

Exporting firms and retail internationalization: Evidence from France *

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April 14, 2017

Abstract

This paper questions the impact of the globalization of the retail sector on the export activity of origin country agri-food firms. We use an original firm-level database of French agri-food exports that identifies the domestic suppliers of French retailers through certification with the private IFS standard. Results show that IFS certified French firms are more likely to export and export larger volumes than non-certified firms to markets where French retailers have established outlets. We also show that when French retailers stop their activities in a market, certified firms reduce their exports to this market in the following years. Results are robust to the use of different sets of firm-year and country-year-specific controls and fixed effects, and are not affected by possible selection and endogeneity biases. The difference in the behaviour of certified and non-certified exporting firms on markets where French retailers operate confirms the network effect that benefits retailers' suppliers, which is lost when French retailers exit from the destination country.

Keywords: Multinational retailers, Firm-level exports, Private standards.

JEL: F12, F14, F23.

*We thank the participants at the CEPPII research seminar (Paris, June 26, 2014), at the IAW research seminar (Tübingen, July 9, 2014), and at the Congress of the European Association of Agricultural Economists (Ljubljana, August 26-29, 2014) for insightful comments and suggestions on earlier versions of this paper. We received funding from the People Programme (Marie Curie Actions) of the European Union's Seventh Framework Programme (FP7/2007-2013) under the REA grant agreement n° 331958. Karine Latouche also acknowledges support from the EC Commission's Research Grant 290693 FOODSECURE. The usual disclaimer applies. The views expressed in the article are those of the authors.

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1 Introduction

In 2012, respectively 36% and 54% of sales by the world’s leading retailers Walmart and Carrefour were made outside their domestic market. The large size and extended transnational networks of outlets and business connections make these multinational retailers major regional and global players. The increasing globalization of the retail sector is likely to shape not only retailers’ domestic and local economies, as suggested by the traditional literature on foreign direct investment, but also the foreign trade of the origin and host countries. In particular, the effect on trade is expected to be significant for food products, with 33% of the household food expenditure made in supermarkets.

In this paper, we explore the impact of the overseas expansion of retailers on the export activity of agri-food firms from their country of origin. More precisely, we use detailed French firm-level data to investigate whether the impact of French retailers’ sales in foreign markets on exports differs for firms that supply their outlets in the domestic market than for other firms. As information concerning retailers’ commercial partners is confidential, we use data on certification with the private IFS standard to identify firms that supply the domestic outlets of French retailers. The IFS standard is a prerequisite for supplying products sold under the retailers’ brand.

This paper contributes to the literature on the role of multinational retailers in international trade. Our analysis relates most to the work of Cheptea et al. (2015) who used aggregated level data and found a strong positive effect of the overseas sales of retailers from a given country on its exports to these markets. Our paper tackles this topic in-depth and questions whether this impact is heterogeneous among exporting firms by distinguishing between retailers’ suppliers at home and other firms. We limit our analysis to France, which is particularly appropriate to address this question as it has some of the world’s largest retailers with wide transnational networks of outlets (Auchan, Carrefour, etc.). Our work also connects to other papers that deal with the impact of the internationalization of retail companies on trade, but which focus mainly on the effect on host countries. Head et al. (2014) analysed the impact of multinational retailers established in China on exports by Chinese cities. Nordås et al. (2008) present a case study to analyse the impact of the arrival of multinational retailers on the host country’s export patterns.

More broadly, our article is also related to the literature on food global value chains. Gereffi and Lee (2012) and Lee et al. (2012) showed that chains evolve from “producer-driven chains” to

“buyer-driven chains”, in which retailers of the final product exert power. Giovannetti and Marvasi (2016) exploited a survey of 25,090 agri-food Italian firms in 2011 and found that firms able to sell products through large supermarkets contribute to internationalization.

The contribution of this article is threefold. First, we used an original dataset on French agri-food firms certified with the IFS standard, which enabled us to identify which French agri-food exporters supply French retail outlets in France. Second, we show that the main benefits of the globalization of the retail sector are appropriated by the retailers’ domestic suppliers. Indeed, results show that IFS certified French firms are more likely to export, and export larger amounts, than non-certified firms to markets where French retailers have established outlets. The gap between the two types of firms is statistically significant and robust to the use of different sets of firm-year- and country-year-specific controls and fixed effects. Results did not change when we controlled for the auto-selection of firms exporting to each market, and the endogeneity of retailers’ sales and firms’ certification and export decisions. This suggests that the buyer-supplier relationship continues when a retail company internationalizes. This finding is rather counterintuitive, as foreign retailers mainly propose locally-sourced products in their outlets. For example, according to Moreau (2008) and Yoder et al. (2016), 90% to 95% of the products sold in Chinese Carrefour and Walmart outlets originate from China. Third, the analysis of the exit of French retailers from some markets allows us to go further and confirms that suppliers of retail companies in the domestic market benefit from a network effect to export to destinations where the retail company invests.

The rest of the article is structured as follows. In the following section, we discuss IFS certification and present stylized facts about French certified and exporting agri-food firms. In section 3, we explain our empirical strategy, the data we used, and present our main results. In sections 3.2 and 3.3, we estimate the impact of the overseas expansion of French retailers on the exports of certified and non-certified firms at the extensive and intensive margin. In section 3.4, we analyse how the exit of French retailers from some markets affects the export patterns of the two types of firms. In section 4, we test the robustness of our results by controlling for potential selection and endogeneity biases. In section 5, we present our conclusions.

2 Stylized facts

2.1 IFS certification to identify retailers' suppliers

Here our objective is to see whether retailers' suppliers perform better on export markets where French retail companies have established outlets. Although information on retailers' suppliers is highly confidential, data on the certification of agri-food firms with the private standards imposed by retailers enabled us to get round this difficulty. French firms willing to sell their products in retailers' outlets have two options: sell them under their own brand, or sell products under a retailer's brand or private label. Most firms that sell under their own brands, also sell similar products under retailers' brands. This can be explained, for example, by firms' attempts to optimize their production capacities, which often exceed their sales. To sell their products under the retailer's label, firms need to comply with private standards imposed by the latter, through certification obtained from an independent private organization.

French retailers use the IFS (International Featured Standard) certification. The standard is a quality and food safety standard for retailer branded food products, named IFS Food, and is intended to allow the assessment of suppliers' food safety and quality systems, according to a uniform approach. Indeed, under the EU food law, retailers and brand owners have a legal responsibility for their brands. Private standards are consequently designed to assist retailers and brand owners to produce food products of consistent safety and quality. In particular, they facilitate the standardization of quality, safety and operational criteria, and the fulfilment of legal obligations by manufacturers. Accordingly, these standards are appropriate tools for the application of the due diligence principle, i.e. the obligation to perform an investigation before contracting. They also increase retailers' knowledge of the production process and of the quality of the goods they sell, thereby reducing the information asymmetry between retailers and suppliers.

To obtain IFS certification, firms undergo an audit, which lasts on average two and a half days and costs the firm around € 3,500, according to IFS auditors.¹ To this audit cost, one needs to add complying costs that may vary across firms, depending on where the firm stands with respect to the IFS requirements (e.g. the adjustments of and investments in the production line(s), training of the personnel, etc.). IFS certification is obtained separately for each production line, which usually corresponds to an independent production unit. Accordingly, firms that obtain certification for a

larger number of product groups or production units pay more for the IFS audit. Although firms exploit their past experience in obtaining the IFS certification by improving internal organization and management, the audit has to be repeated every year. This shows that IFS certification involves an additional annual fixed cost for the firm.

Once the IFS certification has been obtained, the certified firm can become a French retail supplier and sell its products under the retailer's brand. Consequently, certification is a good proxy for identifying firms that supply retailers. However, it is important to note that the term *retail suppliers* includes non-certified firms selling their own-brand products. Hence, the impact of retailers on the export performance of their suppliers will be underestimated in our analysis, where only certified firms are counted as retailer's suppliers.

2.2 A database of French agri-food firms and their IFS certification status

We built an original dataset of French agri-food firms, using different sources. First, we used the AMADEUS database to define a large sample of exporting and non-exporting French agri-food firms, which we needed for our empirical analysis of firm-level export behaviour.² This database provides comparable balance-sheet data, including many financial and business indicators, for public and private firms across Europe. It also allowed us to restrict our sample to the agri-food industry.³ This choice was motivated by the fact that goods from this industry are sold in all retail outlets and, for that reason, the effects investigated should be the strongest for international trade in this type of product. Considering only one industry also has the advantage of limiting the impact of unobserved industry-level factors on firms' export behaviour.⁴ Second, we combined these data with an exhaustive list of certified firms supplied by the IFS organization. This dataset allowed us to identify the French firms that have been IFS certified since certification was launched in 2003. Third, to supplement information on the export behaviour of firms, we merged our dataset with French customs data, through the unique identification number of the firm reported by both data sources. The French Customs Register reports the volume and the quantity (expressed in ton equivalents) of exports by all French exporting firms, per product (at the 8-digit level of the HS classification) and per destination country. We aggregated these data at the firm and country level, keeping only exports of edible grocery products sold in supermarkets.⁵ Finally, we combined the resulting dataset with data from the Planet Retail database on the volume of sales of edible

Table 1: Summary statistics on the final dataset: data from 2011

	Frequency	mean	median	min	max
Agri-food firms					
# firms	25,582	-	-	-	-
# IFS certified firms	875	-	-	-	-
# exporting firms	2,111	-	-	-	-
Employees (full-time equivalents)	14,754	17.43	5	1	11,441
Productivity (€ 1,000 of sales per employee)	14,586	211.17	90.5	0.1	54,712
Export sales (€ 1,000)	2,111	8,089	250	0.001	967,667
Mean # of destination countries	2,111	8.97	3	1	128
Destinations					
# destinations	180	-	-	-	-
# destinations where French retailers operate	83	-	-	-	-
Sales of French retailers at destination (€ mil)	83	1.22	0.09	0.0001	21.70
Market share of French retailers at destination	83	0.30	.15	0.0004	1

Notes: Descriptive statistics on French agri-food firms in the sample, including certification and export status, and export destinations. The full dataset, which each year covers all economically active firms and all possible export destinations for each firm, includes 36,487,098 observations. The positive export sub-sample, which includes only exporting firms and only the countries where each firm actually sells, includes 144,167 observations. Sources: Amadeus, CEPII, Planet Retail, the exhaustive list of French IFS certified firms, and French Customs.

grocery products by French retailers in each country.⁶

Table 1 presents some detailed descriptive statistics on the final dataset. The whole dataset contains 36,487,098 observations and provides information on 25,726 French agri-food firms (including exporting and non-exporting firms) over the period 2004-2011⁷ and the 184 destinations for which we obtained information on exports and retailer sales. Reducing the sample to exporting firms and their corresponding markets reduced the sample to 144,167 observations.

Figure 1 shows the number of firms in our sample, according to their export status and to whether or not they are certified. It shows that the majority of the firms in our sample do not

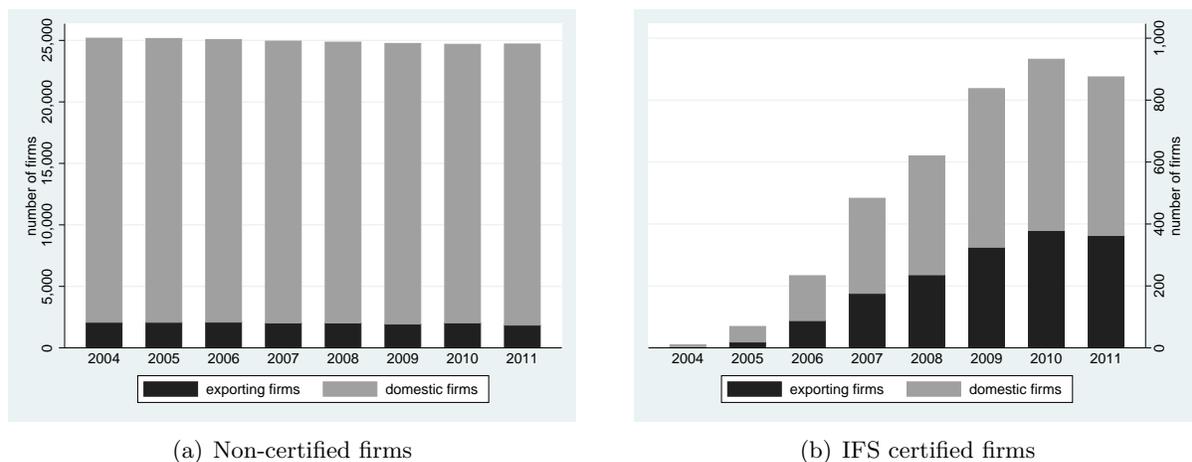


Figure 1: Number of French agri-food firms in our sample
Source: Authors' computation using Amadeus, Planet Retail and French Customs.

export (a fact that is well-documented in the literature, e.g. Mayer and Ottaviano, 2008), and, that certified firms represent a small share (4% on average) of all agri-food firms in each year.

2.3 IFS certified firms are more export oriented and prefer destination countries that already host French retailers

Combining the French custom database with the Planet Retail data enabled us to compare the export performance of French agri-food firms according to whether or not the destination country hosts French retail companies. Figure 2 shows the number of export markets and the mean exported value by French exporting firms, distinguishing between markets with and without French retailers.⁸ What we observed is in line with the main finding of Cheptea et al. (2015): the internationalization of retail companies increases the competitiveness of origin country exports, both at the extensive (number of destinations) and at the intensive (value of exports) margin.

The exhaustive annual lists of IFS certified firms makes it possible to distinguish firms with preferential relationships with retailers from the rest of French firms. According to Figure 3(a), on average, certified firms exported to more destinations over the entire period. Figure 3(b) shows that, on average, certified exporting firms also sold higher export values per destination (the intensive margin). The high values at the beginning of the period can be explained by the fact that very few exporting firms were certified in these years. The evidence presented in these figures suggests that, for French agri-food firms, the benefits of certification are linked with better export performance.

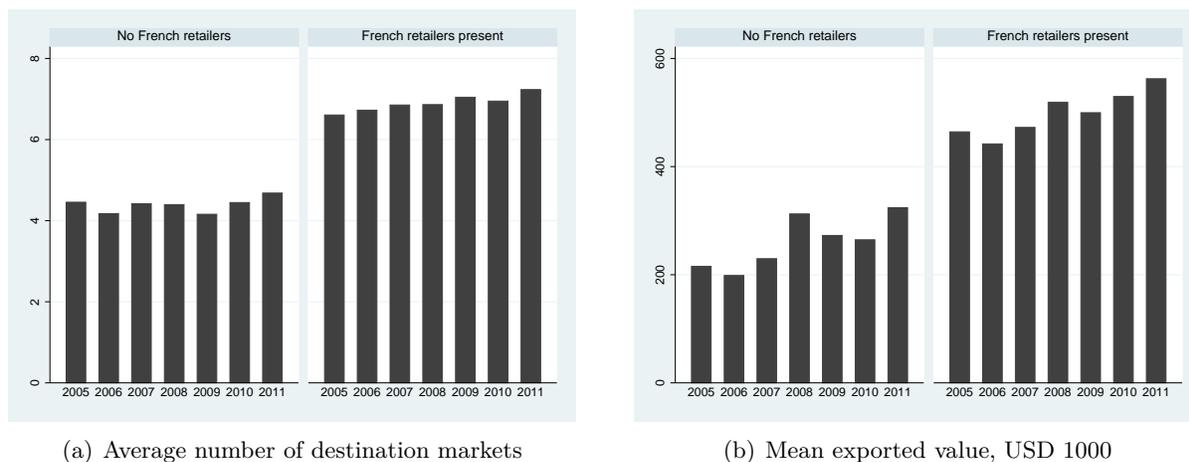


Figure 2: French agri-food firms' exports according to the destination country

Source: Authors' computation using Amadeus, Planet Retail and French Customs.

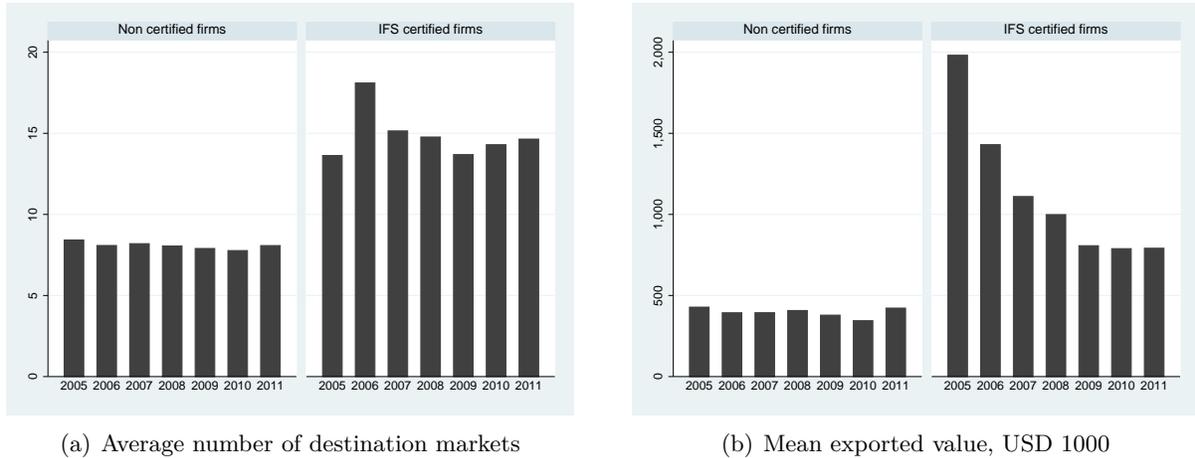


Figure 3: French agri-food firms' exports according to their certification

Source: Authors' computation using Amadeus, Planet Retail and French Customs.

This result was confirmed when the analysis was extended to the whole sample of firms in the Amadeus database (not only exporting firms). While IFS certified firms represented on average 4% of firms in the sample for the whole period, they accounted for 15% of the number of exporting firms and for 33% of the value of French agri-food exports.

Finally, we investigated the trade performance of firms according to their certification and to the presence of French retailers in destination countries. Figures 4(a) and 4(b) show the average export value and number of destination markets for IFS and non-certified firms, separating markets with French retailers from the rest. The previous result concerning the impact of French retailers on exports holds when certified and non-certified firms are distinguished: the presence of French retailers encourages exports by all firms, whether certified or not. On the other hand, the better export performance of certified firms compared to non-certified firms is valid only for markets hosting French retail companies, both at the extensive margin and at the intensive margin. No significant difference between IFS certified and non-certified firms was found on markets without French retailers.

Descriptive statistics suggest that when French retailers establish themselves abroad, all French agri-food firms benefit from improved market access, both in terms of entry and value of trade. The positive impacts of retailers appear to be greater for certified firms, whose export performance on these markets is better. For example, in 2011, 92% of French food exports were oriented to countries hosting a French retailer. IFS certified firms were responsible for one third of these exports.

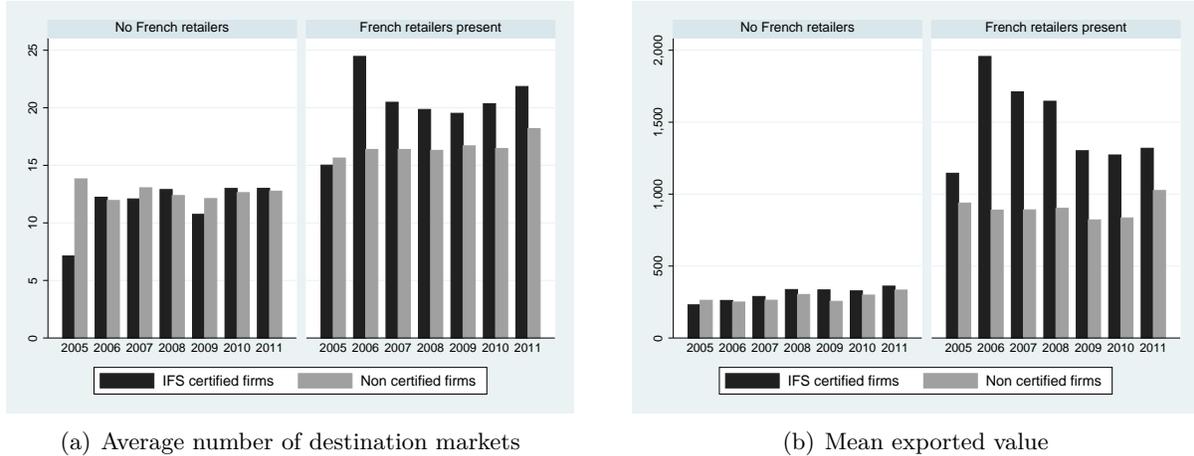


Figure 4: French agri-food firms' exports according to their certification and their destination country

Source: Authors' computation using Amadeus, Planet Retail and French Customs.

3 The impact of French retailers' overseas activity on French agri-food firms' exports

3.1 Empirical strategy and data

In this section, we estimate the impact of the commercial activity of French retailers in foreign markets on the exports of French agri-food firms to these destinations. As explained in the previous section, we were able to distinguish between firms that supply French retailers on the domestic market and the other firms by using information on firms' IFS certification status.

We estimate the impact of retailers' overseas activity separately on the probability of firm f to export to country j in year t (the extensive margin), and on the volume of its exports to this destination (the intensive margin). We use a difference-in-difference approach to allow for a differentiated impact on certified and other firms. We use the same sets of explanatory variables to estimate the effects on both export margins. The certification status of the firm at time t is given by a dummy IFS_{ft} equal to one if the firm obtained the IFS certification for that year and to zero otherwise. French retailers' activity in foreign markets is proxied by an indicator variable of retailers' presence in country j , $Retail_{jt}$, and by the cumulative sales of all French retailers on this market, $\ln Sales_{jt}$. Interaction terms $(IFS_{ft} \times Retail_{jt})$ and $(IFS_{ft} \times Retail_{jt} \times \ln Sales_{jt})$ make it possible to test whether the probability to export and the volume of exported products to markets

where French retailers are established and operate outlets is higher for IFS certified firms.

To estimate effects on the extensive export margin, we estimate a model with a binary dependent variable $I(Exports_{fjt} > 0)$ that takes the value one for observations with positive export flows and zero otherwise:

$$\begin{aligned} I(Exports_{fjt} > 0) = & \alpha_0 + \alpha_1 IFS_{ft} + \alpha_2 Retail_{jt} + \alpha_3 Retail_{jt} \times \ln Sales_{jt} \\ & + \alpha_4 (IFS_{ft} \times Retail_{jt}) + \alpha_5 (IFS_{ft} \times Retail_{jt} \times \ln Sales_{jt}) \\ & + \Lambda X_{ft} + \Theta Y_{jt} + \varepsilon_{fjt} \end{aligned} \quad (1)$$

X_{ft} and Y_{jt} are sets of firm-year- and country-year-specific controls, Λ and Θ are the associated vectors of parameters, and ε is a zero-mean error term. We estimate equation (1) using the dataset containing both exporting and non-exporting firms and all possible destination markets.

We use a similar model for the intensive margin. In this case, the explained variable is equal to the logarithm of the value of firms' exports to each destination country:

$$\begin{aligned} \ln Exports_{fjt} = & \beta_0 + \beta_1 IFS_{ft} + \beta_2 Retail_{jt} + \beta_3 Retail_{jt} \times \ln Sales_{jt} \\ & + \beta_4 (IFS_{ft} \times Retail_{jt}) + \beta_5 (IFS_{ft} \times Retail_{jt} \times \ln Sales_{jt}) \\ & + \Gamma X_{ft} + \Xi Y_{jt} + \epsilon_{fjt} \end{aligned} \quad (2)$$

Equation (2) is estimated on the sub-panel of positive export flows. Parameters β , Γ and Ξ portray the effects of different explanatory variables on the export intensity of French exporting firms. Using a log-linear model makes it possible to interpret coefficients β_3 and β_5 as elasticities.

The data panel used in our estimations covers French agri-food firms' exports of edible grocery products sold in supermarkets between 2004 and 2011. Data sources and the construction of the panel are explained in detail in section 2. First, we estimate equations (1) and (2) using productivity, computed as sales per employee, as a firm-year-specific control variable, and standard gravity variables (country GDP, distance, neighbour and French-speaking dummies) as country- and country-year-specific controls. Since our results may be affected by other unobserved sources of data variation across firms and countries, we sequentially replace these controls with time-varying firm- and country-specific fixed effects.

Equation (1) is estimated using a linear probability model because of the capacity constraints of estimating a probit or logit model with a very large set of fixed effects. Equation (2) is estimated with OLS. Robustness checks, estimations controlling for the auto-selection of firms that export to each market, and for the endogeneity of retailers' sales and firms' certification and export decisions are detailed in section 4.

3.2 Extensive export margin

We start by investigating the impact of certification and retailers' foreign activity on the extensive export margin, i.e. on the probability of a firm to export to a given market. Table 2 lists the results of the estimation of equation (1) using a linear probability model. Our dependent binary variable takes the value one for all observations with positive exports, and the value zero otherwise. In order to correctly estimate the impact on the extensive margin, we include nil exports of each firm in our panel. Therefore, our estimation panel corresponds to the full matrix of French firms (including firms that only sell on the domestic market), years, and destination markets reached by at least one French firm. As we use a linear probability model, the size of estimated coefficients does not reflect the actual change in firms' probability to export, but the sign of coefficients is a plausible indicator of a positive or negative change in export probability. Certification and export decisions are taken at the level of the firm, while our estimation panel includes multiple observations (destinations) for each firm. For this reason, in all regressions we cluster standard errors by firm.⁹ The four columns in Table 2 correspond to four different specifications, using different sets of firm- and country-specific control variables and fixed effects.

In the baseline estimation of equation (1) reported in column 1, we use firm-specific and country-specific control variables alone. The dummy variable IFS_{ft} enters the equation with a positive and significant coefficient, meaning that certified firms are generally more likely to export (to any market) than non-certified firms. Variables $Retail_{jt}$ and $\ln Sales_{jt}$ exhibit both positive and significant coefficients. This shows that the foreign activity of French retailers (presence of outlets and volume of sales) increases the probability to export for all French firms in the agri-food sector. The positive and significant coefficients of the two interaction terms ($IFS_{ft} \times Retail_{jt}$) and ($IFS_{ft} \times Retail_{jt} \times \ln Sales_{jt}$) indicate that this effect is larger for certified firms. Our estimates also point out that more productive firms have higher odds of becoming exporters, a central finding

of the recent trade literature with heterogeneous firms that emerged from the seminal work of Melitz (2003). Lastly, the coefficients of traditional gravity variables have the expected sign, found in previous empirical studies on international trade. Export probability increases with the economic size (measured by GDP) and the proximity of the destination market. French agri-food firms also tend to export more to neighbouring and French-speaking countries.¹⁰

In column 2, we add time-varying country fixed effects to control for unobserved variations in the data across destination markets. This makes it possible to compare the effects of our variables of interest across firms, for a given destination and year. Gravity variables and variables reflecting the presence and sales of French retailers on each market are collinear with our fixed effects and are dropped from the estimation. The coefficients of the IFS certification status and the two interaction terms remain positive and strongly significant, as in column 1. This confirms that for a specific destination market, certified firms have a higher probability to export than non-certified firms, and that this probability increases in the presence and with the volume of sales of French retailers in this market.

The estimation in column 3 includes time-varying firm fixed effects. This makes it possible to account for all sources of variability in firm-specific characteristics that may affect our results. Under this specification, we evaluate the effect of retailers' overseas activity across different export destinations for a given firm and year. We exclude the IFS certification dummy and firm productivity from the estimation due to collinearity with our fixed effects. The coefficients of other explanatory variables keep their sign but decrease in magnitude due to the change in the size of the sample. Productivity, measured as sales per employee, is not documented for all the firms in the AMADEUS database (see section 2.2). Replacing this variable with firm fixed effects makes it possible to include in the estimation an additional 21 million observations omitted in columns 1 and 2. With firm-specific fixed effects, we interpret the positive coefficients of the four interaction terms as follows: both certified and non-certified firms are more likely to export to destination countries hosting one or more French retailers, and this effect is amplified by the volume of retailers' sales in the country concerned. The magnitude of these effects is relatively small for non-certified firms, but quite large for certified firms.

In column 4, we replace all country- and firm-specific control variables by corresponding time-varying fixed effects. This enables us to control for all observable and non-observable firm- and

Table 2: Extensive margin

	Explained variable: $I(Exports_{fjt} > 0)$			
	(1)	(2)	(3)	(4)
IFS Certification _{ft}	0.0127*** (0.0021)	0.0127*** (0.0020)		
Retail _{jt}	0.0018*** (0.0002)		0.0011*** (0.0001)	
Retail _{jt} × ln Sales _{jt}	0.0004*** (0.0000)		0.0003*** (0.0000)	
IFS Certification _{ft} × Retail _{jt}	0.1279*** (0.0071)	0.1304*** (0.0072)	0.0641*** (0.0040)	0.0649*** (0.0041)
IFS Certification _{ft} × Retail _{jt} × ln Sales _{jt}	0.0224*** (0.0012)	0.0228*** (0.0012)	0.0111*** (0.0007)	0.0112*** (0.0007)
ln Productivity _{ft}	0.0092*** (0.0005)	0.0091*** (0.0005)		
ln GDP _{jt}	0.0017*** (0.0001)		0.0012*** (0.0000)	
ln Distance _j	-0.0035*** (0.0001)		-0.0022*** (0.0001)	
Neighbour _j	0.0230*** (0.0007)		0.0154*** (0.0004)	
French-speaking _j	0.0029*** (0.0002)		0.0020*** (0.0001)	
Year-firm FE	no	no	yes	yes
Year-country FE	no	yes	no	yes
N° of observations	14,616,289	14,856,337	35,902,059	36,487,098
R ²	0.04	0.05	0.16	0.16

Notes: $I(Exports_{fjt} > 0)$ is a binary variable equal to one for observations with positive export flows, and to zero otherwise. $IFS\ Certification_{ft}$ is an indicator variable that takes the value one if firm f was certified at time t , and value zero in the opposite case. $Retail_{jt}$ is a dummy equal to one if import country j hosted at least one French retailer in year t , and to zero otherwise. $\ln Sales_{jt}$ is the logarithm of the sales of French retailers in country j in year t . Clustered (by firm) standard errors in parentheses. ***, ** and * indicate significance at the 1%, 5% and respectively 10% confidence levels.

country-specific factors. The only coefficients estimated under this specification are interaction terms with the IFS certification dummy. All other explanatory variables, including firms' certification status and retailers' presence and sales in the destination country are dropped because of collinearity. The results validate our finding in previous columns that certified firms have a higher probability to export to countries where French retailers invest and that this probability is proportional to the commercial activity generated by such investments.

3.3 Intensive export margin

We turn now to the intensive margin of trade and evaluate how multinational retailers and certification affect a firm's volume of exports to each market. We estimate equation (2) with different sets of firm- and country-specific controls and report results in Table 3. The four columns of Table 3 correspond to specifications similar to those displayed in Table 2.

Similar to results on the extensive margin, there is a positive significant effect of firm's IFS certification status in Table 3. This suggests that on top of the higher odds to start exporting, certified firms also export larger volumes than non-certified firms. Likewise, the activity of French retailers (both presence and sales) has a positive and significant impact on the amounts of exports by both types of firms. This effect is partially diluted when we include firm-specific fixed effects. The coefficient of interaction term ($IFS_{ft} \times Retail_{jt}$) takes both positive and negative values, but is never statistically different from zero. Hence, the overseas presence of French retailers does not lead to a marked increase in the volume of exports of certified firms. However, a 10% increase in retailers' sales in a foreign market where French retailers are already present generates a 2%-3% increase in the volume of exports of French certified firms towards this country. This effect is reflected by the positive and statistically significant coefficient of interaction term ($IFS_{ft} \times Retail_{jt} \times \ln Sales_{jt}$) in all specifications. Combined with results for the extensive margin, we conclude that the sales of French retailers in a foreign market increase not only the probability of French certified firms to export to this destination, but also the value of these exports.

Let us illustrate the role of IFS certification and overseas expansion of retailers in a specific example. What would have been the level of French food exports to China in the absence of French retailers? We compare the estimated effect of retailers' foreign activity on the exports of certified and non-certified firms to their counterfactual level of exports in the absence of French retailers.¹¹ We compute counterfactual exports by plugging into equation (2) factual values for all left hand side variables except retailers' activity, which we cancel out by setting $Retail_{jt} = 0$.¹² Aggregating the exports of all French firms selling to China, we obtain an overall effect of 35% extra trade induced by the presence of French retailers on the Chinese market. With similar computations we found that if all firms exporting to China became certified, the total French food exports to this market would double, while if all firms were non-certified, there would be a 23% reduction in French exports.

Estimates in Table 3 also indicate that high productivity French firms export larger amounts. This result complements our finding in section 3.2 of a higher probability to engage in export activities for firms on the right end of the productivity distribution. Estimated effects of gravity type variables are similar in sign and magnitude to values observed in the literature. Firms export more to large markets and less to remote destinations. Exports to neighbouring and French-

Table 3: Intensive margin

	Explained variable: $\ln Exports_{fjt}$			
	(1)	(2)	(3)	(4)
IFS Certification $_{ft}$	0.29*** (0.11)	0.45*** (0.11)		
Retail $_{jt}$	0.17*** (0.04)		0.10*** (0.03)	
Retail $_{jt} \times \ln Sales_{jt}$	0.02*** (0.01)		0.01* (0.01)	
IFS Certification $_{ft} \times Retail_{jt}$	0.07 (0.07)	0.09 (0.07)	-0.05 (0.06)	-0.03 (0.06)
IFS Certification $_{ft} \times Retail_{jt} \times \ln Sales_{jt}$	0.31*** (0.04)	0.26*** (0.04)	0.23*** (0.04)	0.21*** (0.04)
$\ln Productivity_{ft}$	0.80*** (0.06)	0.81*** (0.06)		
$\ln GDP_{jt}$	0.19*** (0.01)		0.40*** (0.01)	
$\ln Distance_j$	-0.21*** (0.02)		-0.31*** (0.02)	
Neighbour $_j$	0.14*** (0.05)		0.23*** (0.04)	
French-speaking $_j$	0.02 (0.05)		0.42*** (0.04)	
Year-firm FE	no	no	yes	yes
Year-country FE	no	yes	no	yes
N ^o of observations	94,056	94,095	144,117	144,167
R ²	0.12	0.17	0.48	0.51

Notes: $\ln Exports_{fjt}$ is the logarithm of exports of firm f to destination j in year t . $IFS Certification_{ft}$ is an indicator variable that takes the value one if firm f was certified at time t , and value zero in the opposite case. $Retail_{jt}$ is a dummy equal to one if import country j hosted at least one French retailer in year t , and to zero otherwise. $\ln Sales_{jt}$ is the logarithm of the sales of French retailers in country j in year t . Clustered (by firm) standard errors in parentheses. ***, ** and * indicate significance at the 1%, 5% and respectively 10% confidence levels.

speaking countries are on average 26% and respectively 52% higher than to otherwise identical destinations, according to the results in column 3.

Results in Tables 2 and 3 support our prediction that certified firms benefit more than their non-certified counterparts from the activity of French retailers on foreign markets. The former can sell their products via the network of outlets of French retailers in foreign markets. Therefore, they are more likely to target countries where these outlets are located and sell larger amounts in these markets than non-certified firms.

3.4 The network effect

The first result highlighted by sections 3.2 and 3.3 is that agri-food French firms have a higher probability to export, and sell larger amounts in markets where French retailers are already established and have a higher level of sales. This confirms the finding of Cheptea et al. (2015) who,

using country-level data, showed that the overseas expansion of retailers fosters the exports of their country of origin to retailers' host countries. These authors argue that overseas expansion in the retail sector can impact trade by reducing the bilateral trade cost for exporting firms from the retailers' country of origin, and/or by changing the preferences of consumers in the host country.

The second result of our empirical analysis is that certified firms, i.e. firms that already supply French retailers on their domestic market, benefit more from retailers' internationalization than the other firms. The activity of French retailers in destination countries gives these firms access to new markets and allows them to export more in terms of value. This outcome thus suggests the existence of a network effect of French retail companies for their domestic suppliers in the case of overseas expansion. The fact that the buyer-supplier relationship lasts when a retail company invests abroad contrasts with the stylized fact that retail companies mostly propose locally-sourced products in their outlets established abroad. For example, according to Moreau (2008) and Yoder et al. (2016), between 90% and 95% of the products in the Chinese outlets of Carrefour and Walmart are from China. However, retail companies may continue to source some goods, in particular retailer branded food products, from their domestic market in order to obtain increased guarantees in terms of quality and food safety that they cannot easily find on the host market. In addition, due to their preferential relationship with retail companies, retail suppliers avoid the cost of prospecting new markets, benefit from lower transport, packaging, and distribution costs by grouping shipments with other suppliers, and reduce other export-related costs by learning from retailers' experience and knowledge on foreign markets (concerning demand, profit margin, infrastructure, and delivery procedures).

We go further in our analysis and test this network effect by exploiting the exit of French retailers' from foreign markets.¹³ More specifically, we question whether certified firms behave differently from non-certified firms on markets where French retailers stop their activity. To answer this question, we compare the change in the exports of certified and non-certified firms before,

during, and after the exit of French retailers. We estimate the following equation:

$$\begin{aligned} \ln\left(\frac{Exports_{fj,t}}{Exports_{fj,t-1}}\right) = & \delta_0 + \delta_1 Before_{jt} + \delta_2 Exit_{jt} + \delta_3 After_{jt} \\ & + \delta_4 (IFS_{ft} \times Before_{jt}) + \delta_5 (IFS_{ft} \times Exit_{jt}) \\ & + \delta_6 (IFS_{ft} \times After_{jt}) + \Phi X_{ft} + \Psi Y_{jt} + v_{fjt} \end{aligned} \quad (3)$$

The dependent variable is the annual evolution of firm-level exports, expressed as a logarithm. We use a difference-in-difference approach to separate the effect of exits on firms' exports to each market from the systematic differences in their exports to different markets. Accordingly, we estimate how the exit of French retailers affects the evolution of firms' exports (and not their level).

We use three dummy variables to compare the evolution of exports to countries from which French retailers exited: $Before_{jt}$ corresponds to the years before French retailers exited from country j , $Exit_{jt}$ stands for the year of exit, and $After_{jt}$ captures the years after exit. For countries where French retailers continued to operate, or never entered, the three dummies are always equal to zero. To compare the export behaviour of certified and non-certified firms, we interact the IFS certification dummy with each of these three variables. Thus, $IFS_{ft} \times Before_{jt}$ reflects the evolution of certified firms' exports before their exit, $IFS_{ft} \times Exit_{jt}$ the evolution in the year of their exit, and $IFS_{ft} \times After_{jt}$ the evolution in the subsequent years. In this specification, the benchmark is the evolution of firms' exports to markets that were never concerned by an exit.

We estimate equation (3) with OLS using the same sample as in section 3.3. We follow the same empirical strategy as above, and include alternatively different sets of firm- and country-specific controls and fixed effects. Results are reported in Table 4.¹⁴ In the regression reported in column 2, we use time-varying country fixed effects and the annual variation in the firm's productivity. The specification in column 3 includes time-varying firm fixed effects and the annual GDP growth of the importing country. Time-varying fixed effects at both country and firm level are used in the last column.

First, results show that, as expected, an increase in the productivity of the firm or in the GDP of the destination country significantly increases the exports of the firm. Second, the non-significant coefficients of dummy variables $Before_{jt}$, $Exit_{jt}$, and $After_{jt}$ indicate that the changes in exports by non-certified firms to markets where French retailers shut down their activity is no different from

Table 4: Retailers' exits from foreign markets

	Explained variable: annual changes in exports			
	(1)	(2)	(3)	(4)
$IFS_{ft} \times Before_{jt}$	-0.002 (0.124)	0.060 (0.143)	-0.033 (0.110)	0.065 (0.086)
$IFS_{ft} \times Exit_{jt}$	0.071 (0.089)	0.063 (0.111)	-0.051 (0.102)	0.095 (0.094)
$IFS_{ft} \times After_{jt}$	-0.126** (0.055)	-0.099 (0.065)	-0.165*** (0.056)	-0.110** (0.047)
$\ln\left(\frac{GDP_{j,t}}{GDP_{j,t-1}}\right)$	0.584*** (0.115)		0.402*** (0.101)	
$Before_{jt}$			0.033 (0.034)	
$Exit_{jt}$			0.065 (0.052)	
$After_{jt}$			0.006 (0.031)	
$\ln\left(\frac{Productivity_{f,t}}{Productivity_{f,t-1}}\right)$	0.155*** (0.035)	0.141*** (0.034)		
Year-firm FE	no	no	yes	yes
Year-country FE	no	yes	no	yes
N° of observations	51,561	51,951	66,048	102,384
R ²	0.01	0.03	0.19	0.23

Notes: Clustered (by firm) standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

the changes in exports by any French firm to other markets. This statement holds for years prior to the exit of French retailers, the year of exit, and the years following the exit. Finally, a different story emerges when we focus on IFS certified firms. The coefficient of variable $IFS_{ft} \times Exit_{jt}$, which reflects the change in exports of certified firms after the exit of French retailers, is negative and significant in columns 1, 3 and 4. The effect of the other two interaction variables is statistically non-significant. This suggests that certified firms reduce their exports after French retailers exit the market, compared to non-certified firms and to firms exporting to other markets.

These results show that the outcome of sections 3.2 and 3.3 are not driven by a shift in consumer preferences. If French retailers' presence in foreign markets increased the local consumers' preference for French products, the changes in exports to these markets would have been similar for both certified and non-certified French firms. We found that the exit of French retailers led to a drop in the volume of exports only for certified firms. Exports to these markets by non-certified firms were not affected. This difference in behaviour with respect to the exit of retailers for the two types of firms confirms that the positive impact of retailers' overseas activity comes mainly from a

network advantage for retailers’ suppliers rather than from a change in consumer preferences.

4 Robustness of results

4.1 Heterogeneous impact depending on the firm’s productivity

A simple look at the productivity distribution of certified and non-certified firms suggests that the productivity gap between the two types of firms, pictured in Figure 5, may explain the higher export participation and larger export volumes of certified firms mentioned in the previous sections. When we consider the entire population of French agri-food firms, certified firms indeed appear to be more productive. However, when we limit the panel to exporting firms, the gap is much reduced and becomes statistically non-significant. This holds when we use data for any single year.¹⁵

Still, it is possible that destination markets where French retailers operate are more easily accessed by high-productivity firms, thereby inflating the effect of our variables of interest.¹⁶ To thoroughly test how firms’ productivity levels affect our results in sections 3.2 and 3.3, we re-estimate an augmented version of equations (1) and (2). We multiply the firm’s productivity by the two variables characterizing the activity of French retailers in the destination country ($Retail_{jt}$ and $Retail_{jt} \times \ln Sales_{jt}$). Estimation results including country-year, firm-year, and both types of fixed effects are displayed in columns 2 to 4 of Tables 5 and 6. In column 1, we check that high-productivity firms are more likely to become exporters and export larger volumes than their

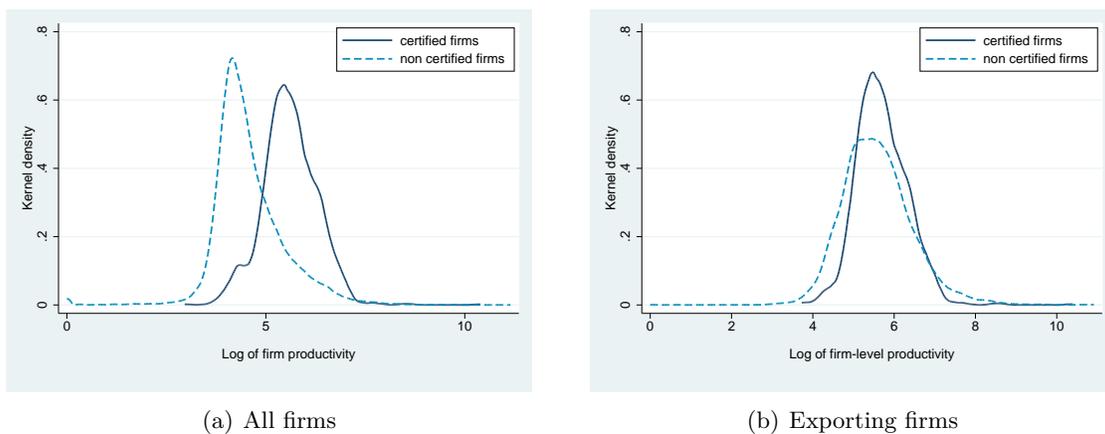


Figure 5: The productivity distribution of French agri-food firms
Source: Authors’ computation using Amadeus, Planet Retail and French Customs.

Table 5: Extensive margin: productivity effects

	Explained variable: $I(Exports_{fjt} > 0)$			
	(1)	(2)	(3)	(4)
$\ln Productivity_{ft}$	0.0112*** (0.0006)	0.0046*** (0.0004)		
$\ln Productivity_{ft} \times Retail_{jt}$		0.0233*** (0.0009)	0.0235*** (0.0009)	0.0237*** (0.0009)
$\ln Productivity_{ft} \times Retail_{jt} \times \ln Sales_{jt}$		0.0041*** (0.0002)	0.0040*** (0.0002)	0.0041*** (0.0002)
IFS Certification $_{ft}$		0.0180*** (0.0021)		
Retail $_{jt}$			-0.1063*** (0.0041)	
Retail $_{jt} \times \ln Sales_{jt}$			-0.0181*** (0.0007)	
IFS Certification $_{ft} \times Retail_{jt}$		0.1063*** (0.0069)	0.1039*** (0.0069)	0.1058*** (0.0070)
IFS Certification $_{ft} \times Retail_{jt} \times \ln Sales_{jt}$		0.0186*** (0.0012)	0.0185*** (0.0012)	0.0187*** (0.0012)
$\ln GDP_{jt}$			0.0019*** (0.0001)	
$\ln Distance_j$			-0.0035*** (0.0001)	
Neighbour $_j$			0.0230*** (0.0007)	
French-speaking $_j$			0.0029*** (0.0002)	
Time-varying firm-specific FE	no	no	yes	yes
Time-varying country-specific FE	yes	yes	no	yes
N ^o of observations	14,560,818	14,560,818	14,560,818	14,560,818
R ²	0.04	0.06	0.19	0.19

Notes: $I(Exports_{fjt} > 0)$ is a binary variable equal to one for observations with positive export flows, and to zero otherwise. *IFS Certification* $_{ft}$ is an indicator variable that takes the value one if firm f was certified at time t , and value zero in the opposite case. *Retail* $_{jt}$ is a dummy equal to one if import country j hosted at least one French retailer in year t , and to zero otherwise. $\ln Sales_{jt}$ is the logarithm of the sales of French retailers in country j in year t . Clustered (by firm) standard errors in parentheses. ***, ** and * indicate significance at the 1%, 5% and respectively 10% confidence levels.

less productive counterparts, as emphasized by previous empirical analyses.

Positive estimates for interaction terms that take productivity into account in columns (2) to (4) in Table 5 show that the difference in the exporting odds of high- and low-productivity firms is larger for countries where French retailers operate.¹⁷ We find a similar but less significant effect on the difference in the volume of exports to these markets in Table 6.

The impact of our main variables of interest ($Retail_{jt} \times IFS_{ft}$ and $Retail_{jt} \times \ln Sales_{jt} \times IFS_{ft}$) on firms' export behaviour remains very similar to our estimates in sections 3.2 and 3.3. We conclude, therefore, that the positive effect of IFS certification on firms' decision to export and volume of exports - overall, as well as to countries reached by French retailers - cannot be attributed to the productivity channel.

Table 6: Intensive margin: productivity effects

	Explained variable: $\ln Exports_{fjt}$			
	(1)	(2)	(3)	(4)
$\ln Productivity_{ft}$	0.81*** (0.06)	0.73*** (0.07)		
$\ln Productivity_{ft} \times Retail_{jt}$		0.11** (0.05)	0.05 (0.05)	0.10** (0.05)
$\ln Productivity_{ft} \times Retail_{jt} \times \ln Sales_{jt}$		0.00 (0.01)	0.01 (0.01)	0.02** (0.01)
IFS Certification $_{ft}$		0.45*** (0.11)		
Retail $_{jt}$			-0.21 (0.27)	
Retail $_{jt} \times \ln Sales_{jt}$			-0.03 (0.04)	
IFS Certification $_{ft} \times Retail_{jt}$		0.10 (0.07)	-0.07 (0.07)	-0.06 (0.07)
IFS Certification $_{ft} \times Retail_{jt} \times \ln Sales_{jt}$		0.26*** (0.04)	0.23*** (0.04)	0.20*** (0.04)
$\ln GDP_{jt}$			0.40*** (0.01)	
$\ln Distance_j$			-0.30*** (0.02)	
Neighbour $_j$			0.30*** (0.05)	
French-speaking $_j$			0.36*** (0.04)	
Time-varying firm-specific FE	no	no	yes	yes
Time-varying country-specific FE	yes	yes	no	yes
N ^o of observations	94,043	94,043	94,043	94,043
R ²	0.16	0.17	0.47	0.50

Notes: $\ln Exports_{fjt}$ is the logarithm of exports of firm f to destination j in year t . $IFS Certification_{ft}$ is an indicator variable that takes the value one if firm f was certified at time t , and value zero in the opposite case. $Retail_{jt}$ is a dummy equal to one if import country j hosted at least one French retailer in year t , and to zero otherwise. $\ln Sales_{jt}$ is the logarithm of the sales of French retailers in country j in year t . Clustered (by firm) standard errors in parentheses. ***, ** and * indicate significance at the 1%, 5% and respectively 10% confidence levels.

4.2 Selection bias

A general result of the recent literature on international trade with heterogeneous firms is that only a fraction of firms, the most productive ones, export. This is because exporting implies a specific fixed cost, which can only be supported by firms on the right side of the productivity distribution. OLS estimates of the impact of the overseas activity of French retailers on the export values of French agri-food firms (Table 3) do not account for this left censoring of the exports data, and can therefore suffer from a selection bias. To address this issue, we follow Eaton and Kortum (2001) and Crozet et al. (2012) and estimate the impact of retailers' activity with an appropriately-designed Tobit model. The approach consists in assuming that a different censoring effect applies to each destination country. This assumption matches another finding confirmed by

many empirical trade studies: firms face fixed (sunk) export costs that vary across destinations (Chaney, 2008; Chevassus-Lozza and Latouche, 2012). The Eaton and Kortum (2001) (hereafter EK) Tobit estimation approach was originally designed for country-level data. Eaton and Kortum (2001) argue that each importer has a threshold level of imports below which it simply does not report imports, and estimate a Tobit model with import-country-specific censoring points. Although these censoring points cannot be observed directly, they can be safely approximated by the lowest exports value over all source countries appearing in the data. Crozet et al. (2012) transpose this solution to a trade setting with firm level data. We follow Crozet et al. (2012) and define the value of left-censoring exports for each country and for each year as the minimum (lowest export value) across all French agri-food firms exporting to this destination. We prefer this definition to estimating threshold productivity levels for each export market as it avoids imposing additional assumptions with respect to the structure of export costs or the productivity distribution of firms.¹⁸

It will be recalled that most of our specifications in Tables 2 and 3 require the use of firm-level fixed effects. To make the computation of EK-Tobit estimates tractable under these circumstances, we need to substantially reduce the number of firms in our panel. We estimate the model on 1,000 different randomly-selected sub-panels of 1,000 firms. The results are listed in Table 7. The EK Tobit makes it possible to include all firms and destinations in the estimation, even when exports are nil. Nil exports depict situations when bilateral sunk export costs are too high for firms to make positive profits, and firms decide not to export. Consequently, the EK Tobit estimates correspond to the average impact of French retailers' foreign activity jointly on the extensive and intensive export margin. The results in Table 7 are quantitatively different from those in Tables 2 and 3, but the main conclusions are confirmed.

4.3 Endogeneity of retail sales and certification

Another issue that may affect our results is endogeneity. A first possible source of endogeneity is between the overseas activity of French retailers and the export patterns of French agri-food firms. A common set of determinants affects both these phenomena (Cheptea et al., 2015). For instance, French retailers and exporters are both attracted by large nearby markets, that also display stronger similarities (linguistic, institutional, etc.) with France.¹⁹ Omitting some of the destination-specific factors that concomitantly shape the decision of French retailers to invest abroad or to increase their

Table 7: The overall effect on both margins: Eaton-Kortum Tobit

	(1)	(2)	(3)
Certification ISF	1.96*** (0.16)		
ln Sales		4.50*** (0.05)	
Certification IFS \times ln Sales	0.97*** (0.17)	0.32** (0.15)	0.59*** (0.13)
Firm \times time FE	no	yes	yes
Country \times time FE	yes	no	yes
N ^o of observations	326,942	326,942	326,942
ll	-81319.6	-80888.4	-66756.8

Notes: Clustered (by firm) standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

foreign sales, and the export participation and volumes of French agri-food firms, may yield biased estimates of our main effects. In our estimations, this potential endogeneity bias is eliminated when we include time varying country fixed effects in Tables 2 and 3. A reverse causality may also cause an endogeneity bias, as the decision by French retailers to invest or sell more in a foreign market may, at some point, be driven by the fraction of French firms exporting to this destination or the amount of their exports (Cheptea et al., 2015). This reverse causality is unlikely to arise in our setting due to differences in the level of data aggregation. In our data, the overseas sales of French retailers vary across destination markets, while exports vary across destinations and firms. Although French retailers may indeed accord their foreign investments and sales to the overall French export patterns, it is highly improbable that an individual firm will influence retailers' decisions or cause a change in their strategies.²⁰

A second possible source of endogeneity may arise from the fact that firms' decision to certify may be linked to their decision to export. This issue may bias our results, since both decisions are taken within the same firm, possibly even simultaneously. Likewise, endogeneity between a firm's certification and export activity may come from omitted variables that affect both outcomes, as well as from reverse causality. The use of firm-year fixed effects permits to control for the omitted variable bias. We use an instrumental variable approach to test the latter source of endogeneity. We construct our instrumental variable using information on the certification of neighbouring firms that produce similar products. For each firm and year in our sample, we compute the share of sales of certified firms from the same sub-national region (*département*), excluding the firm itself. Neighbouring firms compete with each other for the same retail shelf space, leading to mutually

dependent certification strategies. The certification choice of neighbouring competitors, however, is unlikely to affect the firm’s decision to export. The latter is mainly driven by factors specific to the firm, such as productivity, destination-specific trade costs, business connections, etc.

Table 8 shows two-stage least squares (2SLS) estimates. The first two columns correspond to the extensive export margin, the last two columns to the intensive margin. We select the trade specifications that include the full set of annual firm- and country-specific fixed effects (corresponding to columns (4) in Tables 2 and 3), thereby removing other sources of endogeneity.²¹ Accordingly, we instrument the interaction terms $IFS_{ft} \times Retail_{jt}$ and $IFS_{ft} \times Retail_{jt} \times \ln Sales_{jt}$ with the interaction between our instrument and variables $Retail_{jt}$ and $Retail_{jt} \times \ln Sales_{jt}$. Due to data limitation, our instrumental variable for firms’ certification cannot be computed for all firms in the panel. To obtain comparable results, we report both OLS and 2SLS estimations performed on the same sets of observations.

Significant tests for weak identification and under-identification, displayed in the bottom rows in Table 8, confirm the validity of our instrument. Its explanatory power is particularly high for the intensive margin, where it accounts for respectively 70% and 90% of the variation in interaction terms explained in the first-stage estimations. The low first-stage fit for the extensive margin comes from the sparse data needed to compute the instrument for non-exporting firms. The endogeneity test is statistically significant for the extensive margin, but not significant for the extensive export margin. This implies that firms’ decision to certify affects their decision to export, but not the amount of exports.

The absence of reverse causality for the intensive margin means that, in this case, there is no need to control for endogeneity. Indeed, the second-stage estimates are very similar to the effects estimated with OLS. For the extensive margin, OLS estimates are biased downward. The positive effects of retailers’ overseas activity on the likelihood of export by certified firms increase more than twofold when we control for endogeneity.

Based on these findings, we conclude that the main results identified in sections 3.2 and 3.3 are not undermined by a possible endogeneity bias. French agri-food firms export larger amounts to countries where French retailers have established outlets, the effect being larger for certified firms, i.e. for retail suppliers.

Table 8: Control for endogeneity

Explained variable:	$I(Exports_{fjt} > 0)$		$\ln Exports_{fjt}$	
	OLS	2SLS	OLS	2SLS
IFS Certification $_{ft}$ \times Retail $_{jt}$	0.12*** (0.01)	0.27*** (0.05)	-0.05 (0.07)	-0.03 (0.08)
IFS Certification $_{ft}$ \times Retail $_{jt}$ \times \ln Sales $_{jt}$	0.02*** (0.00)	0.06*** (0.01)	0.26*** (0.04)	0.22*** (0.06)
Time-varying firm-specific FE		yes		yes
Time-varying country-specific FE		yes		yes
N $^{\circ}$ of observations		9,723,228		83,946
R 2	0.23	0.22	0.50	0.50
First stage R 2 :				
– Eq. IFS Certification $_{ft}$ \times Retail $_{jt}$		0.02		0.91
– Eq. IFS Certification $_{ft}$ \times Retail $_{jt}$ \times \ln Sales $_{jt}$		0.02		0.69
Identification test		47.72 (0.000)		199.99 (0.000)
Weak identification test		23.97 (0.000)		735.96 (0.000)
Endogeneity test		6.28 (0.002)		1.71 (0.181)

Notes: $I(Exports_{fjt} > 0)$ is a binary variable equal to one for observations with positive export flows, and to zero otherwise. $\ln Exports_{fjt}$ is the logarithm of exports of firm f to destination j in year t . $IFS Certification_{ft}$ is an indicator variable that takes the value one if firm f was certified at time t , and value zero in the opposite case. $Retail_{jt}$ is a dummy equal to one if import country j hosted at least one French retailer in year t , and to zero otherwise. $\ln Sales_{jt}$ is the logarithm of the sales of French retailers in country j in year t . Clustered (by firm) standard errors in parentheses. ***, ** and * indicate significance at the 1%, 5% and respectively 10% confidence levels.

5 Conclusions

The present article shows that IFS certified French firms are more likely to export, and export larger amounts, than non-certified firms to markets where French retailers have established outlets. Moreover, it appears that these firms also behave differently in countries where French retailers close down their activities. These results suggest that the buyer-supplier relationship still stands when a retail company invests overseas.

This outcome can be explained by the need for retailers to source from reliable and safe suppliers, the easiest way being to import products from their domestic suppliers. As mentioned by Reardon et al. (2007), retailers who penetrate foreign markets may continue to source from their suppliers in their country of origin because a given product is not available locally, or not of the appropriate quality. One question remaining would be to understand how this network effect evolves over time, when local producers either adapt or upgrade their products.

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Notes

¹https://www.ifs-certification.com/images/Food_Checks/FoodCheck_FeeSchedule_EN.pdf

²AMADEUS is provided by Bureau van Dijk. We used the version of the AMADEUS database covering French firms operating in the agri-food sector in 2012.

³AMADEUS includes information on firms' primary industry of the NACE Rev.2 4-digit classification. This information is not included in the French Customs Register and was therefore not known for exporting firms that are not included in the French enterprise surveys. Under these conditions, the AMADEUS data enabled us to identify the largest set of French firms agri-food firms whose export behaviour is known.

⁴We excluded wholesalers and retailers from the sample.

⁵Of the first 24 chapters of the Harmonized System that correspond to food products, we excluded live animals (chapter 1), hair, fur, and ivory (chapter 5), flowers (chapter 6), raw cereals (chapter 10), vegetal extracts (chapter 13), planting materials (chapter 14), food residues (chapter 23), and tobacco (chapter 24). See http://www.wcoomd.org/en/topics/nomenclatureandtools/hs_nomenclature_2012/hs_nomenclature_table_2012.aspx.

⁶Planet Retail records data on the activity (sales, outlets, sales area) of individual retail companies in each country. Data is classified in large groups of products, for example, food products are aggregated in a single group called edible grocery products. The database includes 12 French retail companies who sell food products in foreign markets, including the giants Carrefour, Auchan, Casino, Intermarche, Leclerc, Picard and Systeme U.

⁷The introduction of the IFS certification in 2003 defined the lower limit of the time period investigated. The lack of available data on grocery sales by multinational retailers prevented us from extending our analysis beyond the year 2011.

⁸The trends depicted in Figure 2(a) did not change when we controlled for the fact that the total number of foreign markets in which French retailers invest increased from 56 in 2004 to 83 in 2011, while the total number of bypassed markets dropped from 123 to 97.

⁹Clustering by destination country yielded less significant estimates for coefficients of country-specific variables. The statistical significance of our variables of interest remained the same.

¹⁰In Table 9 of the Appendix we replicate these estimates with a logit and probit estimator, clustering standard errors by firm and country, and by country. Results are qualitatively similar to results in Table 1. According to results in Table 9, IFS certified firms are on average five times more likely to export to a given country than their non-certified counterparts. Non-certified French firms have a 30% higher probability to export to a country hosting a French retailer than to a country that does not. For IFS certified firms this probability is 73% larger.

¹¹This reflects the direct effect of retailers' overseas activity on origin country exports and corresponds to the *partial equilibrium* effect described by Glick and Taylor (2010) and Head and Mayer (2014). Our data covers a single exporting country and does not enable us to compute *general equilibrium* effects (i.e. integrate retailers' indirect effect on the income, expenditure, and multilateral remoteness of each market).

¹²In 2011, sales by French retailers on the Chinese market amounted to € 10.8 million. The same year French agri-food firms exported € 662 million worth of food products to China, of which 14% was exported by certified firms.

We use estimates in column 3 for coefficients of country-specific variables and time-varying firm-specific controls (including certification and productivity, captured by firm fixed effects), and parameter estimates in column 4 for the last interaction term in equation (2). We disregard the term ($IFS_{ft} \times Retail_{jt} \times \ln Sales_{jt}$) since its impact on exports is statistically non-significant in all specifications in Table 3. The fractional increase in exports induced by French retailers operating in China in 2011 is equal to $\exp[0.10 + 0.01 \ln(10.8)] - 1 = 0.13$ for non-certified firms, and to $\exp[0.10 + 0.01 \ln(10.8) + 0.21 \ln(10.8)] - 1 = 0.86$ for IFS certified firms.

¹³During the period covered by our study, French retailers exited from ten countries: Chile in 2004, Norway in 2006, Mexico and South Korea in 2007, Latvia, Lithuania, and Slovakia in 2008, Algeria in 2009, Ireland and Venezuela in 2010.

¹⁴The drop in the number of observations compared to Table 3 is due to the fact that annual changes in exports, productivity and GDP can be computed only when the values of these variables are positive in two consecutive years.

¹⁵The weak coefficient of correlation between a firm's certification and its productivity level also points to the orthogonality of these variables: 0.1439 (0.0000) overall and 0.0425 (0.0000) for exporting firms.

¹⁶Parameters α_4 and α_5 in equation (1) and, respectively, β_4 and β_5 in equation (2).

¹⁷Surprisingly, column (3) of Table 5 displays negative and significant coefficients for variables $Retail_{jt}$ and $Retail_{jt} \times \ln Sales_{jt}$. They reflect the effect of retailers' foreign activity on the export patterns of the 0.4% least productive firms in our panel, for which the log of our productivity variable is equal to zero. As the productivity increases, the overall effect of retailers on firms' export probability becomes positive.

¹⁸We estimate the EK Tobit in Stata using the *intreg* command and following the estimation guidelines and Stata code from Head and Mayer (2014) and the companion website: <https://sites.google.com/site/hiegravity/>.

¹⁹Common determinants of French retailers and exporting firms are most likely destination specific. Unlike exports, retailers' presence and sales on each foreign market enter our model in the aggregate form (i.e. cumulated across all French retailers) and, therefore, are unlikely to be affected by the characteristics of individual domestic or exporting firms.

²⁰This argument is supported by the low explanatory power of time-varying firm-specific fixed effects which never exceeds 14% of the observed variation in retailers' overseas presence and sales ($Retail_{jt}$ and $Retail_{jt} \times \ln Sales_{jt}$).

²¹The endogenous variable IFS_{ft} is collinear with firm fixed effects and drops from the estimation.

Appendix

Table 9: Extensive margin: Probit and Logit estimations

	Explained variable: $I(Exports_{fjt} > 0)$			
	(1)	(2)	(3)	(4)
	Logit	Logit	Probit	Probit
IFS Certification _{ft}	1.65*** (0.11)	1.65*** (0.04)	0.61*** (0.04)	0.61*** (0.03)
Retail _{jt}	0.26*** (0.02)	0.26 (0.17)	0.09*** (0.01)	0.09 (0.06)
Retail _{jt} × ln Sales _{jt}	0.02*** (0.00)	0.02 (0.03)	0.01*** (0.00)	0.01 (0.01)
IFS Certification _{ft} × Retail _{jt}	0.29*** (0.06)	0.29*** (0.07)	0.31*** (0.02)	0.31*** (0.05)
IFS Certification _{ft} × Retail _{jt} × ln Sales _{jt}	0.03** (0.01)	0.03 (0.02)	0.04*** (0.01)	0.04*** (0.01)
ln Productivity _{ft}	1.12*** (0.03)	1.12*** (0.01)	0.51*** (0.01)	0.51*** (0.01)
ln GDP _{jt}	0.42*** (0.01)	0.42*** (0.03)	0.17*** (0.00)	0.17*** (0.01)
ln Distance _j	-0.52*** (0.01)	-0.52*** (0.06)	-0.21*** (0.01)	-0.21*** (0.02)
Neighbour _j	0.26*** (0.02)	0.26 (0.18)	0.15*** (0.01)	0.15* (0.08)
French-speaking _j	0.52*** (0.03)	0.52*** (0.14)	0.22*** (0.01)	0.22*** (0.06)
Constant	-17.60*** (0.28)	-17.60*** (1.03)	-7.82*** (0.11)	-7.82*** (0.43)
N° of observations	14083140	14083140	14083140	14083140
Clustering level (standard errors)	firm & country	country	firm & country	country

Notes: $I(Exports_{fjt} > 0)$ is a binary variable equal to one for observations with positive export flows, and to zero otherwise. $IFS\ Certification_{ft}$ is an indicator variable that takes the value one if firm f was certified at time t , and value zero in the opposite case. $Retail_{jt}$ is a dummy equal to one if import country j hosted at least one French retailer in year t , and to zero otherwise. $\ln Sales_{jt}$ is the logarithm of the sales of French retailers in country j in year t . Clustered (by firm or country) standard errors in parentheses. ***, ** and * indicate significance at the 1%, 5% and respectively 10% confidence levels.