# How taste proximity affects consumer quality valuation of imported varieties: Evidence from the French food sector*

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**Abstract**

Consumer tastes for food products can differ substantially between countries and represent an important element shaping trade patterns for food products. While previous literature points to different cultural elements as merely trade promoters or barriers, divergences in consumer tastes may also generate differences in the perception of the quality of products. As a consequence, consumer taste in destination countries is likely to affect the demand for imported products in a different manner according to the origin and the quality of products imported. Based on firm-product level data on French exports, this study analyses how differences in taste proximity with French consumers across destination markets affect the export revenues of vertically differentiated varieties. To identify taste proximity, we rely on data gathered from the online travel company TripAdvisor, which reports information on the type of cuisine offered in restaurants all over the world. Assuming that a large presence of restaurants proposing a certain type of cuisine in a country reflects higher proximity in consumption habits, the measure of taste proximity is built on the information on the distribution of restaurants in each country. The results of this study suggest that quality of French products is more strongly appreciated and consumers are more willing to spend on high-quality products in countries with a taste similar to that of French consumers.

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# 1 Introduction

The literature on international trade identifies productivity as the most relevant attribute ensuring a firm's entry into foreign markets. Nonetheless, the economic environment and other characteristics of destination markets appear to be major determinants of firms export sales. As countries that do not share similar cultural features are likely to differ in their appreciation for specific product characteristic, recent literature points to consumer preferences as a significant element which affect trade dynamics between countries (Disdier and Mayer, 2007; Disdier et al., 2010; Guiso et al., 2009). Within this literature, recent studies find that proximity in food consumption habits between countries promote trade exchanges of food products, but that this effect is likely to depend on the characteristics of products exchanged (Jäkel, 2019; Aw-Roberts et al., 2020).[1]

This study focuses on trade dynamics related to food products and analyses whether consumers' valuation of a variety's quality depends on taste proximity to the origin country of the exported variety. Assuming that firms invest in quality in order to increase varieties appeal in the domestic market, consumers in importing countries are more likely to appreciate quality where consumer taste is more similar to the one of the origin country of exports. Hence, this paper aims to assess whether differences in consumer taste for food between trading partners affect the export revenues of food products in a different manner according to the quality of the product exported. We focus on French exports in the food sector which is particularly interesting and informative because, in addition to being one of the major European exporters of food products, France is also widely recognized for its gastronomic culture.

In this study, we propose a theoretical framework to explain the mechanism according to which the demand for high-quality varieties in each destination country depends on the

[1] Some studies show that divergences in tastes for food explain differences in prices between Indian regions (Atkin, 2013) or the composition of the food consumption basket in France, the US and the UK (Dubois et al., 2014).

taste proximity to the consumers of the origin country of exports. Taste proximity enters the consumer utility function as a factor that increases the perception of the quality of imported varieties. The mechanism at stake is then captured by analyzing the correlation between export sales and prices in each destination. We then implement an empirical analysis of the export sales of French firms to assess whether taste proximity to French consumers in destination countries affects the export revenues according to the quality of the varieties exported. The analysis is conducted using firm-product level data on exports for French firms in the food sector. To identify taste proximity between countries, we rely on data gathered from the online travel company TripAdvisor, which reports information about the type of cuisine offered in restaurants all over the world. We build a database that describes the distribution of restaurants in each country according to the type of cuisine offered and the origin country of that cuisine. Our database includes 2 395 518 restaurants reported in 107 countries. Assuming that the strong presence of restaurants offering culinary specialties from a specific country is determined by consumer appreciation for this type of cuisine, we derive a measure of taste proximity between countries from the information on the cuisine distribution across restaurants. The measure of taste proximity is derived using a control function approach in a gravity model in which we embed a set of variables derived from the cuisine distribution in each country. Hence, in our formulation, taste proximity corresponds to an unobserved affinity in taste for food products between consumers that promotes trade. Once the measure of taste proximity has been obtained, we analyze whether it explains the variation in export revenues for different qualities of exported varieties across destination markets. Our results show that, in general, firms earning larger revenues sell products at lower prices. Nonetheless, taste proximity positively affects the export volume of varieties sold at higher prices. Overall, our findings indicate that French firms selling high-quality products perform better in countries where food preferences are closer to those of French consumers relative to other destination countries.

The contribution of this study is twofold. First, we propose a new innovative way to derive an estimation of taste proximity between countries using data on cuisine distribution.[2] Other studies which derive a measure of taste proximity include the works of Kohler and Wunderlich (2022) which rely on information on the ingredients used in the national dishes and of Jäkel (2019) who restricts the analysis to the confectionery sector and use Euromonitor's passport database on the ingredients of chocolate and confectionery sold in different countries. Second, our study provides new insights on the impact of consumers' attitudes on the demand for imported products. Several studies investigate bilateral affinity as an element that influences the preferences of consumers and represents a source of trade promotion. As illustrative examples, the paper of Guiso et al. (2009) examines the role of trust in citizens of other countries, Disdier and Mayer (2007) focus on the proximity in public opinions, and Disdier et al. (2010) analyze cultural proximity, measured as the bilateral trade in cultural goods. With respect to these studies, we go beyond the consideration of taste proximity as a factor that merely promotes trade between countries and analyze its impact on the sales of products according to their quality.

This study contributes to the broad literature on the determinants of the export dynamics of products differentiated by quality. When looking at these determinants from the demand side, the Linder Hypothesis and the Alchian-Allen effect represent the most recurrent conjectures investigated in the literature. The Linder (1961) hypothesis predicts that a higher level of income implies a higher valuation of quality, and consumers in wealthy countries have a higher propensity to spend on quality. The study of Hallak (2006) is one of the first to observe that the level of income of export destinations is positively related to the unit value of exported products. More recent studies conducted at the firm level corroborate its findings (Bastos and Silva, 2010; Bastos et al., 2018; Görg et al., 2017; Johnson, 2012). The Alchian and Allen (1964) effect, instead, stipu-

[2] The use of information gathered from the TripAdvisor website is not novel in the economic literature. Waldfogel (2019) consider food prepared at restaurants as a cultural good and use TripAdvisor data on restaurants to analyze trade patterns in global cuisines.

lates that because of per-unit trade costs, the relative demand for higher-quality goods is stronger in more distant destinations. Empirical proofs of the Alchian-Allen effect include Hummels and Skiba (2004), Martin (2012), Martin and Mayneris (2015) and Emlinger and Lamani (2020). Other studies find that the scope of product differentiation and the market size of the destination country affect the volume of sales and the selection into the export of varieties according to their quality (Baldwin and Harrigan, 2011; Kneller and Yu, 2016; Manova and Yu, 2017). From the supply side, several empirical studies identify quality as a major determinant of firm export status and report that quality allows exporters to charge higher prices than non-exporters (Hallak and Sivadasan, 2013; Iacovone and Smarzynska Javorcik, 2012; Kugler and Verhoogen, 2012).[3] Similarly, the studies of Manova and Zhang (2012) and Minondo (2020) focus on variations between exporting firms and observe that firms that charge higher export prices earn larger revenues.

The remainder of this study is organized as follows: Section 2 illustrates the theoretical framework; Section 3 describes the data used; Section 4 explains the methodology used for the estimation of taste proximity; Section 5 presents the empirical model and the results; and Section 6 concludes the study.

## 2 Theoretical framework

In this theoretical framework, we introduce the quality valuation mechanism whereby consumer propensity to spend on quality is positively related to consumer taste proximity to the origin country of the imported varieties. We then explain how this mechanism affects the export revenues of varieties in a different manner according to the quality of the varieties exported. Because product quality is often unobserved in international trade, we define how this quality valuation mechanism affects the correlation between export prices and export revenues in order to deliver an empirically testable prediction. We obtain a

[3] With the exception of Jäkel and Sørensen (2020), which instead finds that, for the case of Danish manufacturing firms, cheaper varieties have a higher probability of being exported.

general framework in which the relationship between export prices and export revenues in each destination market is determined by product-specific characteristics, which determine the correlation between a variety's price and quality, and by taste proximity, which determines the consumer propensity to spend on quality. The model we propose is related to the theoretical framework in Manova and Yu (2017), in which the authors distinguish between two environments: a *quality sorting* environment where higher-quality varieties are sold at higher prices and acquire larger market shares because of consumers' willingness to spend on quality, and an *efficiency sorting* environment where higher-quality varieties are sold at lower prices and have larger market shares because of price competition. As a result, high-quality varieties have always larger market shares while the sorting environment depends on the degree of product differentiation. Conversely, in our theoretical framework, the sorting environment also depends on taste proximity, which is destination-specific, while a negative correlation between export prices and export revenues does not necessarily imply that higher quality is associated with lower export prices, but it could be due to weak taste proximity, which reduces the consumer propensity to spend on more expensive high-quality varieties.

## 2.1 Setup

Our conceptual framework is presented with reduced assumptions about the underlying production technology and demand structure. Firms $f$ produce vertically and horizontally differentiated products $h$ and export to different destinations $j$. Each destination differs from the others in the proximity of consumer taste with respect to the exporting country. As firms can belong to different exporting countries, the indexation for exporters $i$ is disregarded when the indexation for firms $f$ is used. We assume that each firm produces only one type (quality) of product. Therefore, each variety is identified by the firm-product combination $fh$. The utility of consumers in country $j$ increases with product quantity, product quality, and the number of available varieties. The demand for a variety $x_{fhj} = x(\underset{-}{\frac{p_{fhj}}{\lambda_{fhj}}}, \underset{+}{P_{jh}}, \underset{+}{E_{jh}})$ is decreasing in quality-adjusted prices $\frac{p_{fhj}}{\lambda_{fhj}}$ and increasing in aggregate demand $E_{jh}$ and a quality-adjusted price index $P_{jh}$. The demand function is assumed to be isoelastic, which makes its implicit form adaptable to different standard frameworks, such as CES or Cobb-Douglas. The parameter $\lambda_{fhj} = \theta_{fh}^{\beta_{ij}}$ represents the quality of variety $fh$ as perceived by consumers in country $j$. It is a function of the intrinsic quality of this variety, $\theta_{fh}$, and of the taste proximity between origin country $i$ and destination $j$, $\beta_{ij} > 0$.[4] Taste proximity enters the demand function as a factor that increases consumer preference for quality. This specification implies that consumers have a higher preference for quality for varieties imported from countries for which they exhibit high taste proximity. In contrast, for imported varieties from countries with low taste proximity, consumers tend to value quality less and be more sensitive to price.

Firms are assumed to be heterogeneous in efficiency $A_{fh}$. The unit cost of production is independent of the quantity produced. The marginal cost is, therefore, constant and corresponds to $c_{fh} = \frac{\omega_{fh}}{A_{fh}}$, where $\omega_{fh}$ represents the price index of production factors and is a function of the cost of inputs and labor used for the production of variety $fh$. As the production of higher-quality products requires hiring skilled labor, which is costly, and the use of high-quality inputs, which are more expensive (Bastos and Silva, 2010; Verhoogen, 2008), we assume that the price index of production factors depends on the intrinsic quality of the variety $\omega_{fh}(\underset{+}{\theta_{fh}})$. Following Kugler and Verhoogen (2012), we assume that most productive firms endogenously choose to produce high-quality products $\theta_{fh}(\underset{+}{A_{fh}})$. Such a complementarity between efficiency and quality could be attributed to the need to ensure quality control when processing more sophisticated intermediates. We assume iceberg trade costs to export $\tau_{ijh} > 1$. Firms maximize their profits independently of each destination. The profit maximization problem defines the optimal price:

[4] This specification recalls the demand system developed in Hallak (2006), where $\beta_{ij}$ is instead a function of the level of income of the destination country.

$$p_{fhj} = \frac{\eta_{x,p}}{\eta_{x,p} - 1} * \frac{\omega_{fh}}{A_{fh}} * \tau_{ijh} \ ,$$

where $\eta_{x,p}$ corresponds to the price elasticity of demand and the term $\frac{\eta_{x,p}}{\eta_{x,p}-1}$ represents the markup over the marginal cost.[5]

## 2.2 Implications for the price of varieties

As a preamble to the analysis of the interaction between the price of a variety and its intensive margin, we analyze the behavior of prices with respect to firm efficiency and the cost of inputs. Efficiency $A_{fh}$ has a twofold effect on prices. First, there is a *direct effect* that decreases the cost of production, as efficiency reflects a firm's capability to produce output using few variable inputs. Second, we have an *indirect quality effect* that increases the marginal costs because more efficient firms use higher-quality inputs. We compute the derivative of the export price with respect to efficiency to delineate the elements conditioning the relationship between efficiency and price:

$$\mathrm{d}\ln p_{fhj} = (-1 + \eta_{\omega,\theta} \times \eta_{\theta,A})\, \mathrm{d}\ln A_{fh} \tag{1}$$

Equation (1) indicates that the effect of efficiency on output prices depends on two parameters: $\eta_{w,\theta} \equiv \frac{\partial w_{fh}}{\partial \theta_{fh}} \frac{\theta_{fh}}{w_{fh}} > 0$, which corresponds to the elasticity of input prices to the quality of output and indicates the cost of producing the quality of variety $fh$, and $\eta_{\theta,A} \equiv \frac{\partial \theta_{fh}}{\partial A_{fh}} \frac{A_{fh}}{\theta_{fh}} > 0$, which corresponds to the elasticity of output quality to efficiency and indicates the actual incentive of most efficient firms to invest in quality. The term $\eta_{\omega,\theta} \times \eta_{\theta,A}$ determines the sign of the correlation and can be interpreted as the sensitivity of production costs to firm efficiency. Replacing the derivative of the cost of inputs over efficiency $\mathrm{d}\ln \omega_{fh} = (\eta_{\omega,\theta} \times \eta_{\theta,A})\, \mathrm{d}\ln A_{fh}$ in Equation (1), we obtain the following relationships:

[5] In monopolistic competition, $\eta_{x,p}$ depends on the elasticity of substitution between varieties; in the case of oligopolistic competition, $\eta_{x,p}$ depends on the elasticity of substitution between varieties and the variety's market share.

$$\mathrm{d}\ln p_{fhj} = \left( \frac{\eta_{\omega,\theta} \times \eta_{\theta,A} - 1}{\eta_{w,\theta} \times \eta_{\theta,A}} \right) \mathrm{d}\ln \omega_{fh} \tag{2}$$

$$\mathrm{d}\ln p_{fhj} = \left( \frac{\eta_{\omega,\theta} \times \eta_{\theta,A} - 1}{\eta_{\theta,A}} \right) \mathrm{d}\ln \theta_{fh} \tag{3}$$

As in the case of Equation (1), the term $\eta_{\omega,\theta} \times \eta_{\theta,A}$ determines the sign of the correlation between input costs and export prices and between intrinsic quality and export prices. Based on how the export price varies with respect to efficiency and input costs, we can distinguish two situations:

- When $\eta_{\omega,\theta} \times \eta_{\theta,A} > 1$. This means that the indirect quality effect prevails over the direct effect of efficiency on prices. This condition reflects a situation in which, although high-quality products are produced by most efficient firms, the costs of high-quality inputs outweigh the benefits of efficiency for costs. As a consequence, the export price reflects the cost of producing quality.

- When $\eta_{\omega,\theta} \times \eta_{\theta,A} < 1$. This indicates that prices decrease with efficiency because of the direct effect of efficiency. In this case, highly efficient firms produce high-quality products, and because of these firms' capacity to reduce the overall costs of production, high-quality products are produced at lower prices. In this case, the cost of producing quality and the output price are negatively correlated.

The two situations presented above recall in part the distinction made by Manova and Yu (2017) between the quality sorting environment, where export prices are positively correlated with quality and efficiency, and the efficiency sorting environment, where export prices decrease with quality and efficiency. Manova and Yu (2017) assume no differences in the demand for imported varieties across importers, obtaining the result that high-quality varieties gain larger market shares in each destination. The introduction of taste proximity as a factor that shapes consumers' valuation of quality means that the sorting environments also depend on demand characteristics.

## 2.3 Export prices and firm revenues

In this section, we provide an understanding of the impact of taste proximity $\beta_{ij}$ on the intensive margin via the quality valuation mechanism. The derivative of sales with respect to the intrinsic quality of variety $\theta_{fh}$ is equal to:

$$\mathrm{d}\ln x_{fhj} = -\eta_{x,p}\left(\beta_{ij} - \eta_{\omega,\theta}\right)\mathrm{d}\ln\theta_{fh} \ , \tag{4}$$

where the price elasticity $\eta_{x,p}$ is negative. Equation (4) indicates that the relationship between quality and sales depends positively on taste proximity $\beta_{ij}$, which increases the quality valuation of varieties exported by country $i$, and negatively on the cost of producing quality $\eta_{\omega,\theta}$, which is product specific. The term $(\beta_{ij} - \eta_{\omega,\theta})$ can be interpreted as the destination-specific return to product quality. Equation (4) ideally represents the empirical model we refer to when we estimate the impact of taste on consumers' valuation of quality (Section 5). Nonetheless, except for a few studies in international trade that use direct measures of product quality,[6] information about product quality is generally unavailable, which makes Equation (4) empirically difficult to estimate. For this reason, we rely on Equation (3), which defines the determinants of the relationship between quality and output prices, and examine the impact of taste proximity on the demand for quality by analyzing the correlation between export revenues and prices. We derive the volume of sales with respect to export prices and obtain:

$$\mathrm{d}\ln x_{fhj} = -\eta_{x,p}\left[-1 + \frac{\overbrace{\beta_{ij}\times\eta_{\theta,A}}^{\text{sensitivity of quality perceived to efficiency}}}{\underbrace{\eta_{w,\theta}\times\eta_{\theta,A}}_{\text{sensitivity of production costs to efficiency}} - 1}\right]\mathrm{d}\ln p_{fhj} \tag{5}$$

Equation (5) indicates that the sign and extent of the relationship between sales and prices depend on the sensitivity of production costs to efficiency $\eta_{w,\theta}\times\eta_{\theta,A}$ and on the term $\beta_{ij}\times\eta_{\theta,A}$, which can be interpreted as the sensitivity of the quality perceived in

[6] The works of Crozet et al. (2012), Chen and Juvenal (2016) and Emlinger and Lamani (2020) propose an analysis of exports for a limited range of products for which they have direct information on quality.

the destination country to firm efficiency. From the previous analysis, we know that when $\eta_{w,\theta} \times \eta_{\theta,A} < 1$, the quality of products decreases with export prices. In this case, independent of the value of $\beta_{ij}$, the coefficient of $\mathrm{d}\ln p_{fhj}$ is always negative, which implies a negative correlation between intensive margins and prices. Higher values of taste proximity amplify the negative correlation between the variety's export value and its export price. On the other hand, when $\eta_{w,\theta} \times \eta_{\theta,A} > 1$ and prices reflect the quality of varieties, the type of relationship between sales and prices is determined by both the sensitivity of production costs to efficiency and the interaction between taste proximity and the elasticity of the intrinsic quality to firm efficiency. In this case, taste proximity increases the valuation of quality and, therefore, the propensity to spend on expensive varieties. Note that in this case, the correlation between export prices and sales can be positive in countries with high taste proximity and negative elsewhere. A negative coefficient of $\mathrm{d}\ln p_{fhj}$ implies that lower-quality varieties have higher export revenues because taste proximity is not high enough to make high-quality varieties attractive to the importing market. Whatever the correlation between export prices and quality, our theoretical framework assumes that taste proximity augments the valuation of quality and, as a consequence, increases the export revenues of high-quality varieties. In contrast, the effect of taste proximity on prices depends on the sensitivity of production costs to efficiency and can be negative when high-quality varieties are exported at lower prices.

# 3 Data

## 3.1 Data on trade

Our empirical analysis focuses on French exporters of food products. Data on the foreign trade of French firms come from French customs. Customs reports the monetary value and the volume (in physical weight) of export and import trade flows for each firm at the 8-digit level of the Combined Nomenclature (CN8). Firms are identified according to their SIREN number, and for each export (import) flow, French customs reports the destination (origin) country. Since the objective of our analysis is to estimate the impact of consumer tastes on trade in food products, we restrict the analysis to consumer products related to the food sector.[7] We distinguish consumer products from intermediary products using the BEC classification.[8] Observations with missing quantity are dropped, as are observations with a value below 1 000 euros. We obtain in this way a database on the trade flows of 51 380 exporting firms and 2 586 traded food products for a period that spans from 2000 to 2014.

Data on country-level trade flows are from BACI, a detailed international trade database provided by CEPII that covers a large number of countries and more than 5000 products expressed in terms of the Harmonized System (HS) classification revision 1996 at the 6-digit level (Gaulier and Zignago, 2010). Concordance between CN8 and HS6 nomenclature is obtained following the methodology proposed by Van Beveren et al. (2012). Data on GDP and population have been obtained from the World Bank's database WDI available as open data,[9] while standard gravity variables have been taken from the Gravity dataset provided by CEPII.[10] For tariffs, we use the TRAINS database provided by the World Integrated Trade Solution (WITS) software of the World Bank.[11] Annual tariffs are reported at the HS 6-digit level for each bilateral trade relationship between countries for the period 2000-2016.[12] Data on the stock of migrants are taken from the United Nations, Department of Economic and Social Affairs (2020). [13] Data on migrants are reported every 5 years and are available between 1990 and 2018. We used linear interpolation to obtain annual data on migration.

[7] The food sector corresponds to HS2 chapters 1 to 24

[8] Broad Economic Categories; see the document published by the Department of Economic and Social Affairs of the UN: United Nations (2018)

[9] Source: https://data.worldbank.org/

[10] Source: http://www.cepii.fr/CEPII/en/bdd_modele/bdd_modele.asp

[11] Source: https://wits.worldbank.org/

[12] The TRAINS database provides three types of tariffs at the 6-digit level for each bilateral relation: most favored nation (MFN) tariffs, which are what countries promise to impose on imports from other members of the WTO, bound tariffs (BND), which correspond to the bound tariff-specific commitments made by individual WTO member governments, and effectively applied (AHS) tariffs assessed by the WITS-TRAINS database developers as the level of tariffs actually applied. In this study, we use effectively applied (AHS) tariffs.

[13] Trends in International Migrant Stock: Migrants by Destination and Origin (United Nations database, POP/DB/MIG/Stock/Rev.2015)

### 3.2 Data on restaurants

To obtain a measure of taste proximity between two countries, we use data on the country-level distribution of restaurants offering the cuisine of the trading partner. We assume, therefore, that consumers' appreciation for a cuisine is directly related to the distribution of restaurants offering that cuisine. To obtain the number of restaurants and the types of cuisine offered in each country, we rely on data gathered from the online travel company TripAdvisor, which reports information on restaurants, hotels, and attractions in cities around the world. On TripAdvisor, restaurant owners or managers fill out information about their restaurants and report the price range, the type of cuisine and the special diets available, while clients are able to rate the restaurant and provide comments. The website is popular worldwide and attracts approximately 350 million visitors per month. We collect information on restaurant cuisine through a web-scraping technique on the top 100 cities in a panel of 107 destination countries. For each type of cuisine, we obtain the distribution of restaurants that offer it in each country. By collecting data on so many cities, we include not only the most prominent tourist destinations and most cosmopolitan areas but also a much larger range of metropolitan areas. With such broad coverage, we argue that the effect of tourism on the distribution of the type of cuisine across restaurants is negligible. The advantage of using the data collected from TripAdvisor is that the website maintains lists of restaurants classified into 183 different cuisine categories, most of which can be identified with particular origin countries.[14] Overall, the data gathered from TripAdvisor cover a total of 2 395 518 restaurants.

From the data on restaurants, our aim is to obtain the distribution of the type of cuisine in each country. Many restaurants do not necessarily offer dishes from a foreign country. Since we are interested in measuring taste proximity between countries, in this analysis, we consider only the restaurants listing at least one cuisine that can be associated with a foreign country. Our sample is therefore reduced to 1 190 742 restaurants

[14]Further details on the association of each type of cuisine with the corresponding origin country can be found in Appendix A.

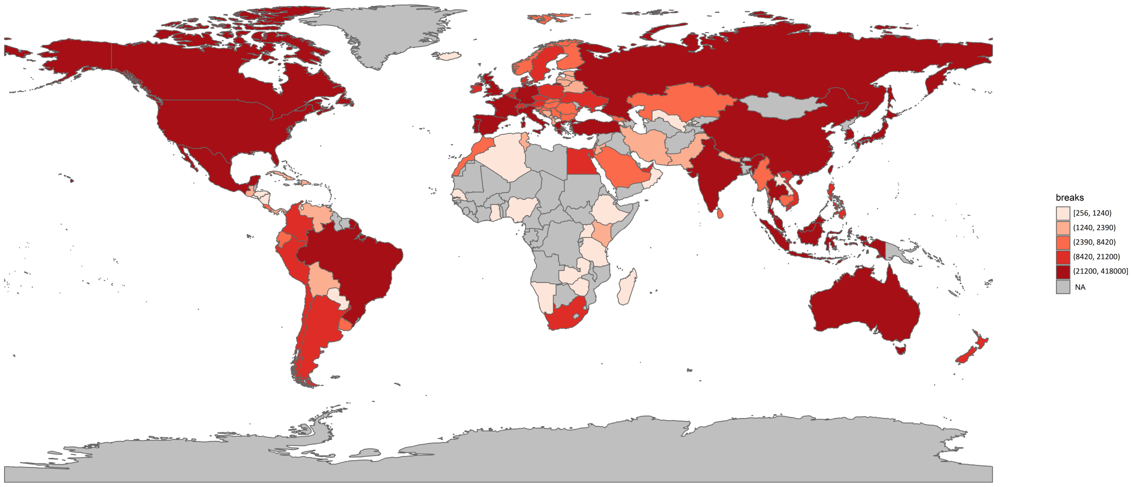


Figure 1: The number of restaurants in the first 100 cities for each country
Source: Computations by author using data from TripAdvisor.

around the world. Because restaurants can report more than one cuisine type, the sum of the number of restaurants offering each cuisine does not equal the total number of restaurants. If each restaurant had only one cuisine, then the number of listings for a particular cuisine would provide a direct measure of the number of restaurants offering that cuisine. Because restaurants can list multiple cuisines, estimating each cuisine's share of restaurants in a country requires the use of a system of weights. When a restaurant reports multiple types of cuisine, we attribute equal shares to the different types listed. An example will provide some insights into the procedure. If a restaurant lists only one type of cuisine, let us suppose Japanese, it will count as one Japanese cuisine. If a restaurant lists Chinese and Japanese cuisine, it will count as 0.5 Japanese cuisine and 0.5 Chinese cuisine. We derive in this way $n_j^i$, which corresponds to the number of restaurants in country $j$ offering a cuisine from country $i$.

The use of data gathered from TripAdvisor may not provide a consistent perspective of the actual distribution of restaurants in a country. Concerns can arise especially in less developed countries where the total number of reported restaurants is small and

TripAdvisor is mainly used by tourists. In these cases, our measure of cuisine distribution does not always represent a sound indicator of consumer taste. For this reason, we consider only countries for which we have information on at least 1000 restaurants offering a cuisine from a foreign country. This choice led us to limit the analysis to 55 countries.

# 4 Estimation of taste proximity

In this section, we explain the methodology we implement to measure consumer taste proximity for food products of a specific origin country. We use a control function approach in a gravity model where we embed variables on country-level cuisines distribution as proxies for taste proximity. Gravity models have long been used to estimate the impact of trade barriers and cultural proximity on trade flows between countries. As outlined by Head and Mayer (2013), consumer proximity in taste for food is one of the forces that promote trade in food products between two countries. The rationale behind the use of a control function approach is that it allows us to tease out the part of the residual of the gravity equation that captures unobserved taste proximity. We estimate the gravity equation using data on country-level trade flows of food products on the 55 countries for which information about the restaurant distribution is available. Since we use data on trade at the country level, a country is treated as a representative consumer, which might conceal within-country heterogeneity across consumers. In this way, the measure of taste proximity we obtain captures the average appreciation of consumers in importing country $j$ for food products from origin country $i$. Based on the information on the country-level cuisines distribution, $n_j^i$, obtained in the previous section, we derive two variables that can be used as proxies for taste proximity. Then, we define the form of the control function for consumer taste proximity, which includes these proxies. Finally, the control function is embedded in the gravity equation and estimated jointly with other parameters. The variables used as proxies for taste proximity are as follows:

1. A measure of cuisine popularity in a given country relative to the average popu-

larity of that cuisine across all destinations. This measure is derived as the log of the share of restaurants offering a cuisine from country $i$ in destination country $j$ over the average share of restaurants offering a cuisine from $i$ across all countries: $\text{popularity}_{ij} = \ln \frac{s_{ij}}{\bar{s}_i}$. The variable $s_{ij} = \frac{n_j^i}{\sum_{i \neq j} n_j^i}$ corresponds to the share of cuisine from country $i$ over the total of foreign cuisines in country $j$, while $\bar{s}_i$ corresponds to the simple average of $s_{ij}$ across all countries. The measure of cuisine popularity represents an indicator of relative consumer appreciation of food products exported from the reference country of the cuisine. As a result, a high degree of appreciation for a type of cuisine is associated with a high taste proximity to the origin country of that cuisine. We divide the share of cuisine $s_{ij}$ by the average share $\bar{s}_i$ because few origin countries have very popular cuisines spread across all destination countries, and the cuisines of the rest of the countries are much less represented worldwide.[15]

2. An index of similarity in the distribution of the type of foreign cuisines offered by two countries. To measure similarity, we compare the distribution of the different types of foreign cuisine in countries $i$ and $j$ excluding the cuisines associated with the two countries. For this purpose, we use the Finger-Kreinin (FK) index, which measures the similarity between two countries $i$ and $j$ as $\text{FK}_{ij} = 1 - \frac{1}{2} \sum_{l \neq i,j} |s_{lj} - s_{li}|$. The FK index compares the shares of each type of cuisine in each country and takes values between zero and one. A high value of the FK index indicates a high degree of similarity in the distribution of the types of cuisine in the two countries.

Once the measure of popularity and the FK index are obtained, we embed the two proxies for consumer taste into a gravity model:

$$x_{ihjt} = \exp[\gamma_0 + \mathbf{X'}\gamma_1 + \ln taste_{ij}(\mathbf{Y'}) + FE_{iht} + FE_{jht}] * \epsilon_{ijht} \ , \qquad (6)$$

where $\mathbf{Y'}$ represents the vector of variables used as proxy for taste, $FE_{iht}$ and $FE_{jht}$ are product-specific time-varying exporter and importer fixed effects, and $\mathbf{X'}$ is a vector

[15] Appendix B reports in detail the average share of cuisines around the world by origin country.

of gravity variables, which includes distance and ad valorem tariffs,[16] the bilateral stock of migrants, a "Linder term" of income dissimilarity, contiguity, common official language, common currency, common colonial past, common religion and the presence of free trade agreements. While many of the gravity variables used here are commonly used in the estimation of gravity equations, we highlight the importance of controlling for the presence of migrants and income dissimilarities. Several studies indicate that migrants impact trade through two main channels (Felbermayr et al., 2015; Steingress, 2018). First, migrants bring with them the preference for products from their origin country and are likely to spread their preferences within the local population. Second, the presence of migrants reduces transaction costs, as it mitigates incomplete information on origin markets. Controlling for the presence of migrants is, therefore, critical. Their presence is likely to be correlated with taste proximity but also with other elements affecting trade. In the same way, similarities in the level of income could also be correlated with taste proximity and represent an essential element for which we need to control. We control for income dissimilarities through the so-called Linder term, which is equal to $\left|\ln \text{gdp/cap}_{it} - \ln \text{gdp/cap}_{jt}\right|$. The gravity Equation (6) is estimated using the PPML regressor. We replace the unobservable $\ln \text{taste}_{ij}(\mathbf{Y'})$ with the two proxies, $\text{popularity}_{ij}$ and $\text{FK}_{ij}$. We use a polynomial function of order one to estimate the coefficients, which are then used to predict a measure of taste proximity:

$$\ln \text{taste}_{ij} = \hat{\alpha}_1 \text{popularity}_{ij} + \hat{\alpha}_2 \text{FK}_{ij} \tag{7}$$

Table 1 reports the coefficients of the proxy variables when included in the gravity estimation. In Columns (1) and (2), the two proxies are embedded separately, while in Column (3), they are embedded jointly. We observe that in all three specifications, the coefficients of the popularity index and the FK index are always significant and positive. The estimated parameters of all the other gravity variables are in line with the literature.

[16] To deal with zero duties, we take $\text{tariff}_{ijht} = \ln(1 + adv_{ijht})$ as in Emlinger and Lamani (2020)

Table 1: Gravity estimation with country-level data

| | Explained variable: $x_{ijht}$ | | |
|---|---|---|---|
| | **(1)** | **(2)** | **(3)** |
| popularity$_j$ | 0.069*** | | 0.067*** |
| | (0.003) | | (0.003) |
| FK index$_{ij}$ | | 0.745*** | 0.648*** |
| | | (0.058) | (0.058) |
| ln distance$_{ij}$ | -0.778*** | -0.763*** | -0.757*** |
| | (0.008) | (0.008) | (0.008) |
| tariff$_{ijht}$ | -1.004*** | -1.014*** | -1.012*** |
| | (0.052) | (0.051) | (0.051) |
| ln immigrants$_{ijt}$ | 0.085*** | 0.113*** | 0.083*** |
| | (0.004) | (0.004) | (0.004) |
| ln emigrants$_{ijt}$ | 0.063*** | 0.060*** | 0.058*** |
| | (0.004) | (0.004) | (0.004) |
| linder$_{ijt}$ | -0.222*** | -0.197*** | -0.209*** |
| | (0.007) | (0.007) | (0.007) |
| FTA$_{ijt}$ | 0.245*** | 0.198*** | 0.248*** |
| | (0.015) | (0.015) | (0.015) |
| contiguity$_{ij}$ | 0.397*** | 0.387*** | 0.393*** |
| | (0.008) | (0.008) | (0.008) |
| language$_{ijt}$ | 0.186*** | 0.181*** | 0.148*** |
| | (0.010) | (0.011) | (0.011) |
| colony$_{ijt}$ | 0.193*** | 0.149*** | 0.185*** |
| | (0.011) | (0.011) | (0.011) |
| currency$_{ijt}$ | 0.196*** | 0.196*** | 0.190*** |
| | (0.011) | (0.011) | (0.011) |
| religion$_{ijt}$ | 0.227*** | 0.170*** | 0.237*** |
| | (0.017) | (0.016) | (0.017) |
| Constant | 14.312*** | 13.466*** | 13.776*** |
| | (0.084) | (0.094) | (0.095) |
| FE exporter-prod-year | Yes | Yes | Yes |
| FE importer-prod-year | Yes | Yes | Yes |
| Observations | 2,003,031 | 2,072,505 | 2,003,031 |

Significance levels: ***0.01 **0.05 *0.10. Dependent variable is product level bilateral exports. Estimation method: PPML.

In Table 2, we report the values of the two proxies, popularity and the FK index, and the resulting estimate of taste proximity with respect to French cuisine. We observe that taste proximity is correlated with distance and that countries that share a common land border with France exhibit a higher taste proximity. Nonetheless, consumer taste proximity is not explained by geographical distance alone. Some countries have a relatively high taste proximity, although they are located far from France, such as Israel and Thailand.

Table 2: Proxies and estimate for taste proximity with France

| Country | Popularity$_{FR,j}$ | FK index$_{FR,j}$ | ln taste$_{FR,j}$ | Country | Popularity$_{FR,j}$ | FK index$_{FR,j}$ | ln taste$_{FR,j}$ |
|---|---|---|---|---|---|---|---|
| Belgium | 1.600 | 0.787 | 1.180 | Rep. of Korea | -0.443 | 0.691 | 0.629 |
| Switzerland | 1.100 | 0.765 | 0.949 | Canada | -0.387 | 0.685 | 0.628 |
| Netherlands | 0.752 | 0.794 | 0.875 | Brazil | -0.572 | 0.723 | 0.628 |
| Denmark | 0.503 | 0.827 | 0.850 | Argentina | -0.166 | 0.648 | 0.617 |
| Czech Rep. | 0.222 | 0.794 | 0.779 | Australia | -0.950 | 0.704 | 0.611 |
| Israel | 0.168 | 0.771 | 0.753 | Ireland | -0.381 | 0.657 | 0.606 |
| Germany | -0.686 | 0.827 | 0.723 | Russia | -0.633 | 0.677 | 0.605 |
| Italy | -0.598 | 0.815 | 0.714 | USA | -0.749 | 0.671 | 0.594 |
| Norway | -0.202 | 0.764 | 0.707 | Kazakhstan | -1.030 | 0.684 | 0.591 |
| Portugal | -0.208 | 0.763 | 0.706 | United Kingdom | -0.657 | 0.661 | 0.591 |
| Spain | -0.760 | 0.809 | 0.705 | Japan | -0.679 | 0.626 | 0.588 |
| Poland | -0.669 | 0.794 | 0.698 | Colombia | -0.148 | 0.586 | 0.569 |
| Sweden | -0.132 | 0.736 | 0.691 | New Zealand | -0.748 | 0.624 | 0.556 |
| Thailand | 0.190 | 0.690 | 0.691 | Chile | -0.486 | 0.599 | 0.551 |
| Finland | -0.453 | 0.766 | 0.689 | Costa Rica | -0.303 | 0.568 | 0.541 |
| Peru | -0.322 | 0.751 | 0.687 | Philippines | -0.672 | 0.592 | 0.534 |
| Egypt | -0.130 | 0.728 | 0.685 | Indonesia | -0.791 | 0.589 | 0.525 |
| Vietnam | 0.444 | 0.633 | 0.684 | China | -0.191 | 0.537 | 0.524 |
| Hungary | -0.137 | 0.727 | 0.683 | Singapore | -0.545 | 0.561 | 0.517 |
| Ukraine | 0.246 | 0.671 | 0.683 | Ecuador | -0.149 | 0.515 | 0.511 |
| Turkey | 0.134 | 0.678 | 0.673 | Croatia | -0.987 | 0.578 | 0.508 |
| Dominican Rep. | 0.272 | 0.650 | 0.670 | Sri Lanka | -0.739 | 0.528 | 0.479 |
| Mexico | 0.054 | 0.678 | 0.664 | Malaysia | -1.052 | 0.517 | 0.456 |
| Austria | -1.070 | 0.765 | 0.656 | Slovenia | -1.725 | 0.487 | 0.413 |
| Romania | 0.302 | 0.619 | 0.649 | India | -1.356 | 0.429 | 0.375 |
| Greece | -0.364 | 0.685 | 0.634 | Georgia | -1.557 | 0.426 | 0.367 |

Source: Computation by authors based on data from TripAdvisor.

# 5 Empirical analysis

The empirical analysis we present aims to assess how taste proximity affects the valuation of product quality and consequently the export revenues of high-quality products. The theoretical framework presented in Section 2, and in particular the findings reported in Equation (5), delivers a testable prediction that makes it possible to empirically examine this effect through an analysis of the correlation between export prices and sales.

## 5.1 Empirical model

Our empirical model has the purpose to examine whether, within a given product category, the correlation between price and revenue across firms depends on the taste proximity of importing countries with respect to France. As French customs data do not report the prices of the exported varieties, we instead use the unit values computed as the ratio of export value to weight. To test our main hypothesis, we regress the log of export sales on the log of unit values for a variety $fh$ exported to destination $j$ at year $t$. To capture the effect of taste proximity on the relationship between sales and prices, we add the variable $\ln \text{taste}_{FR,j}$ obtained in the previous section, interacted with the log of sales:

$$\ln \text{sales}_{fhjt} = \delta_0 + \delta_1 \ln \text{uv}_{fhjt} + \delta_2 (\ln \text{uv}_{fhjt} * \ln \text{taste}_{FR,j}) + \mathbf{Z'}\delta_3 + \varphi_{jt} + \varphi_{ht} + \epsilon_{fhjt} \quad (8)$$

Parameters $\varphi_{jt}$ and $\varphi_{ht}$ correspond to destination-year and product-year fixed effects. $\varphi_{jt}$ controls for time-varying importer-specific characteristics that may explain the variation of sales at a given destination, such as the level of income, population size, or any other demand shock. Moreover, since the analysis is based on exporting firms located in France, $\varphi_{jt}$ allows us to control for all bilateral characteristics between France and the importing country, such as distance, transportation costs, or the presence of free trade agreements. $\varphi_{ht}$ instead controls for the yearly average unit value at which a product is exported by France, as well as for changes in worldwide conditions in the market for this product. **Z'** corresponds to a vector of control variables and includes the product scope within a firm, measured as the total number of products exported by a firm to a destination, and the Herfindal index, measured as $\text{HHI}_{jht} = \sum_n^N s^2_{fhjt}$, where $s_{fhjt}$ is the market share of firm $f$ in the market and $N$ is the number of firms. The rationale behind the use of the $\text{HHI}_{jht}$ is to control for the degree of competition in a market, which could influence the relationship between prices and sales. The product scope within a firm instead is often used in literature to measure the number of exported products outside the firm's core competencies. The coefficients of interest are the sum $\hat{\delta}_1 + \hat{\delta}_2 \ln \text{taste}_{FR,j}$, which determines the sign and the extent of correlation between sales and export prices, and $\delta_2$, which determines how taste proximity affects this correlation. A positive value of $\hat{\delta}_1 + \hat{\delta}_2 \ln \text{taste}_{FR,j}$ indicates that the intensive margin of varieties increases with the export price. According to our theoretical framework, this scenario implies that despite higher prices, higher-quality products perform better than low-quality products because of consumers' valuation of quality. In this case, a positive value of $\delta_2$ indicates that for destinations with strong taste proximity, varieties of higher quality have relatively larger revenues. A negative value of $\hat{\delta}_1 + \hat{\delta}_2 \ln \text{taste}_{FR,j}$ denotes, instead, a negative correlation between the intensive margin and export prices and could indicate two different scenarios. Because export prices and quality may be negatively correlated in this case, the interpretation of the effect depends on the sensitivity of production costs to efficiency. On the one hand, when firms producing high-quality products are so efficient that they produce with lower costs with respect to firms producing low-quality products, quality is negatively correlated with export prices, and higher-quality varieties are characterized by larger market shares because of their lower prices. On the other hand, when quality and export prices are positively correlated, low-quality varieties have larger market shares because of their lower prices.

Hence, our empirical model in Equation (8) explains how taste proximity affects the relationship between sales and prices, but in the case in which prices and sales are negatively correlated, it cannot provide a comprehensive interpretation of the link between taste proximity and consumer valuation of quality. To address this issue, we refer to Equation (3) in Section 2 which indicates that quality and prices are positively correlated when the sensitivity of production costs to efficiency is larger than 1.[17] As we have seen in Equation (2) in Section 2, the sensitivity of production costs to efficiency is also larger than 1 when export prices are correlated with the costs of inputs. This implies

[17] In our theoretical framework, the sensitivity of production costs to efficiency is represented by the term $\eta_{\omega,\theta} \times \eta_{\theta,A}$, which corresponds to the product of the elasticity of input prices to quality and the elasticity of output quality to efficiency.

that we have a positive correlation between export prices and quality when export prices and the cost of inputs are positively correlated. Assuming that the price of imported inputs reflects the costs of inputs used in production, we analyze the correlation between export prices and the price of imported inputs. Since we are not able to identify the exact inputs used for the production of each output, we follow Jäkel and Sørensen (2020) and estimate two different averages:

- $\ln \text{uv}_{fht}^{m,HS3}$ calculated at the firm-product (output) level, which corresponds to the weighted average of the unit values of imported inputs for the inputs within the same category (HS3) as the product.

- $\ln \text{uv}_{ft}^{m}$ calculated at the firm level, which corresponds to the weighted average of the unit values of overall inputs imported by the firm.

In addition, we derive a measure of quality of the varieties exported following the methodology proposed by Khandelwal et al. (2013) and we analyze the correlation between export prices and the estimated quality. The measure of quality derived in this way correspond to a residual of a demand equation and represents the quality perceived by consumers.[18]

Table 3 reports the results of regressing export unit values on estimated quality and imported input prices. As the coefficients of estimated quality in Column (1) and of input prices in both Columns (2) and (3) are significant and positive, we are likely to be in a situation in which the production of high-quality products implies higher marginal costs, which are translated into higher prices. This finding is not surprising since it is well known that in the food sector, the quality of output derives mainly from the ingredients used in processing and that high-quality inputs cost more. With reference to Equations (2) and (3) in the theoretical section, our results suggest that the sensitivity of production costs to efficiency $\eta_{\omega,\theta} \times \eta_{\theta,A}$ is larger than one, which implies a positive correlation between prices and quality.

[18] In Appendix D the methodology used to estimate quality is explained in more detain.

Table 3: Correlation between export unit values, estimated quality and unit values of imported inputs

| | Explained variable: ln $uv_{fhjt}$ | | |
|---|---|---|---|
| | **(1)** | **(2)** | **(3)** |
| ln quality(KWS)$_{fhjt}$ | 0.179*** | | |
| | (0.002) | | |
| ln $uv_{fht}^{m,hs3}$ | | 0.295*** | |
| | | (0.008) | |
| ln $uv_{ft}^{m}$ | | | 0.342*** |
| | | | (0.009) |
| Constant | 8.307*** | 8.239*** | 8.245*** |
| | (0.002) | (0.003) | (0.003) |
| FE destination-year | Yes | Yes | Yes |
| FE product-year | Yes | Yes | Yes |
| R-squared | 0.759 | 0.737 | 0.737 |
| Observations | 2,715,733 | 1,845,993 | 1,845,993 |

Significance levels: ***0.01 **0.05 *0.10. Regressions cluster standard errors by firm-year.

Table 4: Impact of taste proximity on the relationship between sales and export unit values

| | Explained variable: ln $sales_{fhjt}$ | | | | |
|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| ln $uv_{fhjt}$ | -0.196*** | -0.212*** | -0.221*** | -0.216*** | -0.184*** |
| | (0.004) | (0.004) | (0.008) | (0.008) | (0.008) |
| ln $uv_{fhjt}$* ln $taste_{FR,j}$ | | | 0.042*** | 0.038*** | 0.038*** |
| | | | (0.008) | (0.008) | (0.008) |
| ln N $products_{fjt}$ | | | | -0.019*** | 0.485*** |
| | | | | (0.005) | (0.008) |
| $HHI_{jht}$ | | | | -0.298*** | -0.083*** |
| | | | | (0.012) | (0.011) |
| ln product $rank_{ft}$ | | | | | -0.838*** |
| | | | | | (0.008) |
| Constant | 11.150*** | 11.280*** | 11.216*** | 11.323*** | 11.197*** |
| | (0.034) | (0.034) | (0.040) | (0.039) | (0.039) |
| FE destination-year | No | Yes | Yes | Yes | Yes |
| FE product-year | Yes | Yes | Yes | Yes | Yes |
| FE firm | No | No | No | No | No |
| R-squared | 0.127 | 0.169 | 0.156 | 0.157 | 0.287 |
| Observations | 2,957,205 | 2,957,120 | 2,090,834 | 2,090,834 | 2,090,834 |
| $\delta^j(\ln taste_{max})$ | | | -0.171 | -0.170 | -0.139 |
| $\delta^j(\ln taste_{min})$ | | | -0.205 | -0.202 | -0.170 |
| F-test diff. | | | 25.24 | 21.58 | 22.83 |
| p-value F-test | | | 0.000 | 0.000 | 0.000 |

Significance levels: ***0.01 **0.05 *0.10. Regressions cluster standard errors by firm-year.

Table 4 reports the results of the baseline model in Equation (8). In Columns (1) and (2), we regress the log of sales on the log of unit values and we introduce product-year and destination-year fixed effects in each column. We observe a negative correlation between prices and sales, which indicates that overall, export revenues decrease with the unit value and quality of varieties. This result seemingly contradicts the main findings of the literature, which observes, in general, a positive correlation between prices and sales. Note that the vast majority of studies investigating firms' export performance are conducted on developing countries characterized by limited domestic demand for high-quality products and systematically outline the fact that an essential prerequisite to successfully export is to upgrade the quality of products above the average level offered in the domestic market (Kugler and Verhoogen, 2012; Manova and Zhang, 2012; Manova and Yu, 2017). France is a highly developed country characterized by high-quality standards and a domestic demand that drives the production of high-quality products. Our setting is, therefore, different from that of developing countries, and the efficiency sorting mechanism is likely to be driven by other factors. This result is, however, in line with the findings of Jäkel and Sørensen (2020), who observes a negative price premium for exporting firms with respect to non-exporters in the case of Denmark. In Column (3), we include the log of taste as estimated in Section 4, interacted with the log of unit values. The coefficient $\delta_2$ is positive, which indicates that in countries with high taste proximity, varieties sold at higher prices have relatively higher intensive margins. A positive estimate for $\delta_2$ is consistent with our hypothesis that taste proximity increases the quality valuation of imported varieties. The result also holds when we add our control variables in Column (4). This indicates that the effect of taste proximity on the correlation between unit values and sales is not affected by the scope of products exported within the firm or by the degree of competition in the importing country. In Column (5), we add the rank of the product within the firm computed across all destinations (also referred to as the global rank) as an additional control. The purpose is to control for the rank of the product within a firm's portfolio, as we assume that export revenues from a product are higher for firms exporting more varieties and products closer to their core competences (Bernard et al., 2010; Manova and Yu, 2017). This additional control, therefore, allows us to compare the effect of taste proximity on the correlation between sales and unit values for varieties located at the same distance from the firm's core competence. We observe that this additional control does not change our estimated effect of taste proximity. Nonetheless, as the global rank of a product is likely to be correlated with the quality of the product, we retain the specification in Column (4) as the preferred one.

In Columns (3) to (5) of Table 4, we also report the prediction of the effect of export unit values on export revenues $\delta^j = \delta_1 \ln \text{uv}_{fhjt} + \delta_2(\ln \text{uv}_{fhjt} * \ln \text{taste}_{FR,j})$ for the minimal and the maximal levels of taste proximity with France.[19] We observe that, in all specifications, the null hypothesis that $\delta^j(\ln \text{taste}_{max}) = \delta^j(\ln \text{taste}_{min})$ is rejected. We observe that the effect of unit values on export revenues also remains negative for the highest value of taste proximity. This result implies that taste proximity tends to attenuate price competition. Consumers' valuation of quality is stronger, but the negative correlation between export prices and sales persists even in countries with high taste proximity. Therefore, high-quality varieties are unlikely to register the highest sales in destination markets, but they perform relatively better in countries where taste proximity is high.

## 5.2 Additional results

Taste proximity is not the only element affecting the quality valuation of products. The literature on international trade has outlined that the demand for high-quality products can be determined by other factors that differ across countries. If preferences are non-homothetic, consumer propensity to spend on high-quality products increases with the

[19] As reported in Table 2, the country with the highest level of taste proximity reported is Belgium with $\ln \text{taste}_{FR,BE} = 1.180$ while the country with the lowest is Georgia with $\ln \text{taste}_{FR,GE} = 0.367$

level of income (Fajgelbaum et al., 2011; Hallak, 2006). In the same way, the Alchian and Allen (1964) effect stipulates that because of per-unit trade costs, relative demand for higher-quality goods increases to more distant destinations. While we control for these two elements through the country-year fixed effect $\varphi_{jt}$, concerns can arise when these variables are correlated with taste proximity. If taste proximity for French food is particularly strong in wealthy countries, the coefficient $\delta_2$ also captures the effect of similarity in the level of wealth. Moreover, taste proximity is likely to be inversely correlated with geographical proximity, and if not properly controlled for, $\delta_2$ is likely to underestimate the effect of taste proximity. To address these potential biases, we control for interactions of unit values with per capita GDP, distance and taste computed separately:

$$\ln \text{sales}_{fhjt} = \delta_0 + \delta_1 \ln \text{uv}_{fhjt} + \delta_2(\ln \text{uv}_{fhjt} * \ln \text{taste}_{FR,j}) + \mathbf{Z'}\delta_3 + \delta_4(\ln \text{uv}_{fhjt} * \ln \overline{y}_{jt}) + \delta_5(\ln \text{uv}_{fhjt} * \ln \overline{dist}_{FR,j}) + \varphi_{jt} + \varphi_{ht} + \epsilon_{fhjt} \ , \quad (9)$$

where $\overline{dist}_{FR,j}$ and $\overline{y}_{jt}$ correspond to the simple average of the per capita GDP and distance across importers.[20]

The results are reported in Table 5. In Column (1), we regress our baseline model augmented with the interaction between per capita GDP and unit value, while in Column (2), we use the interaction of unit value with distance. We observe that the coefficient of the interaction terms in both specifications is positive and significant. This implies that sales of more expensive varieties increase with the distance and the level of income of importing markets. These results confirm the expectations expressed by the Linder hypothesis and the Alchian-Allen effect. In Column (3), we simultaneously include both interaction terms. We observe that when we control for the income level of importers and distance, the effect of taste remains significant and positive. When comparing our findings

[20]Note that in this case, we predict the effect of export prices on export revenues according to the degree of taste proximity as:
$\delta^j = \delta_1 \ln \text{uv}_{fhjt} + \delta_2(\ln \text{uv}_{fhjt} * \ln \text{taste}_{FR,j}) + \delta_4(\ln \text{uv}_{fhjt} * \ln \overline{y}_{jt}) + \delta_5(\ln \text{uv}_{fhjt} * \ln \overline{dist}_{FR,j})$ .

in Table 4 with the results in Column (3) of Table 4, we observe that the coefficient of the interaction term between taste and unit value is higher in the second case. This indicates that the downward bias on $\delta_2$ due to the negative correlation between unit values and distance is stronger than the upward bias due to the positive correlation between taste proximity and the level of income.

Table 5: Additional controls for non-homothetic preferences and the Alchian-Allen effect

| | Explained variable: ln $\text{sales}_{fhjt}$ | | |
|---|---|---|---|
| | **(1)** | **(2)** | **(3)** |
| ln $\text{uv}_{fhjt}$ | -0.311*** | -0.274*** | -0.445*** |
| | (0.023) | (0.022) | (0.036) |
| ln N $\text{products}_{fjt}$ | -0.019*** | -0.019*** | -0.019*** |
| | (0.005) | (0.005) | (0.005) |
| $\text{HHI}_{jht}$ | -0.296*** | -0.297*** | -0.294*** |
| | (0.012) | (0.012) | (0.012) |
| ln $\text{uv}_{fhjt}$* ln $\text{taste}_{FR,j}$ | 0.031*** | 0.053*** | 0.053*** |
| | (0.008) | (0.009) | (0.009) |
| ln $\text{uv}_{fhjt}$* ln $\text{gdp/cap}_{jt}$ | 0.010*** | | 0.014*** |
| | (0.002) | | (0.002) |
| ln $\text{uv}_{fhjt}$* ln $\text{dist}_{FR,j}$ | | 0.006*** | 0.011*** |
| | | (0.002) | (0.002) |
| Constant | 11.340*** | 11.349*** | 11.326*** |
| | (0.036) | (0.035) | (0.040) |
| FE destination-year | Yes | Yes | Yes |
| FE product-year | Yes | Yes | Yes |
| R-squared | 0.172 | 0.170 | 0.157 |
| Observations | 2,523,243 | 2,929,708 | 2,090,834 |
| $\delta^j(\ln \text{taste}_{max})$ | | | -0.179 |
| $\delta^j(\ln \text{taste}_{min})$ | | | -0.223 |
| F-test diff. | | | 33.51 |
| p-value F-test | | | 0.000 |

Significance levels: ***0.01 **0.05 *0.10. Regressions cluster standard errors by firm-year.

In Table 6, we test our empirical model on a range of different industries within the food sector. Panel A of Table 6 reports the results of the baseline model as in Equation (8) without the interaction term $\ln \text{uv}_{fhjt} * \ln \text{taste}_{FR,j}$; Panel B reports the results when including the interaction term between taste proximity and unit values, and the other interaction terms used as controls as in Equation (9).[21] In the first two columns of

[21]The coefficients of the control variables are not reported.

Table 6, we run the estimation separately on the beverage industry (Column 1), by far the largest in terms of export value,[22] and on the rest of the food sector (Column 2). Surprisingly, we observe that the results in these two columns diverge tremendously. In Panel A, we observe a negative correlation between export sales and unit values in both cases, but the coefficient $\delta_1$ is much lower for the beverage industry. In Panel B, the coefficient of sales interacted with taste proximity yields the opposite results. While the results in Column (2) confirm our findings in Table 5, for the beverage industry, the correlation between sales and unit values decreases with taste proximity. In Columns (3) to (5), we run the regression separately for the most important French industries in terms of export value after beverages, namely dairy products, meat and preparations of cereals. While the results for nonbeverage industries (Columns (2) to (5)) are in line with our expectations, the findings reported in Column (1) regarding the beverage industry require further comment.

French exports in the beverage industry are dominated by wine, which represents 82% of the exported value. A possible explanation for the different result for this industry is that, similar to other alcoholic beverages, wine is mainly consumed and traded in countries in which wine is produced. These countries are likely to share a similar consumption culture and consumer taste with France and to import wine of different qualities to satisfy a heterogeneous demand. In countries in which the consumption of wine is not popular, the consumption of wine is limited to the wealthy part of the population. For this reason, the demand for high-quality varieties is stronger in countries in which wine is not popular. Another possible interpretation is that in countries with high taste proximity, consumers prefer high-quality wines produced domestically. Finally, the result for the beverages industry could be because our variable $\ln \text{taste}_{FR,j}$ captures the taste proximity for food products but does not truly reflect the taste proximity for beverages.

[22] France is renowned for being a world-leading exporter of wine. In fact, 27.82% of total exports in our data are in the HS2 class "Beverages, spirits and vinegar", covering a total of 25 122 firms. The wine industry is one of the most export-oriented industries.

Table 6: Results for most relevant industries

| | Explained variable: ln $\text{sales}_{fhjt}$ | | | | |
|---|---|---|---|---|---|
| | Beverages | Non-Bev. | Dairy | Meat | Cereals |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| Panel A | | | | | |
| ln $\text{uv}_{fhjt}$ | -0.043*** | -0.290*** | -0.697*** | -0.233*** | -0.458*** |
| | (0.006) | (0.005) | (0.020) | (0.010) | (0.012) |
| Panel B | | | | | |
| ln $\text{uv}_{fhjt}$ | -0.075 | -0.070 | -1.426*** | -0.385** | -0.590*** |
| | (0.052) | (0.049) | (0.215) | (0.165) | (0.187) |
| ln $\text{uv}_{fhjt}$* ln $\text{taste}_{FR,j}$ | -0.094*** | 0.064*** | 0.453*** | 0.354*** | 0.196*** |
| | (0.019) | (0.011) | (0.052) | (0.034) | (0.054) |
| Observations | 627,819 | 1,462,948 | 154,905 | 170,205 | 107,008 |
| $\delta^j(\ln \text{taste}_{max})$ | -0.109 | -0.261 | -0.548 | -0.004 | -0.203 |
| $\delta^j(\ln \text{taste}_{min})$ | -0.032 | -0.314 | -0.916 | -0.292 | -0.362 |
| F-test diff. | 24.82 | 35.03 | 76.57 | 108.48 | 13.03 |
| p-value F-test | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

Significance levels: ***0.01 **0.05 *0.10. The industries are defined at HS2 digits level. Beverages corresponds to the HS2 class "22 - Beverages, spirits and vinegar", Dairy to "04 - Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included", Meat to "02 - Meat and edible meat offal", Cereals to "19 - Preparations of cereals, flour, starch or milk; pastrycooks' products". Regressions cluster standard errors by firm-year. All estimations include destination-year and product-year fixed effects and the control variables ln N $\text{products}_{fjt}$ and $\text{HHI}_{jht}$. Estimations in Panel B include also the two interaction variables ln $\text{uv}_{fhjt}$* ln $\text{gdp/cap}_{jt}$ and ln $\text{uv}_{fhjt}$* ln $\text{dist}_j$ as controls.

## 5.3 Robustness

Our investigation is based on the theoretical assumption that constant markups exceed marginal costs for all varieties. Some concerns may rise when considering eventual pricing-to-market strategies, which could bias the interpretation of $\delta_2$ in the empirical model presented in Equations (8) and (9). In Table 7, we replace the unit values of exports in the baseline model with two different proxies for quality, which are independent of pricing-to-market strategies relative to destination markets. In Columns (1) and (3) of Table 7, we analyze the correlation between the unit values of imported inputs calculated as in Section 5.1, ln $\text{uv}^{m,HS3}_{fht}$, and sales; while in Columns (2) and (4), we use the weighted average of unit values of the variety on the other destination markets calculated as $\ln \overline{uv}_{fhjt} = \frac{\sum_{l \neq j} \ln \text{uv}_{fhjt} * \text{quantity}_{fhjt}}{\sum_{l \neq j} \text{quantity}_{fhjt}}$. Although these proxies share the advantage of being independent

Table 7: Relationship between proxies of intrinsic variety quality and sales

| | Explained variable: ln $\text{sales}_{fhjt}$ | | | |
|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** |
| ln $\text{uv}^{m,hs3}_{fht}$ | -0.172*** | | -1.119*** | |
| | (0.009) | | (0.106) | |
| $\ln \overline{uv}_{fhjt}$ | | -0.153*** | | -0.534*** |
| | | (0.007) | | (0.055) |
| ln $\text{uv}^{m,hs3}_{fht}$* ln $\text{taste}_{FR,j}$ | | | 0.256*** | |
| | | | (0.029) | |
| ln $\text{uv}^{m,hs3}_{fhjt}$* ln $\text{gdp/cap}_{jt}$ | | | 0.009 | |
| | | | (0.007) | |
| ln $\text{uv}^{m,hs3}_{fht}$* ln $\text{dist}_j$ | | | 0.088*** | |
| | | | (0.007) | |
| $\ln \overline{uv}_{fhjt}$* ln $\text{taste}_{FR,j}$ | | | | 0.106*** |
| | | | | (0.013) |
| $\ln \overline{uv}_{fhjt}$* ln $\text{gdp/cap}_{jt}$ | | | | 0.008** |
| | | | | (0.003) |
| $\ln \overline{uv}_{fhjt}$* ln $\text{dist}_j$ | | | | 0.028*** |
| | | | | (0.004) |
| ln N $\text{products}_{fjt}$ | -0.046*** | -0.026*** | -0.095*** | -0.052*** |
| | (0.005) | (0.004) | (0.005) | (0.005) |
| $\text{HHI}_{jht}$ | -0.299*** | -0.352*** | -0.252*** | -0.305*** |
| | (0.012) | (0.010) | (0.015) | (0.012) |
| Constant | 9.852*** | 10.921*** | 10.075*** | 11.177*** |
| | (0.010) | (0.059) | (0.011) | (0.053) |
| FE destination-year | Yes | Yes | Yes | Yes |
| FE product-year | Yes | Yes | Yes | Yes |
| R-squared | 0.181 | 0.170 | 0.171 | 0.158 |
| Observations | 1,845,993 | 2,893,006 | 1,267,498 | 2,044,142 |

Significance levels: ***0.01 **0.05 *0.10. Regressions cluster standard errors by firm-year.

from pricing-to-market strategies, they correspond to imperfect measures of quality. In particular, the weighted average of unit values of a variety on the other markets may also capture differences in the varieties exported to each destination.[23] The results in Table 7 confirm that on average, varieties produced with cheaper imported inputs (Column 1) and varieties sold on average at lower prices (Column 2) are characterized by higher export revenues. This result is in line with our interpretation that low-quality products

[23]Within a given 8-digit product category, there could be differences between products. The literature often refers to these unobserved varieties within a product category as hidden varieties (Khandelwal, 2010).

are characterized by a higher intensive margin because of their lower prices. In Columns (3) and (4), we add the log of taste interacted with the proxies for quality. We find a positive coefficient for these interaction variables, which indicates that high-quality products perform relatively better in countries with higher taste proximity. This result corroborates our previous findings in Tables 4 and 5, according to which quality valuation increases with taste proximity, except in the beverage industry.

## 6 Conclusion

In this study, we investigate how consumer tastes proximity for food products between trading partners affects the propensity to spend on quality of imported varieties. We first develop a theoretical model which describes the quality valuation mechanism relating taste proximity and consumer valuation of quality, and explains how this mechanism affects the correlation between export prices and revenues. Then, based on our theoretical findings, we conduct an analysis on French export in the food sector and examine the impact of consumer taste proximity to France on the export revenues of French varieties differentiated by quality. To measure taste proximity between countries, we use data from the online travel company TripAdvisor, which reports information on the type of cuisine offered in restaurants for many countries. Through the use of these data, we derive a measure of cuisine distribution offered in restaurants in each country and we use a control function approach on the estimation of a gravity model to obtain the measure of taste proximity. Conceptually, the measure of taste proximity obtained corresponds to the unobserved affinity in taste for food products between consumers that promotes trade.

Our preliminary analysis shows that, in general, lower-quality varieties are exported at lower prices and acquire larger revenues. This indicates that price competition prevails in foreign markets. Our result is at odds with a number of studies that find that higher-quality varieties are often sold at higher prices and are the ones that acquire larger export revenues (Kugler and Verhoogen, 2012; Manova and Zhang, 2012; Manova and Yu, 2017; Minondo, 2020). This divergence in results is probably because these studies are conducted on less developed countries characterized by lower quality standards. The main finding of our empirical analysis is that the negative correlation between sales and export prices is attenuated in countries with high taste proximity. Our results indicate that although high-quality varieties are characterized by lower export revenues, firms exporting high-quality products perform relatively better in countries with high taste proximity. The results obtained are robust to controlling for possible correlations of taste proximity with geographical distance, countries' level of income and pricing-to-market strategies. Our results recall, in part, the findings in Jäkel (2019) which focuses on Danish firms in the confectionery sector and observes that the product appeal in the domestic market is a good predictor of export revenues in countries characterized by high taste proximity with Denmark. In addition to our main findings, we observe that the effect of taste proximity on the sales of high-quality products is confirmed for the majority of food industries except for beverages, which are dominated in France by wine exports. We argue that the difference in results between beverages and the other products may be due to peculiarities of the demand for wine in countries where wine consumption is not present or to the fact that the measure of taste proximity does not truly reflect the taste proximity for beverages.

The empirical results reported herein should be considered in light of some limitations that could also represent starting points for future research. First, our measure of taste proximity is time-invariant, as it is obtained from data on cuisine distribution across countries at a given time. While the literature generally indicates a strong persistence in food consumption habits (Atkin, 2013), in our analysis we are unable to account for possible changes in consumer preferences for food products. Second, in the absence of a direct measure of the quality of exported varieties, our empirical analysis relies on the use of export unit values. The studies of Khandelwal (2010), Khandelwal et al. (2013), and Piveteau and Smagghue (2019) propose different methods to estimate quality of exported varieties on the demand side. The issue with these methodologies is that quality is obtained as a residual of a demand equation and reflects all non-price factors which increase export revenues, including preferences for horizontal attributes which we refer to as consumer taste. Given the justification based on our theoretical findings and the positive correlation of unit values of exported output with and the unit values of imported inputs, we consider the use of unit values to be the most suitable option for the scope of the research. Finally, in the theoretical model presented in this chapter, we do not include the fixed costs of exports, incurred by each firm exporting to each destination regardless of its level of productivity, product quality and destination characteristics. Similarly, our empirical analysis focuses on export revenues but is silent on the effect of taste proximity on the probability of market entry for vertically differentiated products. An interesting perspective for future research would be to analyze the effect of consumer preferences on the probability of market entry from theoretical and empirical points of view.

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# APPENDICES

## A Data on restaurant cuisine

Table A1: Concordance between type of cuisine and iso2 code of origin country

| CUISINE | ISO2 | CUISINE | ISO2 | CUISINE | ISO2 | CUISINE | ISO2 |
|---|---|---|---|---|---|---|---|
| Afghani | AF | Contemporary | N/A | Izakaya | JP | Pub | N/A |
| African | N/A | Costa Rican | CR | Jamaican | JM | Puerto Rican | PR |
| Albanian | AL | Croatian | HR | Japanese | JP | Romagna | IT |
| Algerian | DZ | Cuban | CU | Japanese-Other | JP | Romana | IT |
| American | US | Czech | CZ | Japanese - Other | JP | Romanian | RO |
| Anhui | CN | Danish | DK | Japanese - Traditional | JP | Russian | RU |
| Apulian | IT | Deli | N/A | Japanese Fusion | JP | Salvadoran | SV |
| Arabic | N/A | Diner | N/A | Japanese sweets parlour | JP | Sardinian | IT |
| Argentinian | AR | Dining bars | N/A | Jiangsu | CN | Scandinavian | multiple6 |
| Armenian | AM | Dutch | NL | Jiangxi | CN | Scottish | GB |
| Asian | N/A | Eastern European | N/A | Kaiseki | JP | Seafood | N/A |
| Assyrian | N/A | Ecuadorean | EC | Kappo | JP | Shandong | CN |
| Australian | AU | Egyptian | EG | Korean | KR | Shanghai | CN |
| Austrian | AT | Emilian | IT | Kyoto cuisine | JP | Shojin | JP |
| Azerbaijani | AZ | Ethiopian | ET | Kyushu cuisine | JP | Sicilian | IT |
| Bahamian | BS | European | N/A | Latin | N/A | Singaporean | SG |
| Balti | IN | Fast Food | N/A | Latvian | LV | Slovenian | SI |
| Bangladeshi | BD | Filipino | PH | Lazio | IT | Soups | N/A |
| Bar | N/A | French | FR | Lebanese | LB | South American | N/A |
| Barbecue | N/A | Fruit parlours | N/A | Ligurian | IT | Southern-Italian | IT |
| Basque | ES | Fujian | CN | Lombard | IT | Southwestern | US |
| Beer restaurants | N/A | Fusion | N/A | Malaysian | MY | Spanish | ES |
| Beijing cuisine | CN | Gastropub | N/A | Medicinal foods | N/A | Sri Lankan | LK |
| Beijing Specialities | CN | Georgian | GE | Mediterranean | N/A | Steakhouse | N/A |
| Belgian | BE | German | DE | Mexican | MX | Street Food | N/A |
| Brazilian | BR | Greek | GR | Middle Eastern | N/A | Sushi | JP |
| Brew Pub | N/A | Grill | N/A | Mongolian | MN | Swedish | SE |
| British | GB | Guangxi | CN | Moroccan | MA | Swiss | CH |
| Burmese | MM | Guatemalan | GT | Native American | US | Szechuan | CN |
| Cafe | N/A | Guizhou | CN | Neapolitan | IT | Taiwanese | TW |
| Cajun & Creole | N/A | Hangzhou | CN | Nepali | NP | Thai | TH |
| Calabrian | IT | Hawaiian | US | New Zealand | NZ | Tibetan | CN |
| Cambodian | KH | Healthy | N/A | Nigerian | NG | Tunisian | TN |
| Campania | IT | Henan | CN | Nonya | MY | Turkish | TR |
| Canadian | CA | Hokkaido cuisine | JP | NorthEastern Chinese | CN | Tuscan | IT |
| Cantonese | CN | Hong Kong | CN | Northern-Italian | IT | Ukrainian | UA |
| Caribbean | multiple1 | Hubei | CN | NorthWestern Chinese | CN | Uzbek | UZ |
| Catalan | ES | Hunan | CN | Norwegian | NO | Venezuelan | VE |
| Caucasian | multiple2 | Hungarian | HU | Okinawan Cuisine | JP | Vietnamese | VN |
| Central American | multiple3 | Imperial Chinese | CN | Pakistani | PK | Welsh | GB |
| Central Asian | multiple4 | Indian | IN | Persian | IR | Wine Bar | N/A |
| Central European | multiple5 | Indonesian | ID | Peruvian | PE | Xinjiang | CN |
| Central-Italian | IT | International | N/A | Pizza | N/A | Yunnan | CN |
| Chilean | CL | Irish | IE | Polish | PL | Zhejiang | CN |
| Chinese | CN | Israeli | IL | Polynesian | N/A | | |
| Colombian | CO | Italian | IT | Portuguese | PT | | |

On TripAdvisor, the type of reported cuisine is selected from a list provided by the website. The total number of cuisines proposed by TripAdvisor is 182, and each restaurant can register up to 4 different types. We associate each type of cuisine with the origin country that offers the cuisine. From the 182 listed cuisines, 151 were associated with 93 different origin countries. Table A1 reports the combination between the type of cuisine and the corresponding origin country. There are types of cuisines that cannot be directly associated with a specific origin country because they are simply ageographic, such as "sea food", or because they refer to wide geographic regions, such as "European". We do not take into account these types of cuisine because the provided information is not useful to the scope of the study or is too generic. For these types of cuisine, the corresponding exporter is reported as N/A in Table A1. In contrast, some types of cuisine refer to restricted geographic regions such as "Caucasian" or "Central American". In these cases, we assign the cuisine to all countries in the region according to their weight in terms of the total population as measured in 2019. In Table A1, we designate these cuisines as "multiple". We have 6 "multiple" cuisines that we allocate to origin countries as follows:

– multiple1: Caribbean ⇒ 31% Cuba (CU) - 30% Dominican republic (DO) - 31% Haiti (HT) - 4% Trinidad and Tobago (TT) - 2% Guyana (GY) - 2% Suriname (SR)

– multiple2: Caucasian ⇒ 18% Armenia (AM) - 22% Georgia (GE) - 60% Azerbaijan (AZ)

– multiple3: Central America ⇒ 10% Costa Rica (CR) - 34% Guatemala (GT) - 13% El Salvador (SV) - 20% Honduras (HN) - 14% Nicaragua (NI) - 9% Panama (PA)

– multiple4: Central Asia ⇒ 25% Kazakhstan (KZ) - 9% Kyrgyzstan (KG) - 13% Tajikistan (TJ) - 8% Turkmenistan (TM) - 45% Uzbekistan (UZ)

– multiple5: Central Europe ⇒ 7% Czech Republic (CZ) - 23% Poland (PL) - 50% Germany (DE) - 3% Slovakia (SK) - 1% Slovenia (SI) - 6% Hungary (HU) - 5% Switzerland (CH) - 5% Austria (AT)

– multiple6: Scandinavian ⇒ 21% Denmark (DK) - 38% Sweden (SE) - 20% Norway (NO) - 20% Finland (FI) - 1% Iceland (IS)

# B Average cuisine shares across countries

Table B1 describes the average share of cuisine from each origin country computed as the average of its share in each destination relative to other nondomestic cuisines, $\bar{s}_i$. The most popular cuisine in the world is Italian cuisine, with an average share of 26.4%, followed by Chinese cuisine, with a share of 16%, and Japanese cuisine, with a share of 13%. French cuisine is one of the most highly appreciated cuisines in the world, with an average share of 5.71%. In contrast, for the majority of cuisines, the average share destination countries is below 1%.

Table B1: Average share of cuisine across destination countries

| Country | Average share % | Country | Average share % |
|---|---|---|---|
| Argentina | 0.601 | Japan | 13.0 |
| Australia | 0.203 | Kazakhstan | 0.0150 |
| Austria | 0.353 | Malaysia | 0.215 |
| Belgium | 0.325 | Mexico | 3.89 |
| Brazil | 0.568 | Morocco | 0.403 |
| Cambodia | 0.0244 | Netherlands | 0.246 |
| Canada | 0.0531 | New Zealand | 0.0205 |
| Chile | 0.0364 | Norway | 0.0150 |
| China | 16.0 | Peru | 0.965 |
| Colombia | 0.0990 | Philippines | 0.0939 |
| Costa Rica | 0.0103 | Poland | 0.238 |
| Croatia | 0.0983 | Portugal | 0.253 |
| Czech Republic | 0.101 | Rep. of Korea | 1.73 |
| Denmark | 0.0383 | Romania | 0.0268 |
| Dominican Rep. | 0.135 | Russia | 0.442 |
| Ecuador | 0.0107 | Singapore | 0.0776 |
| Egypt | 0.0540 | Slovenia | 0.0210 |
| Finland | 0.007 | Spain | 3.46 |
| France | 5.71 | Sri Lanka | 0.0422 |
| Georgia | 0.323 | Sweden | 0.102 |
| Germany | 1.49 | Switzerland | 0.187 |
| Greece | 1.37 | Taiwan | 0.253 |
| Hungary | 0.116 | Thailand | 3.44 |
| India | 4.82 | Turkey | 1.78 |
| Indonesia | 0.256 | USA | 13.3 |
| Ireland | 0.371 | Ukraine | 0.0451 |
| Israel | 0.151 | United Kingdom | 0.802 |
| Italy | 26.4 | Vietnam | 1.53 |

# C The measure of taste

The recent study of Kohler and Wunderlich (2022) proposes two measures of food taste similarity between countries based on the information on the ingredients used in the recipes of a country's national dish. The first measure they propose corresponds to the Manhattan distance between the ingredients used any two national dishes $\text{similarity(man)}_{ij}$. The second measure $\text{similarity(lsa)}_{ij}$ is obtained using latent semantic analysis. Table C1 reports the correlation between the proxies for taste proximity and the estimated taste proximity obtained in Section 4 with these two measures.

Table C1: Correlation between taste proximity and food taste similarity

| | $\ln \text{taste}_{ij}$ | $\text{popularity}_{ij}$ | $\text{FK}_{ij}$ | $\text{similarity(man)}_{ij}$ | $\text{similarity(lsa)}_{ij}$ |
|---|---|---|---|---|---|
| $\ln \text{taste}_{ij}$ | 1 | | | | |
| $\text{popularity}_{ij}$ | 0.442*** | 1 | | | |
| $\text{FK}_{ij}$ | 0.700*** | 0.377*** | 1 | | |
| $\text{similarity(man)}_{ij}$ | 0.0931*** | 0.139*** | 0.140*** | 1 | |
| $\text{similarity(lsa)}_{ij}$ | 0.112*** | 0.144*** | 0.161*** | 0.967*** | 1 |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In Table C2 instead, we regress our measure of taste proximity on the two measures of food taste similarity with different combinations of fixed effects. We observe that in both Tables C1 and C2 we obtain a positive and significant correlation between our estimation and their measure of proximity in food consumption.

Table C2: Taste proximity and other measures of food similarity

| | Explained variable: ln $\text{taste}_{ij}$ | | | | | |
|---|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** |
| food sim(man)$_{ij}$ | 0.128*** | 0.094*** | 0.125*** | | | |
| | (0.017) | (0.022) | (0.018) | | | |
| food sim(lsa)$_{ij}$ | | | | 0.106*** | 0.086*** | 0.091*** |
| | | | | (0.014) | (0.017) | (0.014) |
| Constant | 0.494*** | 0.503*** | 0.494*** | 0.491*** | 0.498*** | 0.496*** |
| | (0.005) | (0.006) | (0.005) | (0.005) | (0.006) | (0.005) |
| FE exporter | Yes | No | Yes | Yes | No | Yes |
| FE destination | No | Yes | Yes | No | Yes | Yes |
| R-squared | 0.438 | 0.117 | 0.549 | 0.439 | 0.119 | 0.549 |
| Observations | 2,953 | 2,953 | 2,953 | 2,953 | 2,953 | 2,953 |

Significance levels: ***0.01 **0.05 *0.10.

# D Estimation of varieties quality

The estimation of quality according to the methodology proposed by Khandelwal et al. (2013) is increasingly adopted to infer quality as the residual of a demand function. While this estimation is practical, as it requires only information on volumes and quantities of trade flows, the methodology needs to assume a value for the CES elasticity of substitution between varieties. Product quality is inferred from the demand function derived by the classic CES utility function of Dixit and Stiglitz (1977): $\ln q_{fhjt} + \sigma p_{fhjt} = FE_{jt} + FE_h + \epsilon_{fhjt}$, where $q_{fhjt}$ corresponds to quantity exported and $\sigma$ corresponds to the elasticity of substitution between varieties. In the estimation, we use the country-product-specific elasticity of substitution estimated by Broda and Weinstein (2006). Quality is then obtained as:

$$\text{quality(KWS)}_{fhjt} = \frac{\hat{\epsilon}_{fhjt}}{\sigma - 1}.$$

For the country-product pairs for which the elasticity of substitution is not available, we used the median $\sigma$ across all products. Quality is estimated for each firm-product-importer-year and it represents the quality perceived by consumers relative to the other varieties available.