it}$	0.118***	0.185***	0.052	0.186***	0.052	0.186***	0.040	0.193***	0.044
	(0.036)	(0.044)	(0.040)	(0.044)	(0.040)	(0.046)	(0.038)	(0.047)	(0.037)
ln Total Employment in area t	0.740	0.662	0.817	0.689	0.786	0.425	1.112*	0. 536	0.939
	(0.595)	(0.697)	(0.786)	(0.701)	(0.783)	(0.737)	(0.659)	(0.739)	(0.679)
ln Imports$_{jkt}$	0.188***	0.154***	0.194***	0.168***	0.190***	0.142***	0.200***	0.142***	0.195***
	(0.014)	(0.026)	(0.016)	(0.027)	(0.016)	(0.027)	(0.017)	(0.027)	(0.016)
Firms in area - same product-country	0.049***	0.033***	0.093***	0.033***	0.093***	0.030***	0.100***	0.027***	0.099***
	(0.010)	(0.008)	(0.019)	(0.008)	(0.019)	(0.008)	(0.021)	(0.008)	(0.024)
Observations	620471	321897	298574	318167	302304	342382	278089	316179	304292
R^2	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.09	0.10

(Note) Results in this table are restricted to observations for which data on trade impediments are available. Heteroskedasticity-robust standard errors are reported in parentheses. Standard errors are clustered at the employment area level. ***, ** and * indicate significance at the 1%, 5% and 10% confidence level. Conditional logit estimations in all columns.