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Do Immigrants Enhance International Trade in Services? The Case of US Tourism Services Exports

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ABSTRACT

That immigrants affect trade in goods between their home and host countries is well established in the literature. Little evidence exists, however, as to whether immigrants also affect trade in services. Using data on international tourist arrivals from 86 countries to the United States during the years 1995–2004, we provide the first empirical evidence on the effect of immigrants on exports of tourism services. Our results suggest that immigrants significantly enhance exports of tourism services (as measured by the number of tourist arrivals in the US from different home countries). Copyright © 2011 John Wiley & Sons, Ltd.

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Keywords: demand; immigrants; tourism; trade; zero-inflated negative binomial.

INTRODUCTION

In recent years, a voluminous literature has emerged that documents a positive influence of immigrants on the flow of international trade in goods between their home and host countries (see Tadesse and White [2011] for a comprehensive survey). Results from the available studies support the hypothesis that immigrants increase trade between their host and home countries through the following: (i) their preferences for home country-produced goods (described by White (2007) as a 'transplanted home bias' effect); (ii) their network connections with individuals, business and social groups in their home (host) countries (described by Rauch and Trindade (2002) as an 'information bridging' effect); and (iii) by enabling cross-cultural contacts and increasing the likelihood that transactions will be initiated and that deals will be completed. Describing specifically the latter as the 'cultural difference bridging effects' of immigrants, Tadesse and White (2010) show that immigrants increase the exports of goods embedded with their host countries' cultures to their home countries. Given that trade in services (particularly that of tourism) involves the exposure of importers to cultures and practices that define a particular society and which often are foreign to them, we hypothesize that in a similar fashion, immigrants may enhance bilateral trade in services.

There are few empirical studies of the effect of immigrants on trade in services, particularly on whether and how immigrants might affect the number of tourists arriving in their host/home countries. Thus, for the purpose of our study, we draw inferences from two types of literature: studies of the demand for tourism and the literature relating to the influences of immigrants on trade in goods. Among the first group of studies, Feng and Page (2000), Cohen (1997) and Boyer (1996) indicate that migrants generate tourism through the geographic extension of friendship- and kinship-based networks. They also stress that the extent to which migrants generate tourism depends upon the characteristics of such networks (i.e. their intensity and reciprocity) and the modes used

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to sustain contacts. Most recently, using data on the annual inflow of visitors and controlling for the stock of each tourist origin country's immigrant population residing in Canada, Prescott *et al.* (2005) estimate that an additional immigrant increases Canada's total tourism-related revenue by approximately $4550. Results from Morley's (1991) survey of the models that have been used in the estimation of tourism demand functions generally indicate that destination choices are influenced, in part, by the amount of information available to potential tourists.

Taking these findings into account, we posit that immigrants enhance trade in tourism services between their home and host countries by providing otherwise unavailable information to potential consumers of tourism services in their home countries. Also, by facilitating travel arrangements and providing finances, accommodations and connections to individuals, businesses and social groups, immigrants may confer information that decreases transaction costs, thus increasing tourism.[1] Immigrants also could be the reason for travel by friends and family members who are interested in visiting them in their host countries but who would not otherwise do so. To examine our hypothesis, we utilized data on US exports of tourism services to 86 home countries for which data on the stock of immigrants and related control variables are available during the period 1995–2004.[2] We utilized the US data for several reasons. First, the US is host to roughly 35 million of the more than 175 million immigrants worldwide and from 1960 to 2007, exports of services accounted for 21.1% of total US exports. Second, in recent decades, the US has observed a phenomenal rise in both the inflow of immigrants and the number of tourist arrivals. Thus, understanding whether and to what extent immigrants affect trade in tourism has important policy implications. Third, as indicated, very little information exists on whether immigrants who reside in the US influence trade in services between the US and their home countries. Given the diversity of both immigrants' and tourists' home countries to which the US exports services and the significance of tourism services trade relative to total US exports, analysis of the relationship using US data may provide useful information.

Our results indicate that increases in the stock of immigrants from a given home country correspond with significant increases in the number of tourist arrivals from the particular home country, subject to the presence of positive demand for imports of tourism services from the US. This suggests that, although immigrants do not necessarily induce demand for US tourism services, they enhance effective demand for travel to the US among consumers in their home countries. The implication is that in the absence of immigrants from a given home country, US exports of tourism services to that country would be significantly lower than what is observed. We also found that demand for US tourism services among consumers in the immigrants' home countries is negatively related to the geographic distance between the US and the respective home countries as well as the amount of home country goods that would be forgone (as measured by the inverse of purchasing power parity conversion factors) to import a basket of US tourism services. Similarly, a rise in economic freedom, the number of US embassies and/or consulates located in the immigrants' home countries, and the wealth (as measured by the per capita income) of the immigrants' home countries increases the number of tourist arrivals in the US. Our results have two important implications. First, the positive influence of immigrants on the effective demand for US tourism services indicates that immigrants play a broader role in influencing host–home country trade than has previously been discussed in the immigrant-trade literature or in studies of the demand for tourism. Second, previous estimates of aggregate tourism demand, where immigrants are not included as an explanatory variable, may not be robust.

The paper proceeds as follows. In Section II, we review the literature relating to the

[1]For simplicity, we consider travel by foreigners to the US for tourism-related purposes to be US exports of tourism services.

[2]Our selection of which home countries to include and which reference period to use was exogenously determined on the basis of data availability for all of the variables that we include in the empirical model Equation (5).

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determinants of tourism demand, the link between immigrants and trade in services, in general, and the available evidence on immigrant–tourism links. Section III introduces the empirical model and provides a discussion of the variables. Section IV presents the econometric results, whereas Section V concludes.

RELATED LITERATURE

As indicated, given the lack of adequate literature on the nexus between immigration and trade in tourism services, we build relevant inferences from prior studies of the demand for tourism services that were conducted from the global, regional and country-specific perspectives. Among these studies, Khadaroo and Seetanah (2007) emphasize the importance of infrastructure. Wall (1997) considers the influence of destination-specific attributes (e.g. parks and monuments). Litvin and MacLaurin (2001) and Sonmez (1998) indicate consumer attitudes, behavior and safety as important determinants of tourism demand; whereas Hanefors and Mossberg (1998) emphasize tourists' loyalty as a determinant of their choice of destinations. Similarly, whereas Tsaur *et al.* (1997) stress the importance of risk aversion, Fodness and Murray (1997) address the role of information, and Pizam and Sussmann (1995) emphasize nationality as an important factor affecting the demand for tourism.

Some of these studies give more weight to micro facets (i.e. individual consumer's attributes), whereas others consider macro variables as being more important. However, results from both groups of studies suggest that the respective influences of macro and micro factors on tourism demand vary across developed and developing countries. For example, using both cross-sectional and panel data that represent tourist arrivals during the years 1996–2000, Naudee and Saayman (2005) report that political stability, tourism infrastructure, marketing and information, and the level of development of the destination countries are key determinants of travel. The authors further indicate that the typical 'developed country determinants' of tourism demand, such as the level of income in the origin country and the relative prices and the cost of travel, fail to explain a large share of the variation in the demand for tourism in Africa. On the other hand, Saayman and Saayman (2008), who apply cointegration analysis in a multivariate framework to quarterly data from 1993 to 2004, find that income, relative prices, travel costs, climate and the capacity to provide accommodations for tourists' desires are strong determinants of tourist arrivals in South Africa.

Despite the abundance of studies devoted to the examination of the demand for tourism services and the observation that commonly used control variables fall short of explaining a significant proportion of the variation in imports/exports of tourism services, many of these studies place little or no emphasis on the roles that immigrants may play in influencing the demand for tourism services. To this end, Prescott *et al.* (2005), who develop a utility-maximizing model of travel decisions and investigate the role immigrants play in influencing the aggregate demand for visits to Canada, show that just as relative price, income and commonality of languages have important roles in explaining differences in the level of demand for tourism, so too do immigrants. Chesney and Hazari (2003), who analyse the relationship between tourism and illegal immigration using a trade-theoretic approach, report that by lowering the relative price of non-traded goods, undocumented immigrants help increase trade in tourism for their host countries. Using microdata detailing the travel experiences of Chinese immigrants in New Zealand and employing a correspondence analysis, Feng and Page (2000) find that immigrants contribute to trade in tourism both by travelling to their country of origin (perhaps with friends and family) to visit relatives or for business purposes and by inducing friends and relatives in their home countries to travel to their host countries for visitation or business purposes.

Following these studies and the framework of the gravity model of trade used in the literature on the immigrant–goods trade link, in the next section, we develop a theoretical model that allows the examination of the effect of immigrants on the number of tourist arrivals from 86 countries during the period 1996–2005; effectively, the demand for US tourism services.

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Although our theoretical model is closely related to that of Prescott *et al.* (2005), it differs from their focus, as well as those of Chesney and Hazari (2003) and Feng and Page (2000), in two important aspects: First, in our empirical analysis, we specifically account for the discrete nature of the tourist arrival data, and second, we separate the factors that explain the lack of tourists from a given country and the number of tourist arrivals in instances where there is positive demand.

THEORETICAL FRAMEWORK AND THE EMPIRICAL MODEL

We begin by considering that potential consumers of tourism services in a given immigrant home country have two products to consume: Q_1, representing international tourism services (in our case, travel to the US), and Q_2, a composite domestic good. Thus, it can be considered that the representative consumer i derives utility, U_i, from the consumption of Q_{1i} and Q_{2i}, with $U_i$represented by a variant of the Stone-Geary utility function described in natural logarithms by Equation (1).

$$\ln U_i = \lambda \ln (Q_{1i} - \alpha_{1i}) + (1-\lambda) \ln (Q_{2i} - \alpha_{2i}) \quad (1)$$

Within the general framework of the Stone-Geary utility function, the parameters α_{1i} and α_{2i} can be thought of as the respective minimum (i.e. subsistence) quantities of each of the two goods, tourism services (Q_{1i}) and the composite domestic good (Q_{2i}), that the individual must consume to survive, irrespective of his or her income level. λ can be taken as a measure of the relative importance of Q_1 in the individual's utility. The utility-maximizing amounts of tourism services (Q_{1i}) and the composite commodity (Q_{2i}) that the individual consumes are subject to the following budget constraints:

$$Y_i = P_1 Q_{1i} + P_2 Q_{2i} + c_i \quad \text{for} \quad Q_{1i} > 0 \quad (2.1)$$

and

$$Y_i = P_2 Q_{2i} \quad \text{for} \quad Q_{1i} = 0 \quad (2.2)$$

where Y_i denotes our representative consumer's income, P_1 and P_2 represent the unit prices of international tourism (Q_{1i}) and the composite commodity (Q_{2i}) respectively, and c_i is the fixed cost of transportation (travel) between the consumer's home country and the tourism services supplier country. Maximizing the utility function, given as Equation (1), subject to the budget constraints Equations (2.1) and (2.2) and solving for the first-order conditions yield Equation (3), our tourism demand function:

$$Q_{1i} = \alpha_{1i} + \frac{\lambda}{P_1}(Y_i - P_2\alpha_{2i} - P_1\alpha_{1i} - C_i) \quad (3)$$

Assuming λ is influenced by the individual consumer's network connections in the foreign country (through friendship and/or families and, hence, by the stock of immigrants from her home country that reside in the tourism services supplying country), Equation (3) can be rewritten as:

$$Q_{1i} = \alpha_{1i} + \frac{\lambda(..)}{P_1}(Y_i - P_2\alpha_{2i} - P_1\alpha_{1i} - C_i) \quad (4)$$

Equation (4) clearly postulates positive effects both for the relative importance of tourism services (λ) to the consumer and, hence, his or her network connections with individuals in a foreign country, and the consumer's income (Y_i), adjusted for expenditures related to the consumption of the subsistence level the composite good ($P_2\alpha_2$) and the fixed cost of transportation to the foreign country (C_i). It also predicts negative effects for the unit price (P_1) of tourism services in the foreign country and the fixed cost of transportation.

Finally, the equation predicts strictly positive realizations of tourism demand, Q_{1i} (i.e. that the representative consumer engages in some amount of tourism each period).[3] However, it is obvious that in any given period, the majority of consumers in a foreign country may not consume international tourism

[3]In the event that the consumer does not travel to a foreign country, the subsistence level of tourism in Equation (1) can be equated with travel within the domestic country for tourism-related purposes. For simplicity, we assume that domestic travel is costless.

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services (i.e. may not travel to another country; in this case, the US). Given the equation, such an outcome is possible with α_{1i} set equal to zero. Hence, the notion of a subsistence level consumption of either or both of the commodities can be dispensed with by setting $\alpha_i = 0$.

The empirical model, variable descriptions and the data

We develop our empirical model following the theoretical framework of the determinants of the demand for international tourism services depicted by Equation (4), and noting that the demand for tourism services is positively related to income of the customer and negatively related to both the unit price of international tourism and the cost of travel between the immigrants' home and host countries. As presented, although Equation (4) establishes a theoretical relationship between the quantities of international tourism consumed and prices, income and the fixed costs of transportation, given the deterministic nature of the model, it does not permit empirical examination of the relationships. However, controlling for additional variables that relate to incomes, prices and travel costs and adding an assumed identically and independently distributed error term (ξ_{it}) to the level of demand predicted by the equation results in the following stochastic model (Equation [5]) that permits the empirical examination of the determinants of demand for tourism services.

$$\begin{aligned}\ln TOUR_{it} = {} & \lambda_0 + \lambda_1 \ln IMMG_{it} + \lambda_2 \ln RPCI_{it} \\ & + \lambda_3 \ln GDST_i + \lambda_4 \ln IPPP_{it} \\ & + \lambda_5 \Delta \ln FXRT_{it} + \lambda_6 \ln ECFR_{it} \\ & + \lambda_7 \ln NEMB_{it} + \lambda_8 \ln TELP_{it} \\ & + \lambda_9 OPEC_i + \lambda_{10} \ln TELP_{it} \\ & + \lambda_{11} \ln TRAF_{it} + \lambda_{12} \ln OPEN_{it} \\ & + \lambda_{13} \ln TREM_{it} + \lambda_{14} \Delta \ln TOUR_{it} \\ & + \lambda_{15} ENGL_i + \lambda_{16} PORT_i \\ & + \mu_i REGN_i + \nu_t YEAR_t + \xi_{it} \quad (5)\end{aligned}$$

Data on the total number of tourists arriving in the US from each of the 86 home countries in our sample ($TOUR_{it}$ i.e. Q_{it}) are from the US International Tourism Administration (US ITA, 2007). Included in the set of explanatory variables in Equation (5) is our variable of primary interest $IMMG_{it}$, which is an estimate of the total stock of immigrants from country i who reside in the US during year t (MPI, 2007). We constructed the variable following White and Tadesse (2007) and using data from the 1990 and 2000 US decennial censuses and immigrant inflow data for the years 1991–2004. Taking decennial census values as benchmarks, immigrant stock estimates for intracensus years are thus constructed as $IMMG_{it} = IMMG_{i1990} + \sum_{1991}^{t} INFLOW_{it} + \delta_i$. The term i adjusts the immigrant stock estimate for return migration and the death of immigrants during intracensus years. It is constructed as $\delta_i = \frac{IMMG_{i2000} - \left[IMMG_{i1990} + \sum_{t=1991}^{2000} INFLOW_{it}\right]}{10}$. The immigrant stock variable for the years 2001–2004 is constructed similarly. Thus, the adjustment made to the post-2000 portion of the series is based on the proportional difference between the sum of the 1990 benchmark (i.e. census) values and inflows during the 1991–2000 period and the 2000 benchmark values.

The remaining explanatory variables in Equation (5) represent other factors that are thought to affect the aggregate demand for tourism services in a given country: (i) the levels of consumer incomes (as represented by real per capita income); (ii) the price of tourism services (as represented by the inverse of the purchasing power parity conversion factor); and (iii) the fixed costs of transportation associated with international travel (as represented by the geodesic distance between each home country and the US). The real per capita income variable ($RPCI_{it}$) represents the wealth of the typical resident of country i (i.e. the typical individual's ability to pay for tourism services) (World Bank, 2006). We included a variable that measures the distance ($GDST_i$), calculated using the great circle method and measured in kilometers, between the capital city of the tourist origin country and New York City to represent the price of international travel. Likewise, we included a dummy variable, as an additional control for travel costs, to

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identify tourist origin countries that have coastal access ($PORT_i$) (CIA, 2007). Following Eilat and Einav (2004), we also included a composite measure of the price of tourism services ($IPPP_{it}$), which is computed as the inverse of the purchasing power parity conversion factor. The variable indicates how many baskets of goods a tourist has to give up in her home country to buy a basket of goods in the destination country. As such, the variable informs the consumer's decision to travel to a foreign country and the identification of the destination and, thus, determines the total number of people that travel to a given destination. We also included the change in the home country currency–US dollar exchange rate ($\Delta \ln FXRT_{it}$), computed as $\ln FXRT_{it} - \ln FXRT_{it-1}$, to capture relevant terms of trade effects (IMF, 2007). Expressed as the change in the number of tourist origin country's currency units per US dollar, an increase in the variable indicates a depreciation of the tourist origin country's currency and a corresponding reduction in potential tourists' abilities to travel to the US and/or consume greater amounts of US tourism services.

Related to the fixed costs associated with international tourism, we included an aggregate index of economic freedom ($ECFR_{it}$) for country i, a variable identifying the number of US embassies and/or consulates ($NEMB_{it}$) in country i and a dummy variable indicating whether each home country is a member of the Organization of the Petroleum Exporting Countries ($OPEC_i$). We expected the aggregate index of economic freedom ($ECFR_{it}$), computed as the average of several measures of individual freedom (Beach and Kane, 2008), to account for the potential effects that the material autonomy of individuals (in relation to their state and other organized groups) have on their capacity to consume international tourism services.[4] Generally speaking, greater economic freedom in country i is expected to correspond with reduced costs of travel and, thus, increased consumption of US tourism services. Conversely, it also is possible that individuals in countries with greater economic freedom may have many more potential travel destinations and, thus, reduced demand for travel to the US.

Following Rose (2007), who argues that US exports of goods and services to a given country may vary depending upon diplomatic relationships, we also included the number of US embassies and/or consulates ($NEMB_{it}$) in country i to account for the effects that cultural proximity and political ties between the US and the tourist origin country may have on the relative ease with which potential consumers from each country may be able to acquire tourist visas and, hence, travel to the US. In addition, we included a dummy variable that indicates whether the tourist origin countries are members of the Organization of the Petroleum Exporting Countries ($OPEC_i$) to account for the potential effect of differences in the sources of income (productive and non-productive sectors) on the ability of consumers to pay for tourism services.

It has been shown that common language and infrastructure affect trade flows (Hutchinson, 2002; Dunlevy, 2006; Khadaroo and Seetanah, 2007). Thus, we included a dummy variable ($ENGL_i$) that denotes whether English is a common language in the home country (CIA, 2007). On the grounds that potential consumers' access to information, the relative economic openness of each country, and the country's overall goods trade affiliation with the US may affect consumers' decisions regarding their tourist destination choices and the timing of their visits, we also included the following variables in our empirical model: a proxy for the adequacy of infrastructure in each home country, measured as the number of Internet, cable television and telephone (cell phones and land lines) subscribers per capita ($TELP_{it}$) (ITU, 2007); a measure of the economic openness of country i ($OPEN_{it}$), computed as the sum of a country's imports and exports divided by its gross domestic product, (World Bank, 2006); and the ratio of each home country's trade in goods with the US relative to their respective gross domestic product ($TRAF_{it}$).

Our theoretical model assumes that the relative weights of tourism services in individuals' consumption baskets may differ. Thus, we adopted the methodology used by Wagner *et al.* (2002) to compute the economic remoteness

[4]The $ECFR_{it}$ variable ranges in value from 0 to 100 and is constructed as the arithmetic average of business freedom, trade freedom, fiscal freedom, government size, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption and labour freedom (each of which also ranges in value from 0 to 100).

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of potential trade partners and construct a measure of the tourism remoteness ($TREM_{it}$) of each of the countries in our data. The measure represents the relative importance of tourism in each home country. We used each country's tourism receipts from all countries in the world other than the US to develop the variable:

$$TREM_{it} = 1/\sum_{k=1}^{k}[(TREC_{kt}/TREC_{wt})/GDST_{ik}],$$

where $TREC_{kt}$ and $TREC_{wt}$ represent each country's income from tourism and global gross tourism receipts respectively, and the subscript k identifies the availability of alternative tourist destinations (i.e. non-US locales) to each country's residents. A higher index value indicates greater remoteness of the country from opportunities to trade in tourism and, thus, a lower relative importance of tourism and/or a reduced ability of the country to attract non-US consumers of tourism services.

Finally, we included the log first difference, computed as $\ln TOUR_{it} - \ln TOUR_{it-1}$, of the number of tourist arrivals from each country i in the US ($\Delta \ln TOUR_{it}$) and several dummy variables that denote the regional locations of the origin countries and the reference years to control for the potential effect of differences in the rate of growth of demand for US tourism services across origin countries and for unobservable regional and intrayear heterogeneity in the demand for US tourism services. Accordingly, whereas the variable $\Delta \ln TOUR_{it}$ captures inertia in service trade relationships between the US and each of the countries in our sample, the regional dummies control for potential cross-cultural variation in people's desire for travel experiences, and the year dummies control for periodic variation in the economic policies of the US or the tourist origin countries that may relate to international travel and immigration activities and, hence, the role that immigrants may play in influencing US trade in services with their home countries.

Table 1 lists the variables included in our empirical model along with a brief description of their respective descriptive statistics and the *a priori* expected signs of the corresponding coefficient estimates. A cursory review of the values in the table indicates that, on average, 291 810 immigrants from the typical tourist origin country in our data resided in the US during the typical year in our reference period. On average, about 509 842 tourists from a typical country in our data visited the US during the typical year that our data span. Although greatly variable across countries, the typical immigrant home country is located about 8437 km from New York City, is host to nearly two US embassies and/or consulates and has a moderately low degree of trade affiliation (0.21) with the US. Furthermore, the typical home country has a per capita income of $7470, a value of 0.772 for our measure of trade openness, and a value of 61.07 for the index of economic freedom. Thus, the typical immigrant home country can be described as a middle income country that is moderately open to trade and which offers its residents a medium to high degree of economic freedom. English is commonly used in 22% of the countries, and 89% of the countries have access to international waters. Finally, a small number of the countries (about 5%) are OPEC members.

As indicated, our primary focus is to determine whether immigrants enhance the demand for trade in services. As the US is host to a relatively large stock of immigrants from diverse home countries, there is great variation in the total number of immigrants and in the number of tourist arrivals in the US. In general, although there seems to be a tendency for countries that account for a larger share of their region's total US immigrant stock to also comprise a relatively larger share of US tourist arrivals from their region, this observation is not consistent across all countries. Given this variation, in Table 2, we provided the descriptive statistics (mean and standard deviations) of the country-specific counts of international tourist arrivals, stocks of immigrants, and the corresponding country's regional share of total tourist arrivals and immigrant stocks during the years 1995–2004. Values presented in the table clearly depict that, despite variation in both variables, our sample includes both countries that have strong as well as weak services trade and migration links with the US.

EMPIRICAL RESULTS

Estimation of the empirical model

Our measure of the demand for US tourism services – the number of tourist arrivals from

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Table 1. Descriptive statistics

Variable	Description	Mean (standard deviation) $N = 855$	*A priori* expected sign
$TOUR_{it}$	Number of tourist arrivals to the US from country i (i.e. the dependent variable)	509 842.2 (1 936 983)	..
$IMMG_{it}$	Stock of immigrants from the home country living in the US	291 809.8 (864 060.7)	+
$RPCI_{it}$	Real GDP per capita (in 2000 US prices)	7470.64 (9688.55)	+
$GDST_i$	Geographic distance (in kilometers) from New York City to the immigrant home country	8437.48 (3788.75)	−
$PORT_i$	Dummy variable equal to 1 if immigrant home country has coastal access (i.e. is not landlocked)	0.8947 (0.3070)	+
$IPPP_{it}$	Inverse of PPP conversion factor	1.886 (34.2956)	−
$\Delta FXRT_{it}$	Change in exchange rate (measured as home country currency units per US dollars)	0.0896 (0.2915)	−
$ECFR_{it}$	Index of economic freedom in immigrant home country	61.0728 (10.5770)	+/−
$NEMB_{it}$	Number of US embassies and/or consulates in the immigrant home country	1.699 (1.4646)	+
$OPEC_i$	Dummy variable equal to 1 if immigrant home country is a member of the OPEC	0.0584 (0.2347)	+/−
$ENGL_i$	Dummy variable equal to 1 if English is commonly used in the immigrant home country	0.2187 (0.4136)	+
$TELP_{it}$	Total Internet, cable and telephone (fixed and mobile) subscribers relative to total population in immigrant home country	3.23 (9.84)	+
$OPEN_{it}$	Measure of general economic openness	0.7719 (0.4177)	+
$TRAF_{it}$	Affinity of the immigrant home country for trade with the US	0.2094 (1.0187)	+
$TREM_{it}$	Measure of immigrant home country's tourism remoteness	4581.836 (2475.88)	−
$\Delta TOUR_{it}$	Growth rate of tourist arrivals from country i (measured as the difference in log values over two consecutive years)	0.214 (1.278)	+

Standard deviations in parentheses. See text for explanations of variable construction.

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Table 2. Descriptive statistics of counts of tourist arrivals and the stocks of immigrants in the US by regional location of the home countries in the sample

Region/home country	Tourist arrivals		Immigrant stock	
	Mean (standard deviation)	Regional share of home country i	Mean (standard deviation)	Regional share of home country i
AFRICA	***14 008.26 (22 930.17)***	***100.00***	***36 618.91 (40 654.99)***	***100.00***
Angola	2379.8 (1009.874)	1.02	3619.698 (870.36)	0.59
Cameroon	3005.9 (1736.27)	1.28	9814.487 (3954.31)	1.60
Congo[a]	1282.889 (593.29)	0.49	4364.511 (1373.22)	0.64
Egypt	32 181.9 (9452.09)	13.76	110 857.4 (14 595.29)	18.13
Ghana	13 890.6 (5258.62)	5.94	57 803.86 (17 763.98)	9.45
Kenya	14 038.4 (3174.77)	6.00	33 849.16 (13 138.71)	5.54
Morocco	14 824 (3209.05	6.34	34 895.81 (9653.162)	5.71
Nigeria	31 431.6 (10702.04)	13.44	126 523.6 (32 130.56)	20.69
Senegal	7249.7 (2116.58)	3.10	8206.208 (3444.68)	1.34
Sierra Leone[b]	550.5 (408.79)	0.19	17 356.64 (4832.03)	2.27
South Africa	93 525.1 (15 751.14)	39.98	60 113.56 (11 333.77)	9.83
Sudan	894.7 (458.64)	0.38	18 093.01 (6912.74)	2.96
Tunisia	4830.3 (3166.12)	2.06	36 792.68 (26,193.90)	6.02
Uganda	2890.2 (1203.97)	1.24	81 11.425 (4391.60)	1.33
Tanzania	3223.9 (1371.29)	1.38	70 688.94 (52 055.12)	11.56
Zambia	2452.4 (1410.31)	1.05	5455.502 (1175.79)	0.89
Zimbabwe	5524.5 (2217.84)	2.36	8897.013 (2633.49)	1.45
CENTRAL ASIA	***623 201.9 (1 404 685.00)***	***100.00***	***392 963.9 (370 066.20)***	***100.00***
Cambodia[a]	1612.66 (1321.804)	0.03	136 108.4 (5206.88)	3.50
China	204 228.5 (28 225.14)	3.68	104 5946 (25 4364.30)	30.00
Hong Kong	183 689.7 (45 416.12)	3.31	217 583.4 (15 504.89)	6.22
Japan	4 454 854 (749 036.80)	80.18	349 855.3 (18 336.29)	10.00
Korea, Republic	611 365.6 (113 129.90)	11.02	787 535.7 (11 2192.10)	22.50
Laos.	792.5 (515.79)	0.01	209 759.9 (3311.10)	5.99
Malta	5927.3 (2632.12)	0.11	9525.532 (777.32)	0.27
Thailand	76 885 (15 546.01)	1.39	103 434.3 (68 703.84)	2.96
Vietnam	7303.1 (4509.71)	0.13	651 241.3 (373 576.20)	18.61
EASTERN EUROPE	***34 748.18 (32 055.83)***	***100.00***	***152 614.4 (169,990.40)***	***100.00***
Albania	3271.7 (1667.13)	1.57	32 087.65 (15 596.66)	3.50
Bulgaria	11 279.5 (2530.70)	5.41	31 090.37 (13 444.82)	3.40
Czech Rep.	32 353.8 (12 836.73)	15.52	86 002.62 (2080.86)	9.39
Hungary	43 788.4 (9212.16)	21.00	108 866.6 (12 872.87)	11.89

(*Continues*)

Table 2. (Continued)

Region/home country	Tourist arrivals		Immigrant stock	
	Mean (standard deviation)	Regional share of home country i	Mean (standard deviation)	Regional share of home country i
Poland	93 820.9 (25 194.01)	45.00	517 763.6 (27 805.16)	56.54
Romania	23 974.8 (5145.75)	11.50	139 875.6 (11 469.26)	15.28
MIDDLE EAST	***19 291.62 (20 380.03)***	***100.00***	***144 800.6 (185 214.40)***	***100.00***
Jordan	13 838.7 (2381.32)	11.96	60 081.93 (6897.48)	6.92
Lebanon	14 023.3 (3285.89)	12.12	118 930.3 (6697.48)	13.69
Saudi Arabia	53 872.9 (23 310.00)	46.54	20 337.01 (3154.97)	2.34
Syrian Arab Rep.	6163.8 (1707.93)	5.33	181 983.1 (108 550.40)	20.95
United Arab Emirates	26 665.9 (12 276.09)	23.04	386 416.2 (337 196.60)	44.48
Yemen	1185.1 (760.06)	1.02	101 055.3 (69 566.06)	11.63
NORTH AMERICA	***12 100 000 (2 323 500.00)***	***100.00***	***4 218 259 (3 678 743.00)***	***100.00***
Canada	14 000 000 (891 154.70)	58.09	857 129.2 (23 716.13)	10.16
Mexico	10 100 000 (1 351 859.00)	41.91	7 579 389 (1 861 326.00)	89.81
PACIFIC	**218 084.6 (167 460.80)**	**100.00**	**34 913.80 (17 201.83)**	**100.00**
Australia	456 622.9 (45 621.47)	64.98	59 594.30 (5519.74)	52.97
Finland	78 493.7 (9639.21)	12.41	24 379.74 (1917.27)	24.08
New Zealand	142 990.9 (22 032.99)	22.61	23 235.41 (2422.20)	22.95
SCANDINAVIAN	***195 046.1 (75 710.52)***	***100.00***	***45 340.01 (7032.16)***	***100.00***
Norway	128 283.8 (15 554.75)	32.89	40 724.97 (6807.90)	44.91
Sweden	261 808.4 (44 206.50)	67.11	49 955.05 (3274.07)	55.09
SOUTH AMERICA	***146 072.1 (126 896.20)***	***100.00***	***258 065.6 (226 887.50)***	***100.00***
Argentina	377 449.7 (157 180.90)	12.93	121 014.7 (11 914.65)	2.35
Belize	22 056.3 (8363.55)	0.76	39 421.65 (2732.73)	0.76
Bolivia	30 008.3 (8670.96)	1.03	49 659.93 (7323.17)	0.96
Chile	150 382.6 (35 108.27)	5.15	75 606.52 (8776.82)	1.47
Colombia	327 017.2 (64 766.16)	11.20	45 3187.4 (89 849.74)	8.78
Costa Rica	137 395.9 (20 865.67)	4.71	63 012.29 (11 566.94)	1.22
Dominican Rep.	179 426.2 (17 001.93)	6.14	680 536.7 (68 906.34)	13.19
Ecuador	125 728.8 (17 160.60)	4.31	249 321.3 (65 466.63)	4.83
El Salvador	149 706.9 (48 006.50)	5.13	741 078.8 (136 380.6)	14.36
Guatemala	155 744.6 (18 321.73)	5.33	392 926.7 (111 356.6)	7.61
Haiti	60 616.9 (7809.425)	2.08	406 120.7 (61 714.02)	7.87
Honduras	75 780.3 (14 819.66)	2.60	216 520 (73 607.34)	4.20
Jamaica	204 140.4 (28 725.60)	6.99	517 306.9 (69 212.26)	10.03
Nicaragua	39 804.8 (4674.50)	1.36	239 822.2 (17 338.99)	4.65

(*Continues*)

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Table 2. (Continued)

Region/home country	Tourist arrivals		Immigrant stock	
	Mean (standard deviation)	Regional share of home country i	Mean (standard deviation)	Regional share of home country i
Panama	84 230.3 (12 528.06)	2.88	106 802.9 (3423.77)	2.07
Paraguay	16 241.4 (4109.17)	0.56	11 209.54 (1518.73)	0.22
Peru	156 458.2 (20 999.37)	5.36	257 830.9 (45 066.62)	5.00
Trinidad and Tobago	110 008.6 (18 180.69)	3.77	117 546.1 (84 851.13)	2.28
Uruguay	51 037.5 (12 574.31)	1.75	38 339.35 (10 928.01)	0.74
Venezuela	468 207 (10 1309.50)	16.03	384 048.2 (238 163.80)	7.44
SOUTH ASIA	***77 617.76 (78 597.59)***	***100.00***	***392 979.9 (514 430.70)***	***100.00***
Bangladesh	9352.5 (3598.87)	1.72	85 668.36 (24 879.43)	3.12
India	226 108.4 (61 997.37)	41.62	920 276.7 (241 267.30)	33.46
Indonesia	60 564.8 (15 815.04)	11.15	67 662.87 (9606.30)	2.46
Malaysia	58 337.9 (16 528.53)	10.74	49 225.13 (5062.18)	1.79
Pakistan	39 564.3 (8 831.11)	7.28	212 657.7 (44 136.39)	7.73
Philippines	142 652.3 (24 355.41)	26.26	139 0376 (115 379.70)	50.55
Sri Lanka	6744.1 (2696.73)	1.24	24 993.09 (3833.76)	0.91
WESTERN EUROPE	***635 609.1 (1 014 608.00)***	***100.00***	***179 693.7 (231 990.40)***	***100.00***
Austria	154 141.3 (40 336.88)	1.73	80 612.28 (14501.15)	3.20
Belgium	208 117.8 (38 332.20)	2.34	37 500.62 (2011.32)	1.49
Cyprus	10 293.5 (1132.19)	0.12	11 540.16 (242.95)	0.46
France	912 068.1 (139 053.10)	10.25	148 215.6 (11 667.13)	5.88
Germany	1 651 543 (353 774.70)	18.54	748 840.8 (23 517.66)	29.72
Iceland	23 260 (3951.926)	0.26	5991.912 (238.19)	0.24
Israel	267 901 (32 344.28)	3.01	114 727.6 (5647.10)	4.55
Italy	523 771.5 (82 764.32)	5.89	549 557 (64 074.49)	21.81
Netherlands	448 680.1 (60 360.72)	5.04	48 104.65 (45 199.98)	1.91
Portugal	64 098.7 (11 435.40)	0.72	219 826.4 (12 568.86)	8.72
Spain	318 332.8 (31 292.43)	3.58	86 858.9 (2094.91)	3.45
Switzerland	347 362.5 (78 624.00)	3.90	44 407.61 (1769.99)	1.76
Turkey	75 116.5 (17 320.49)	0.84	50 728.23 (32 134.16)	2.01
United Kingdom	3 893 840.0 (523 516.90)	43.71	368 799.6 (312 649.30)	14.63

[a]Data span: 1995–2003;
[b]Data span: 1995–2002. For all other countries, data span: 1995–2004.

each home country – is a count variable. That is, our dependent variable series takes only integer (zero or positive) values. As a result, estimation of the relationships between our dependent variable, the annual number of tourist arrivals in the US from each country in our sample, and our set of explanatory variables cannot be conducted using the usual Ordinary Least Squares (OLS) regression analysis. Instead, it requires the use of a Poisson regression, a model that accounts for the discrete nature of the dependent variable series.

Despite its ability to handle the discrete outcome nature of count data, the appropriateness of the Poisson regression also rests on the fulfillment of the very strict assumption of equidispersion (i.e. equality of the mean and standard deviation) in the distribution of the dependent variable series. As shown in the overall descriptive statistics that are presented in Table 1, the unconditional variance of the dependent variable series (i.e. the counts of international tourist arrivals in the US) is significantly larger than its mean, indicating that the dependent variable is over-dispersed and, thus, rendering a Poisson regression model inappropriate for these data. In addition, as indicated in the theoretical model, at any given time, individuals may forego the consumption of international tourism services (i.e. travel to the US), potentially resulting in no tourist arrivals from a given country and, hence, inflating the possibility of zero outcomes in the dependent variable series.[5] In the presence of only the first problem (over-dispersion), a negative binomial model can be fitted as a solution; however, the presence of only the second problem (inflation of zeros) suggests the need for a Zero-Inflated Poisson regression. In our case, the large positive values of Vuong (1989) tests suggest that our dependent variable series suffers from both over-dispersion and an inflation of zeros. Long (1997) and Cameron and Trivedi (1998) both note that unobserved heterogeneity can cause both over-dispersion and 'excess zeros'. Cameron and Trivedi (1998) further suggested the use of a zero-inflated negative binomial (ZINB) model as it allows for the modelling of a count dependent variable that has the twin problems of over-dispersion and inflation of zeros while also modelling between-subject (i.e. cross-sectional) heterogeneity. Additional features that make the ZINB model even more relevant for our problem include its ability to nest the Poisson model. In addition to solving these problems, the model allows us to examine whether immigrants enhance the total number of people that travel to the US from a given country while isolating factors that account for the potential inflation of no tourist arrivals.

Table 3 presents results from the estimation of four variants of our empirical model, Equation (5). The first model (model 5.1) is more general – a specification in which we examine the demand for US tourism services among potential consumers from the home countries in our study without accounting for the effects of the stock of immigrants and unobserved heterogeneity due to the cross-sectional and time-series dimensions of the data. The second model (model 5.2) differs from the first in that it includes our main variable of interest and accounts for potential cross-sectional and time-specific variation in the demand for US tourism services. In the third (model 5.3) and fourth (model 5.4) variants of our model, we specifically account for the tourism remoteness of the home countries in our study and indicate their membership in the OPEC cartel. In addition to allowing us to establish the general effects of most of the variables included in our empirical model, results from the respective specifications enable us to check the sensitivity of our findings and the consistency of the observed effect(s) of our main variable(s) of interest to the inclusion of additional control variables.

In each case, the first column provides coefficient estimates for the factors thought to account for the inflation of zero tourist arrivals

[5]Note that the data we used as our dependent variable do not differentiate between one-time or repeat visitors and individuals who may not travel to the US at all. Yet some individuals may not travel to the US simply because they have no demand for it. However, there are individuals who have both the ability and the willingness to travel to the US but are denied entry visas or the permission to leave their country. A zero value for our dependent variable reflects both possible scenarios. Although such values do not necessarily reflect lack of demand for US tourism services, they suggest the following: (i) zero tourist arrivals from a given country in a given year is more likely than non-zero tourist arrivals; and (ii) there may exist subject heterogeneity across the cross-sectional dimension of the data at any given year.

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Table 3. Coefficient estimates of the determinants of demand for US tourism services: results from zero-inflated negative binomial model

	(a)		(b)		(c)		(d)	
	Model (5.1)		Model (5.2)		Model (5.3)		Model (5.4)	
Variable	Inflate	N Tourists	Inflate	N Tourists	Inflate	N Tourists	Inflate	N Tourists
ln $RPCI_{it}$	0.168 (0.31)	0.137*** (0.033)	0.250 (0.32)	0.528*** (0.032)	0.202 (0.36)	0.528*** (0.032)	0.209 (0.36)	0.526*** (0.032)
ln $GDST_i$	1.602* (0.82)	−1.090*** (0.048)	1.521* (0.78)	−0.283*** (0.072)	1.509* (0.79)	−0.283*** (0.072)	1.525* (0.81)	−0.281*** (0.072)
$PORT_i$	0.497 (0.66)	0.330*** (0.095)	0.367 (0.67)	0.110 (0.076)	0.335 (0.68)	0.110 (0.076)	0.330 (0.69)	0.104 (0.076)
ln $IPPP_{it}$	0.210* (0.12)	−0.043*** (0.011)	0.234* (0.12)	−0.036*** (0.009)	0.227* (0.12)	−0.036*** (0.009)	0.227* (0.12)	−0.031*** (0.009)
Δ ln $FXRT_{it}$	−0.322 (0.52)	0.299** (0.13)	−0.262 (0.52)	0.128 (0.085)	−0.247 (0.52)	0.128 (0.085)	−0.245 (0.52)	0.129 (0.085)
ln $ECFR_{it}$	0.396 (1.26)	1.599*** (0.20)	0.266 (1.30)	0.736*** (0.15)	0.221 (1.31)	0.736*** (0.15)	0.213 (1.31)	0.755*** (0.15)
ln $NEMB_{it}$	0.561 (1.08)	1.901*** (0.076)	0.354 (1.13)	1.166*** (0.071)	0.328 (1.14)	1.166*** (0.072)	0.378 (1.15)	1.165*** (0.072)
$ENGL_i$	0.255 (0.57)	0.318*** (0.072)	0.432 (0.61)	0.338*** (0.062)	0.456 (0.61)	0.338*** (0.062)	0.403 (0.64)	0.331*** (0.062)
ln $TELP_{it}$	−1.100*** (0.22)	0.362*** (0.019)	−1.158*** (0.23)	0.253*** (0.016)	−1.162*** (0.24)	0.253*** (0.016)	−1.162*** (0.24)	0.249*** (0.016)
ln $OPEN_{it}$	4.236*** (1.64)	−0.959*** (0.14)	4.236*** (1.64)	−0.475*** (0.11)	4.228*** (1.64)	−0.475*** (0.12)	4.177** (1.65)	−0.474*** (0.12)
ln $TRAF_{it}$	−0.656*** (0.17)	0.301*** (0.015)	−0.687*** (0.17)	0.203*** (0.012)	−0.670*** (0.18)	0.203*** (0.012)	−0.683*** (0.19)	0.194*** (0.013)
Δ ln $TOUR_{it}$		−0.029 (0.023)		−0.053*** (0.018)		−0.053*** (0.018)		−0.052*** (0.018)
ln $IMMG_{it}$			0.156 (0.20)	0.337*** (0.021)	0.143 (0.20)	0.337*** (0.021)	0.131 (0.21)	0.336*** (0.022)
ln $TREM_{it}$					−0.214 (0.67)	0.0001 (0.039)	−0.215 (0.67)	−0.002 (0.039)
$OPEC_i$							0.361 (1.28)	0.183* (0.096)
Constant	−30.32*** (10.4)	13.38*** (0.95)	−31.37*** (10.1)	3.198*** (0.95)	−28.72** (13.2)	3.197*** (1.02)	−28.82** (13.1)	3.080*** (1.02)
Time and region dummies	No	No	No	Yes	No	Yes	No	Yes
Dispersion parameter		−0.513*** (0.045)		−1.155*** (0.047)		−1.155*** (0.047)		−1.159*** (0.047)
Observations	855	855	855	855	855	855	855	855
Log Likelihood		−10,182		−9,877		−9,877		−9,875
Chi-squared (K)		1,931 (26)***		2,540 (46)***		2,539 (48)***		2,542 (50)***
Vuong		34.60***		32.06***		33.13***		31.76***

Standard errors in parentheses.
*$p < 0.1$;
**$p < 0.05$;
***$p < 0.01$.

(i.e. the lack of consumption of US tourism services by potential consumers in the home countries) and the second column provides estimates of the effects of each of the variables on the counts of tourist arrivals in the US. For each estimation, we also provide tests of significance of the overall model performance (chi-squared and log-likelihood values) and the corresponding results of the Vuong (1989) tests that indicate the appropriateness of the fitted models. In all instances, although the large and significant positive values of the Vuong (1989) tests favor the models fitted, the highly significant ($p < 0.001$) chi-squared values corresponding with the log-likelihood ratios warrant the rejection of the null hypothesis that the effects of all of the explanatory variables are zero, confirming that the data fit the model very well. Finally, across all specifications, as the results, particularly those related to the extent and direction of the effects of our variable of primary interest – the immigrant stock variable – and almost all of the theoretical predictions hold, the estimated effects can be considered as robust.

Do immigrants affect demand for US tourism services?

Focusing on the results obtained from the second model (model 5.2 in Table 3), we can say that, as expected, immigrants in the US exert economically and statistically significant effects on the demand for US tourism services among potential consumers in their respective home countries. To this end, *ceteris paribus*, a 1% increase in the stock of immigrants from a typical home country in our sample would raise the total number of tourists arriving from the given home country by a factor of 0.337. Given these results, one might expect that a rise in the stock of immigrants from a given home country might counter the inflation of zero (i.e. the lack of) tourist arrivals. However, our result from the zero-inflated portion of the model tells a different story: that the increase in the stock of immigrants from a given home country neither counters nor enhances the lack of effective demand among potential consumers in the respective home country. These observations suggest that potential variation exists in the roles that immigrants play as a factor for inducing a desire for travel and, hence, in countering the lack of effective demand for tourism services among potential consumers from their home countries and, subject to the presence of effective demand, in the roles they play in determining how many people might consume US tourism services.

Interpretation of the coefficients reported in Table 3 (e.g. what is meant by the factor of 0.337 that corresponds with a rise in the stock of immigrants) is not straightforward. To simplify and facilitate direct interpretation, we converted the coefficient estimates reported in Table 3 into incidental rate ratios (IRRs), which allow a straightforward inference of the effects of each of the variables and comparison of the effects across variables. The IRRs are presented in Table 4.[6] Based on the IRRs and their respective signs (reported in Table 3), we can say that for the immigrant stock variable, *ceteris paribus*, a 1% increase in the stocks of immigrants from a given home country in the US would enhance the rate of tourist arrivals from that country to the US by about 1.4%. Although interpretation of the effects of each of the continuous variables can be done similarly, the IRRs corresponding with the dummy variables represent the effect of the presence of the attribute represented by the variable on the rate of tourist arrivals as compared with the absence of the attribute. For example, the significant and positive coefficient of the dummy variable representing commonality of language ($ENGL_i$) between the home countries and the US implies that, as compared with home countries where English is not an official language, the rate of tourist arrivals from home countries where English is the official language is higher by about 1.4%.

The use of IRRs to compare the estimated effects of immigrant stocks with the influences of the other variables (i.e. the number of US embassies and consulates in the home country, the communication infrastructure, the economic freedom enjoyed by people in the home country and their per capita income levels) provides

[6]It is important to note that other than allowing direct interpretation of the meaning of each of the estimated coefficients, the signs of IRRs are always positive. Hence, the coefficients provide no information as to whether the effect of the variable of interest is negative or positive. Therefore, we report both the coefficient estimates (Table 3) and the corresponding IRRs (Table 4).

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Table 4. IRRs based on the coefficient estimates of the determinants of demand for US tourism services: zero-inflated negative binomial model

Variable	(a)		(b)		(c)		(d)	
	Model (5.1)		Model (5.2)		Model (5.3)		Model (5.4)	
	Inflate	N tourists	Inflate	N tourists	Inflate	N tourists	Inflate	N tourists
ln $RPCI_{it}$	1.183 (0.366)	1.146*** (0.0379)	1.284 (0.41)	1.696*** (0.054)	1.224 (0.44)	1.696*** (0.054)	1.233 (0.44)	1.691*** (0.053)
ln $GDST_i$	4.963* (4.091)	0.336*** (0.0163)	4.578* (3.59)	0.753*** (0.054)	4.524* (3.58)	0.753*** (0.054)	4.594* (3.71)	0.755*** (0.054)
$PORT_i$	1.644 (1.087)	1.391*** (0.132)	1.443 (0.97)	1.117 (0.085)	1.398 (0.95)	1.117 (0.085)	1.392 (0.95)	1.110 (0.084)
ln $IPPP_{it}$	1.233* (0.144)	0.958*** (0.0109)	1.264* (0.15)	0.965*** (0.008)	1.255* (0.15)	0.965*** (0.009)	1.255* (0.16)	0.970*** (0.009)
Δ ln $FXRT_{it}$	0.725 (0.375)	1.348** (0.170)	0.769 (0.40)	1.137 (0.096)	0.781 (0.41)	1.137 (0.096)	0.783 (0.41)	1.137 (0.096)
ln $ECFR_{it}$	1.486 (1.875)	4.948*** (1.002)	1.305 (1.69)	2.088*** (0.32)	1.247 (1.63)	2.088*** (0.32)	1.238 (1.62)	2.127*** (0.33)
ln $NEMB_{it}$	1.752 (1.898)	6.690*** (0.508)	1.424 (1.60)	3.208*** (0.23)	1.389 (1.58)	3.208*** (0.23)	1.459 (1.68)	3.206*** (0.23)
$ENGL_i$	1.290 (0.729)	1.374*** (0.0986)	1.540 (0.93)	1.403*** (0.087)	1.578 (0.96)	1.403*** (0.087)	1.497 (0.96)	1.392*** (0.086)
ln $TELP_{it}$	0.333*** (0.0734)	1.437*** (0.0272)	0.314*** (0.074)	1.288*** (0.020)	0.313*** (0.074)	1.288*** (0.020)	0.313*** (0.074)	1.282*** (0.020)
ln $OPEN_{it}$	69.11*** (113.4)	0.383*** (0.0545)	69.13*** (1.13)	0.622*** (0.071)	68.56*** (1.12)	0.622*** (0.072)	65.20** (1.08)	0.622*** (0.072)
ln $TRAF_{it}$	0.519*** (0.0878)	1.351*** (0.0205)	0.503*** (0.088)	1.225*** (0.015)	0.512*** (0.092)	1.225*** (0.015)	0.505*** (0.095)	1.214*** (0.016)
Δ ln $TOUR_{it}$		0.971 (0.0223)		0.949*** (0.017)		0.949*** (0.017)		0.949*** (0.017)
ln $IMMG_{it}$			1.169 (0.23)	1.401*** (0.030)	1.154 (0.23)	1.401*** (0.030)	1.140 (0.24)	1.400*** (0.030)
ln $TREM_{it}$					0.807 (0.54)	1.000 (0.039)	0.807 (0.54)	0.998 (0.039)
$OPEC_i$							1.435 (1.84)	1.200* (0.11)
Constant				24.48*** (23.4)		24.47*** (24.9)		21.76*** (22.1)
Time and region dummies			No	Yes	No	Yes	No	Yes
Dispersion parameter				0.315*** (0.015)		0.315*** (0.015)		0.314*** (0.015)
Observations	855	855	855	855	855	855	855	855
Log Likelihood		−10,182		−9,877		−9,877		−9,875
Chi-squared (K)		1,931 (26)***		2,540 (46)***		2,539 (48)***		2,542 (50)***
Vuong		34.60***		32.06***		33.13***		31.76***

Standard errors in parentheses.
*$p < 0.1$;
**$p < 0.05$;
***$p < 0.01$.

further insights. Accordingly, the extent to which a 1% rise in the stock of immigrants affects the number of tourists arriving in the US (1.4%) not only is economically sizable but also exceeds the positive effects of a corresponding 1% increase in the overall trade affiliation (1.3%) and the expansion of communication infrastructure (1.29%) in the home countries. Although different in the direction of its effect, the magnitude of the effect of a rise in the stock of immigrants on the number of tourist arrivals also outweighs both the negative effects of a comparable increase in the fixed cost of transportation (0.75%) and that of a 1% rise in the opportunity cost of travel to the US (0.97%).

We found that, among all variables, improvement in diplomatic relationships (approximated by a 1% increase in the number of US embassies and consulates located in a typical origin country) has the greatest relative influence on the number of tourist arrivals (3.3%), followed by a comparable improvement in the economic freedom enjoyed by residents of the tourist origin countries (2.1%) and the rise in the real per capita income (1.67%) of the home countries included in our study. Similarly, when considering the effects of a 1% increase in geographic distance and that of the opportunity cost of travel to the US, we found that, although a 1% increase in the geographic distance (a proxy for the cost of transportation) reduces the rate at which tourists from a given home country arrive in the US by 0.76%, a proportional increase in the opportunity cost of travel to the US would reduce the demand for US tourism services by 0.97%.

What about the other control variables?

Having presented the effects of our main variable of interest, we now turn to a brief discussion of the effects of the control variables on the demand for tourism services. We restricted our discussion of the remaining explanatory variables to only the presentation of the statistical significance and the direction of the effects, unlike the detailed interpretation presented for the effect of our main variable of interest. As hypothesized, the results in Table 3 indicate positive and significant relationships between most of the control variables and the number of tourist arriving in the US from a typical home country. Specifically, these variables include the number of US embassies and consulates in that country, the real per capita income of the home country, the tourists' origin country's access to a seaport, the commonality of language between the US and the home countries, the degree of economic freedom enjoyed by home country's respective residents, the presence of better communication infrastructure and the origin country's goods trade affiliation with the US.

We also found that the distance between the US and the tourists' origin countries (a proxy for the fixed cost of international travel), the baskets of goods and services that consumers in the tourist origin countries must forgo to travel to the US and the economic openness of the home countries to international trade have significant but negative impacts on the number of tourists arriving in the US from a typical home country in our study. We consider that, although unexpected, the negative sign of the coefficient of the measure of economic openness is the result of the tourist origin country's demographic size (as countries with smaller populations tend to be more open). To this end, Eilat and Einav (2004) indicate that a smaller population in the tourist origin countries implies a relatively lower amount of total tourism services consumed. The coefficients of the region- and time-specific dummy variables (although, for brevity, not reported in the tables) also are significant in most cases, indicating the presence of considerable heterogeneity in the demand for US tourism services across different regions and periods.[7] For example, we observed a slowdown in tourist arrivals beginning in 2002, perhaps a result of the events of 11 September 2001 and the subsequent US foreign policy response.

The results presented in Tables 3 and 4 also identify which of the variables hypothesized to affect the demand for US tourism services also affect the inflation of zero tourist arrivals from the respective countries in our study. Accordingly, of the variables representing various socio-economic characteristics of the population in the home countries considered, only five have notable influences on the inflation of

[7] A full set of estimation results inclusive of coefficients on the regional and time dummy variables can be obtained from the authors.

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no tourist arrivals: geographic distance, the opportunity cost of travel to the US, economic openness, the goods trade affiliation of each of the home countries with the US and the communication infrastructure available in the home countries (i.e. Internet, cable television and telephone access in the origin countries). This implies that the likelihood of no tourist arrivals from a given country into the US is higher among home countries that are geographically more distant from the US, when the opportunity cost of travel to the US for the home country's population (in terms of the goods and services that must be forgone) is higher and when the tourist origin country is relatively more open to international trade. To the contrary, the presence of better communications infrastructure and of greater goods trade affiliation between the origin country and the US leads to a decrease in the likelihood of no tourist arrivals from the given country. These results remain consistent when we estimate several variants of the general model. Intuitively, our findings of differences in the variables that influence the inflation of no tourist arrivals and, the number of tourists arriving in the US suggests that differences exist between processes that motivate people to travel abroad (i.e. presence or absence of demand for tourism services) and the mechanisms that determine the realization of demand for tourism (i.e. the number of people that actually travel).

CONCLUSION

With our main objective being the determination of whether the pro-trade effects of immigrants on merchandise trade between their host and home countries also extends to trade in services, we examine the role that immigrants may play in enhancing their home countries' imports of tourism services from the US. Immigrants are thought to potentially influence merchandise trade through three distinct channels: preferences, enforcement and information- and cultural difference-bridging effects. Of these channels, we considered that immigrants may increase demand for tourism services through their information- or cultural difference-bridging abilities and by assisting in the enforcement of contracts in several ways. First, immigrants have the potential to provide otherwise unavailable information to consumers of tourism services in their home and/or host countries who may want to travel to the host or home countries. Second, immigrants have the potential to facilitate travel arrangements (e.g. by providing finances, accommodations and/or connections with businesses and social groups) that may confer necessary information to consumers and/or decrease transaction costs. Third, immigrants may encourage travel by friends and family members, if these individuals wish to visit them in their host countries.

Using data on US exports of tourism services to 86 historically and economically heterogeneous countries for which immigrant stock data are available during the years 1995–2004, we examined the tourism–migration relationship by modelling the demand for tourism as a two-part process using the zero-inflated negative binomial regression technique. We found that immigrants indeed exert economically and statistically significant effects that enhance trade in services to an extent that outweighs the effects of factors such as the general trade affiliation between the immigrants' home countries and the US and the prevalence of Internet, cable television and telephone services. We also found that the pro-service (tourism) trade effects of immigrants have the potential to counteract the negative effects of the relative geographic distance of their home countries as well as the opportunity cost of travel from their home countries to the US. Our findings have two important implications. First, as immigrants are found to exert pro-export effects for the service sector, the role that immigrants play in promoting the economic development of their host and/or home countries, via the promotion of trade, goes beyond just their influences on merchandise trade. This finding complements that of Murat and Pistoresi (2009) who report that the networks of Italian emigrants significantly promote both inward and outward bilateral Foreign Direct Investment (FDI). Second, prior estimates of the effect that several factors may have on the demand for tourism services, particularly in countries that serve as host to significant proportion of immigrant population, might be biased as they have failed to account for the observed positive influences of immigrants on tourism demand.

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APPENDIX

Data Sources

Variable	Description	Source
$TOUR_{it}$	Number of tourist arrivals to the US from country i (i.e. the dependent variable)	US Department of Commerce, ITA, Office of Travel & Tourism Industries (US ITA, 2007)
$IMMG_{it}$	Stock of immigrants from the home country living in the US	Migration Policy Institute (MPI, 2007)
$RPCI_{it}$	Real gross domestic product (GDP) per capita (in 2000 US prices)	World Bank (2006)
$GDST_i$	Geographic distance from New York City to the immigrant home country	Authors' calculations
$PORT_i$	Coastal access dummy variable	CIA (2007)
$IPPP_{it}$	Inverse of purchasing power parity (PPP) conversion factor	Authors' calculations based on (World Bank (2006)
$\Delta FXRT_{it}$	Change in exchange rate (measured as home country currency units per US dollars)	IMF (2007)
$ECFR_{it}$	Index of economic freedom	Beach and Kane (2008)
$NEMB_{it}$	Number of US embassies and/or consulates in the immigrant home country	Rose (2007)
$OPEC_i$	OPEC membership dummy variable	www.opec.org
$ENGL_i$	Common language dummy variable	CIA (2007)
$TELP_{it}$	Total Internet, cable and telephone (fixed and mobile) subscribers relative to total population in immigrant home country	ITU (2007)
$OPEN_{it}$	Measure of general economic openness	World Bank (2006)
$TRAF_{it}$	Immigrant home country affinity for trade with the US	Authors' calculations based on OECD(2007)
$TREM_{it}$	Immigrant home country tourism remoteness	Authors' calculations

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