Multinational Retailers and Home Country Food Exports

Angela Cheptea, Charlotte Emlinger, and Karine Latouche

This article questions whether food exports to a given national market are impacted by a domestic retailer opening in that market. To answer this question, we considered an empirical gravity-type trade model. We tested our model with data on bilateral exports of food products sold in supermarkets (groceries) on a large panel of countries, as well as the foreign grocery sales of the world's 100 largest retail companies from 2001–2010. We found a strong positive effect of the overseas presence of retailers from a given country on its exports to those markets. This outcome is far from trivial since most products sold in retailers' foreign outlets are produced locally, and it also testifies to the fact that the presence of a country's retail companies overseas helps reduce export costs to these markets for other firms from the retailers' country of origin. On average, a 10% increase in retailers' sales in a foreign country leads to a 2.1%–2.5% increase in food exports to this destination. Our result is robust to different specifications, the use of different sets of instrumental variables, and econometric approaches. The effects on exported values and quantities are similar, implying that our finding is not induced by price or quality upgrading.

Key words: International trade, multinational retailers.

JEL codes: F10, F12, F14, F23.

Retail sales in emerging countries have increased dramatically since the end of the 20th century. For example, between 2000 and 2010, total retail sales of grocery products on the Chinese market grew from 3 billion to 35 billion U.S. dollars (USD), and on the Brazilian market from 9 to 33 billion USD (Planet Retail).[1] This phenomenon is likely to continue since these retail markets are far from saturated (for comparison, grocery retail sales in France amount to 186 billion USD). Retail sales in developing and emerging countries are concentrated in the hands of a relatively small number of foreign companies, all of which are characterized by strong overseas expansion during the last decade. About 26% of retailers' sales take place on foreign markets.

The internationalization of retail companies can shape international trade in many different ways. In the present article, we analyze to what extent a country's food product exports to a specific market are impacted by the entry of domestic retailers on that market. We show that the overseas expansion of a country's retailers encourages exports to these foreign markets by reducing trade costs for suppliers in the country of origin and by modifying consumer preferences in the host country.

The effects of multinational retailers on international trade have only recently been

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[1] See http://www1.planetretail.net/.

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explored in the literature and related works are still rare. Head, Jing, and Swenson (2010) analyzed how the presence of multinational retailers influences exports from the host country. Their analysis drew on Chinese city-level exports of retail goods and the geographic expansion (in China and worldwide) of the world's four largest retailers. These authors found evidence for a positive impact on the export capabilities of local suppliers. Nordås, Geloso Grosso, and Pinali (2008) employed a case study analysis of four top food retailers (Ahold, Carrefour, Metro, Tesco) to investigate how the arrival of multinational retailers shapes host country exports. These authors separated food from non-food products and confirmed the existence of a positive effect on exports from the host country to the retailers' country of origin.

Our work is closely linked to the recent strand of international trade literature that evaluates the role of intermediaries (Antràs and Costinot 2010; Bernard et al. 2010; Blum, Claro, and Horstmann 2010; Ahn, Khandelwal, and Wei 2011; Antràs and Costinot 2011; Crozet, Lalanne, and Poncet 2013). Most of these works refer to wholesale companies, although the term "retailer" is also used. Whereas this literature considers retailers as trade intermediaries, their trade patterns differ significantly from those of wholesalers. Unlike wholesalers, retail companies are not specialized in trade, but aim to sell final goods to consumers. Hence, these companies import products to supply their outlets, but they do not export. The importing activity of retailers may lead them to reshape international trade. Consequently, the different models and conclusions drawn by the literature that mainly deals with wholesalers do not apply to the same extent to retailers. More broadly, our article is also related to research in the field of foreign direct investment (FDI). A recent strand of this literature investigates the internationalization of major world retailers and extrapolates the classical results to the retail sector (Javorcik and Li 2013; Javorcik, Keller, and Tybout 2008; Iacovone et al. 2011).

The present article questions the causality between the expansion of retailers' activities beyond their domestic market and exports from their countries of origin in the food sector. We investigated this relationship empirically using data on bilateral exports for a large panel of countries and data on the sales of the top 100 world's retailers from 2000–2010. We limited our analysis to the food trade, as these products are the main goods sold in supermarkets. The contribution of the article is threefold. First, we ask and answer a new question that, to our knowledge, has not yet been raised in the literature. Secondly, we used an original dataset of retail sales of grocery products disaggregated by the country of sales and by the retailers' nationality. Third, we propose an original instrumental variable approach to control for the endogeneity bias caused by the fact that both bilateral exports and retailers' sales share a number of common observed and unobserved factors. We compare the traditional instrumental-variables approach used in most of the empirical trade literature with the approach suggested by Wooldridge (2001, 2010), which relies on generated instruments.

We confirm a positive effect of operations carried out on foreign markets by a country's retailers on exports to these markets. This outcome is far from trivial, because most retailers' foreign sales consist of locally produced goods.[2] This outcome thus suggests that the dynamics of international retail companies create a competitive advantage for domestic food industries.

The article is structured as follows. In the next section, we present stylized facts related to the world's largest retail companies and their operations on foreign markets. We emphasize that emerging economies (Brazil, India, and China) are among the most dynamic markets in terms of the growth of sales by foreign retailers. Next, we provide a detailed explanation of our empirical gravity-type trade model. In the following section we discuss the data, our econometric approaches, and main results, and pay particular attention to endogeneity to validate the significant positive role of multinational retail investments in trade. We draw some conclusions in the final section.

Stylized Facts

Retail sales of groceries more than doubled worldwide between 2000 and 2010.[3]

[2] According to Coe and Hess (2005), the foreign subsidiaries of some of the world's largest retailers (Tesco, Ahold, and Carrefour) commonly source over 90% of their products in the host country.

[3] This observation is based on data from Planet Retail covering the sales of the world's top 100 retailers in domestic and foreign markets, at company level, since 2000. The grocery sales of retailers

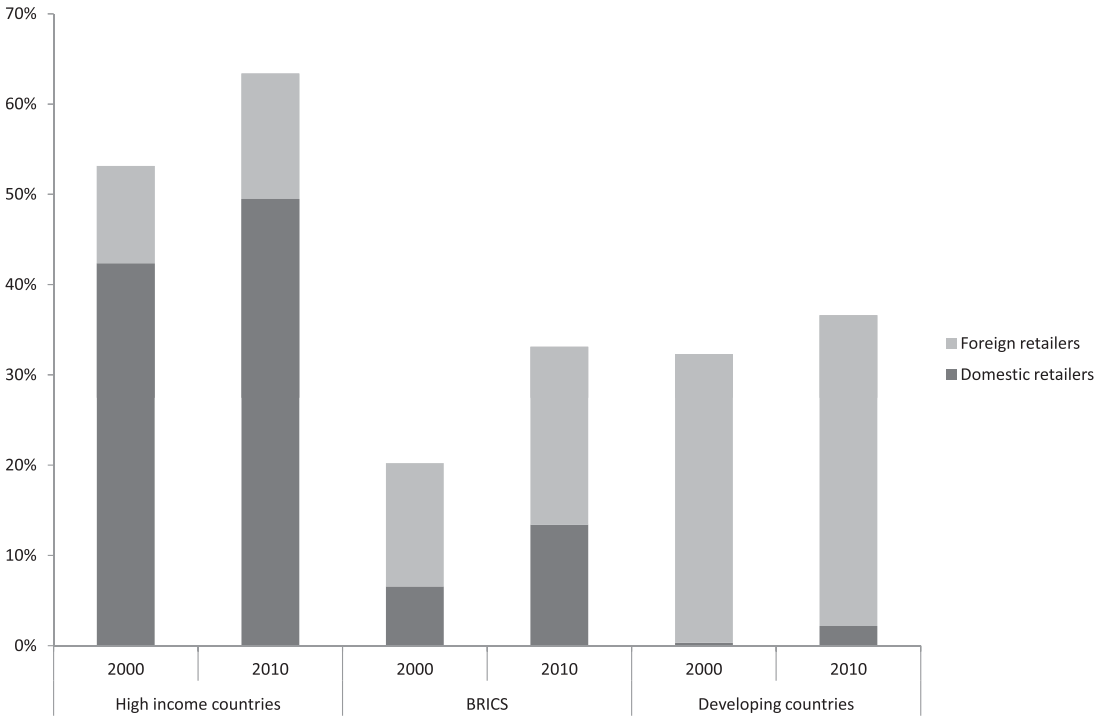

Figure 1. The share of "modern" retail in household total grocery expenditures, by country

Note: Authors' calculation using data from Planet Retail. "Modern" retail outlets refers to large retail chains, in contrast to traditional, usually one-outlet family-run, small retailers.

This increase was particularly high in developing countries (+220% of sales) and in the four main emerging countries: Brazil, Russia, India, and China (BRIC; +526%). Population and income growth, especially in emerging countries, together with changes in consumer habits, are the reasons behind the recent expansion of retail chains (Evans et al. 2008; Reardon et al. 2003). The early-stage liberalization of the retail sector in developing and emerging countries, and the continuing low share of retail in household total grocery expenditures in these countries (figure 1), suggest that this trend will continue in upcoming years. The internationalization of retail companies is not a recent phenomenon. The leading French retail company Carrefour established its first foreign outlet in Belgium in 1969, while Wal-Mart entered the Mexican market in 1991. However, foreign investment in the retail sector has accelerated in the last decade, mainly due to the rapid development of the retail market in developing and emerging countries, and to the saturation of the retailers' domestic markets. Sales by multinational retailers on foreign markets increased by 144% between 2000 and 2010, compared with only 110% for domestic sales.

Figure 2 shows retailers' sales, differentiated by their country of origin, on domestic and foreign markets. According to our data, the internationalization of the retail sector concerns companies of a few geographical origins. The overall leading position of American retail companies (27% of sales in the global retail sector) is due essentially to the large size of the U.S. domestic market. Sales in foreign markets represent 17% of total sales by American retailers. In contrast, German and French retail companies make over 40% of their total sales on foreign markets (see table A1 in the appendix for detailed data). This implies that almost half the retail sales on foreign markets take place in outlets owned by German and French retailers.

in our panel represent 77% of the global retail sector in 2010. The origin of retail companies were added using information available on the companies' websites. Mergers and acquisitions are taken into account only if they imply a change in the name of outlets. For each firm, we considered only one country of origin. In the rest of the article, we define the global market as the sum of sales by the world's largest 100 retailers in our panel.

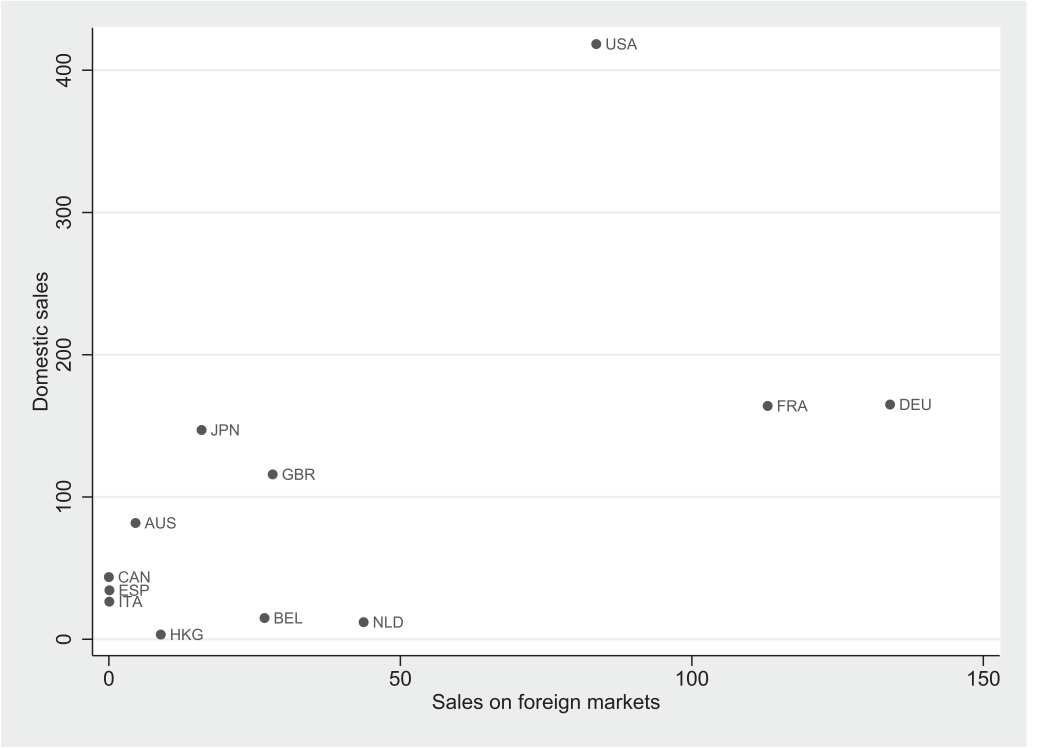

Figure 2. Sales of retailers in 2010 in billions of USD according to the main countries of origin

Note: Authors' calculation using data from Planet Retail.

Retailers from the Netherlands, Belgium, and Hong Kong have the highest degree of internationalization: over 60% of their turnover (total sales) comes from abroad. This is indicated in figure 2 by the dots located closest to the horizontal axis. At the other extreme, Canadian, Italian, and Spanish retailers sell almost only on their domestic market.

Geographical specialization can also be observed in terms of the host countries targeted by different multinational retailers (figure 3). Most of the foreign outlets of retailers from Germany, Belgium, and the Netherlands are located in European high income countries. German companies are the main retailers in Eastern and Central European countries, including Bulgaria (96%), Croatia (85%), and Ukraine (80%). In contrast, a large proportion of the foreign activity of French and American companies is concentrated in BRIC and developing countries. In particular, Brazil and China are two strategic markets for French retailers, and account for 19% and 7%, respectively, of their foreign sales (these retailers represent 66% of the Brazilian market and 24% of the Chinese market). Retailers in the United States are also very active on the Brazilian and Chinese markets, even though sales on their neighboring Mexican market account for 20% of their foreign sales. Next, we question whether the geographically diversified foreign investments of multinational retailers represent an advantage for exports from their countries of origin.

The Empirical Model

We considered a trade structure with a differentiated good of n_i varieties produced in each country i. Products are differentiated by country of origin. Consumer preferences are homothetic and represented by a CES utility function. The difference in the price of a given good in two different locations is explained entirely by the difference in trade costs to these locations. For the sake of simplicity, we assume an *iceberg* trade cost

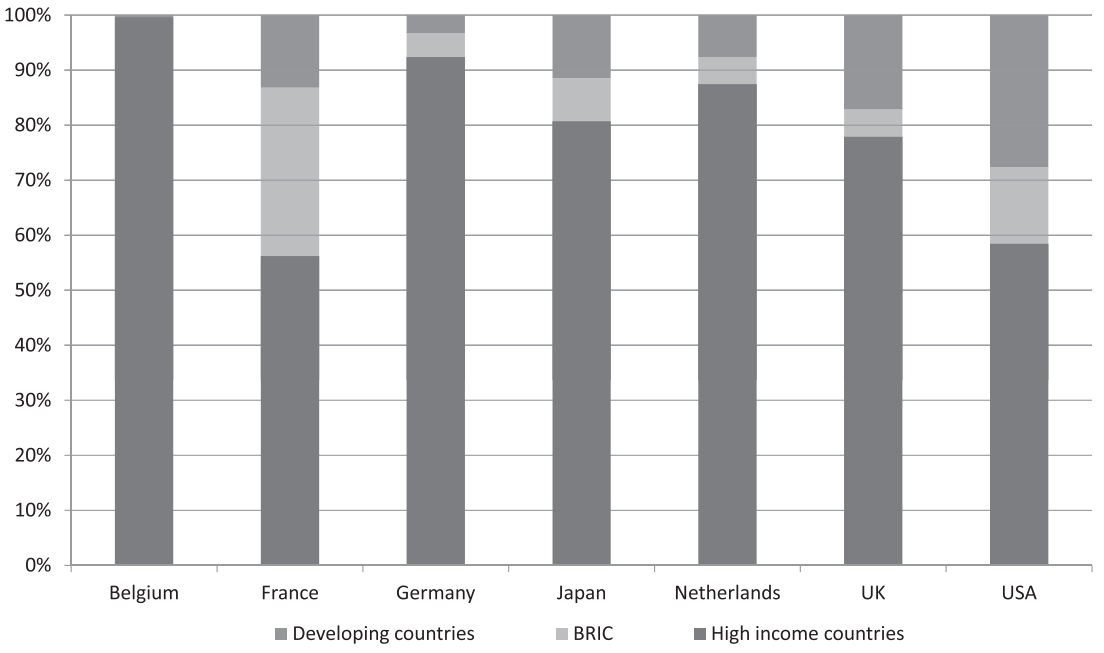

Figure 3. Sales on foreign markets in 2010 according to the country of origin of the retailers

Note: Authors' calculation using data from Planet Retail.

function: the price to country j consumers of a good produced in i, p_{ij}, is the product of its mill price p_i and the corresponding trade cost τ_{ij}. Consumers in each country j spend a total amount E_j on domestic and foreign products and choose quantities that maximize their utility function under the budget constraint. Country j's overall demand for products from origin i is expressed as:

$$(1) \qquad m_{ij} = a_{ij}^{\sigma-1}\left(\frac{p_i\tau_{ij}}{P_j}\right)^{1-\sigma} n_i E_j$$

where P_j is a non-linear (CES) price index of imports from country j, depending on the elasticity of substitution σ and the bilateral preference parameter a_{ij}. Under market clearance, the exporter-specific portion of equation (1) can be expressed as the country's production Y_i adjusted by a non-linear average cost Π_{ij} of shipping its products to the global market: $n_i p_i^{1-\sigma} = Y_i \Pi_i^{\sigma-1}$.[4] Using these results, Anderson and van Wincoop (2003, 2004) showed that the importer price index P_j also reflects the average cost of importing into country j from all origins combined. The trade equation (1) then becomes:

$$(2) \qquad m_{ij,t} = \left(\frac{\tau_{ij,t}}{a_{ij}}\right)^{1-\sigma} Y_{i,t}\Pi_{i,t}^{\sigma-1}E_{j,t}P_{j,t}^{\sigma-1}.$$

We add subscript t to reflect the time dimension of variables; $\Pi_{i,t}$ and $P_{j,t}$ are referred to in the literature as outward and inward multilateral resistances.[5] The non-linearity of these terms and the presence of bilateral preference parameters a_{ij} make it virtually impossible to estimate equation (2) in its structural form without additional simplifying assumptions.

Consumer preferences can be expressed as a function of observables, just like trade costs. However, we have no way to disentangle the impact of a variable on preference parameters from its impact on trade costs. Therefore, estimated coefficients on any exogenous component of trade costs or preferences will

[4] The market clearing assumption implies that a country's production equals the sum of its exports to all destinations, including the domestic market, $Y_i = \sum_j$, and is usually checked for aggregate data.

[5] More specifically, $\Pi_{i,t} = \sum_j \left(\frac{\tau_{ij,t}}{a_{ij}}\right)^{\sigma-1} E_{j,t}P_{j,t}^{\sigma-1}$ and $P_{j,t} = \sum_i \left(\frac{\tau_{ij,t}}{a_{ij}}\right)^{1-\sigma} Y_{i,t}\Pi_{i,t}^{\sigma-1}$.

actually capture the global effect of these variables on both trade costs and consumer preferences. In the remainder of the article we consider preference-adjusted trade costs and interpret any increase in the term $\tau_{ij,t}/a_{ij}$ as an increase in costs. An alternative interpretation of preference parameters is that an identical equally-priced good from source country s is perceived differently by consumers in country i and consumers in country j. A strong taste for good s leads consumers to overvalue the virtues of the product and shifts their demand function upward. Thus, the actual price to which consumers in country j respond is $p_{sj,t}/a_{sj}$ rather than $p_{sj,t}$.

Equation (2) can be directly estimated in logarithmic form with time-varying importer and exporter fixed effects after grouping the terms i and j.[6] We assume that multilateral resistances do not vary significantly over time, and use time-invariant exporter and importer fixed effects.[7] This enables us to explore the time-varying dimension of countries' levels of production and consumption, and to take advantage of the panel structure of our data:

$$\ln m_{ij,t} = \ln Y_{i,t} + FE_i + \ln E_{j,t} + FM_j + (1-\sigma)\ln\frac{\tau_{ij,t}}{a_{ij}}. \tag{3}$$

We use a preference-adjusted trade costs function that includes the standard proxy variables cited in the literature, as well as some innovative factors and a zero-mean randomly distributed error term $e_{ij,t}$:

$$\ln\frac{\tau_{ij,t}}{a_{ij}} = b_1 \ln dist_{ij} + b_2 contig_{ij} + b_3 colony_{ij} + b_4 comlang_{ij} + b_5 RTA_{ij,t} + b_6 landlocked_i + b_7 landlocked_j + \ln(1+tariff_{ij,t}) + c\ln SALES_{ij,t} + e_{ij,t}. \tag{4}$$

Here, the variable $dist_{ij}$ represents the physical distance separating countries i and j; this variable increases trade costs and we expect the data to confirm that $b_1 > 0$. Variables $contig_{ij}$, $colony_{ij}$, $comlang_{ij}$, and $RTA_{ij,t}$ denote a common land border, a common colonial history, a common official language, and membership of the same Regional Trade Agreement (RTA) for countries i and j, respectively. These variables reduce trade costs and facilitate trade, and as a result, we expect coefficients $b_2 - b_5$ to be negative. The variables $landlocked_i$ and $landlocked_j$ indicate whether i or j are landlocked. We expect higher trade costs for landlocked countries, that is, positive values for parameters b_6 and b_7. Import tariffs $tariff_{ij,t}$ are expressed as *ad valorem* equivalents and enter the trade costs function (4) with a unitary coefficient. The last term $SALES_{ij,t}$ corresponds to the sales of domestic and foreign grocery products by multinational retailers from country i in their outlets located in host country j.

The trade equation to be estimated is obtained by integrating the trade costs function (4) in equation (3) and using importer and exporter gross domestic products (GDP) as proxies for production and expenditure levels. We replace country-specific importer and exporter effects with region-specific effects i' and j' to work around the fact that country and partner fixed effects explain a large share of observations with zero retail sales, leading to low explanatory power of our variable of interest. The exogenous definition of geographical regions, listed in table A2 in the appendix, (unlike groups defined by countries' income levels, etc.) and the fact that countries in each geographical area face comparable trade costs (due to their geographic proximity and the large number of regional trade agreements) underpins this approach:

$$\ln m_{ij,t} = \alpha_1 GDP_{i,t} + \alpha_2 GDP_{j,t} + \beta_1 \ln dist_{ij} + \beta_2 contig_{ij} + \beta_3 colony_{ij} + \beta_4 comlang_{ij} + \beta_5 RTA_{ij,t} + \beta_6 landlocked_i \tag{5}$$

[6] Rose and van Wincoop (2001) and Redding and Venables (2004) use country-specific effects in a cross-section setting to capture the exporter- and importer-specific variables of a trade equation. Estimating the non-linear system formed by trade equation (2) and equations defining remoteness terms $\Pi_{i,t}$ and $P_{j,t}$ requires additional constraints ensuring that the system has a single solution, such as symmetric trade costs in Anderson and van Wincoop (2003, 2004). We specifically wanted to avoid creating such constraints in the present study, and therefore used the fixed-effects estimation approach.

[7] This assumption does not appear to be very strong for a period of one decade.

$$+ \beta_7 \, landlocked_j + (1 - \sigma) \ln(1 + tariff_{ij,t}) + \gamma \ln SALES_{ij,t} + FE_{i'} + FM_{j'} + \varepsilon_{ij,t}.$$

The rest of the article is dedicated to estimating the parameters in equation (5). Special attention is paid to the impact of retailers' foreign sales (parameter γ).

Retailers' Overseas Expansion and Exports from their Countries of Origin

This section presents the empirical findings of the article. We start with the description of the data and econometric methods used, and continue with a discussion of our estimated results and a robustness analysis.

Employed Data

The data panel used in this article covers bilateral trade between a large number (171) of exporting and (101) importing countries between 2000 and 2010. The main variable of interest in our analysis is $SALES_{ij,t}$, which corresponds to the total sales of all retailers from country i in outlets established in host market j. We computed this variable using data from Planet Retail, the same database we used to compute the descriptive statistics presented above.[8] The original database contains records of grocery sales by the world's top 100 individual retail companies in each country. We aggregated the data according to the country of origin of the retailers and obtained the sales volume of all retailers from each country i in each host market j. Multinational retailers included in our panel originate from 25 countries and sell in 107 foreign markets. Bilateral foreign investments in the retail sector, however, are a relatively rare phenomenon compared to the number of all possible bilateral links. To better illustrate the impact of retailers' sales in foreign markets on exports from their countries of origin, we limited our panel to importing countries familiar with retailing, that is, that host at least one foreign or domestic retailer.[9] Even so, observations with positive sales by multinational retailers in foreign markets represent only 2.3% of the dataset.

For trade data, we used the BACI database developed by the CEPII (Gaulier and Zignago 2010).[10] The BACI trade data are produced at a high level of product disaggregation, that is, at the 6-digit level of the Harmonized System (HS) nomenclature. We selected food products sold in supermarkets, aggregated trade data across products, and ended up with a single trade value for each pair of exporting and importing countries.[11]

Countries' GDPs were taken from the World Bank World Development Indicators database. Variables corresponding to the geographical and historical links (*dist, contig, colony, comlang, landlocked*), came from the CEPII Geodist database (Mayer and Zignago 2011). Membership of an RTA and import tariffs were taken from the MAcMap-HS6 dataset, but import tariffs are only available for three years of our sample: 2001, 2004, and 2007 (see Guimbard et al. (2012) for a description of the data set.) The MAcMap database provided ad valorem equivalents of tariff protection for each importer, exporter, and product defined at the 6-digit level of the HS nomenclature. We aggregated tariff data across the food products included in our trade variable and used world trade at the HS 6-digit level as weights to obtain the average level of protection for each pair of countries and each year.

Various Econometric Approaches

The objective of this section is to identify the econometric techniques that enable us to correctly estimate how the presence of multinational retailers originating from country i, along with retail outlets in country j, affects the volume of exports from i to j. A positive sign parameter γ in equation (5) suggests that the foreign activity of retailers improves the export performance of their country of origin

[8] See http://www1.planetretail.net/.

[9] This leads to dropping exports to 75 countries that, depending on the year, account for 7.1% to 4.3% of world trade in groceries. Therefore, this choice should not affect the main results of the article.

[10] This database uses original procedures to harmonize the United Nations Comtrade data: evaluation of cost, insurance and freight (CIF) rates to reconcile import and export declarations, and evaluation of the quality of declarations of importers and exporters.

[11] 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-and-tools/hs_nomenclature_2012/hs_nomenclature_table_2012.aspx.

on the respective foreign markets. However, the sales in country j of retailers based in country i, $SALES_{ij,t}$, and the bilateral exports from i to j, $m_{ij,t}$, have a common set of observed and unobserved determinants. Both exports and retail investments increase with the size of the destination country's economy, the presence of cultural, linguistic, and historical ties between the country of origin, and the destination country. The simultaneous determination of the two variables is a potential source of endogeneity. Estimating equation (5) directly with ordinary least squares (OLS) may thus yield biased results.

To eliminate the endogeneity bias and obtain a correct estimation of the causality effect between variables $SALES_{ij,t}$ and $m_{ij,t}$, we used an instrumental variable approach. We identified two exogenous variables that affect the decision of a retail company to invest abroad or the amount of sales in its outlets located abroad, but not the volume of bilateral exports between the retailers' country of origin and the host countries. First, we considered the share of purchases in "modern" retail stores in total household grocery expenditures in the host (importing) country. By "modern" retail stores, we mean the outlets of large retail chains, in contrast to traditional, usually one-outlet, family-run, small retailers. Multinational retailers sell more groceries in host countries that have a large share of modern retailing. The more developed a country's modern retail sector, the easier it is for foreign retail companies to attract local consumers who are already accustomed to purchasing their groceries in supermarkets. The second instrument we used is the market share of the retailers in their country of origin. According to Deloitte (2007), retailers that sell mainly food and groceries tend to saturate one market before they move to the next. Reardon et al. (2003) and Reardon, Henson, and Berdegué (2007) claim that the main incentive for European and U.S. retailers to invest in developing markets is saturation and intense competition (accompanied by low margins) on their home markets. We followed this view and used the home market share of retailers to capture this phenomenon. We make the assumption that retail companies are more eager to sell abroad when they already have a high share of the domestic market in their country of origin. A large retailer's market share in the country of origin implies more limited growth opportunities on this market. Therefore, entering new markets becomes the retailer's main strategy for expanding its activities (Reardon et al. 2003). Both instruments were computed using data from Planet Retail. To account for the bilateral dimension of our data, we used the product of these two variables as a third instrument. To reduce endogeneity, we used lagged values (by one year, in $t-1$) of all our instruments.

Let us denote the three instrumental variables described above by vector $\boldsymbol{Z}_{ij,t-1}$, which can be used untransformed to construct the standard two-stage least squares (2SLS) estimator of parameters in equation (5). This is the traditional econometric approach that makes it possible to control for endogeneity (simultaneity) between explained and explanatory variables. In addition, we used two other 2SLS estimators that account for the specific distribution of the endogenous variable $\ln SALES_{ij,t}$; retailers' sales are equal to zero for a large number of observations in our dataset.

First, we assumed that $\ln SALES_{ij,t}$ follows a standard Tobit model censored at zero:[12]

$$\begin{aligned}(6)\qquad &\ln SALES_{ij,t}\\ &\quad = \max\left(0, \mu \boldsymbol{X}_{ij,t} + \nu \boldsymbol{Z}_{ij,t-1} + \upsilon_{ij,t}\right)\\ &\quad \upsilon_{ij,t} \sim \mathcal{N}(0, \varsigma^2)\end{aligned}$$

where $\boldsymbol{X}_{ij,t}$ is the vector of exogenous variables in trade equation (5) including fixed effects, and μ and ν are vectors of coefficients. We computed the best prediction of $\ln SALES_{ij,t}$ following Wooldridge (2001, 2010): $f^{\dagger}(\boldsymbol{Z}_{ij,t}) = E(\ln SALES_{ij,t} | \boldsymbol{X}_{ij,t}, \boldsymbol{Z}_{ij,t-1})$.

Second, we used a Heckman estimator to obtain the best prediction of $\ln SALES_{ij,t}$. Contrary to the Tobit model, where all independent variables have a similar effect on the occurrence and the volume of retailers' sales, the Heckman model allows $\boldsymbol{X}_{ij,t}$ and $\boldsymbol{Z}_{ij,t-1}$ to affect the discrete and continuous part of retailers' sales in foreign

[12] The censoring of $\ln SALES_{ij,t}$ at zero rather than at $\ln(0) = 1$ has a minor impact on our estimations since $\min(SALES_{ij,t} | SALES_{ij,t} > 0) = \text{USD}19{,}675$, but considerably simplifies the computation of $E\left(\ln SALES_{ij,t} | \mathbf{X}_{ij,t}, \mathbf{Z}_{ij,t-1}\right)$ further used to instrument $\ln SALES_{ij,t}$.

markets differently:

$$(7)\quad \begin{cases} y_{ij,t} = 1\left[\eta \boldsymbol{X}_{ij,t} + \psi \boldsymbol{Z}_{ij,t-1} + \kappa\, \pi_{ij,t-1} + v_{ij,t} > 0\right], & v_{ij,t} \sim \mathcal{N}(0,1) \\ \ln SALES_{ij,t} = \eta' \boldsymbol{X}_{ij,t} + \psi' \boldsymbol{Z}_{ij,t-1} + u_{ij,t} & \text{if } y_{ij,t} = 1 \end{cases}$$

where $y_{ij,t}$ is an indicator variable that takes the value one for positive sales and otherwise zero, $\pi_{ij,t-1}$ is a selection variable that affects the probability of retailers investing abroad but not the volume of sales, and η, ψ, η', and ψ' are vectors of coefficients. We used the number of administrative procedures required to start a business in the host country as the selection variable.[13] To obtain unbiased values of model parameters, we estimated the selection equation on the entire sample, computed the inverse Mills' ratios for fitted values of $y_{ij,t}$, $\lambda(\hat{y}_{ij,t})$, and added the latter to the right-hand side of the equation of retailers' sales in foreign markets, estimated for the selected subpanel (where $y_{ij,t} = 1$, i.e., $SALES_{ij,t} > 0$). The best prediction of the endogenous variable $\ln SALES_{ij,t}$ in this case is $f^{\ddagger}(\boldsymbol{Z}_{ij,t}) = E(\ln SALES_{ij,t} | \boldsymbol{X}_{ij,t}, \boldsymbol{Z}_{ij,t-1}, \pi_{ij,t-1})$.

Subsequently, the variables $f^{\dagger}(\boldsymbol{Z}_{ij,t})$ and $f^{\ddagger}(\boldsymbol{Z}_{ij,t})$ were used alternatively as the unique instrument of $\ln SALES_{ij,t}$ in a two-stage least squares procedure to estimate the coefficients of equation (5):

$$\begin{cases} 1^{st}\ stage: & \ln SALES_{ij,t} = \zeta\, \boldsymbol{X}_{ij,t} + \xi\, f(.) + \omega_{ij,t} \\ 2^{nd}\ stage: & \ln m_{ij,t} = \beta\, \boldsymbol{X}_{ij,t} + \gamma' \ln \widehat{SALES}_{ij,t} + w_{ij,t} \end{cases}$$

where $f(.)$ stands for $f^{\dagger}(\boldsymbol{Z}_{ij,t})$, or $f^{\ddagger}(\boldsymbol{Z}_{ij,t})$, β is the vector of coefficients of independent variables in equation (5), γ' is the unbiased estimate of the impact of retailers' foreign sales on bilateral exports, and $\ln \widehat{SALES}_{ij,t}$ is the first-stage prediction of the variable that is endogenous to the model.

Main Estimated Results

In this section we present the results obtained from estimating equation (5) using the data and econometric approaches described above.

Table 1 shows the estimates of the coefficients in equation (5) using five alternative specifications. In all specifications, we used importer and exporter GDPs as a proxy for the size of demand and supply in the two countries. The geographical distance and dichotomous variables for a shared border, common language, past colonial ties, landlockedness, and RTA membership were used to account for unobservable bilateral trade costs and preferences. Import tariff data covered only three years of our sample, that is, less than 30% of the total number of observations. Therefore, in the first three columns of table 1 we dropped this variable from our estimations. The main variable of interest for our study is $SALES_{ij,t}$, the sales of retailers on foreign markets. This variable's positive coefficient indicates that an increase in the sales on a foreign market by retailers from a given country of origin leads to higher bilateral exports to this destination. Importer and exporter fixed effects for 12 geographical zones and year fixed effects are included in all specifications. Numbers in parentheses correspond to standard errors clustered by pairs of countries. This makes it possible to eliminate most of the heteroscedasticity and autocorrelation present in the data.

The first column lists the coefficients obtained with the standard two-stage least squares (2SLS) estimator. The equivalent of the Durbin-Wu-Hausman χ^2 test is equal to 99.1 and is highly significant, confirming the endogeneity of our variable of interest. Since we consider a generalized form of the variance matrix of the error term $\varepsilon_{ij,t}$ (allowing heteroscedasticity and autocorrelation), in the lower part of table 1 we list the corresponding generalized tests that validated our choice of instruments. A value of the Kleibergen and Paap (2006) *rk* Wald *F* statistic of the first-order estimation (test for weak identification) above 10 and

[13] Data on the number of administrative procedures required to start a business come from the World Bank's website http://doingbusiness.org/.

Table 1. Impact of Multinational Retailers' Sales on Foreign Markets on Exports from the Retailers' Country of Origin

	Explained variable: $\ln m_{ij,t}$. 2SLS estimations with instruments:				
	$\mathbf{Z}_{ij,t-1}$ (1)	$f^{\dagger}(\mathbf{Z}_{ij,t-1})$ (2)	$f^{\ddagger}(\mathbf{Z}_{ij,t-1})$ (3)	$\mathbf{Z}_{ij,t-1}$ (4)	$\mathbf{Z}_{ij,t-1}$ (5)
ln retailers' sales	0.25***	0.24***	0.23***	0.21***	0.42***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)
ln GDP exporter	0.85***	0.85***	0.90***	0.83***	0.86***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
ln GDP importer	0.69***	0.69***	0.67***	0.72***	0.69***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
ln distance	−0.93***	−0.93***	−0.93***	−0.99***	−0.89***
	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)
contiguity	0.69***	0.69***	0.74***	0.70***	0.74***
	(0.16)	(0.16)	(0.18)	(0.15)	(0.19)
colony	0.63***	0.63***	0.55***	0.78***	0.51***
	(0.16)	(0.16)	(0.18)	(0.16)	(0.20)
RTA	0.36***	0.36***	0.35***	0.20***	0.38***
	(0.05)	(0.05)	(0.07)	(0.06)	(0.05)
common language	0.89***	0.89***	0.86***	0.76***	0.90***
	(0.07)	(0.07)	(0.09)	(0.08)	(0.08)
exporter landlocked	−0.62***	−0.62***	−0.37***	−0.57***	−0.63***
	(0.06)	(0.06)	(0.07)	(0.07)	(0.07)
importer landlocked	−0.71***	−0.70***	−0.69***	−0.60***	−0.73***
	(0.07)	(0.07)	(0.08)	(0.07)	(0.08)
ln (1+tariff)				−1.33***	
				(0.18)	
Nb obs.	88324	88324	50220	237301	85660
R^2, centered	0.47	0.47	0.47	0.49	0.42
Hansen J statistic	0.22			0.75	1.19
J Hansen p-value	0.894			0.688	0.551
F stat for weak id.	86.22	256.15	237.00	79.26	43.30
LM test underid.	252.56	245.22	227.22	226.89	128.11
underid. p-value	0.000	0.000	0.000	0.000	0.000
ln likelihood	−205324.36	−205271.10	−118486.00	−54346.47	−4202513.49
endogeneity test stat	99.10	87.40	61.74	65.28	101.98
$p-$value endogeneity test	0.000	0.000	0.000	0.000	0.000

Note: Robust standard errors in parentheses. A triple asterisk (***), double asterisk (**), and simple asterisk (*) denote parameters significant at the 1%, 5%, and 10% levels, respectively. Estimations in all columns include a fixed effect for each year, each exporting, and each importing geographic zone. Instruments $\mathbf{Z}_{ij,t-1}$ are the share of "modern" retail household grocery expenditure in the host country, the share of the domestic market of retailers from the country of origin, and the products of these two variables. Instruments $f^{\dagger}(\mathbf{Z}_{ij,t-1})$ and $f^{\ddagger}(\mathbf{Z}_{ij,t-1})$ are the best predictions of retailers' sales with all the model's exogenous variables, using Tobit and Heckman estimators, respectively. See main text for details.

a Kleibergen-Paap *rk LM* statistic (test for under-identification) that was significant at 1% confirmed that the selected instrumental variables are good predictors of retailers' sales on foreign markets. The small non-significant Hansen J statistic (test for over identification) showed that our instruments are uncorrelated with the error term $\varepsilon_{ij,t}$. The coefficients of traditional variables are highly significant and in line with values obtained in previous studies in the literature. The size of the country of origin and of the destination country, geographical proximity/contiguity, the existence of a shared colonial history, common language, or the existence of an RTA all enhance bilateral exports of food products, while being landlocked reduces trade. We found a positive significant coefficient for retailers' sales on foreign markets, suggesting that a 10% increase in the sales volume of a country's retailers on a foreign market would lead to a 2.5% increase in the country's exports to this market.

The next two columns of table 1 correspond to 2SLS estimates, where the endogeneity of $\ln SALES_{ij,t}$ is controlled

for with instruments generated with Tobit and Heckman estimators, respectively.[14] The best prediction of variable $\ln SALES_{ij,t}$, computed with each approach, $f^{\dagger}(\boldsymbol{Z}_{ij,t-1})$ and $f^{\ddagger}(\boldsymbol{Z}_{ij,t-1})$, were then used separately as the sole instrumental variable in a 2SLS estimation with precisely identified equations. Therefore, in columns (2) and (3), we did not provide the value of the Hansen *J* test for over identification. Using Tobit and Heckman-based predictions of $SALES_{ij,t}$ as instruments, the impact of retailers' foreign sales on exports is very similar to the one obtained in column (1).

In column (4) we replicated the 2SLS estimates from column (1) on equation (5), including import tariffs.[15] We obtained a negative, highly significant coefficient on this variable in accordance with the existing theoretical and empirical literature. It should be noted that import tariffs enter the trade costs function with a coefficient of one. Therefore, the tariff coefficient in column (4) allowed us to deduce the magnitude of the elasticity of substitution between exchanged products: $\sigma = 1.33$. The impact of variable $SALES_{ij,t}$ on bilateral exports is very similar to the impacts obtained with the other 2SLS estimators.

According to figure 2, the three main countries of origin for multinational retailers—Germany, France, and the United States—can be considered as outliers. Therefore, in column (5) we re-estimated equation (5) with the standard 2SLS procedure from column (1), but excluding the exports of these countries, which are also among the world's largest exporters. We obtained a positive, highly significant impact of our variable of interest on the reduced sample, even larger than in the previous columns. Hence, our result showing a positive impact of retailers' foreign activity on exports from the country of origin is not caused by the largest retail companies or exporting countries.

We considered the specification in column (1) of table 1 as our benchmark regression and conducted two counterfactual exercises in which we manipulated the volume of retailers' sales.[16] According to our results, a twofold increase in the volume of retailers' sales in foreign markets for all observations where sales were strictly positive leads to an 18.6% average increase in exports by retailers in the country of origin to these markets. The result was similar for different countries and for the world as a whole. Closing all markets to foreign retailers, that is, setting retailers' sales abroad at zero, would lead to an average 2.7% drop in bilateral exports at the global level. The effect was larger for countries of origin of the largest multinational retailers: bilateral exports from the United States, Germany, and France decreased by an average of 15%, 39%, and 54%, respectively.

One could argue that the positive effect of retailers' sales in table 1 could be the result of an upward shift in the price of exported goods. An increase in the foreign activity of a country's retailers may help domestic firms to export their products at higher prices, or to export larger amounts of high quality (and consequently high-priced) products. To analyze the issue of possible price effects, in table A3 in the appendix we replicate estimates from table 1 on exported quantities (expressed in metric tons). We find a positive, significant effect of retailers' foreign sales in all specifications, and conclude that the positive effect on exported values (table 1) is explained by a similar effect on quantities (table A3), with price effects playing a minor role.

Retailers' investments abroad may impact not only the volume of exports (the intensive margin), but also the number of exported varieties (the extensive margin). To verify this, we estimated equation (5) with the number of HS 6-digit product lines exported from the retailers' country of origin to each trade partner as the dependent variable, using 2SLS and the same instrumental variables as above. We found a positive, significant impact

[14] Results of Tobit and Heckman estimations are available in the online appendix. Using the Heckman estimator reduced our estimation panel by half. This is because data on the administrative procedures required to start a business in the destination country (our selection variable) is only available from 2005 on. Each additional procedure decreases the probability of retailers establishing facilities abroad by 1.7%. The positive and highly significant effect of the hazard rate (the inverse Mills' ratio) on retailers' foreign sales confirms the presence of a selection bias: retailers that are more likely to invest abroad sell more on foreign markets.

[15] Due to the limited availability of data on the administrative costs of establishing a new business and on import tariffs, results in column (4) in table 1 correspond only to observations for the year 2007.

[16] The benchmark regression yields the benchmark predictions of bilateral export levels. We attributed new values to $\ln \ln SALES_{ijt}$ and use the benchmark estimated coefficients to recalculate the predicted levels of bilateral exports. The difference between the predicted counterfactual and benchmark export values provides an evaluation of the magnitude of the effect of the altered variable $\ln SALES_{ijt}$. We exponentiated the obtained value and subtracted one to express changes in percentage terms.

of retailers' sales on foreign markets on the number of exported products, underlining the fact that retailers' presence abroad affects both the intensive and the extensive export margin. The disaggregation at the level of HS 6-digit product lines is a very basic measure of variety, with true product varieties being defined at firm level.[17] Therefore, we would expect the impact of retailers' sales on the actual number of product varieties, as perceived by consumers, to be even larger.[18]

To sum up, the results presented in tables 1 and A3 testify that retail investments abroad encourage exports by producers in the country of origin. Various economic mechanisms can explain this outcome. In our empirical model, we assumed that sales by retailers from country i in the host country j, $SALES_{ijt}$, enter the preference-adjusted trade cost function (equation (4)). In this empirical framework, foreign retail investments can impact trade through two channels: by reducing the bilateral costs of exports by producers in the country of origin, and by altering the preferences of consumers in the host country. We discuss these two potential channels in the next section.

Discussion

The first channel underlying our empirical framework implies that *trade costs* for a country's exporters are reduced because of the presence of a domestic retailer on a given destination market. This needs to be linked with the central role that retailers play in the *supply chain*. In particular, lean retailing requirements imposed by retailers imply integrated supply chains (Wrigley and Lowe 2010). As a consequence, retailers are leading firms (also called channel captains) in buyer-driven supply chains and impact imports into the host country. Durand (2007) documents the effect of retailers on imports through their sourcing strategy during the establishment of Wal-Mart in Mexico, and shows that Wal-Mart investments in the Mexican retail sector increased the competitive pressure on Mexico's imports. In 2003 Wal-Mart became the sixth largest importer to Mexico. Reardon, Henson, and Berdegué (2007) show that retailers who penetrate foreign markets may continue to supply their overseas stores using suppliers in their country of origin because a given product is not available locally, or not at the appropriate quality. This may explain our main result of a positive impact of retailers' sales in foreign markets on the exports of their countries of origin to these markets. When local producers either adapt or upgrade their products, retailers start sourcing locally. However, Reardon, Henson, and Berdegué (2007) highlight the fact that the paths of sourcing for multinational retailers are various and complex. Wrigley and Lowe (2010) note that retailers use their global sourcing capabilities and in this way become potential "Trojan horses" of imported goods for host countries. Nordås (2008) designates retailers as "gatekeepers" to consumer markets because they enable exports to countries where they operate; this is also in line with our findings. Our article provides empirical support to these analyses. Some of these authors provide a detailed analysis and discussion of the relationship between retail companies and their suppliers. Dawson (2007) highlights that relationships with suppliers are important specific assets for retailers. The concept of "preferred suppliers" is also emphasized by Reardon, Henson, and Berdegué (2007). The preferred supplier can be identified through formal or implicit contracts and may benefit from the presence of retailers on foreign markets.

The second channel of our analysis deals with *consumer preferences*. As shown by Veeck and Burns (2005), the arrival of multinational retailers in developing countries often coincides with an increase in the local consumption of processed food. Higher incomes and changes in lifestyle lead to a change in eating habits that benefits all exporters of processed food. Coe and Hess (2005) argue that retailers have become a constituent part of processes of socio-cultural changes in host markets regarding shopping and eating patterns. For instance, the increased demand for wine in China may be linked with the fact that Chinese consumers have access to French wines in Carrefour outlets in China. This change in consumer tastes may benefit not only domestic retail suppliers, but also all national and foreign exporters of these products. In his analysis, Dawson (2007) highlights the fact that retailers seek to integrate in their host countries as far as possible. Given the repeated long-term

[17] Indeed, consumers rarely perceive the products of different firms as being identical, even when they have very similar characteristics.

[18] The results of the extensive export margin are reported in the on-line appendix.

interaction of retailers with local consumers, this pursuit may lead them to alter the local culture by creating new consumer values and expectations. According to Dawson (2007), such a change is more prominent in retailing than in manufacturing.

Robustness of Results

We performed robustness checks on the effects identified in the previous section by adding various controls, by considering a different set of instrumental variables, and by replacing exporter and importer fixed effects with measures of multilateral resistance terms.

Adding different explanatory variables on the right-hand side of equation (5) made it possible to check the robustness of our results by controlling for potential omitted variables (see table A4 in the appendix).[19] In the first column of table A4, we added the shares of population living in temperate zones,[20] and the extent of arable land in the exporting and importing countries.[21] These variables control for country-level characteristics that may affect the supply and demand for agri-food products, such as climate or productive capacity, which are not taken into account by regional fixed effects.[22] Second, we added the per capita GDP levels of the two countries to allow for a non-linear relationship between income and food expenditure. The negative coefficient for the importer confirms that rich countries import less grocery products. Since migrants may influence the host country's demand for foreign food products, in the last column we included the annual bilateral flows of migrants from the exporting to the importing country.[23] All three columns in table A4 list positive, highly significant estimates of the effect of retailers' sales on exports. Except for the last column, the magnitude of the effect is very similar to the one in table 1. The lower impact of sales in the last column is related to the difference in the estimation sample because of the limited availability of bilateral migrant data (this is only available for OECD countries).

As another robustness check, we estimated equation (6) with three sets of alternative instrumental variables (see table A5 in the appendix). First, we used the share of households with a female head and the retailers' share of their domestic market, computed using the Planet Retail database, to instrument $SALES_{ij,t}$.[24] In the second estimation, the instruments used were the cost of starting a new business in the host country and the number of retail companies in the country of origin (from Planet Retail).[25] Finally, we used the retailers' share of the domestic market and the index of regulation of the retail sector in the host country, computed by the OECD.[26] The index of regulation summarizes conditions in retail distribution sectors, taking into account barriers to entry, operational restrictions, and price controls. As done previously, we used cross variables as a third instrument to obtain bilateral instruments and lagged our instruments by one time period. Our initial results are robust to these new specifications.[27]

Up to this point we used importer and exporter fixed effects to control for the multilateral resistance terms $P_{j,t}$ and $\Pi_{i,t}$ in equation (2). If it were possible to directly measure multilateral resistances, estimating the impact of different trade cost elements on the volume of trade would be straightforward and would not require the use of exporter and importer fixed effects. As a final robustness check, we replaced the region-fixed effects in equation (5) with approximations of multilateral resistances, computed

[19] We do not include these additional control variables in our main estimations of equation (5) because it reduces the number of observations due to the limited availability of data.

[20] Data on the shares of population in temperate zones in 1995 come from Mellinger, Sachs, and Gallup (2000).

[21] Data on arable land area is expressed as log of squared kilometers, and comes from FAOstat.

[22] Since most crop production takes place in temperate regions and is characterized by higher yields, the share of population established in these zones can be used as a proxy for the suitability of country's soil and climate for agricultural production. Together with the extent of arable land, it has a positive effect on the country's agricultural output and a negative effect on its demand for agricultural products.

[23] Migrant data comes from the OECD and is expressed in logs.

[24] Data on households with a female head was taken from the World Bank's database World Development Indicators.

[25] Data on the cost of starting a new business is from the World Bank's website http://doingbusiness.org/.

[26] Data from http://stats.oecd.org/Index.aspx?DatasetCode=RETAIL. The index of regulation in the retail sector is available only for a limited sample of countries, mainly OECD countries and a few emerging countries, and only for 2003 and 2008, which explains the small number of observations in column (3).

[27] Differences in the magnitude of the impact of our variable of interest between table A5 and the first column of table 1 are due to the use of different samples of observations in the estimations.

according to their theoretical definition.[28] Computing multilateral resistances requires the use of unknown parameters (the elasticity of substitution σ and the coefficients of the trade costs equation (4)) and cannot be achieved directly with observed data. As a result, a variety of ad hoc formulas have emerged in the empirical trade literature, but none is consistent with the theoretical model. An improved alternative was provided by Baier and Bergstrand (2009), who approximated multilateral resistance terms by their first-order log-linear Taylor series expansions. This means that the same trade costs function can be used to derive trade volumes and remoteness terms, and to directly estimate all unknown parameters. Implementing this approach implies computing a bilateral remoteness term $MR\_V_{ij,t}$ for each variable V of the trade costs function (4).[29] By replacing importer and exporter fixed effects in equation (3) by the sum of multilateral resistance terms $MR\_V_{ij,t}$ and grouping variables, we obtained a trade equation that enables the direct estimation of all the parameters of our trade model:

$$
\begin{aligned}
(8)\qquad \ln m_{ij,t} = {} & \alpha_0 + \alpha_1 GDP_{i,t} + \alpha_2 GDP_{j,t} \\
& + \beta_1 \left[\ln dist_{ij} - MR\_\ln dist_{ij}\right] \\
& + \beta_2 \left[contig_{ij} - MR\_contig_{ij}\right] \\
& + \beta_3 \left[colony_{ij} - MR\_colony_{ij}\right] \\
& + \beta_4 \left[comlang_{ij,t} - MR\_comlang_{ij,t}\right] \\
& + \beta_5 \left[RTA_{ij,t} - MR\_RTA_{ij,t}\right] \\
& + \beta_6 \left[landlocked_i\right] \\
& + \beta_7 \left[landlocked_j\right] \\
& + (1-\sigma)\left[\ln\left(1 + tariff_{ij,t}\right)\right. \\
& \left. - MR\_\ln\left(1 + tariff_{ij,t}\right)\right] \\
& + \gamma \ln SALES_{ij,t} + \epsilon_{ij,t}.
\end{aligned}
$$

The constant term α_0 was added in equation (8) to increase the flexibility of our empirical model. We estimated equation (8) with and without tariffs, according to the five approaches listed in table 1. To enable a comparison, we used the same instrumental variables as in table 1 to control for the endogeneity of multinational retailers' sales on foreign markets (the obtained coefficients are listed in table A6 in the appendix). Again, we found a positive significant effect of retailers' sales on a foreign market on the exports from their country of origin to this market. The magnitude of the effect is even larger than the one found in table 1, but the difference between the two estimates is statistically significant in only two columns out of five.

Conclusions

Retail sales in developing countries have increased dramatically since the beginning of the 21st century. This is a major advantage for food exporters from countries with internationalized retail companies (Germany, France, the United States, the Netherlands, etc.). Indeed, our results show that when a domestic retailer establishes outlets in another country, food exports to this market also increase. Our result is robust to different specifications, the use of different sets of instrumental variables, and econometric approaches.

This outcome is far from trivial since only a small fraction of the products sold in retailers' foreign outlets come from their country of origin: the bulk of retailers' foreign sales are locally produced goods. Two economic mechanisms can explain this finding. First, the overseas presence of retail companies from a given country of origin helps reduce trade costs towards these markets. Second, establishing outlets in a foreign country may change consumer habits in favor of products from the retailers' country of origin. Our analysis does not enable us to distinguish the role of the reduction in trade costs from that of changes in consumer preferences. Recent literature suggests that retailers' preferred suppliers benefit the most from this network effect. Suppliers complying with private standards and selling retailer-branded products are the main beneficiaries of the overseas retail network, as they are involved in specific contracts with the retail companies.

[28] See endnote 4.

[29] Thus, $MR\_V_{ij,t} = \sum_j \theta_{j,t} V_{ij,t} + \sum_i \theta_{i,t} V_{ij,t} - \frac{1}{2}\sum_i \sum_j \theta_{i,t}\theta_{j,t} V_{ij,t} - \frac{1}{2}\sum_i \sum_j \theta_{i,t}\theta_{j,t} V_{ji,t}$ where θ are the countries' shares in world GDP. $MR\_V_{ij,t}$ is the sum of exporter i and importer j multilateral remotenesses.

Further research is needed to evaluate the relative importance of these two channels. The effect that a reduction in trade costs has on the export performance of food producers because of retailers' overseas expansion can be analyzed using firm level data. This will allow researchers to measure the impact of the retailer foreign network by distinguishing between retailers' suppliers and other exporters.

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Appendix

Table A1. Internationalization of the World's Largest Retailers in 2010 According to the Retailers' Country of Origin

Origin country of retail companies	Sales in foreign markets (bn USD)	Share of sales in foreign markets* (%)	Share of the global market† (%)	Number of overall retail companies	Number of multi-national retailers
Germany	134	45	27	7	7
France	113	41	23	6	6
USA	84	17	17	21	9
Netherlands	44	78	9	2	2
United Kingdom	28	20	6	7	4
Belgium	26	63	5	3	3
Japan	16	10	3	6	5
Hong Kong	9	72	2	2	2
Portugal	6	58	1	1	1
Chile	5	56	1	1	1
Australia	5	5	1	3	3
Austria	5	46	1	1	1
Ireland	4	48	1	1	1
Denmark	4	17	1	3	1
Norway	4	18	1	2	1
Slovakia	3	70	1	1	1
Korea	2	11	0	2	2
South Africa	1	8	0	2	2
Finland	1	4	0	2	2
China	0.4	2	0	2	1
Switzerland	0.2	1	0	2	1
Spain	0.1	0	0	3	1
Italy	0.1	0	0	3	2
Russia	0.03	0	0	1	1
Sweden	0.001	0	0	1	1
Canada	–	0	0	3	–
New Zealand	–	0	0	1	–
United Arab Emirates	–	0	0	1	–
Puerto Rico	–	0	0	1	–
Total	492	26	100	91	61

Note: Authors's calculations using data from Planet Retail. An asterisk * denotes the degree of internationalization, while † indicates the Eexclusion of ding sales on domestic markets.

Table A2. Geographical Area Fixed Effects

Geographic area	Geographic area
European Union (27)	Northern Africa
Rest of Europe	Sub-Saharan Africa
Northern America	North-Eastern Asia
Central and Southern America	South-Eastern Asia
Community of Independent States	Southern Asia and Pacific
Middle East	Oceania

Table A3. Impact that Multinational Retailers' Sales on Foreign Markets Have on Quantities of Exports from the Country of Origin

	Explained variable: $\ln m_{ij,t}$. 2SLS estimations with instruments:				
	$\mathbf{Z}_{ij,t-1}$ (1)	$f^{\dagger}(\mathbf{Z}_{ij,t-1})$ (2)	$f^{\ddagger}(\mathbf{Z}_{ij,t-1})$ (3)	$\mathbf{Z}_{ij,t-1}$ (4)	$\mathbf{Z}_{ij,t-1}$ (5)
ln retailers' sales	0.53***	0.61**	0.34***	0.51***	2.66*
	(0.10)	(0.25)	(0.11)	(0.12)	(1.41)
ln GDP exporter	0.87***	0.84***	0.95***	0.85***	0.64***
	(0.04)	(0.08)	(0.05)	(0.04)	(0.20)
ln GDP importer	0.67***	0.66***	0.68***	0.68***	0.54***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.10)
ln distance	−1.02***	−0.99***	−1.06***	−1.12***	−0.32
	(0.07)	(0.13)	(0.08)	(0.08)	(0.54)
contiguity	0.75**	0.64	1.01***	0.84***	−0.81
	(0.30)	(0.45)	(0.29)	(0.29)	(1.62)
colony	0.21	0.08	0.38	0.30	−2.01
	(0.30)	(0.48)	(′0.29)	(0.34)	(1.80)
RTA	0.48***	0.49***	0.44***	0.37***	0.68***
	(0.07)	(0.08)	(0.08)	(0.08)	(0.20)
common language	−0.52***	−0.50***	−0.26***	−0.48***	−0.31
	(0.08)	(0.10)	(0.08)	(0.10)	(0.23)
exporter landlocked	−0.98***	−0.99***	−0.88***	−0.92***	−1.25***
	(0.10)	(0.11)	(0.10)	(0.11)	(0.29)
importer landlocked	0.76***	0.74***	0.75***	0.61***	0.44
	(0.10)	(0.13)	(0.11)	(0.12)	(0.35)
ln (1+tariff)				−1.63***	
				(0.30)	
Nb obs.	55506	55506	44232	9020	53904
R^2, centered	0.32	0.27	0.40	0.33	−1.96
Hansen J statistic	0.47			3.82	1.76
J Hansen p-value	0.79			0.15	0.41
F stat for weak id.	14.66	7.18	27.06	13.57	2.29
LM test underid.	42.52	7.8	26.36	39.84	6.84
underid. p-value	0.000	0.005	0.000	0.000	0.077
ln likelihood	−143170.17	−145123.19	−111411.86	−23186.38	−178227.39
endogeneity test stat	61.96	20.35	17.08	36.12	72.58
p-value endogeneity test	0.000	0.000	0.000	0.000	0.000

Note: Robust standard errors appear in parentheses. A triple asterisk (***), double asterisk (**), and single asterisk (*) denote that parameters are significant at the 1%, 5%, and 10% levels, respectively. Estimations in all columns include a fixed effect for each year, each exporting and each importing geographic zone. Instruments $\mathbf{Z}_{ij,t-1}$ are the number of retailers in the country of origin, the minimum amount of capital necessary to start a business in the host country, expressed as percentage of income per capita, and the products of these two variables. Instruments $f^{\dagger}(\mathbf{Z}_{ij,t-1})$ and $f^{\ddagger}(\mathbf{Z}_{ij,t-1})$ are the best predictions of retailers' sales with all the model's exogenous variables, using Tobit and Heckman estimators, respectively.

Table A4. Impact that Multinational Retailers' Sales in Foreign Markets Have on Exports from the Retailers' Country of Origin: Different Controls

	Explained variable: $\ln m_{ij,t}$		
	(1)	(2)	(3)
ln retailers' sales	0.22***	0.23***	0.07**
	(0.03)	(0.03)	(0.03)
ln GDP exporter	0.75***	0.77***	0.77***
	(0.03)	(0.04)	(0.04)
ln GDP importer	0.83***	0.92***	0.70***
	(0.02)	(0.04)	(0.05)
ln GDP per cap. exporter		−0.05	
		(0.04)	
ln GDP per cap. importer		−0.15***	
		(0.05)	
ln distance	−1.00***	−0.98***	−0.49***
	(0.04)	(0.04)	(0.08)
contiguity	0.79***	0.78**	0.56**
	(0.16)	(0.16)	(0.22)
colony	0.53***	0.49**	0.21
	(0.17)	(0.17)	(0.18)
RTA	0.33***	0.32***	0.36***
	(0.06)	(0.06)	(0.11)
common language	0.82***	0.83***	0.40***
	(0.09)	(0.09)	(0.14)
importer landlocked	−0.63***	−0.63***	−0.84***
	(0.07)	(0.07)	(0.11)
exporter landlocked	−0.62***	−0.60***	−0.45***
	(0.08)	(0.08)	(0.12)
share population in temperate zones exporter	0.44***	0.47***	
	(0.09)	(0.10)	
share population in temperate zones importer	0.18*	0.26***	
	(0.10)	(0.11)	
ln arable land exporter	0.14***	0.12***	
	(0.02)	(0.03)	
ln arable land importer	−0.14***	−0.20***	
	(0.02)	(0.03)	
ln bilateral flows of migrants			0.31***
			(0.03)
Nb obs.	71580	71548	16863
R^2, centered	0.49	0.49	0.61

Note: The 2SLS estimations with instruments are as follows: the share of "modern" retail household grocery expenditure in the host country, the share of the domestic market of retailers from the country of origin, and the products of these two variables. Robust standard errors appear in parentheses. A triple asterisk (***), double asterisk (**), and single asterisk (*) denote that parameters are significant at the 1%, 5%, and 10% levels, respectively. Estimations in all columns include a fixed effect for each year, each exporting, and each importing geographic zone.

Table A5. Impact that Multinational Retailers' Sales in Foreign Markets Have on Exports from the Retailers' Country of Origin: Different Controls

	Explained variable: $\ln m_{ij,t}$		
	(1)	(2)	(3)
ln retailers' sales	0.40***	0.56***	0.11***
	(0.10)	(0.10)	(0.03)
ln GDP exporter	0.75***	0.77***	0.97***
	(0.05)	(0.04)	(0.02)
ln GDP importer	0.24***	0.64***	0.93***
	(0.07)	−0.02	(0.03)
ln distance	−0.98***	−0.80***	−0.72***
	(0.10)	(0.07)	(0.06)
contiguity	1.33***	0.27	0.45**
	(0.33)	(0.30)	(0.21)
colony	−0.27	0.09	0.85***
	(0.68)	(0.30)	(0.18)
RTA	0.55***	0.44***	0.38***
	(0.14)	(0.06)	(0.09)
common language	0.62***	0.80***	0.82***
	(0.18)	(0.10)	(0.13)
exporter landlocked	−0.14	−0.57***	−0.83***
	(0.20)	(0.08)	(0.09)
importer landlocked	−1.63***	−0.80***	−0.31***
	(0.19)	(0.09)	(0.10)
Nb obs.	4060	54846	8105
R^2, centered	0.35	0.30	0.56
Hansen J statistic	0.35	9.80	2.70
J Hansen p-value	0.84	0.01	0.26
F stat for weak id.	11.14	14.59	48.01
LM test underid.	30.76	42.35	144.49
underid. p-value	0.000	0.000	0.000
ln likelihood	−9613.21	−137321.12	−18386.64
endogeneity test stat	16.97	85.59	20.45
p-value endogeneity test	0.000	0.000	0.000

Note: Robust standard errors appear in parentheses. A triple asterisk (***), double asterisk (**), and single asterisk (*) denote that parameters are significant at the 1%, 5%, and 10% levels, respectively. Estimations in all columns include a fixed effect for each year, each exporting and each importing geographic zone. In column (1), instruments are the share of household with a female head, the share of the domestic market of retailers in the country of origin, and the cross variable of the two. In column (2), instruments are the cost of starting a new business in the host country, the number of retail companies in the country of origin and the cross variable of the two. In column (3), the instruments are the index of regulation in the retail sector of the host country, the share of the domestic market of retailers in the country of origin, and the cross variable of the two.

Table A6. Impact that Multinational Retailers' Sales in Foreign Markets Have on Exports from the Retailers' Country of Origin: Multilateral Remotenesses

	Explained variable: $\ln m_{ij,t}$. 2SLS with instruments:				
	$\mathbf{Z}_{ij,t-1}$ (1)	$f^{\dagger}(\mathbf{Z}_{ij,t-1})$ (2)	$f^{\ddagger}(\mathbf{Z}_{ij,t-1})$ (3)	$\mathbf{Z}_{ij,t-1}$ (4)	$\mathbf{Z}_{ij,t-1}$ (5)
ln retailers' sales	0.31***	0.30***	0.32***	0.29***	0.44***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.06)
ln GDP exporter	0.76***	0.76***	0.78***	0.73***	0.76***
	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)
ln GDP importer	0.76***	0.76***	0.75***	0.77***	0.76***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
ln distance	−0.85***	−0.86***	−0.86***	−0.90***	−0.82***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
contiguity	0.21	0.22	0.21	0.30*	0.20
	(0.16)	(0.16)	(0.17)	(0.16)	(0.18)
colony	0.67***	0.67***	0.66***	0.59***	0.56***
	(0.17)	(0.17)	(0.18)	(0.17)	(0.20)
RTA	0.44***	0.44***	0.46***	0.26***	0.47***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
common language	0.58***	0.58***	0.63***	0.52***	0.66***
	(0.07)	(0.07)	(0.08)	(0.08)	(0.08)
exporter landlocked	−0.68***	−0.68***	−0.69***	−0.64***	−0.68***
	(0.06)	(0.06)	(0.07)	(0.07)	(0.06)
importer landlocked	−0.32***	−0.32***	−0.33***	−0.30***	−0.33***
	(0.07)	(0.07)	(0.08)	(0.08)	(0.08)
ln (1+tariff)				−0.49**	
				(0.22)	
Nb obs.	88564	88564	63276	23800	85900
R^2, centered	0.39	0.39	0.38	0.39	0.34
Hansen J statistic	42.69			29.76	34.32
J Hansen p-value	0.000			0.000	0.000
F stat for weak id.	93.29	281.44	269.00	82.65	49.69
LM test underid.	262.34	261.74	248.53	232.94	141.04
underid. p-value	0.000	0.000	0.000	0.000	0.000
ln likelihood	−212511.37	−212273.33	−154029.46	−56492.60	−208610.67
endogeneity test stat	106.78	87.33	100.30	78.26	99.55
p-value endogeneity test	0.000	0.000	0.000	0.000	0.000

Note: Robust standard errors in parentheses. A triple asterisk (***), double asterisk (**), and single asterisk (*) denote that parameters are significant at the 1%, 5%, and 10% levels, respectively. Estimations in all columns include year fixed effects. Instruments $\mathbf{Z}_{ij,t-1}$ are the share of "modern" retail in the household grocery expenditure in the host country, the share of the domestic market of retailers in the country of origin, and the products of these two variables. Instruments $f^{\dagger}(\mathbf{Z}_{ij,t-1})$ and $f^{\ddagger}(\mathbf{Z}_{ij,t-1})$ are the best predictions of retailers' sales with all the model's exogenous variables, using Tobit and Heckman estimators, respectively. Explanatory variables ln *distance, colony, contiguity*, and $\ln(1+tariff_{ij,t})$ are transformations of original variables as in equation (8).