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DINING OUT AS CULTURAL TRADE

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ABSTRACT

Perceptions of Anglo-American dominance in movie and music trade motivate restrictions on cultural trade. Yet, the market for another cultural good, food at restaurants, is roughly ten times larger than the markets for music and film. Using TripAdvisor data on restaurant cuisines, along with Euromonitor data on overall and fast food expenditure, this paper calculates implicit trade patterns in global cuisines for 52 destination countries. We obtain three major results. First, the pattern of cuisine trade resembles the "gravity" patterns in physically traded products. Second, after accounting gravity factors, the most popular cuisines are Italian, Japanese, Chinese, Indian, and American. Third, excluding fast food, the largest net exporters of their cuisines are the Italians and the Japanese, while the largest net importers are the US – with a 2017 deficit of over $130 billion – followed by Brazil, China, and the UK. With fast food included, the US deficit shrinks to $55 billion but remains the largest net importer along with China and, to a lesser extent, the UK and Brazil. Cuisine trade patterns appear to run starkly counter to the audiovisual patterns that have motivated concern about Anglo-American cultural dominance.

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Despite a trend toward acceptance of free trade in goods and services, many countries restrict trade in cultural products, largely as a reaction to US dominance in audiovisual products. Concerns about US dominance in motion pictures are not unfounded. The US producers' share of box office revenue exceeds the domestic share in most countries, and US movies' box office revenue abroad ("exports") exceeded US revenue for foreign films ("imports") by over $10 billion in 2014.[1] As a result, most European countries subsidize local motion picture production, and a number of countries, including France and Canada, impose domestic content restrictions on radio broadcasting.[2] Over the objections of US negotiators, the French introduced the "cultural exception" into the Uruguay Round of GATT negotiations in the 1990s, excluding cultural goods from the agreement. French President François Mitterrand argued that "no country should be allowed to control the images of the whole world."[3]

While discussions of cultural trade tend to focus on audiovisual products, these products do not exhaust the list of cultural products.[4] Perhaps the most ubiquitous – and most economically important – cultural product is prepared food at restaurants. By sheer size, the market for prepared food dwarfs markets for other cultural products. In the US, the motion picture industry generates roughly $30 billion per year in the US, while recorded music revenue accounts for another $10 billion. The US restaurant industry, by contrast, generated about $560 billion in annual revenue in 2017. To the extent that foreign cuisines are popular with consumers in the US and elsewhere – and we will demonstrate that they are – then implicit cuisine trade will be large in comparison with trade in other cultural products.

[1] See Section IV, below.
[2] See Richardson (2006).
[3] See Gordon and Meunier (2001), p. 47.
[4] See Waterman (2005) for evidence on motion pictures and Ferreira and Waldfogel (2013) for evidence on music.

Concerns about consumption of foreign products as threats to local culture arise in the culinary as well as audiovisual realms. For example, there was considerable controversy in 2013 when fast food consumption was said to have surpassed consumption of domestic cuisines in France.[5] The spread of fast food, and the declining popularity of traditional French dining styles, "mobilized the country to protect them" through taste education, "in which students are taught how to savor foods, and about concepts like *terroir*" as "a formal part of the curriculum." In 2014 the French government unveiled "a national food policy that aims to make "high-quality food and nutrition a foundational aspect of French citizenship.""[6] In a widely-cited essay in *Le Mond*, Jean Michel Normand argued that "McDonald's … commercial hegemony threatens our agriculture and its cultural hegemony insidiously ruins alimentary behavior—both sacred reflections of the French identity." Moreover, "Resistance to the hegemonic pretenses of hamburgers is, above all, a cultural imperative."[7] It seems clear that cuisine, along with music and movies, is an important cultural product.

While the physical products of the restaurant industry are generally produced and distributed locally, the cultural content of the products is often not local. Restaurant meals are instead often prepared according to recipes from foreign countries. Because recipes and cuisines are not eligible for intellectual property protection, the sale of food made according to a recipe created by another requires no compensation. As a result, there is no formal world trade arising from the sale of, say, Italian cuisine in Germany, or American cuisine in France. Still, as the cited passages above suggest, interest in cultural trade reflects concerns that transcend balance of trade and extend substantially into issues of cross-border cultural influence.

[5] See Samuel (2013).
[6] See Godoy and Beardsley (2015).
[7] See Gordon and Meunier-Aitsahalia (2001), p. 53.

While many observers raise concerns about culinary imports – for example the spread of the American hamburger – there seems to be little cognizance that cuisines are exported as well as imported. Against the backdrop of these concerns about identity and foreign cultural influence, the goal of this paper is to document patterns of world trade in cuisines. This requires some source of comparable data on the distribution of available restaurants by cuisine for countries around the world. I am aware of no such data, so I derive estimates using Euromonitor data on aggregate and fast food restaurant expenditure by country, along with TripAdvisor and Euromonitor data on the distribution of restaurants by cuisine. TripAdvisor maintains lists of restaurants in hundreds of cities around the world, and users classify restaurants into 148 different cuisine categories, most of which (e.g. pizza, Italian, Greek, Japanese) can be identified with particular origin countries. Euromonitor provides data on fast food expenditure for each of a dozen fast food cuisines (hamburger, chicken, pizza, etc.) that we can match with TripAdvisor data for 52 countries that account for 89 percent of world GDP.

Combining these data sources, I calculate measures of trade flows between origin-cuisine countries and destination markets, with and without fast food. These data are of interest in themselves, as they allow me to calculate the origin-cuisine share of consumption in each destination. I then use the data to estimate standard gravity models of bilateral trade flows. I document both that cuisine trade follows patterns documented for other products. My goal in estimating gravity models is to produce an index of origin-cuisine appeal that accounts for distance between origin and destination, but I also explore the pattern of trade in cuisines by linking origin country cuisine trade fixed effects to origin country migration and food trade effects as well as origin country arable land. While all are related to cuisine origin country effects, included together only migration bears a significant relationship with cuisine origin fixed effects. Finally, I turn to the main task of the paper: I calculate implied cuisine trade deficits and surpluses; and I contrast the patterns of origin country dominance in cuisine with patterns for other cultural products.

Cuisine trade patterns contrast rather sharply with the patterns for audiovisual products. While the US is dominant in motion pictures, and the UK (and Sweden) are dominant in music, neither is among the top sources of cuisine. The origin countries with the largest international trade surpluses are Italy, Japan, and Mexico. Excluding fast food, the US has the largest cuisine trade deficit, at $134 billion in 2017. Including fast food, the US deficit is $55 billion and still the largest. Both US deficit measures far exceed the American trade surplus in other cultural products, raising questions about whether the US, notwithstanding the success of its motion picture industry, has disproportionate influence in cultural markets more generally.

The paper proceeds in four sections. Section 1 presents background, including links to the relevant literatures in cultural and trade economics. Section 2 describes the data. Section 3 presents results in five parts. First, I document bilateral trade patterns descriptively, showing which countries consume which cuisines. Second, I estimate gravity models, which allow me to characterize the appeal of origin country cuisines. Third, I explore some factors associated with cuisine trade patterns, including migration, food trade, and arable land. Fourth, I calculate the patterns of net exports by country which demonstrate the main point of the paper. Finally, I explore robustness of various results to alternative assumptions. The concluding section presents discussion of the results and comparison with other cultural goods. I also discuss potential data weakness and directions for further research.

I. Background

a. Cuisine "Trade"

The quantification of cuisine "trade" based on, say, the consumption of domestically produced food made according to foreign recipes is at odds with the way trade statistics are calculated. Even if consumption of foreign cuisines occurred at foreign-owned restaurants (presumably using local ingredients and labor), only a small share – the profit or licensing fees – would formally constitute trade. Still, the policy concerns attending cultural trade transcend the current account balance and instead – in at least some countries – reflect concern that citizens of a country are deriving the pleasure and sustenance that one obtains from food using foreign intellectual property in the form of the recipes for non-domestic cuisines. In some ways the trade documented in this study resembles foreign direct investment, in which home country ideas are used to produce abroad with local inputs (Ramondo, Rodríguez-Clare, and Tintelnot, 2015).

As a result, the quantification of "trade" as, say, the value of food sold by Italian restaurants in the US does provide a useful indicator. If we were interested in, say, the consumer surplus that Americans derive from food at Italian restaurants, the relevant calculation would depend on the quantity of such meals purchased at the going price, or the total US spending on Italian restaurant food, not just the component that would hypothetically be repatriated to Italy in an alternative ownership regime.

b. Cuisine as culture

Because a goal of this paper is to juxtapose cuisine trade with recognized elements of cultural trade, it is important to establish that cuisine is a cultural product. A full exploration of this topic lies outside the ken of an economist. Still, it is clear that many countries take their cuisines seriously and that cuisines are an important aspect of culture. As discussed in the introduction, the French view their cuisine as an aspect of culture that requires preservation. Others care, too. Notably, the United Nations Educational, Scientific and Cultural Organization (UNESCO) shares the French concern for the preservation of important world cuisines and has declared a number of cuisines to be "intangible cultural assets." These include France's "multi-course gastronomic meal", traditional Japanese cuisine, known as *washoku*, and traditional Mexican cuisine. [8]

Although the sales of a country's cuisine in restaurants abroad does not generate export revenue, some countries – including Thailand, South Korea, Taiwan, Malaysia and even North Korea – work actively to promote their cuisines abroad (see Karp, 2018).

c. Relevant literature

This paper is related to a few distinct extant literatures. First, there is a large amount of theoretical work on cultural trade exploring possible rationales for protectionism.[9] Second, there is a growing empirical literature on trade in cultural products.[10] Much of this work concerns particular products, such as recorded music, motion pictures, or books. Some of the work is instead about the spread of information or culture, such as Blum and Goldfarb (2006) on cross-border Internet use or Disdier, Head and Mayer (2010) on media and the growth of foreign names in France.

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[8] See http://www.unescobkk.org/fileadmin/user_upload/library/OPI/Documents/UNESCO_in_the_news_2013/131216Japans_Cusine.pdf, Samuel (2010), and Peralta (2015).
[9] See Bernier (2003), Richardson (2006); and Bala and Van Long (2005).
[10] See Disdier, Tai, Fontagne, and Mayer (2010); Hanson and Xiang (2008); Ferreira and Waldfogel (2013); Ferreira, Petrin, and Waldfogel (2017); Meloni et. Al. (2018); and Takara (2018)

This paper also complements a small but growing literature on restaurant markets. For example, Chossat and Gergaud (2003) find that cuisine quality matters more than restaurant setting in the determinants of chef quality in the 2000 GaultMillau guidebook. Gergaud et al (2007) document, among other things, that Michelin guide authors favor French cuisine over others, among Paris restaurants. After accounting for a Paris restaurant's Zagat rating, Paris restaurants serving French cuisine have more Michelin stars. This is consistent with a Michelin "home bias" in favor of French cuisine. Gergaud et al (2015) document the impact of Michelin stars on patron views of New York restaurants, as revealed in the Zagat guide. To my knowledge, this is the only paper documenting cross-border patterns of culinary consumption. Finally, this is also research on product variety that takes restaurants as its context (Schiff, 2015; Berry and Waldfogel, 2010; Waldfogel, 2008).

II. Data

As Acheson and Maule (2006) point out, "[c]ultural statistics of any kind are of generally poor quality, and this includes those recording trade." As with other cultural products, getting data on cuisine trade is not straightforward; but it is possible. I combine data of three types from two sources to create separate measures of cuisine trade for fast food and non-fast food at restaurants.

a. Total and Fast Food Restaurant Expenditure

First, I have 2017 Euromonitor's Passport data on total restaurant expenditure as well as total fast food restaurant expenditure for each of 52 countries that I can merge with other data sources.[11] Define R_d^{tot} as total restaurant expenditure in country d. (All data below refer to 2017/2018, so notation omits time subscripts). Define R_d^{ff} as fast food restaurant expenditure in country d, and define R_d^{nf} as non-fast food restaurant expenditure in country d, so that $R_d^{tot} = R_d^{nf} + R_d^{ff}$. Fast food expenditure makes up an average of 20 percent of total restaurant expenditure.

b. Fast Food Expenditures by Cuisine and Origin

Second, I have Euromonitor's country-specific measures of fast food restaurant expenditure in each of twelve fast food cuisines: Asian, bakery, burger, chicken, convenience store, fish, ice cream, Latin American, Middle Eastern, and pizza, as well as a generic "fast food" category and "other." Given a mapping of cuisines to origin countries, I can create fast food trade measures. Some of these cuisines are easy to map into origin countries, for example burger as American, pizza as Italian, and Latin American and Middle Eastern apportioned to the countries of the respective regions according to the shares of region GDP originating in each country (more on this below). The chicken category includes fried chicken restaurants that serve American cuisine (such as KFC), as well as restaurants serving chicken prepared according to other cuisines. We classify the chicken cuisine as American understanding that this may tend to overstate US restaurant exports. The remaining cuisines (bakery, etc) are classified as domestic wherever they are observed. Burger accounts for an average of 30 percent of fast food

[11] Euromonitor describes itself as the "world's leading provider of strategic market research." They describe their market research on the consumer foodservice industry as follows: "Standardised and cross-comparable total market sizes, market share and share data, distribution and industry trends and category level information." They charge $2,100 per country for a la carte purchase of reports. See http://go.euromonitor.com/passport.html, http://www.euromonitor.com/about-us , and http://www.euromonitor.com/consumer-foodservice.

expenditure, chicken for 12 percent, Asian for 9 percent, Middle Eastern for 6 percent, pizza for 4, and Latin American for 2. (In the robustness section I explore the impact of classifying chicken fast food as domestic rather than US-origin).

c. Non-Fast Food Cuisine Shares

To create non-fast food trade flows I need to determine the share of non-fast food restaurant expenditure in each country occurs in each cuisine, along with a way to apportion those cuisines to origin countries. For this I employ data from TripAdvisor.[12] TripAdvisor maintains a website offering user-generated reviews and other information about restaurants, hotels, and attractions in cities around the world.[13] Users are able to tag restaurants with cuisine types, among 148 listed varieties. The site is popular and attracts 350 million visitors per month.[14]

To get a characterization of the cuisines consumed in each country's restaurants, I obtain the cuisine distributions for at least the top 60 cities in each of the study's 52 destination countries. [15] For the larger countries, such as the US, China, Japan, South Korea, the major European countries, I collect data on up to 160 cities. By collecting data on this many cities in each country, I include not only the most prominent tourist destinations and most cosmopolitan areas but also a much larger range of metropolitan areas. For each of 4,016 cities in 52 countries

[12] We use data from TripAdvisor rather than Yelp because TripAdvisor is more widely used around the world, where as Yelp use is concentrated in the US. The Appendix compares TripAdvisor and Yelp and also shows that Yelp and TripAdvisor data suggest similar cuisine shares within the US. I also compare TripAdvisor to Tabelog.com for Japan, finding similar cuisine distributions from the two data sources.
[13] In contrast to Yelp, which is popular mainly in the US, and Tabelog, which is used in Japan, TripAdvisor is used in a wide range of countries. See the Appendix for evidence on the geographic distribution of TripAdvisor usage.
[14] See Chesto (2016). Other research – including Mayzlin, Dover, and Chevalier (2014) - uses TripAdvisor data.
[15] I have fewer than 60 for some countries, such as New Zealand, that are too small to have 60 listed cities in TripAdvisor.

– or an average of 77 cities per country - I obtain two pieces of information for June of 2018. First, I observe the total number of restaurants in the city that are listed in TripAdvisor. Many of these listings are unpopulated, including only the name of the restaurant but no cuisine information. Second, we observe the number of restaurants in the city reporting that it serves food in one of the 148 listed cuisine types. Because restaurants can and typically do report more than one cuisine type, the sum of the number of restaurants offering each cuisine does not equal the total number of restaurants. In total, the TripAdvisor sample covers 3,220,420 restaurants in the 52 countries; and the data include 5,236,180 underlying cuisine listings.

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. Moreover, we could estimate the share of restaurant food in a cuisine as the share of restaurants offering that cuisine. Because restaurants can list multiple cuisines, estimating each cuisine's share of restaurants in an area requires a weight for each cuisine reflecting the share of the restaurant's fare the cuisine accounts for when the cuisine is present at a restaurant. A simple example clarifies the point. Suppose that the Italian restaurants serve only Italian food, so that the Italian cuisine designation only appears alone. By contrast, suppose that all restaurants serving Moroccan food also serve Algerian food and that all such restaurants therefore list two cuisines, Algerian and Moroccan. A town with two restaurants, one Italian and one Algerian/Moroccan, will have a total of three cuisine listings in the town: Italian, Algerian, and Moroccan. According to raw listings, all three cuisines account for a third of what's available. But this is misleading, since an Algerian or Moroccan listing actually reflects only one half of what's available at a restaurant offering that cuisine. Hence, Algerian and Moroccan should each receive a weight of one half, while Italian should receive a weight of one. So in the hypothetical town, Italian accounts for half of the food, while Algerian and Moroccan each account for one quarter.

Apportioning restaurants to cuisines requires weights for each cuisine indicating the share of a restaurant's cuisines typically accounted for by the cuisine when present at a restaurant. Determining these weights for each cuisine *c* and destination country *d*, which we term ω_c^d, requires restaurant-level data on the cuisines listed rather than the metro-level data described above. To accommodate the possibility that cuisine weights vary across countries, I obtain restaurant-level data on the listed cuisines at each of the first 60 listed restaurants in (up to) each of the 40 Trip-Advisor-listed cities in each country. The resulting dataset for calculating cuisine weights by country is based on 63,577 restaurants in 52 countries, or on an average of 1,223 restaurants per country. I also calculate overall cuisine weights (pooling the data across countries). Because the restaurant-level sample for calculating cuisine weights contains only a subset of restaurants in the underlying sample, I am missing some cuisine weights for some countries, as well as the weights for some cuisines everywhere. I replace missing country-specific cuisine weights with common cuisine weights, and I replace other missing cuisine weights with the average of the common cuisine weights for the cuisines where I observe a weight. (Note that I explore the impact of weights on results in the robustness section, where I consider the extreme case where all cuisines have a weight of one).

Aggregated across countries, the mean (median) cuisine has a weight of 0.33 (0.32), meaning that each cuisine typically appears as one of about 3 cuisines. There is variation across cuisines in their tendency to be the only listed cuisine. Indian cuisine has among the highest weights, at 0.50. This is followed fairly closely by Chinese, at 0.46. Italian is at 0.40. Ukrainian and Armenian, by contrast, account for under 0.25. With ω_c^d as the weight associated with cuisine c in destination country d and n_c^d as the number of country d restaurants listing cuisine c among their cuisines, the effective number of restaurants in cuisine c is then $n'^d_c \equiv \omega_c^d n_c^d$.

The most common cuisines vary by country. In China, they are Chinese (30.0%), Asian (6.7%), Cantonese (5.1%), and Japanese (4.7%). In France, they are French (25.7%), European (14.5%), and Italian (5.8%). In the US they are American (17.9%), bar (6.8%), Asian (5.9%), and Italian (5.4%). Many of the 148 cuisines are easy to associate with origin regions, as the cuisine is literally the name of a country (Italian, Chinese, Slovakian, etc). In other cases the cuisines are named for regions with countries (Wales, Scotland), which we can associate with the country that includes the region. Some cuisines – pizza – have ready associations with their origin countries.

Of the 148 cuisines, eighteen are literally ageographic and cannot be associated with an origin region. These include bar, barbecue, brew pub, café, contemporary, delicatessen, diner, fusion, gastropub, grill, healthy, international, pub, seafood, soups, steakhouse, street food, and wine bar. For restaurants whose cuisines are ageographic, we assign their locations as their origins. Hence I label a bar in Italy as a restaurant with Italian-origin cuisine.

Another sixteen are associated with a region and not a country. These are African, Arabic, Asian, Caribbean, Central American, Central Asian, Central European, Eastern European, European, Fast Food, Latin, Mediterranean, Middle Eastern, Polynesian, Scandinavian, and South American. For each of these cuisines, we obtain lists of countries in the group. We then apportion the imports to the countries that are group members, proportionally to

GDP. This is easier for some groupings (such as Africa) than for others (such as Mediterranean). We rely on Wikipedia pages describing regions for lists of countries in the respective regions.[16]

For each country *d* in the sample we calculate the effective number of restaurants by cuisine from above as n'^{d}_{c}. Given our mapping of cuisines to origin countries, we can calculate the effective number of restaurants by origin country *o* in each destination country *d*, n'^{d}_{o} (where we replace the cuisine subscript *c* with the origin subscript *o* and continue to denote destination countries by *d*). In some cases cuisines map directly and uniquely to origin countries. In other cases, multiple cuisines map to a single country (e.g. pizza and Italian to Italy). In still other cases, a particular cuisine (e.g. African) maps to multiple countries.

Our goal is to estimate the volume of restaurant consumption from each origin country in each destination country. We calculate origin *o* cuisines' share of restaurants in country *d* as $s_o^d = \frac{n'^{d}_{o}}{\sum_{o \in O} n'^{d}_{o}}$. We can treat this as an estimate of the share of consumption associated with the origin country, an approach that, perforce, assumes that restaurants have the same volume and prices across cuisines.

TripAdvisor includes "fast food" among its cuisines. While fast food makes up a fifth of restaurant expenditure across the 52 sample countries according to aggregate expenditure in the Euromonitor data, fast food makes up just two percent of restaurants according to the method above. I therefore exclude fast food from the TripAdvisor shares and scale the remaining shares up to sum to one within each country. I then apply the TripAdvisor shares to aggregate non-fast food expenditure in each destination to calculate non-fast food trade flows.

[16] See, for example. https://en.wikipedia.org/wiki/Mediterranean_Sea .

In the end I have separate measures of restaurant expenditures for fast food and non-fast food in each of the 52 destination countries and (up to) 169 origin countries. For total restaurant expenditure we observe positive trade for 8,616 of the country pairs among the 8,788 possible pairs with 52 destinations and 169 origins. I denote the total restaurant expenditure on *o*-country origin cuisine in destination country *d* as r_o^d. I calculate an analogous total excluding fast food, and these two measures are the bases for trade flow calculations as well as the dependent variables in the gravity regressions.

In addition to data on cuisine trade derived from TripAdvisor in conjunction with Euromonitor, I have measures from three additional sources. First, I obtain "gravity" variables – distance between countries and whether they share language, etc. – from CEPII (Head and Mayer, 2013). Second, I obtain data on bilateral trade in food products from the COMTRADE. In particular, I observe product trade between origin and destination country by year (4 digit, bilateral) based on the BACI data which in turn are derived from the UN Comtrade data for 2014.[17] Third, I obtain data on the migrant stock by origin and destination country from United Nations (2015).[18] Fourth, I obtain data on the total arable land in each country from the World Bank.[19]

III. Results

[17] I obtain these data from https://atlas.media.mit.edu/static/db/raw/year_origin_destination_hs07_4.tsv.bz2 I classify as food all of the product codes between 101 and 2209, except for the following codes: 501, 502, 505, 506, 507, 508, 510, 511, 601, 602, 603, 604, 1211, 1302, and 1401. The underlying data source is http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=1.

[18] United Nations, Department of Economic and Social Affairs (2015). Trends in International Migrant Stock: Migrants by Destination and Origin (United Nations database, POP/DB/MIG/Stock/Rev.2015).

[19] http://databank.worldbank.org/data/reports.aspx?source=2&series=AG.LND.TOTL.K2&country=#

a. Trade patterns

Table 1 describes patterns of cuisine trade among selected origin and destination markets, excluding fast food. For example, the table shows that 56.8 percent of the restaurant cuisine consumed in our Argentine sample is domestic. A few features of the data are notable. First, the high shares along the main diagonal are reminiscent of analogous figures in other trade studies documenting home bias. Countries with particularly high domestic shares include Turkey (where 80.9 percent of consumption is domestic), China (78.4%), Italy (78.0%), and Japan (69.0%). Other countries are far more open to foreign cuisines and therefore have lower shares on the main diagonal. Examples include Germany (34.0%), Russia (40.7%), and France (49.7%). Second, some cuisines – notably Japanese, Italian, Chinese, French, Indian, and US – are popular in many destination markets.

Table 2 revisits the exercise for all restaurant expenditure (including fast food). The US share of many destination markets is larger when fast food is included. Home shares in many markets fall. The Chinese home share falls from 78.4% to 70.8% when fast food is included in the trade measures.

b. Gravity Models

Large volumes of existing research on trade document that bilateral trade flows obey the gravity model.[20] That is, the extent of trade between two countries tends to be smaller as the geographic distance between them is larger, and the volume of trade tends to be higher if the countries share a language or colonial ties. Domestic products are disproportionately consumed. Beyond the domestic home bias documented above, do cuisine trade patterns follow these

[20] See Anderson (1979) and Anderson and van Wincoop (2003) for theoretical gravity derivations; and see e.g. Disdier and Head (2008) for additional empirical evidence.

patterns? On one hand, one might not expect cuisine trade to obey gravity since there are no physical products being traded. Hence, one might expect less of a role for distance. On the other hand, other research documents gravity relationships in information trade, including attention to distant websites (Blum and Goldfarb, 2006).

To explore whether cuisine trade obeys gravity- and to ascertain origin cuisine popularity controlling for trade determinants - we regress the log of trade volumes (measured as the share of a destination's restaurant offering cuisines from each origin) on the log of distance between origin and destination, an indicator for whether the origin and destination are the same country, indicators for whether the pair shares a language and whether the pair were ever in a colonial relationship. We also include both origin and destination fixed effects. The model takes the form:

$$\ln(r_o^d) = \alpha \ln(dist_{od}) + \beta \delta_{od}^{home} + \gamma \delta_{od}^{common\ lang} + \pi \delta_{od}^{common\ colonial} + \mu_o + \mu_d + \epsilon_{od} \quad (1)$$

In this equation, r_o^d is the trade volume calculated above, $dist_{od}$ is the distance between origin (o) and destination (d) countries, δ_{od}^{home} is an indicator for observations where o=d, $\delta_{od}^{common\ lang}$ is 1 for countries sharing a language, $\delta_{od}^{common\ colonial}$ is 1 for countries sharing colonial heritage, and μ_o and μ_d are origin and destination fixed effects, respectively.

The destination fixed effects can be thought of as controlling for destination price levels or other destination-specific factors. The origin fixed effects are more substantively interesting for this exercise: they show the appeal of each origin's cuisine(s), after accounting for its proximity, language, and colonial relationships.

One shortcoming of estimating (1) via OLS is that the procedure drops country pairs with zero trade. The absence of trade is informative; and it is important to include the zero-trade pairs in the estimation. Santos and Tenreyro (2006) develop a method for including all pairs, and we report the estimates resulting from the use of Poisson pseudo maximum likelihood (PPML).

Table 3, column 1, reports OLS estimates of the gravity model including all food. As in many models of trade, distance matters: a one percent increase in distance reduces trade by about 1 percent. There is substantial home bias. On average domestic cuisines have market shares that are about 14 times higher ($e^{2.6} \approx 14$) than their shares elsewhere. Common language and common colonial heritage also matter. Column (2) excludes fast food, with similar implications for the gravity coefficients. Columns (3) and (4) repeat the exercise of the first two columns using the PPML approach. Distance coefficients become smaller, common language effects become small and insignificant, and the former colony coefficient shrinks.

The gravity estimates in Table 3 are interesting in the sense that the results recall gravity estimates from many other contexts (see, for example, Disdier and Head (2008)). Distance matters, even though the products here are not being shipped, as with the information trade in Blum and Goldfarb (2006). There is substantial home bias, and common language and colonial ties are positively related to the trade studied here.

Which cuisines are most appealing after accounting for rudimentary gravity factors? Figure 1 reports the origin fixed effects from the OLS model excluding fast food, while Figure 2 reports the origin fixed effects from the estimation that includes fast food. Excluding fast food, the ten most appealing origins are Italy, China, and Japan, which all have similar levels of appeal, followed by the US, India, France, Mexico, Thailand, Spain, and Turkey. When fast food is included, the US rises to the top, and the others remain in the same order. Figures 3 and 4 report analogous origin fixed effects from PPML models. Most results are similar, although a few orderings change. Brazil moves into the top 10 in both Figures 3 and 4, and Italy displaces the US in cuisine appeal when fast food is included.

c. Exploring Gravity

The exercises above reveal which origin countries have the most appealing cuisines, but they provide no explanation for the patterns. Here we explore a few possible explanations for patterns of trade in cuisine, including patterns of migration, trade in food products, and agricultural production capability (as measured by arable land in origin countries). Two of these variables, migration and food trade, are bilateral, while arable land is simply an origin country characteristic. We can include the bilateral variables but not an origin-country measure (such as arable land) directly in gravity models. Hence we do two kinds of exericses to explore the relationship between these additional factors and the patterns of cuisine trade. First, we include the bilateral variables in augmented gravity regressions. The coefficients on the additional variables are potentially interesting, as are the cuisine origin fixed effects from these models that include the additional explanatory variables. Second, we obtain origin fixed effects from simple gravity models of migration and food trade which we can then compare with the cuisine origin fixed effects as well as the arable land measure.

1. Augmented gravity

Table 4 presents a comparison of gravity models. The first two columns report cuisine gravity models, for total cuisine and cuisine excluding fast food, respectively. These specifications exclude domestic consumption, since the migration and food trade data do not include domestic consumption. The third column presents a gravity model of migration, and the fourth column presents a gravity model for food trade. Distance effects are larger for migration and, especially food, than for cuisine. Common language effects are particularly large for migration and are larger for food than for cuisine. Finally, the former colony coefficients are larger for food than cuisine and especially large for migration.

Columns (5) and (6) include measures of migration and food trade directly in gravity models for overall and non-fast-food cuisine. The additional explanatory variables are highly significant in the regressions. Interestingly, the resulting cuisine origin fixed effects (after controlling for migration and food trade) are quite similar to the cuisine origin fixed effects without controlling for these factors. See Figures 5 and 6.

2. Comparison origin fixed effects for cuisine and other factors

It would be desirable to try to explain the cuisine origin fixed effects with the origin fixed effects for migration and food trade, along with the arable land measure for origin countries. Figures 7 and 8 report the origin fixed effects associated with the migrant and food trade models. China, the US, Brazil, and Germany have the largest migrant origin fixed effects. The US, Brazil, China, and New Zealand have the largest food fixed effects.

The first three columns of Table 5 report regressions of cuisine origin fixed effects on the three candidate explanations, food and migration origin fixed effects, along with origin arable land area, respectively, as well as all three together in column (4). Columns (5)-(8) repeat the exercise using the cuisine fixed effects without fast food. All regressions include the origin country population measure to guard against simple scale effects. Each determinant is significantly related to the cuisine fixed effect when entered alone. When all three enter together, in columns (5) and (8), only migration remains significant. There are limits to what one can infer from this sort of exercise, but it does appear than migration patterns play a role in cuisine trade patterns.

d. Balance of Cuisine Trade

While the cuisine origin fixed effects indicate which cuisines consumers find most appealing, they do not directly indicate the size of the cuisine trade balances. A cuisine country's exports depend on its appeal abroad, but the country's net exports depend on the conjunction of the cuisine's appeal at home at a country's willingness to consume cuisines from abroad.

Table 6 reports the "imports," "exports," and "net exports" for 44 selected countries, excluding fast food in columns (1)-(3).[21] "Imports" are defined as home restaurant consumption in non-domestic cuisines. "Exports" are the sum of an origin country's consumption abroad. Of these selected countries, three are substantial net exporters: Italy (with net exports of $158 billion), Japan ($44 billion), and Mexico ($17 billion). Substantial net importers include the US ($134 billion), Brazil ($39 billion), the UK ($20 billion), and Spain ($20 billion).

The second half of the table repeats the exercise including fast food, producing a few interestingly different patterns. First, the US deficit falls substantially, from $134 billion to $55 billion, while many other countries' imports rise. This is particularly true for China and to lesser extents for Germany and the UK. The surpluses of Italy and Japan are increased somewhat by the inclusion of fast food because some of fast food trade includes their origin cuisines.

[21] We include countries that are a) among the 52 for which we have restaurant expenditure data and b) have a cuisine in Trip Advisor that explicitly corresponds to the country.

Interestingly, two of the countries most commonly implicated as global cultural hegemons, the Anglophone US and UK, are net importers rather than exporters in cuisine trade. For a sense of magnitudes, it is helpful to compare the implicit balance of payments in cuisine with the overall balance of payments. The overall US balance of payments was roughly $500 billion per year, 2010-2016, roughly ten times the unmeasured cuisine deficit.[22] Many of the other numbers are large in comparison with the measured balance of trade. For example, in 2015 Italy had a trade surplus of $50.1 billion, under half its cuisine surplus of $168 billion.[23]

e. Robustness to assumptions

The calculations in this paper embody a number of assumptions, including 1) the cuisine weights for non-fast food and 2) whether chicken fast food is assumed to be American. Here I explore the sensitivity of the basic results to different assumptions.

One can map TripAdvisor cuisines into distributions of non-fast food restaurants by cuisine in various ways. So far we have used country-specific cuisine weights. We can instead use equal weights on all cuisines. This is not so much a plausible method as a test for how much cuisine weighting schemes matter.

The main results in the paper assume that chicken fast food is US in origin. While much fast food chicken, such as KFC, is based on American cuisine, other chicken fast food around the world is not. For example, the Malaysian-based Chicken Rice Shop serves "what it calls "grandmother's traditional Hainanese secret recipe chicken rice."[24] Philippines-based Mang Insal

[22] https://www.census.gov/foreign-trade/statistics/historical/gands.pdf
[23] https://www.statista.com/statistics/263624/trade-balance-of-goods-in-italy/
[24] See https://en.wikipedia.org/wiki/The_Chicken_Rice_Shop .

serves chicken skewers. [25] It seems prudent to check how results change if we classify chicken fast food as domestic rather than American.

Figure 9 contrasts the cuisine origin fixed effects from the equal-weights and local chicken approaches with the baseline cuisine origin FE (including fast food). The baseline cuisine origin fixed effect is along the horizontal axis. The baseline estimate of the US cuisine fixed effect is just over 6.5. The origin cuisine fixed effects for the top countries are close to their baseline values on the 45 degree line, indicating that basic results (including fast food) are not sensitive to these assumptions. Figure 10 compares baseline and equal-weight results excluding fast food, with similar results. The rank orderings sometimes change, but the magnitudes of the origin fixed effects are similar across specifications.

Figures 11 and 12 summarize the net export measures based on these differing approaches, compared with the baseline results (using country-specific cuisine weights and assigning all chicken fast food to the US). Baseline net exports are depicted along the line, while alternatives appear as symbols potentially away from the line. Countries are ordered from those with the largest deficits to those with the largest surpluses, and the figures include all 44 countries included in Table 6. If chicken fast food were domestic rather than US-origin, the overall US deficit in Figure 11 (including fast food) rises from $55 billion to roughly $90 billion. Placing equal weight on cuisines increases the Chinese trade deficit by $18 billion. Otherwise, the net export results are not very sensitive to the differing measurement approaches. Figure 12 repeats the exercise excluding fast food, with only small changes from the baseline results that exclude fast food.

[25] See https://www.manginasal.com/menu/.

IV. Discussion and Conclusion

It is instructive to compare our results on cuisine trade with analogous figures for the audiovisual products that dominate most discussions of cultural trade, motion pictures and recorded music. While analogous trade statistics are not readily available from, say, government or industry sources, we can construct them from related research. US-origin movies generate large shares of box office revenues in most countries around the world. Based on data in Ferreira, Petrin, and Waldfogel (2017) one can calculate that in 2014 the US had a motion picture box office surplus of roughly $10 billion. Similar rough calculations indicate that the UK had a recorded music trade surplus on the order of $2 billion in 2015.[26]

In contrast to their audio-visual trade surpluses, the Anglo-American countries have substantial cuisine trade deficits. Moreover, the magnitudes of these deficits dwarf the surpluses in other cultural products. If we add the net exports across cuisine, movies, and music, we obtain substantial trade deficits for the Anglo American countries. If one views cuisine as a cultural good – and there is good reason to do so – then its inclusion reverses one of the standard stylized facts that motivates much policy making around trade in cultural products.

Not only is the cuisine category larger, but the patterns of trade are quite different. The top 5 cuisines by export appeal are Italian, Chinese, Japanese, US, and Indian. The top 5 net exporters are Italy, Japan, Mexico, Turkey, Thailand, and France. While the study's findings are relatively clear, our approach has some inherent shortcomings that bear mention both for caution as well as to guide further research. First, it is difficult to know how representative Trip Advisor

[26] See Waldfogel, Aguiar, and Gomez-Herrera (2017) as well as Ferreira and Waldfogel (2013).

data are for even non-fast food restaurants. Despite our evidence in the Appendix that TripAdvisor is similar to Yelp for the US and similar to Tabelog for Japan, these data sources may reflect tourist interests in ways that are unrepresentative of the underlying restaurant population. Second, because we don't observe sales volumes, our approach treats each restaurant as equally important, an implicit assumption that may introduce bias across cuisines. Still, if one accepts the results as even rough approximations, the inclusion of cuisine as a cultural good reverses the apparent dominance of Anglo-American cultural products.

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Table 1: Cuisine trade excluding fast food

	Argentina	**Brazil**	**China**	**France**	**Germany**	**Greece**	**India**	**Italy**	**Japan**	**Mexico**	**Russia**	**South Korea**	**Spain**	**Thailand**	**Turkey**	**United Kingdom (UK)**	**United States**
Argentina	56.8%	1.0%	0.0%	0.2%	0.2%	0.0%	0.0%	0.1%	0.0%	2.0%	0.0%	0.0%	0.6%	0.1%	0.1%	0.1%	0.3%
Brazil	5.5%	55.6%	0.0%	0.3%	0.3%	0.1%	0.1%	0.1%	0.1%	2.4%	0.1%	0.1%	0.5%	0.1%	0.0%	0.2%	0.8%
China	1.3%	1.4%	78.4%	3.3%	5.0%	1.3%	23.5%	1.8%	11.5%	1.2%	2.4%	14.9%	2.7%	8.4%	0.7%	7.9%	6.3%
France	2.2%	1.4%	0.9%	49.7%	3.8%	6.9%	0.8%	3.7%	2.2%	2.0%	3.5%	0.5%	6.1%	2.5%	2.1%	2.0%	1.7%
Germany	0.7%	0.5%	0.2%	2.3%	34.2%	0.7%	0.3%	0.5%	0.1%	0.3%	3.5%	0.1%	1.9%	1.3%	0.5%	0.7%	0.3%
Greece	0.2%	0.7%	0.1%	0.5%	2.7%	59.9%	0.2%	0.7%	0.0%	0.5%	0.9%	0.1%	0.7%	0.2%	0.6%	0.6%	0.9%
India	0.8%	0.4%	1.7%	2.6%	2.8%	0.7%	53.7%	0.6%	3.2%	0.5%	0.7%	5.2%	1.3%	4.2%	0.4%	5.9%	2.4%
Italy	14.1%	22.7%	2.9%	11.3%	16.4%	9.6%	7.2%	78.0%	6.1%	10.4%	13.5%	5.3%	12.3%	7.1%	5.8%	9.5%	15.5%
Japan	3.3%	5.1%	6.8%	4.4%	3.2%	1.0%	1.7%	2.5%	69.0%	3.0%	7.1%	10.3%	2.5%	6.0%	0.5%	2.1%	4.6%
Mexico	1.4%	2.7%	0.2%	0.4%	0.8%	0.3%	0.9%	0.4%	0.1%	65.0%	0.3%	1.1%	0.9%	0.5%	0.3%	0.7%	5.7%
Russia	0.3%	0.2%	0.3%	2.2%	1.6%	0.7%	0.3%	0.4%	0.1%	0.2%	40.7%	0.1%	1.7%	1.2%	0.4%	0.9%	0.2%
South Korea	0.2%	0.1%	2.0%	0.5%	0.5%	0.1%	0.5%	0.1%	0.7%	0.3%	0.3%	48.4%	0.2%	0.9%	0.1%	0.4%	0.7%
Spain	2.6%	0.6%	0.3%	2.4%	2.7%	4.0%	0.3%	2.3%	0.7%	3.0%	1.6%	0.1%	48.7%	0.8%	1.3%	1.3%	1.9%
Thailand	0.2%	0.1%	0.7%	1.3%	2.1%	0.2%	1.6%	0.1%	1.1%	0.4%	0.3%	1.0%	0.5%	52.2%	0.1%	1.5%	1.6%
Turkey	0.7%	0.4%	0.2%	2.1%	3.2%	4.2%	0.4%	2.2%	0.1%	0.4%	2.5%	0.1%	3.7%	0.8%	80.9%	1.7%	0.7%
United Kingdom (UK)	0.2%	0.2%	0.2%	1.6%	1.1%	0.7%	0.3%	0.3%	0.1%	0.2%	2.2%	0.1%	2.5%	1.1%	0.8%	51.6%	0.2%
United States	1.4%	1.5%	0.9%	2.2%	2.3%	0.8%	1.7%	0.7%	1.2%	2.9%	3.3%	2.0%	1.5%	1.8%	0.9%	1.7%	48.7%

Note: author's calculation of cuisine trade between origin countries (on the rows) and destination countries (on the columns). Trade flows are based on Euromonitor measures of aggregate restaurant spending in each destination country (less fast food), multiplied by the origin shares as inferred from TripAdvisor data. See text for details.

Table 2: Cuisine trade overall (including fast food)

	Argentina	Brazil	China	France	Germany	Greece	India	Italy	Japan	Mexico	Russia	South Korea	Spain	Thailand	Turkey	United Kingdom (UK)	United States
Argentina	59.4%	0.8%	0.0%	0.2%	0.1%	0.0%	0.0%	0.1%	0.0%	2.1%	0.0%	0.0%	0.6%	0.1%	0.1%	0.1%	0.5%
Brazil	4.3%	61.2%	0.0%	0.3%	0.2%	0.0%	0.1%	0.1%	0.0%	3.8%	0.1%	0.1%	0.5%	0.1%	0.0%	0.2%	1.8%
China	1.0%	1.2%	70.8%	3.0%	3.9%	1.1%	25.6%	1.7%	9.9%	1.1%	1.4%	12.3%	2.5%	6.5%	0.6%	6.3%	4.1%
France	1.7%	1.1%	0.8%	44.5%	2.7%	6.1%	0.6%	3.5%	1.7%	1.6%	1.9%	0.4%	5.8%	2.0%	1.8%	1.5%	1.0%
Germany	0.5%	0.4%	0.2%	1.8%	35.5%	0.6%	0.2%	0.5%	0.1%	0.3%	1.9%	0.1%	1.8%	1.0%	0.4%	0.6%	0.1%
Greece	0.1%	0.5%	0.1%	0.4%	2.0%	62.7%	0.1%	0.7%	0.0%	0.4%	0.5%	0.1%	0.7%	0.2%	0.5%	0.4%	0.5%
India	0.6%	0.3%	4.1%	2.2%	2.2%	0.7%	48.2%	0.5%	2.9%	0.4%	0.4%	4.3%	1.3%	3.2%	0.3%	4.6%	1.6%
Italy	11.1%	18.3%	2.4%	8.7%	11.9%	8.7%	6.6%	77.3%	4.7%	13.9%	11.3%	4.4%	11.7%	5.5%	5.2%	7.3%	9.3%
Japan	2.6%	4.1%	7.3%	3.5%	2.4%	0.8%	3.0%	2.4%	70.6%	2.3%	3.9%	8.5%	2.3%	4.7%	0.4%	1.6%	2.7%
Mexico	1.1%	2.1%	0.2%	0.4%	0.6%	0.3%	0.8%	0.4%	0.1%	59.0%	0.2%	0.9%	0.9%	0.4%	0.3%	0.6%	4.0%
Russia	0.3%	0.1%	0.2%	1.7%	1.2%	0.6%	0.3%	0.4%	0.1%	0.2%	42.0%	0.1%	1.6%	0.9%	0.4%	0.7%	0.1%
South Korea	0.1%	0.1%	2.3%	0.5%	0.4%	0.1%	1.0%	0.1%	0.7%	0.2%	0.2%	48.5%	0.2%	0.7%	0.1%	0.3%	0.5%
Spain	2.0%	0.5%	0.2%	1.8%	2.0%	3.6%	0.2%	2.2%	0.5%	2.3%	0.9%	0.1%	48.1%	0.6%	1.1%	1.0%	1.1%
Thailand	0.1%	0.1%	0.9%	1.0%	1.5%	0.2%	1.6%	0.1%	0.9%	0.3%	0.1%	0.8%	0.4%	59.8%	0.1%	1.2%	1.0%
Turkey	0.5%	0.5%	0.1%	2.6%	4.2%	3.8%	0.4%	2.2%	0.1%	0.3%	1.6%	0.1%	3.5%	0.6%	73.4%	2.5%	0.4%
United Kingdom	0.2%	0.1%	0.2%	1.3%	0.8%	0.6%	0.3%	0.3%	0.1%	0.1%	1.2%	0.0%	2.4%	0.9%	0.7%	50.8%	0.1%
United States	7.8%	3.9%	3.2%	14.9%	13.8%	2.0%	2.1%	2.4%	4.2%	6.4%	22.7%	10.5%	4.6%	4.5%	9.3%	10.0%	65.6%

Note: author's calculation of cuisine trade between origin countries (on the rows) and destination countries (on the columns). Trade flows are based on Euromonitor measures of aggregate restaurant spending in each destination country (less fast food), multiplied by the origin shares as inferred from TripAdvisor data, along with Euromonitor measures of fast food expenditure by country and cuisine allocated to cuisine origin countries. See text for details.

Table 3: Gravity regressions, country specific cuisine weights

	OLS, all	OLS, no fast	PPML, all	PPML, no fast
	(1)	(2)	(3)	(4)
log distance	-1.0757	-1.0609	-0.7945	-0.7835
	(0.0166)**	(0.0166)**	(0.0547)**	(0.0565)**
common language	0.4399	0.4563	-0.0422	-0.0880
	(0.0383)**	(0.0382)**	(0.1461)	(0.1193)
home dummy	2.5919	2.5038	1.7328	1.9269
	(0.1337)**	(0.1336)**	(0.1764)**	(0.1815)**
former colony	0.4746	0.4758	0.2876	0.1831
	(0.0710)**	(0.0709)**	(0.1597)	(0.1262)
R^2	0.93	0.93	0.99	0.99
N	8,616	8,616	8,788	8,788

* p<0.05; ** p<0.01

Notes: Regressions of log trade on listed variables as well as origin and destination fixed effects. OLS in columns (1) and (3), PPML in columns (2) and (4). Fast food is assumed to be domestic in each country in (1) and (2) and US-origin in (3) and (4). * p<0.05; ** p<0.

Table 4: Cuisine and other gravity

	Total	excl fast	Migrants	food exports	log total	excl fast
	(1)	(2)	(3)	(4)	(5)	(6)
log distance	-1.0741	-1.0621	-1.1819	-1.4296	-0.7673	-0.7349
	(0.0159)**	(0.0158)**	(0.0324)**	(0.0377)**	(0.0240)**	(0.0240)**
common language	0.4191	0.4329	1.2207	0.6204	0.2278	0.2678
	(0.0363)**	(0.0363)**	(0.0733)**	(0.0908)**	(0.0475)**	(0.0474)**
former colony	0.4210	0.4323	2.1014	0.9278	0.1444	0.1244
	(0.0674)**	(0.0673)**	(0.1125)**	(0.1453)**	(0.0679)*	(0.0677)
log migrants					0.1361	0.1429
					(0.0092)**	(0.0091)**
log food trade					0.0426	0.0434
					(0.0078)**	(0.0077)**
R^2	0.94	0.94	0.78	0.75	0.94	0.94
N	8,564	8,564	5,147	6,154	4,216	4,216

* p<0.05; ** p<0.01

Notes: Columns (1) and (2) report linear gravity regression of total cuisine and cuisine excluding fast food on listed variables as well as origin and destination fixed effects. Columns (3) and (4) use log migrants and log food trade as the dependent variable in analogous gravity regressions. Columns (5) and (6) agg the log migrant and log food trade variables to the gravity regressions of columns (1) and (2).

Table 5: Explaining cuisine appeal

	All (including fast)				Excluding fast food			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Population (mil)	0.0031	0.0010	0.0024	0.0012	0.0030	0.0009	0.0027	0.0016
	(0.0011)**	(0.0009)	(0.0020)	(0.0013)	(0.0011)**	(0.0009)	(0.0020)	(0.0012)
food origin FE	0.6157			0.0821	0.5982			0.0744
	(0.0610)**			(0.0749)	(0.0603)**			(0.0740)
migration origin FE		1.3813		1.2757		1.3504		1.2707
		(0.0873)**		(0.1366)**		(0.0864)**		(0.1349)**
Arable land			0.0407	-0.0022			0.0355	-0.0068
			(0.0133)**	(0.0089)			(0.0131)**	(0.0088)
R^2	0.49	0.68	0.20	0.68	0.48	0.68	0.18	0.68
N	152	152	152	152	152	152	152	152

* p<0.05; ** p<0.01

Notes: regression of cuisine origin fixed effects from linear gravity models on food and migration origin fixed effects as well as population and arable land area of origin country. The first four columns include all cuisines; the second four columns exclude fast food.

Table 6: Cuisine net exports, country-specific cuisine weights

	Excluding fast food			Including fast food		
country	exports	imports	net exports	exports	imports	Net exports
Argentina	4,206	6,119	-1,913	6,838	7,403	-565
Australia	1,394	16,463	-15,069	1,394	25,286	-23,892
Austria	1,392	8,304	-6,912	1,392	9,207	-7,815
Belgium	1,922	5,715	-3,793	1,922	6,200	-4,277
Brazil	7,243	46,138	-38,895	16,541	50,570	-34,029
Canada	295	15,510	-15,215	295	25,276	-24,982
Chile	1,241	1,396	-155	2,363	2,600	-238
China	114,822	110,351	4,471	130,528	182,937	-52,409
Colombia	2,127	5,038	-2,911	3,993	6,216	-2,223
Czech Republic	3,467	3,070	397	3,467	3,586	-119
Denmark	1,265	3,417	-2,152	1,265	4,256	-2,991
Egypt	7,971	1,934	6,038	10,489	2,567	7,922
France	40,353	21,391	18,962	40,353	30,508	9,844
Germany	12,208	22,483	-10,276	12,208	30,530	-18,323
Greece	9,772	4,096	5,676	9,772	4,264	5,508
Hungary	2,614	1,619	995	2,614	2,133	481
India	46,607	50,841	-4,233	66,756	67,136	-381
Indonesia	8,335	18,462	-10,127	16,498	19,819	-3,321
Ireland	2,035	3,703	-1,669	2,035	4,414	-2,380
Israel	3,337	2,038	1,300	4,815	3,280	1,535
Italy	176,219	17,945	158,274	187,744	19,544	168,200
Japan	91,447	47,564	43,883	105,770	57,975	47,796
Malaysia	2,990	4,855	-1,865	5,118	6,047	-929
Mexico	29,251	12,276	16,975	34,632	18,730	15,902
Morocco	2,561	1,419	1,143	2,561	1,872	689
New Zealand	172	3,653	-3,481	172	4,815	-4,643
Norway	1,869	3,444	-1,575	1,869	3,940	-2,070
Peru	2,202	2,322	-119	3,231	4,161	-930
Poland	2,852	4,057	-1,204	2,852	5,657	-2,804
Portugal	3,131	4,043	-912	3,131	4,787	-1,656
Russia	11,740	6,292	5,448	11,740	11,292	448
South Korea	18,048	32,739	-14,691	23,799	39,538	-15,738
Spain	21,358	41,649	-20,290	21,358	44,551	-23,193
Sweden	1,926	7,754	-5,828	1,926	10,155	-8,229
Switzerland	1,739	7,978	-6,239	1,739	9,464	-7,725
Taiwan	5,287	9,551	-4,264	8,453	12,025	-3,573
Thailand	21,409	10,309	11,101	24,463	11,176	13,287
The Netherlands	2,498	5,688	-3,190	2,498	7,398	-4,900
Turkey	18,676	2,021	16,655	22,677	3,234	19,443
Ukraine	1,398	1,716	-319	1,398	2,042	-644

United Kingdom (UK)	9,928	30,064	-20,137	9,928	40,056	-30,129
United States	26,919	160,698	-133,778	136,888	191,663	-54,776
Venezuela	1,785	236	1,549	3,232	304	2,928
Vietnam	10,282	8,957	1,325	11,944	9,545	2,398

Notes: Estimates for 2017, in milions of dollars. The table includes countries for which we have both a measure of restaurant expenditure as well as a Trip Advisor cuisines that corresponds directly to the country.

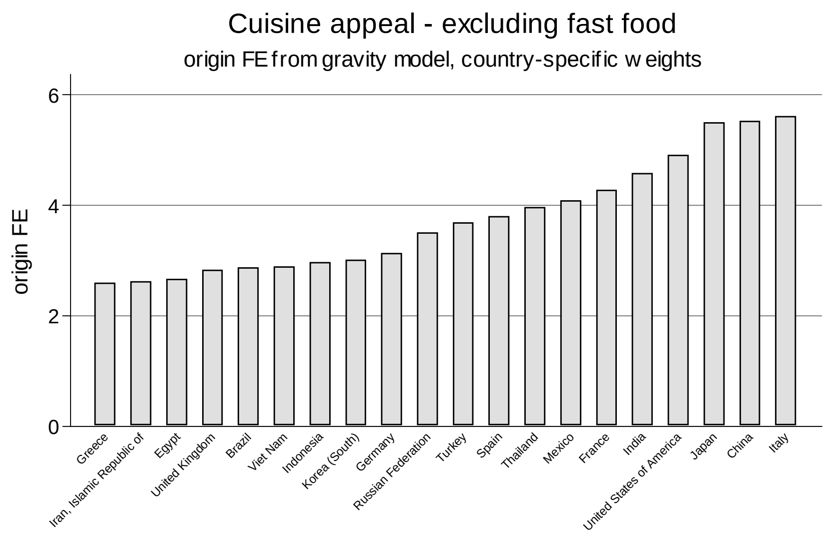

Figure 1

Notes: Origin fixed effects from a gravity regression of log non-fast food trade on log distance, a home dummy, common language and colonial ties dummies, along with origin and destination fixed effects.

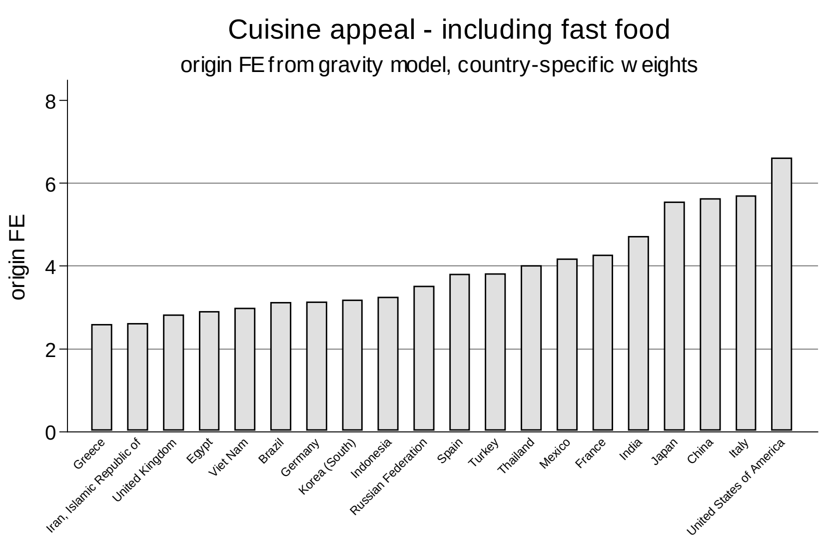

Figure 2

Notes: Origin fixed effects from a gravity regression of log total cuisine trade on log distance, a home dummy, common language and colonial ties dummies, along with origin and destination fixed effects.

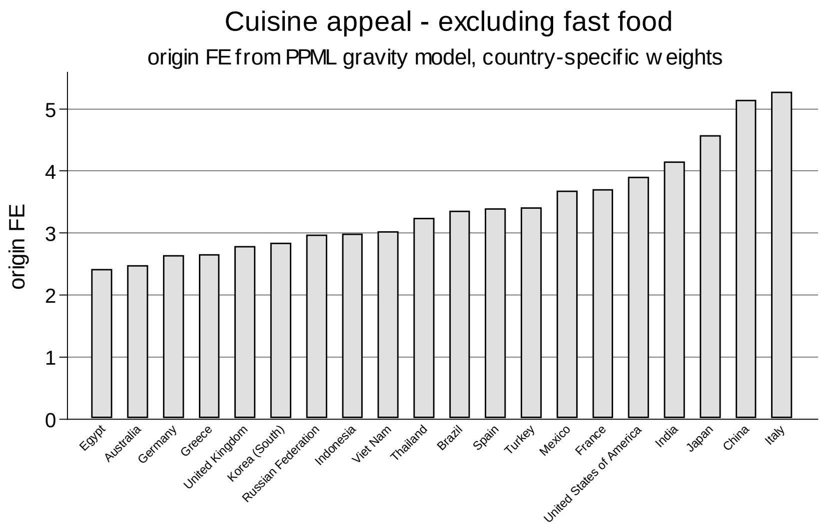

Figure 3

Notes: Origin fixed effects from a PPML gravity regression of non-fast food trade on distance, a home dummy, common language and colonial ties dummies, along with origin and destination fixed effects.

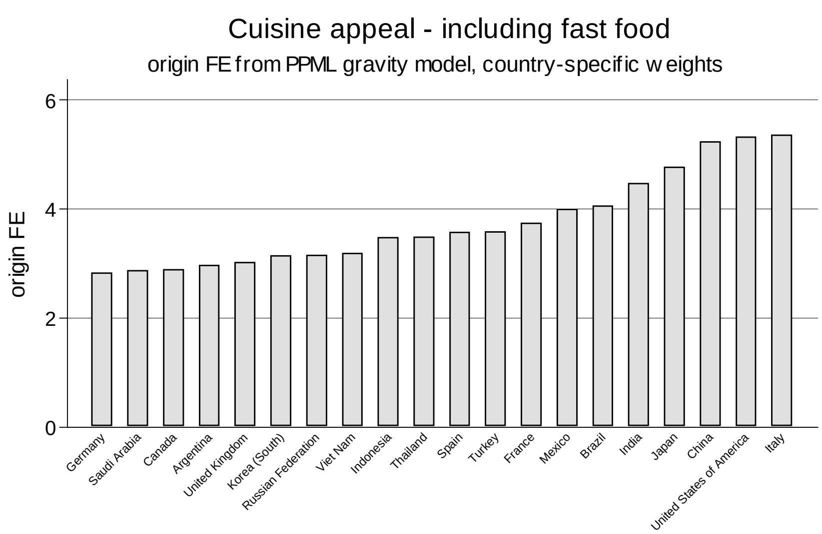

Figure 4

Notes: Origin fixed effects from a PPML gravity regression of total cuisine trade on distance, a home dummy, common language and colonial ties dummies, along with origin and destination fixed effects.

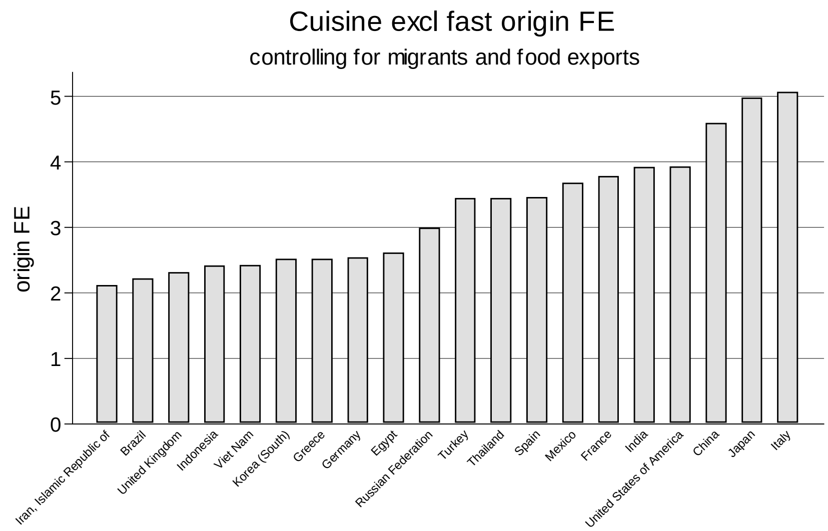

Figure 5

Notes: Origin fixed effects from a gravity regression of log non-fast food trade on log distance, a home dummy, common language and colonial ties dummies, as well as log migration and log food trade measures, along with origin and destination fixed effects.

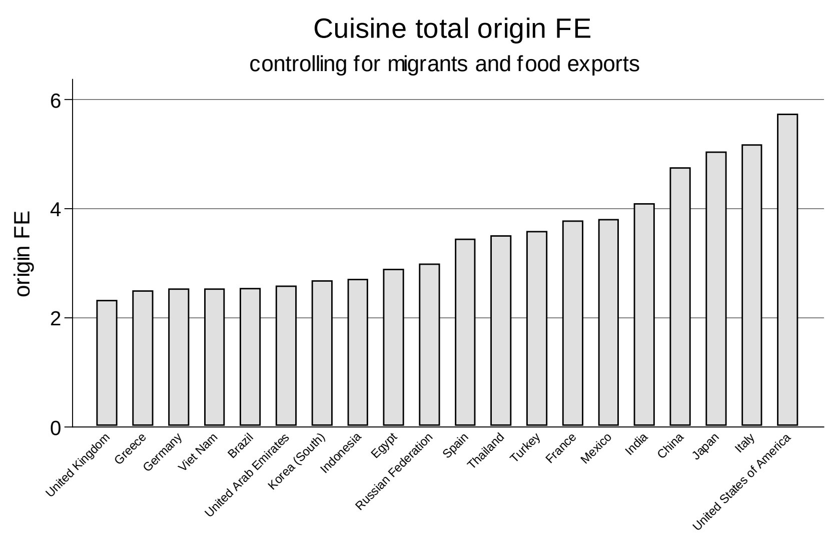

Figure 6

Notes: Origin fixed effects from a gravity regression of log total cuisine trade on log distance, a home dummy, common language and colonial ties dummies, as well as log migration and log food trade measures, along with origin and destination fixed effects.

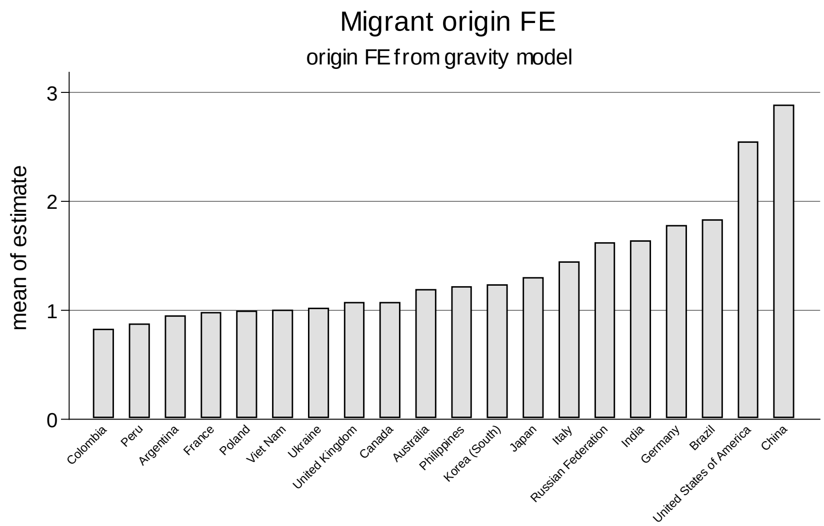

Figure 7

Notes: Origin fixed effects from a gravity regression of log migrant stock on log distance, a home dummy, common language and colonial ties dummies, along with origin and destination fixed effects.

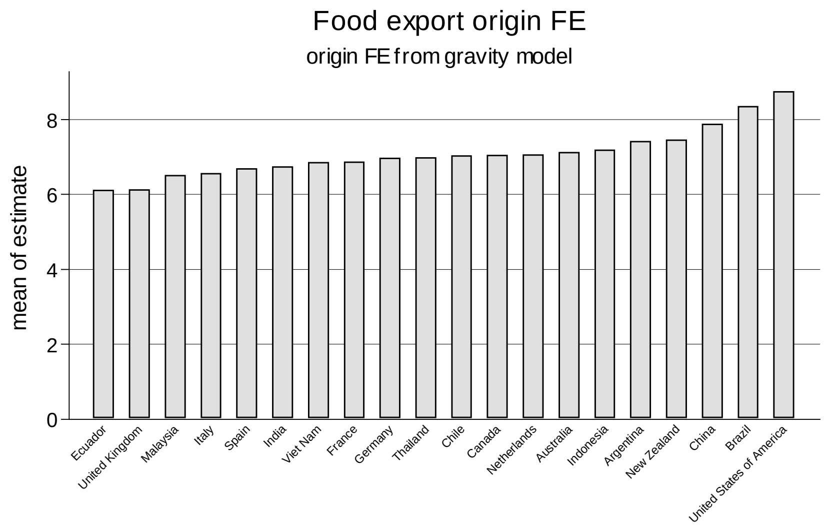

Figure 8

Notes: Origin fixed effects from a gravity regression of log food trade on log distance, a home dummy, common language and colonial ties dummies, along with origin and destination fixed effects.

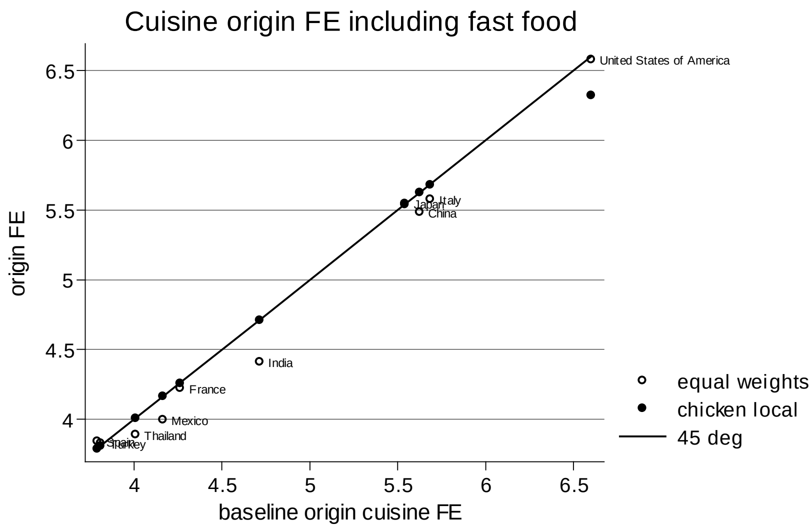

Figure 9

Note: cuisine origin fixed effects from gravity models embodying different assumptions. "Equal weights" means that each cuisine obtains the same cuisine weight of one. "Chicken local" means that the fast food chicken cuisine is assigned to the destination country rather than the US.

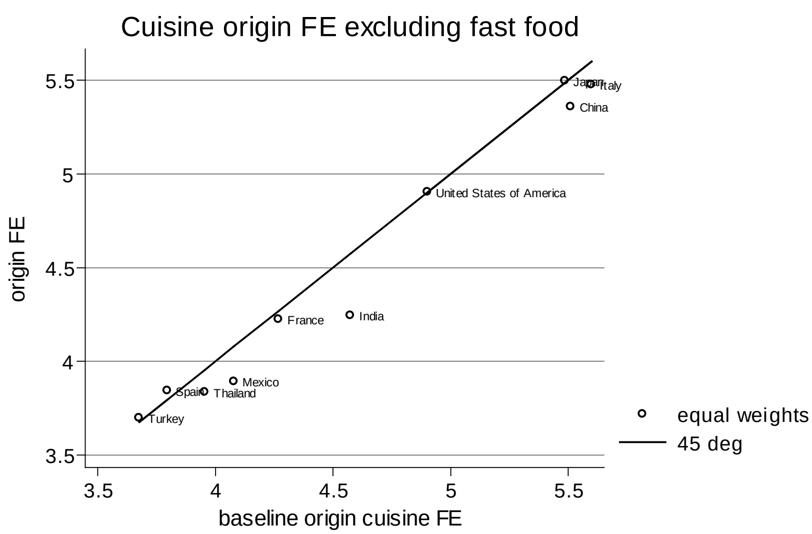

Figure 10

Note: cuisine origin fixed effects from gravity models embodying different assumptions. "Equal weights" means that each cuisine obtains the same cuisine weight of one.

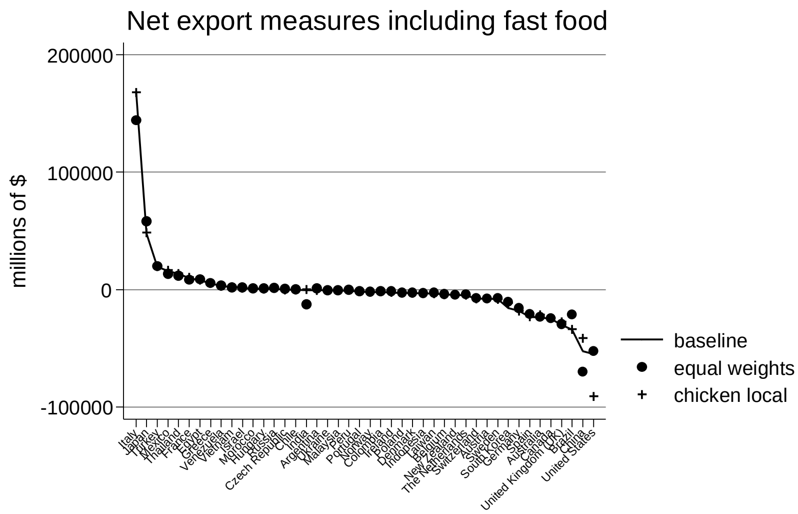

Figure 11

Notes: net exports including fast food incorporating differing assumptions. The line shows the baseline estimate. Baseline means that cuisine weights are country specific, and fast food chicken is assumed to be American in origin. Equal weights means that all cuisines are weighted equally. Chicken local assigns fast food chicken to its location country rather than the US.

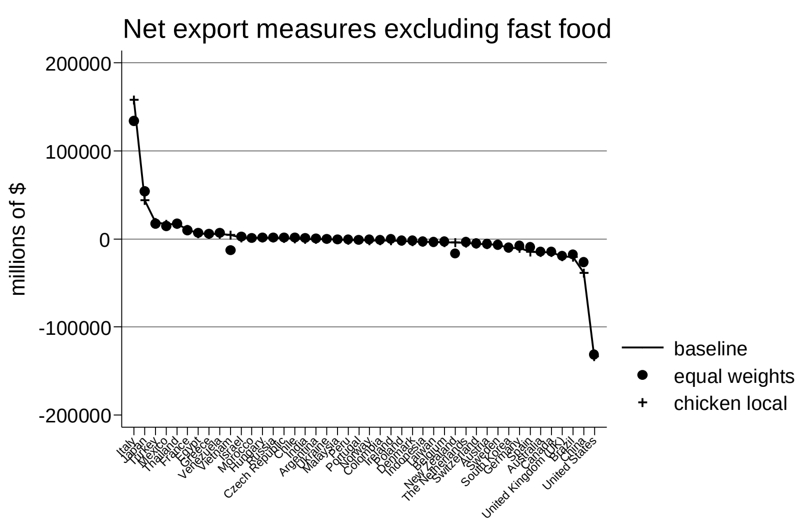

Figure 12

Notes: net exports including fast food incorporating differing assumptions. The line shows the baseline estimate. Baseline means that cuisine weights are country specific, and fast food chicken is assumed to be American in origin. Equal weights means that all cuisines are weighted equally. Chicken local assigns fast food chicken to its location country rather than the US and so is by construction the same as the baseline for non-fast food.

Appendix: TripAdvisor vs Yelp and Tabelog.

TripAdvisor is not the only source of restaurant information. Yelp is another major source of information, and Yelp is popular in the US. Tabelog.com, by contrast, is popular in Japan. Here we compare cuisine distributions between TripAdvisor and Yelp, in the US, and between TripAdvisor and Tabelog, for Japan.

1. TripAdvisor vs Yelp

Like TripAdvisor, Yelp classifies restaurants into roughly 120 cuisines, of which 61 match exactly across sources.

Almost half - 61 - cuisines match directly across the two data sources. These matching cuisines account for just over half of the US cuisine listings, 47.3 percent in TripAdvisor and 50.5 in Yelp. The shares are highly correlated across data sources (correlation=0.94), as figure A1 shows, which plots the TripAdvisor share against the Yelp share, confirms. For example, Mexican restaurants account for 5.2 percent of the cuisines in TripAdvisor and 6.8 percent in Yelp. Italian accounts for 5.4 percent in TA and 3.5 percent in Yelp, but pizza is 5.2 in TA and 6.8 percent in Yelp, perhaps reflecting a different distinction between pizza and Italian in the two data sources. We take the high correlation as evidence supportive of the validity of the TripAdvisor data.

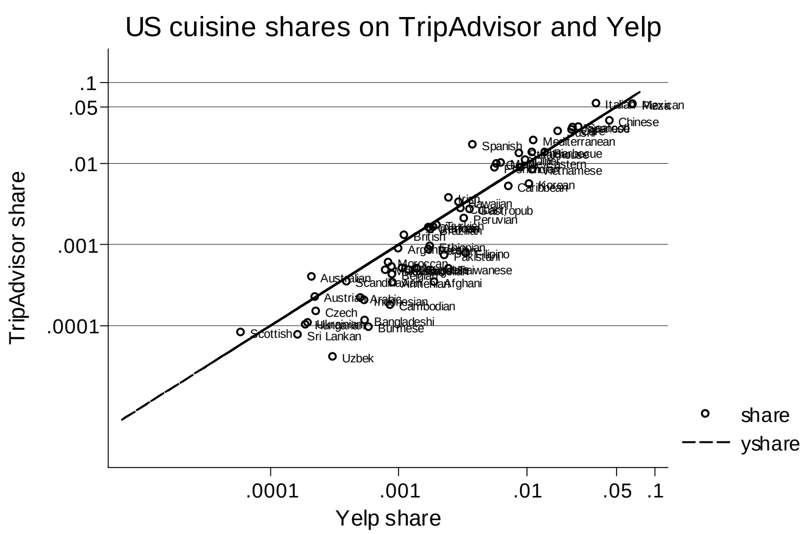

Figure A1

2. TripAdvisor vs Tabelog

An article at Eater (Nomura, 2017) describes Tabelog as “the definitive catalog of restaurants in Japan.” According to Nomura (2017), the crowd-sourced site “might sound a lot like Yelp, but there's a key difference: it is much, much better (even if it looks uglier).”

I obtained data on 1,000 restaurants from each of Tokyo, Osaka, Fukuoka, and Kyoto, as well as 200 restaurants from each of the remaining 41 cities listed at Tabelog.com. Each of these restaurants lists up to three cuisines at Tabelog. I then mapped these cuisines into 9 categories: French, Indian, Italian, Mexican, American, Japanese, and other (non-Japanese). I did the same thing for the listed cuisines for the restaurants from the 158 Japanese cities in the TripAdvisor data. This gives me 39,612 cuisines listings from Tabelog and 1,362,828 from TripAdvisor.

Table A2 shows the resulting cuisine distributions. Japanese cuisines (including ageographic cuisines such as “bar”) account for 86.31 percent in the Tabelog data, compared with 81.81 percent in the TripAdvisor data. French accounts for 1.56 percent in Tabelog and 1.89 percent in TripAdvisor. Italian accounts for 5.76 percent in Tabelog and 4.68 percent in TripAdvisor. We take the similarity of these cuisine distributions, along with the Yelp evidence for the US, as evidence supporting the use of TripAdvisor.

Table A2: Cuisine distributions for Japan cities, Tabelog.com vs TripAdvisor

	Tabelog	TripAdvisor
France	1.56%	1.89%
India	0.24%	1.28%
Italy	5.76%	4.68%
Korea	0.73%	0.81%
Mexico	0.14%	0.15%
Thailand	0.27%	0.51%
United States	0.23%	1.13%
Japan	86.31%	81.81%
other	4.76%	7.73%
total	100.00%	100.00%

Note: these are the distributions of listed cuisines for the top 1,000 listed restaurants in each of Tokyo, Osaka, Fukuoka, Hokkaido and Kyoto, along with the top 200 from each of 41 additional Japanese cities listed at Tabelog, compared with the TripAdvisor listings in the paper’s dataset for Japan.

3. TripAdvisor, Yelp, and Tabelog usage

Based on the volume of Google searches for the terms Yelp and TripAdvisor, it is clear that Yelp is more popular in the US than is TripAdvisor. Yelp has twice as many US searches as TripAdvisor, as Table A2 shows. Outside of the US, TripAdvisor is far more popular. Yelp accounts for a third of the searches to one of the two sources in Guam, just over a quarter in Pakistan, about a fifth in Bangladesh, just under a fifth in Canada, Kosovo, and Syria.

Among the major countries in Europe, Yelp accounts for 10 percent in Germany, 2 percent in France, one percent in Spain and the UK, and less that a percent in Italy. Usage in Asia is similarly, although slightly less, skewed toward TripAdvisor: Yelp accounts for 13 percent of searches for either Yelp or TripAdvisor in South Korea, 10 percent in China, Taiwan, and Japan.

We take the relatively low usage of Yelp outside of the US as an obstacle to its use as a source of information on the distribution of restaurant cuisines around the world. Despite that drawback, the Yelp data are useful to us as a check on the TripAdvisor data. It would be reassuring if the two sources indicated similar cuisine distributions in a country they both cover extensively, the US.

Tabelog, which is indexed in Google trends as kakaku.com, is searched only in Japan, where its searches account for 71 percent of the searches for the three sites.

Table A2: Countries with the Highest Yelp Search Intensity relative to TripAdvisor

Country	TripAdvisor: (6/25/13 - 6/25/18)	Yelp: (6/25/13 – 6/25/18)	
United States	36%	64%	0.5625
Guam	67%	33%	2.0303
Pakistan	73%	27%	2.7037
Bangladesh	78%	22%	3.5455
Canada	81%	19%	4.2632
Kosovo	82%	18%	4.5556
Syria	82%	18%	4.5556
Puerto Rico	85%	15%	5.6667
U.S. Virgin Islands	86%	14%	6.1429
Afghanistan	86%	14%	6.1429
South Korea	87%	13%	6.6923
Iraq	88%	12%	7.3333
Mongolia	89%	11%	8.0909
Ghana	89%	11%	8.0909
Nigeria	89%	11%	8.0909
Germany	90%	10%	9.0000
China	90%	10%	9.0000
Taiwan	90%	10%	9.0000
Japan	90%	10%	9.0000

Source: Google Trends.