Exporting firms and retail internationalization: Evidence from France

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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 International Featured Standard (IFS). The results show that IFS certified French firms are more likely to export and export larger volumes than noncertified 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. The 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 behavior of certified and noncertified 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
firm-level exports, multinational retailers, private standards

JEL CLASSIFICATION
F12, F14, F23

1 INTRODUCTION

In 2012, 36% and 54% of sales by the world’s leading retailers Walmart and Carrefour, respectively, were made outside their domestic market (Planet Retail database). 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 International Featured Standard (IFS) to identify firms that supply the domestic outlets of French retailers. The
IFS is a quality and food safety standard required by all French retail companies from suppliers of products sold under their brand. IFS certification is costly and needs to be renewed annually. Consequently, we can safely conclude that each certified firm supplies at least one retailer on the domestic market.

This paper contributes to the literature on the role of multinational retailers in international trade. Our analysis relates most to the work of Cheptea, Emlinger, and Latouche (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, Jing, and Swenson (2014) analyzed the impact of multinational retailers established in China on exports by Chinese cities. Nordås, Grosso, and Pinali (2008) present a case study to analyze 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, Gereffi, and Beauvais (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 study is threefold. First, we used an original data set on French agri-food firms certified with the IFS, 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, the results show that IFS certified French firms are more likely to export, and export larger amounts, than noncertified 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. The 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, Visich, and Rustambekov (2016), 90–95% 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 3.3 and 3.4, we estimate the impact of the overseas expansion of French retailers on the exports of certified and noncertified firms at the extensive and intensive margin. In Section 3.5, we analyze 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 around 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.
All French retailers require the same private standard, the IFS 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 fulfillment of legal obligations by manufacturers. Accordingly, these standards are appropriate tools for the application of the due diligence principle, that is, 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 negotiate and sign a supply contract with any French retailer to sell its products under the retailer’s brand. Consequently, certification is a good proxy for identifying firms that supply at least one French retailer. However, it is important to note that the term retail suppliers includes noncertified 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 data set of French agri-food firms, using different sources. First, we used the AMADEUS database to define a large sample of exporting and nonexporting French agri-food firms, which we needed for our empirical analysis of firm-level export behavior.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 products. Considering only one industry also has the advantage of limiting the impact of unobserved industry-level factors on firms’ export behavior.⁴ Second, we combined these data with an exhaustive list of certified firms supplied by the IFS organization. This data set 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 behavior of firms, we merged our data set 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 eight-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 data set with data from the Planet Retail database on the volume of sales of edible grocery products by French retailers in each country.⁶

Table 1 presents some detailed descriptive statistics on the final data set. The whole data set contains 36,487,098 observations and provides information on 25,726 French agri-food firms (including exporting and nonexporting firms) over the period of 2004–2011,⁷ and the 184 destinations for which we obtained information on exports and retailer sales. Limiting the sample to exporting firms and their corresponding destination markets reduced the sample to 144,167 observations. Table 1 shows that the majority of the firms in our sample do not export (a fact well documented in the literature, e.g., Mayer & Ottaviano, 2008), and that certified firms represent a small share of all agri-food firms in each year.

For each year, our sample includes around 2,000 exporting firms and 180 destination countries. The number of IFS certified firms increased steadily from as low as 10 in 2004 and 69 in 2005 to around 900 firms in 2009–2011. At the same time, the total number of foreign markets in which French retailers operate outlets increased from 56 in 2004 to 83 in 2011. Firms also differ greatly in the number of employees and in terms of productivity. Thus, in 2011, the median firm in our sample had five full-time equivalent employees and a turnover of €90,500 per employee.

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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. French firms export larger amounts to countries with French retailers than to the rest of destinations. Export markets hosting French retailers also attract exporting firms with a wider international network. Thus, the average firm exporting to a market with French retailers exports its products to 6.7 different destinations, whereas the average firm exporting to a market without French retailers exports to only 4.3 foreign destinations. These findings are confirmed when we control for the increase in the number of foreign markets in which French retailers invest (from 56 in 2004 to 83 in 2011). 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.

Exhaustive annual lists of IFS certified firms make it possible to distinguish firms with preferential relationships with retailers from the rest of French firms. Certified firms exported, on average, to more destinations and higher values per destination than their noncertified counterparts. For example, in 2011, IFS firms exported on average to 14.5 countries, with non-IFS firms exporting to only 7.9 countries (Table 1). In the same year, the average export flow per destination of certified firms was €15.6 million versus €6.5 million for noncertified. This evidence suggests that, for French agri-food firms, the benefits of certification are linked with better export performance. This result was confirmed when the analysis was extended to the whole sample of firms in the AMADEUS database (not just exporting firms). While IFS certified firms represented on average 4% of firms in the sample (all years combined), 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. Figure 1a,b shows the average export value and number of destination markets for IFS and noncertified firms, separating markets with French retailers from the rest. The previous result concerning the impact of French retailers on exports holds when certified and noncertified firms are distinguished: The presence of French retailers encourages exports by all firms, whether certified or not. In contrast, the better export performance of

| TABLE 1 Summary statistics for the final data set |
|--------------------------------------------------|
| **Data for year 2011**                         | **Frequency** | **Mean** | **Median** | **Min** | **Max** |
| Agri-food firms                                 |               |          |            |         |         |
| # firms                                         | 25,582        | –        | –          | –       | –       |
| # IFS certified firms                           | 875           | –        | –          | –       | –       |
| # exporting firms                               | 2,111         | –        | –          | –       | –       |
| # exporting IFS certified firms                 | 360           | –        | –          | –       | –       |
| Share of exporting firms in total firms         | 8.3%          | –        | –          | –       | –       |
| Share of exporting firms in IFS firms           | 41.1%         | –        | –          | –       | –       |
| Employees per firm (full-time equivalents)      | 14,754        | 17.2     | 5          | 1       | 11,441  |
| Productivity (€1,000 of sales per employee)     | 14,486        | 211.2    | 90.5       | 0.1     | 54,712  |
| Export sales per firm—all firms (£1,000)        | 2,111         | 8,089    | 251        | 0.001   | 967,668 |
| Export sales per firm—IFS certified firms (£1,000) | 360        | 15,604   | 2,373      | 0.021   | 437,043 |
| # of destinations per firm—all firms             | 2,111         | 9.0      | 3          | 1       | 128     |
| # of destinations per firm—IFS certified firms   | 360           | 14.5     | 9          | 1       | 128     |
| Destinations                                    |               |          |            |         |         |
| # destinations                                  | 179           | –        | –          | –       | –       |
| # destinations where French retailers operate    | 83            | –        | –          | –       | –       |
| Sales of French retailers at destination (€ mil) | 83            | 1.22     | 0.09       | 0.0002  | 21.7    |
| Market share of French retailers at destination  | 83            | 0.30     | 0.15       | 0.0004  | 1       |
| French exports per destination (€ mil)           | 179           | 95.4     | 6.6        | 0.004   | 2,162   |

*Note.* Descriptive statistics on French agri-food firms in the sample, including certification and export status, and export destinations. The full data set, covering each year all economically active firms and for each firm all possible export destinations, counts 36,487,098 observations. The positive exports subsample, which includes only exporting firms and for each firm only countries where it actually sales, has 144,167 observations. *Source:* AMADEUS, CEPII, Planet Retail, the exhaustive list of French IFS certified firms, and French Customs.

IFS: International Featured Standard.
certified firms compared with noncertified 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 noncertified 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 the value of trade. The positive impacts of retailers appear to be greater for certified firms, whose export performance is greater on these markets. For example, in 2011, 92% of French food exports was oriented to countries hosting a French retailer. IFS certified firms were responsible for one-third of these exports.

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 $IFS_f$ 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, $lnSales_{jt}$. Interaction terms
and (IFSₜ × Retailᵢₗ) 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 \( I(\text{Exports}_{fjt} > 0) \) that takes the value one for observations with positive export flows and zero otherwise:

\[
I(\text{Exports}_{fjt} > 0) = \alpha_0 + \alpha_1 \text{IFS}_{t} + \alpha_2 \text{Retail}_{i} + \alpha_3 \text{Retail}_{i} \times \ln \text{Sales}_{jt} + \alpha_4 (\text{IFS}_{t} \times \text{Retail}_{i}) \\
+ \alpha_5 (\text{IFS}_{t} \times \text{Retail}_{i} \times \ln \text{Sales}_{jt}) + \Lambda X_{jt} + \Theta Y_{jt} + \varepsilon_{fjt}, \tag{1}
\]

where \( X_{jt} \) and \( Y_{jt} \) are the sets of firm-year- and country-year-specific controls, \( \Lambda \) and \( \Theta \) are the associated vectors of parameters, and \( \varepsilon \) is a zero-mean error term. We estimate Equation (1) using the data set containing both exporting and nonexporting 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:

\[
\ln \text{Exports}_{fjt} = \beta_0 + \beta_1 \text{IFS}_{t} + \beta_2 \text{Retail}_{i} + \beta_3 \text{Retail}_{i} \times \ln \text{Sales}_{jt} \\
+ \beta_4 (\text{IFS}_{t} \times \text{Retail}_{i}) + \beta_5 (\text{IFS}_{t} \times \text{Retail}_{i} \times \ln \text{Sales}_{jt}) + \Gamma X_{jt} + \Xi Y_{jt} + \varepsilon_{fjt}. \tag{2}
\]

Equation (2) is estimated on the subpanel of positive export flows. Parameters \( \beta \), \( \Gamma \), and \( \Xi \) 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 \( \beta_3 \) and \( \beta_5 \) 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 gross domestic product [GDP], distance, neighbor, 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.

Ordinary least squares (OLS) estimates of Equations (1) and (2) may be affected by possible endogeneity between firms’ decisions to certify and to export, as well as between French retailers’ activity on foreign markets and the export patterns of French agri-food firms. We address this issue in the following section and propose appropriate solutions. We present OLS and two-stage least squares (2SLS) results for the extensive and intensive export margin separately, and test our predictions from a dynamic perspective on firms’ export strategies in response to French retailers’ withdrawal from a destination country. Additional robustness checks are discussed in Section 4.

### 3.2 Endogeneity of retail sales and certification

OLS estimations of Equations (1) and (2) may be subject to an endogeneity bias. 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, and which display stronger similarities (linguistic, institutional, etc.) with France.⁹ Omitting some of the destination-specific factors that concomitantly shape the decision of French retailers to invest abroad or to increase their 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. 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.\textsuperscript{10}

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 for reverse causality between certification and export decisions. We construct our instrumental variable using information on the certification of neighboring 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 subnational region (département), excluding the firm itself. Neighboring firms compete with each other for the same retail shelf space, leading to mutually dependent certification strategies. The certification choice of neighboring competitors is, however, 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, and so forth.

### 3.3 Extensive export margin

We start by investigating the impact of certification and retailers’ foreign activity on the extensive export margin, that is, 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. 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 sell only on the domestic market), years, and destination markets reached by at least one French firm. We focus on the sign of coefficients, which indicates a positive or negative change in a firm’s export probability. The size of estimated coefficients reflects the change in export probability for firms at (or close to) the sample mean, but requires more careful interpretation for the rest of our heterogeneous firm sample. 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.\textsuperscript{11} The first 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- 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 noncertified firms. Variables $Retail_{ft} \times \ln{Sales_{ft}}$ 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 $(IFS_{ft} \times Retail_{ft})$ and $(IFS_{ft} \times Retail_{ft} \times \ln{Sales_{ft}})$ indicate that this effect is larger for certified firms. The presence of retailers in a specific market increases the probability of exporting to that market for certified firms by 12.8 percentage points, compared with noncertified firms, but this result should be interpreted with caution for firms far away from the sample mean. 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 neighboring and French-speaking countries.\textsuperscript{12}

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 IPS 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 noncertified 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 noncertified 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.

| Table 2 Extensive margin | Explained variable: I(Exports_{jt} > 0) |
|--------------------------|----------------------------------------|
|                          | (1) OLS                                |
|                          | (2) OLS                                |
|                          | (3) OLS                                |
|                          | (4) OLS                                |
|                          | (5) 2SLS                               |
| IFS Certification_{ft}   | 0.0127***                              |
|                         | (0.0021)                               |
| Retail_{jt}             | 0.0018***                              |
|                         | (0.0002)                               |
| Retail_{jt} × ln Sales_{jt} | 0.0004***          |
|                         | (0.0000)                               |
| IFS Certification_{ft} × Retail_{jt} | 0.1279***      |
|                         | (0.0071)                               |
| IFS Certification_{ft} × Retail_{jt} × ln Sales_{jt} | 0.0224***    |
|                         | (0.0012)                               |
| ln Productivity_{jt}    | 0.0092***                              |
|                         | (0.0005)                               |
| ln GDP_{jt}             | 0.0017***                              |
|                         | (0.0001)                               |
| ln Distance_{jt}        | −0.0035***                             |
|                         | (0.0001)                               |
| Neighbor_{jt}           | 0.0230***                              |
|                         | (0.0007)                               |
| French-speaking_{jt}    | 0.0029***                              |
|                         | (0.0002)                               |
| Year-firm FE            | No                                      |
|                         | Yes                                     |
| Year-country FE         | No                                      |
|                         | Yes                                     |
| Number of observations  | 14,616,289                             |
|                         | 14,856,337                             |
| R^2                     | 0.04                                    |
|                         | 0.05                                    |
| Identification test     | 359.82                                  |
|                         | (0.000)                                |
| Weak identification test| 4,396.58                                |
| Endogeneity test        | 34.66                                   |
|                         | (0.000)                                |

Note. I(Exports_{jt} > 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 are given in parentheses. FE: fixed effects; GDP: gross domestic product; IFS: International Featured Standard; OLS: ordinary least squares; 2SLS: two-stage least squares. *** Indicates significance at the 1% confidence level.
in the country concerned. The magnitude of these effects is relatively small for noncertified 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 nonobservable firm- and 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.

The last column of Table 2 reports estimates that control for possible endogeneity biases. We show the second-stage results of a 2SLS estimator where a firm’s decision to certify is instrumented by the strategy of its neighbor firms. We focus on the trade specification with time-varying firm- and country-specific fixed effects, thereby eliminating any endogeneity arising from an omitted variables bias. The endogenous variable $IFS_t$ is collinear with firm fixed effects and drops out of the estimation. Accordingly, we instrument the interaction terms $IFS_t \times Retail_{jt}$ and $IFS_t \times Retail_{jt} \times \ln Sales_{jt}$ with the interaction between our instrument and variables $Retail_{jt}$ and $Retail_{jt} \times \ln Sales_{jt}$. The endogeneity test is statistically significant, implying that firms’ decision to certify affects their decision to export.13

Due to limited data, our instrumental variable cannot be computed for all firms in the panel, thereby reducing the number of observations in column 5. Still, OLS estimates performed on the same set of observations (not reported) are very close to estimates obtained on the full sample (column 4). This confirms the absence of a sample bias and enables us to directly compare the results in columns 4 and 5. 2SLS coefficient estimates are slightly larger than OLS estimates, but the difference is not statistically significant for either variable. Controlling for endogeneity, although necessary, does not change the main predictions of our model. Certified firms more often chose to export to countries hosting French retailers, and this effect is amplified by retailers’ activity in these markets.

### 3.4 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 the results in Table 3. The four columns of Table 3 correspond to specifications similar to those displayed in Table 2.

Similar to the 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 noncertified 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 $(IFS_t \times Retail_{jt})$ 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 toward this country. This effect is reflected by the positive and statistically significant coefficient of interaction term $(IFS_t \times Retail_{jt} \times \ln Sales_{jt})$ in all specifications. Combined with the 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 with a specific example. What would have been the level of French food exports to China if no French retailer was operating on the Chinese market? To answer this question, we compare the predicted level of exports under the presence of French retailers, aggregated across firms, to their counterfactual level in the absence of French retailers. For each certified and noncertified firm, we compute counterfactual exports by plugging into Equation (2) parameter estimates from column 3 of Table 3 and factual values for all right-hand side variables except retailers’ activity, which we set equal to zero ($Retail_{jt} = 0$ and $Retail_{jt} \times \ln Sales_{jt} = 0$).14 Our computations predict that in 2011, French agri-food exports to China would have been 27% lower if French retailers were absent from the Chinese market. This corresponds to a €182 million loss of export revenues for French agri-food firms. Certified firms would bear most of this loss, their
exports to China decreasing by 49% (€137 million). The exports of noncertified firms would suffer only a 12% drop (€45 million).

The last two columns in Table 3 correspond to the trade specification with annual firm and country fixed effects, estimated with OLS and 2SLS.\(^{15}\) The nonsignificant endogeneity test indicates the absence of a reverse causality between firms’ decision to get IFS certification and their volume of exports to a given market. Indeed, second-stage estimates are very similar to the effects estimated with OLS.\(^ {16}\) Thus, the positive effect of retailers’ overseas activity on the exports of certified firms in columns 1–4 is confirmed when we control for endogeneity in column 5.
Estimates in Table 3 also indicate that high-productivity French firms export larger amounts. This result complements our finding in Section 3.3 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 neighboring and French-speaking countries are on average 26% and 52%, respectively, higher than to otherwise identical destinations, according to the results in column 3.

The results in Tables 2 and 3 support our prediction that certified firms benefit more than their noncertified 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 noncertified firms. This finding is confirmed when we account for possible endogeneity biases.

### 3.5 The network effect

The first result highlighted by Sections 3.3 and 3.4 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 high 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.

The second result of our empirical analysis is that certified firms, that is, firms that already supply French retailers on their domestic market, benefit more from retailers’ internationalization than do 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 suggests that the relationship established between a retailer and its suppliers of retailer-branded food products continues when the retail company invests abroad.

As documented by Moreau (2008) and Yoder et al. (2016), retailers supply their overseas outlets mainly with locally produced goods. However, we show that retail companies continue to source some goods, particularly retailer-branded food products, from their domestic market. This may be explained by the fact that retailers need increased guarantees of food quality and food safety they cannot easily find on the host market. Our results thus highlight the network effect from which retail suppliers benefit and the central role of multinational retail companies in global supply chains, which are mainly buyer driven, as shown by Wrigley and Lowe (2010).

We go further in our analysis and test this network effect by exploiting the exit of French retailers’ from foreign markets. More specifically, we question whether certified firms behave differently from noncertified firms on markets where French retailers stop their activity. To answer this question, we compare the change in the exports of certified and noncertified firms before, during, and after the exit of French retailers. We estimate the following equation:

\[
\ln\left(\frac{\text{Exports}_{jt}}{\text{Exports}_{jt-1}}\right) = \delta_0 + \delta_1 \text{Before}_{jt} + \delta_2 \text{Exit}_{jt} + \delta_3 \text{After}_{jt} + \delta_4 (\text{IFS}_{jt} \times \text{Before}_{jt}) + \delta_5 (\text{IFS}_{jt} \times \text{Exit}_{jt}) + \delta_6 (\text{IFS}_{jt} \times \text{After}_{jt}) + \Phi X_{jt} + \Psi Y_{jt} + \nu_{jt}. \tag{3}
\]

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 behavior of certified and noncertified firms, we interact the IFS certification dummy with each of these three variables. Thus, IFS_{jt} \times \text{Before}_{jt} reflects the evolution of certified firms’ exports before their exit, IFS_{jt} \times \text{Exit}_{jt} the evolution in the year of their exit, and IFS_{jt} \times \text{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 3.4. We follow the same empirical strategy as above and include alternatively different sets of firm- and country-specific controls and fixed effects. The results are reported in Table 4. In the regression reported in column 2, we use time-varying country fixed effects and the annual variation in firm 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, the 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 nonsignificant coefficients of dummy variables Before$_{jt}$, Exit$_{jt}$, and After$_{jt}$ indicate that the changes in exports by noncertified firms to markets where French retailers shut down their activity are no different from the changes in exports by any French firm to other markets. This statement holds for years before 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$_{jt}$ × 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 nonsignificant. This suggests that certified firms reduce their exports after French retailers exit the market, compared with noncertified firms and to firms exporting to other markets.

These results show that the outcome of Sections 3.3 and 3.4 is 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 noncertified 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 noncertified firms were not affected. This difference in behavior with respect to the exit of retailers for the two types of firms is consistent with the idea that the presence of French retailers increased the demand for French products in foreign markets, but the impact of the exit on certified firms is negative and significant, suggesting that certified firms reduced their exports after the exit of French retailers.

| Table 4: Retailers’ exits from foreign markets |
|------------------------------------------------|
| Explained variable: Annual evolution of exports |
| (1) | (2) | (3) | (4) |
| IFS$_{jt}$ × Before$_{jt}$ | −0.002 | 0.060 | −0.033 | 0.065 |
| | (0.124) | (0.143) | (0.110) | (0.086) |
| IFS$_{jt}$ × Exit$_{jt}$ | 0.071 | 0.063 | −0.051 | 0.095 |
| | (0.089) | (0.111) | (0.102) | (0.094) |
| IFS$_{jt}$ × After$_{jt}$ | −0.126*** | −0.099 | −0.165*** | −0.110** |
| | (0.055) | (0.065) | (0.056) | (0.047) |
| ln(\frac{GDP_{jt}}{GDP_{jt-1}}) | 0.584*** | 0.402*** |
| | (0.115) | (0.101) |
| ln(\frac{Productivity_{jt}}{Productivity_{jt-1}}) | 0.155*** | 0.141*** |
| | (0.035) | (0.034) |
| Year-firm FE | No | No | Yes | Yes |
| Year-country FE | No | Yes | No | Yes |
| Number of observations | 51,561 | 51,951 | 66,048 | 102,384 |
| $R^2$ | 0.01 | 0.03 | 0.19 | 0.23 |

Note. Clustered (by firm) standard errors are given in parentheses. FE: fixed effects; GDP: gross domestic product; IFS: International Featured Standard. *** and ** indicate significance at the 1% and 5% confidence levels, respectively.
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 effects depending on firm productivity

A simple look at the productivity distribution of certified and noncertified firms suggests that the productivity gap between the two types of firms, pictured in Figure 2, 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 nonsignificant. This holds when we use data for any single year.20

Still, it is possible that destination markets where operate French retailers are more easily accessed by high-productivity firms, thereby inflating the effect of our variables of interest.21 To thoroughly test how firms’ productivity levels affect our results in Sections 3.3 and 3.4, we reestimate 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\(_j\) and Retail\(_j\) × ln Sales\(_j\)). The estimation results, including country year, firm year, and both types of fixed effects, are displayed in columns 2–4 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 less productive counterparts, as emphasized by previous empirical analyses.

Positive estimates for interaction terms that take productivity into account in columns 2–4 of Table 5 show that the difference in the exporting odds of high- and low-productivity firms is larger for countries where operate French retailers.22 We find a similar but less significant effect on the difference in the volume of exports to these markets in Table 6.

In Tables A2 and A3 of Appendix A, we report the estimation results using additional firm-level controls. In columns 1 and 2, we measure firm productivity by the value added per employee. This reduces our estimation sample by more than half, but the results remain very similar to those in Tables 2 and 3. In columns 3 and 4, in addition to firm productivity (sales per employee), we control for firm size. Since the variable firm size is already used to compute firm productivity, we split firms into three size groups. Small firms (with less than 50 employees) represent our reference group. In the estimations, we add a dummy for medium-size firms (50–499 employees) and one for large firms (500 or more employees). Our results show that, like productivity, the size of the firm is an important determinant of its export activity. The larger the firm, the higher the probability it will start exporting and the larger the volume of its exports. Controlling for firm size reduced the estimated effect attributed to a firm’s productivity level, indicating that, on average, high-productivity firms are larger than low-productivity firms. The negative coefficient of the IFS dummy in columns 3 and 4 indicates that, for small firms
that constitute our reference group, IFS certification does not imply higher export participation or higher export volumes. For larger firms, the overall effect of certification (obtained by summing the IFS coefficient and the coefficient of the corresponding size class dummy) becomes positive.

The impact of our main variables of interest ($IFS_{jt} \times Retail_{jt}$ and $IFS_{jt} \times Retail_{jt} \times \ln Sales_{jt}$) on firms’ export behavior remains very similar to our estimates in Sections 3.3 and 3.4. 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 5: Extensive margin: Productivity effects

| Explained variable: $I(\text{Exports}_{jt} > 0)$ | (1)   | (2)   | (3)   | (4)   |
|-----------------------------------------------|-------|-------|-------|-------|
| $\ln \text{Productivity}_{jt}$               | 0.0112*** (0.0006) | 0.0046*** (0.0004) |       |       |
| $\ln \text{Productivity}_{jt} \times Retail_{jt}$ | 0.0233*** (0.0009) | 0.0235*** (0.0009) | 0.0237*** (0.0009) |       |
| $\ln \text{Productivity}_{jt} \times Retail_{jt} \times \ln Sales_{jt}$ | 0.0041*** (0.0002) | 0.0040*** (0.0002) | 0.0041*** (0.0002) |       |
| $IFS_{jt}$                                    |       |       | 0.180*** (0.0021) |       |
| $Retail_{jt}$                                 |       |       | −0.1063*** (0.0041) |       |
| $Retail_{jt} \times \ln Sales_{jt}$          |       |       | −0.0181*** (0.0007) |       |
| $IFS_{jt} \times Retail_{jt}$                |       |       | 0.1063*** (0.0069) | 0.1039*** (0.0069) | 0.1058*** (0.0070) |       |
| $IFS_{jt} \times Retail_{jt} \times \ln Sales_{jt}$ |       |       | 0.0186*** (0.0012) | 0.0185*** (0.0012) | 0.0187*** (0.0012) |       |
| $\ln \text{GDP}_{jt}$                        |       |       | 0.0019*** (0.0001) |       |
| $\ln \text{Distance}_{jt}$                   |       |       | −0.0035*** (0.0001) |       |
| Neighbor_{jt}                                 |       |       | 0.0230*** (0.0007) |       |
| French-speaking_{jt}                          |       |       | 0.0029*** (0.0002) |       |
| Year-firm FE                                  | No    | No    | Yes   | Yes   |
| Year-country FE                               | Yes   | Yes   | No    | Yes   |
| Number of observations                        | 14,560,818 | 14,560,818 | 14,560,818 | 14,560,818 |
| $R^2$                                         | 0.04  | 0.06  | 0.19  | 0.19  |

Note. $I(\text{Exports}_{jt} > 0)$ is a binary variable equal to one for observations with positive export flows, and to zero otherwise. $IFS_{jt}$ is an indicator variable that takes the value one if firm $f$ was certified at time $t$, and value zero in the opposite case. $2^{-\Delta \Delta}$ 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 are given in parentheses. FE: fixed effects; GDP: gross domestic product; IFS: International Featured Standard.

*** Indicates significance at the 1% confidence level.
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 Crozet, Head, and Mayer (2012) and Eaton and Kortum (2001) 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 & Latouche, 2012). The Eaton and Kortum (2001; hereafter EK)

### Table 6: Intensive margin: Productivity effects

| Explained variable: \( \ln \) Exports_{jt} | (1) | (2) | (3) | (4) |
|---------------------------------------------|-----|-----|-----|-----|
| \( \ln \) Productivity_{jt}               | 0.81*** | 0.73*** |       |       |
|                                              | (0.06) | (0.07) |       |       |
| \( \ln \) Productivity_{jt} \times Retail_{jt} | 0.11** | 0.05 | 0.10** |       |
|                                              | (0.05) | (0.05) | (0.05) |       |
| \( \ln \) Productivity_{jt} \times Retail_{jt} \times \ln Sales_{jt} | 0.00 | 0.01 | 0.02** |       |
|                                              | (0.01) | (0.01) | (0.01) |       |
| IFS Certification_{jt}                      | 0.45*** |       |       |       |
|                                              | (0.11) |       |       |       |
| Retail_{jt}                                 | -0.21 |       |       |       |
|                                              | (0.27) |       |       |       |
| Retail_{jt} \times \ln Sales_{jt}          | -0.03 |       |       |       |
|                                              | (0.04) |       |       |       |
| IFS Certification_{jt} \times Retail_{jt}  | 0.10 | -0.07 | -0.06 |       |
|                                              | (0.07) | (0.07) | (0.07) |       |
| IFS Certification_{jt} \times Retail_{jt} \times \ln Sales_{jt} | 0.26*** | 0.23*** | 0.20*** |       |
|                                              | (0.04) | (0.04) | (0.04) |       |
| \( \ln \) GDP_{jt}                         | 0.40*** |       |       |       |
|                                              | (0.01) |       |       |       |
| \( \ln \) Distance_{jt}                    | -0.30*** |       |       |       |
|                                              | (0.02) |       |       |       |
| Neighbor_{jt}                               | 0.30*** |       |       |       |
|                                              | (0.05) |       |       |       |
| French-speaking_{jt}                        | 0.36*** |       |       |       |
|                                              | (0.04) |       |       |       |
| Year-firm FE                                | No | No | Yes | Yes |
| Year-country FE                             | Yes | Yes | No | Yes |
| Number of observations                      | 94,043 | 94,043 | 94,043 | 94,043 |
| \( R^2 \)                                   | 0.16 | 0.17 | 0.47 | 0.50 |

Note. In Exports_{jt} is the logarithm of exports of firm \( f \) to destination \( j \) in year \( t \). IFS Certification_{jt} 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 are given in parentheses. FE: fixed effects; GDP: gross domestic product; IFS: International Featured Standard. *** and ** indicate significance at the 1% and 5% confidence levels, respectively.

### 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 Crozet, Head, and Mayer (2012) and Eaton and Kortum (2001) 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 & 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.23

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 subpanels 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 The pseudo Poisson maximum likelihood (PPML) estimator

The recent empirical trade literature relies increasingly on the PPML model, introduced by Santos Silva and Tenreyro (2006). In line with this trend, we estimate the impact of certification and retailers’ activity in foreign market on firms’ export strategies with the corresponding PPML model:

\[
\text{Exports}_{j} = \exp[\beta_{0} + \beta_{IFS} + \beta_{Retail} + \beta_{IFS} \times \text{Retail} \times \ln \text{Sales}_{j} + \beta_{IFS} \times \text{Retail} \times \ln \text{Sales}_{j} + \Gamma X_{j} + \Xi Y_{j} + \varepsilon_{j}].
\]

The explained variable in (4) is the actual value of firms’ exports to each destination market. The PPML estimator controls for the heteroscedasticity of residuals and makes it possible to include observations with both nil and positive export values in a single estimation. Therefore, like in Section 4.2, it estimates the joint effects on the intensive and extensive export margins, without being able to differentiate between the two.

Table 8 reports the results of estimating (4) with different sets of firm and country fixed effects. Observations with nil exports that are ideally predicted by country and/or firm-specific fixed effects are dropped from the...
estimation. This leads to an important reduction in the estimation sample in columns 2–4 in Table 8 (compared with the same columns in Table 2) and leads to slight variations in the magnitude of our main parameters of interest. Still, the main findings derived earlier in the paper are reaffirmed by the PPML results. Certified firms export larger volumes to all countries. This effect comes on top of the productivity effect on exports. All firms export more to countries where French retailers operate, firms with IFS certification being much more responsive (than noncertified firms) to changes in retailers’ overseas activity when defining or adjusting their export strategies. The PPML parameter estimates for our main variables of interest (IFS × Retail ft j and IFS × Retail × ln Sales ft j) are similar to the OLS estimates on the intensive margin in Table 3.24 This result is not surprising, since both models explain the value of exports, not the probability to export. PPML estimates in Table 8 (the nonsignificant estimate for term IFS × Retail ft j and the positive and significant estimate for term IFS × Retail × ln Sales ft j) suggest that the higher likelihood of certified firms exporting to countries with French retailers (found in Tables 2, 5, and A2) translates into higher export values only when these retailers make substantial sales on the destination market.

**Table 8** PPML estimator

| Explained variable: Exports fjt | (1) | (2) | (3) | (4) |
|---------------------------------|-----|-----|-----|-----|
| IFS Certification ft j          | 1.6008*** | 1.8255*** |     |     |
|                                 | (0.1951) | (0.1179) |     |     |
| Retail jt                       | 0.7953*** |         | 0.7650*** |     |
|                                 | (0.0984) |     | (0.0931) |     |
| Retail jt × ln Sales jt         | 0.0577**  |         | 0.0832*** |     |
|                                 | (0.0252) |     | (0.0220) |     |
| IFS Certification ft j × Retail jt | 0.1337 | 0.1491 | 0.0884 | 0.1222 |
|                                 | (0.1303) | (0.1763) | (0.1201) | (0.1315) |
| IFS Certification ft j × Retail jt × ln Sales jt | 0.2223*** | 0.1864*** | 0.1685*** | 0.1340*** |
|                                 | (0.0426) | (0.0539) | (0.0427) | (0.0458) |
| ln Productivity ft j            | 1.1020*** | 1.1271*** |     |     |
|                                 | (0.0491) | (0.0125) |     |     |
| ln GDP ft j                     | 0.6953*** |         | 0.7030*** |     |
|                                 | (0.0342) |     | (0.0297) |     |
| ln Distance jt                  | −0.6545*** |       | −0.7047*** |     |
|                                 | (0.0800) |     | (0.0679) |     |
| Neighbor j                      | 0.2468*** |         | 0.1830*** |     |
|                                 | (0.0833) |     | (0.0812) |     |
| French-speaking j               | 0.3693*** |         | 0.3758*** |     |
|                                 | (0.1005) |     | (0.1037) |     |
| Year-firm FE                    | No | No | Yes | Yes |
| Year-country FE                 | No | Yes | No | Yes |
| Number of observations          | 14,616,289 | 14,620,073 | 2,978,536 | 3,027,173 |

Note: The explained variable Exports fjt takes both zero and positive values. IFS Certification ft j 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 are given in parentheses. FE: fixed effects; GDP: gross domestic product; IFS: International Featured Standard; PPML: pseudo Poisson maximum likelihood.

*** and ** indicate significance at the 1% and 5% confidence levels, respectively.

Electronic copy available at: https://ssrn.com/abstract=3607397
5 CONCLUSIONS

The present article shows that IFS certified French firms are more likely to export, and export larger amounts, than noncertified 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, Henson, and Berdegué (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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ENDNOTES

1 https://www ifs-certification com/images/Food_/Checks/FoodCheck/_FeeSchedule/_ EN.pdf
2 AMADEUS is provided by Bureau van Dijk (Amsterdam, Netherlands). We used the version of the AMADEUS database covering French firms operating in the agri-food sector in 2012.
3 AMADEUS includes information on firms’ primary industry of the NACE Rev.2 four-digit classification (Eurostat, European Commission). 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 behavior is known.
4 We excluded wholesalers and retailers from the sample.
5 Of 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/nomenclature/instrument-andtools/hs/_nomenclature/_2012/hs/_nomenclature/_table/_2012.aspx.
6 Planet Retail records data on the activity (sales, outlets, and sales area) of individual retail companies in each country. Data are classified in large groups of products, for example, food products are aggregated in a single group called edible grocery products. The database covers 12 French retail companies who sell food products in foreign markets, including the giants Carrefour, Auchan, Casino, Intermarche, Leclerc, Picard, and Systeme U.
7 The 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.
8 Including both Retailjt and Retailjt × ln Salesjt makes it possible to separate the effect of the presence of French retailers on destination markets from that of the intensity of their overseas activity. By doing so we allow the presence of retailers and the value of their sales to have different effects on the dependent variable and we ensure that the coefficient estimated for the variable Retailjt × ln Salesjt can be interpreted as an elasticity. Note that using the term Retailjt × ln Salesjt is equivalent to using the term ln Salesjt and imposing ln Salesjt = 0 for Salesjt = 0.
9 Common 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.
10 This 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 (Retailjt and Retailjt × ln Salesjt).
11 Clustering by destination country yielded less significant estimates for coefficients of country-specific variables. The statistical significance of our variables of interest remained unchanged.
12 We obtain similar results when we replicate these estimates with a logit or probit estimator. These results can be provided upon request.
13 First-stage estimates in Table A1 of Appendix A indicate that an increase in the share of neighboring firms with IFS certification has a strong positive effect on a firm’s decision to certify. Significant tests for weak identification and underidentification, and the high explanatory power of first-stage estimations confirm the validity of our instrument.
We focus only on the direct effect of French retailers’ overseas activity on French exports, which corresponds to the partial equilibrium effect described by Glick and Taylor (2010) and Head and Mayer (2014). Our data cover a single exporting country and do not permit the computation of general equilibrium effects, that is, to integrate retailers’ indirect effect on the income, expenditure, and multilateral remoteness of each country.

The first-stage results of the 2SLS estimator, shown in Table A1 of Appendix A, confirm that our instrumental variable discussed in Section 3.2 is a good predictor of a firm’s decision to certify.

Similarly to the extensive margin, the drop in the number of observations used in the 2SLS estimation does not generate a sample bias. OLS estimates based on the entire sample and on the 2SLS subsample are almost identical.

We have no information on the contract negotiated by the retailer and its supplier, so it is difficult to know whether the decision to export lies with the retail company or the agri-food firm. In our data, no French retailers, only agri-food firms, declare exports. Furthermore, in the data, we observe that 86% of the certified firms also export to countries where no French retailers are present. This suggests that the production and the exports of certified firms do not depend only on their contracts with the French retail companies, and that firms take some export decisions on their own.

During the period covered by our study, French retailers exited from 10 countries: Chile in 2004, Norway in 2006, Mexico and South Korea in 2007, Latvia, Lithuania, and Slovakia in 2008, Algeria in 2009, and Ireland and Venezuela in 2010. For each country, the year of exit corresponds to the year when the last French retailer left the market.

The drop in the number of observations compared with 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.

The 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.

Parameters \( \alpha_1 \) and \( \alpha_5 \) in Equation (1) and \( \beta_2 \) and \( \beta_4 \) in Equation (2).

The negative and significant coefficients for variables Retail, and Retail × In Sales, in column 3 of Table 5 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 productivity increases, the overall effect of retailers on firms’ export probability becomes positive.

We 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/.

The results are even more similar when we exclude observations dropped by the PPML mode from OLS estimations.

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## APPENDIX

### TABLE A1  First stage of 2SLS estimations controlling for endogeneity

| Instrumental variables | Extensive export margin | Intensive export margin |
|------------------------|-------------------------|-------------------------|
|                        | Explained (instrumented) variable | Explained (instrumented) variable |
|                        | IFS<sub>fj</sub> × Retail<sub>j</sub> | IFS<sub>fj</sub> × Retail<sub>j</sub> × ln Sales<sub>j</sub> |
| IV<sub>fj</sub> × Retail<sub>j</sub> | 1.4298*** | 0.0178*** | 1.33*** | 1.27*** |
|                        | (0.0152) | (0.0022) | (0.02) | (0.02) |
| IV<sub>fj</sub> × Retail<sub>j</sub> × ln Sales<sub>j</sub> | −0.0003*** | 1.4400*** | 0.0013*** | 0.44*** |
|                        | (0.0000) | (0.0156) | (0.0004) | (0.01) |
| Time-varying firm-specific FE | Yes | Yes | Yes | Yes |
| Time-varying country-specific FE | Yes | Yes | Yes | Yes |
| Number of observations | 1,085,192 | 1,085,192 | 83,946 | 83,946 |
| First-stage R<sup>2</sup> | 0.94 | 0.89 | 0.88 | 0.60 |

**Note.** IFS Certification<sub>fj</sub> is an indicator variable that takes the value one if firm <i>f</i> was certified at time <i>t</i>, and value zero in the opposite case. Retail<sub>j</sub> is a dummy equal to one if import country <i>j</i> hosted at least one French retailer in year <i>t</i>, and to zero otherwise. ln Sales<sub>j</sub> is the logarithm of the sales of French retailers in country <i>j</i> in year <i>t</i>. The instrumental variable (IV<sub>fj</sub>) is the share of certified neighbor firms, computed using firms’ sales as weights. Clustered (by firm) standard errors are given in parentheses. FE: fixed effects; IFS: International Featured Standard; 2SLS: two-stage least squares. *** Indicates significance at the 1% confidence level.

### TABLE A2  Extensive margin: Different productivity measures

| Explained variable: I Exports<sub>fj</sub> > 0 | (1) | (2) | (3) | (4) |
|---------------------------------------------|-----|-----|-----|-----|
| IFS Certification<sub>fj</sub> | 0.0177*** | 0.0184*** | −0.0230*** | −0.0226*** |
|                        | (0.0022) | (0.0022) | (0.0032) | (0.0032) |
| Retail<sub>j</sub> | 0.0043*** | 0.0017*** | | |
|                        | (0.0004) | (0.0002) | | |
| Retail<sub>j</sub> × ln Sales<sub>j</sub> | 0.0011*** | 0.0004*** | | |
|                        | (0.0001) | (0.0000) | | |
| IFS Certification<sub>fj</sub> × Retail<sub>j</sub> | 0.1163*** | 0.1191*** | 0.1282*** | 0.1308*** |
|                        | (0.0072) | (0.0073) | (0.0071) | (0.0072) |
| IFS Certification<sub>fj</sub> × Retail<sub>j</sub> × ln Sales<sub>j</sub> | 0.0203** | 0.0207*** | 0.0224*** | 0.0228*** |
|                        | (0.0013) | (0.0013) | (0.0012) | (0.0012) |

(Continues)
### TABLE A2  (Continued)

| Explained variable: \( l \text{ Exports}_{jt} > 0 \) | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| \( \ln \text{ Productivity VA}_{jt} \) | 0.0144*** | 0.0148*** | | |
| | (0.0013) | (0.0013) | | |
| \( \ln \text{ Productivity}_{jt} \) | | 0.0064*** | 0.0064*** | |
| | | (0.0004) | (0.0004) | |
| \( 50–499 \text{ employees}_{jt} \) | | 0.0383*** | 0.0373*** | |
| | | (0.0028) | (0.0028) | |
| \( \geq 500 \text{ employees}_{jt} \) | | 0.1187*** | 0.1163*** | |
| | | (0.0134) | (0.0123) | |
| \( \ln \text{ GDP}_{jt} \) | 0.0036*** | 0.0018*** | | |
| | (0.0001) | (0.0001) | | |
| \( \ln \text{ Distance}_{jt} \) | | −0.0075*** | −0.0035*** | |
| | | (0.0003) | (0.0001) | |
| \( \text{Neighbor}_{jt} \) | 0.0480*** | 0.0229*** | | |
| | (0.0014) | (0.0007) | | |
| \( \text{French-speaking}_{jt} \) | 0.0059*** | 0.0029*** | | |
| | (0.0003) | (0.0002) | | |
| Year-firm FE | No | No | No | No |
| Year-country FE | No | Yes | No | Yes |
| Number of observations | 6,651,410 | 6,760,078 | 14,616,289 | 14,856,337 |
| \( R^2 \) | 0.05 | 0.07 | 0.06 | 0.07 |

**Note.** The explained variable is a dummy equal to one for observations with positive export flows, and to zero otherwise. IFS Certification\(_{jt}\) is a dummy that takes the value one if firm \( f \) was certified at time \( t \), and value zero otherwise. 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. \( \ln \text{ Sales}_{jt} \) is the log of sales of French retailers in country \( j \) in year \( t \). Productivity VA corresponds to value added per employee; Productivity corresponds to sales per employee. Clustered (by firm) standard errors are given in parentheses. FE: fixed effects; GDP: gross domestic product; IFS: International Featured Standard.

*** Indicates significance at the 1% confidence level.

### TABLE A3  Intensive margin: Different productivity measures

| Explained variable: \( \ln \text{ Exports}_{jt} \) | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| IFS Certification\(_{jt}\) | 0.45*** | 0.62*** | −0.25*** | −0.16* |
| | (0.11) | (0.11) | (0.09) | (0.09) |
| Retail\(_{jt}\) | 0.19*** | 0.11*** | | |
| | (0.04) | (0.04) | | |
| Retail\(_{jt}\) × \( \ln \text{ Sales}_{jt} \) | 0.02*** | 0.01* | | |
| | (0.01) | (0.01) | | |
| IFS Certification\(_{jt}\) × Retail\(_{jt}\) | 0.06 | 0.09 | −0.01 | 0.01 |
| | (0.07) | (0.07) | (0.07) | (0.07) |
| IFS Certification\(_{jt}\) × Retail\(_{jt}\) × \( \ln \text{ Sales}_{jt} \) | 0.29*** | 0.22*** | 0.27*** | 0.24*** |
| | (0.04) | (0.05) | (0.04) | (0.04) |
| \( \ln \text{ Productivity VA}_{jt} \) | 0.52*** | 0.56*** | | |
| | (0.08) | (0.08) | | |

(Continues)
TABLE A3  (Continued)

| Explained variable: ln Exports_{jt} | (1) | (2) | (3) | (4) |
|--------------------------------------|-----|-----|-----|-----|
| ln Productivity_{jt}                | 0.76*** | 0.77*** |
|                                      | (0.04) | (0.04) | |
| 50–499 employees_{jt}               | 1.27*** | 1.26*** |
|                                      | (0.07) | (0.07) | |
| ≥ 500 employees_{jt}                | 2.54*** | 2.53*** |
|                                      | (0.12) | (0.13) | |
| ln GDP_{jt}                         | 0.18*** | 0.29*** |
|                                      | (0.02) | (0.02) | |
| ln Distance_{jt}                    | −0.21*** | −0.24*** |
|                                      | (0.02) | (0.02) | |
| Neighbor_{jt}                       | 0.13*** | 0.22*** |
|                                      | (0.05) | (0.04) | |
| French-speaking_{jt}                | 0.02 | 0.15*** |
|                                      | (0.05) | (0.04) | |
| Year-firm FE                        | No | No | No | No |
| Year-country FE                     | Yes | No | Yes | No |
| Number of observations              | 90,787 | 90,826 | 94,056 | 94,095 |
| R²                                  | 0.08 | 0.13 | 0.24 | 0.28 |

Note. The explained variable is the log of exports of firm $f$ to destination $j$ in year $t$. IFS Certification$_{jt}$ is a dummy that takes the value one if firm $f$ was certified at time $t$, and value zero otherwise. 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. In Sales$_{jt}$ is the log of sales of French retailers in country $j$ in year $t$. Productivity VA corresponds to value added per employee; Productivity corresponds to sales per employee. Clustered (by firm) standard errors are given in parentheses. FE: fixed effects; GDP: gross domestic product; IFS: International Featured Standard. *** and * indicate significance at the 1% and 10% confidence levels, respectively.