Business Travel as an Input to International Trade*

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Abstract

The importance of business and social networks in generating trade is becoming increasingly recognized in the international economics literature. An important way in which people build and maintain networks is through face-to-face meetings. I propose an empirical model in which business travel helps to overcome informational asymmetries in international trade, generating international sales in the form of new export relationships. The empirical evidence, using a unique survey of all outbound travelers from the U.S. on international flights, which differentiates between business and leisure travel and U.S. resident and non-resident travel, and exploits relative changes in U.S. visa policy towards non-Visa Waiver Program countries in the aftermath of September 11 to instrument for international travel, supports the model. Business travel to the United States by non-resident, non-citizens has a positive impact on the extensive export margin. The effect is driven by travel from non-English speaking countries, for which communication with the U.S. by other means may be less effective. Moreover, the effect is stronger for differentiated products and for higher-skilled travelers, reflecting the information-intensive nature of differentiated products and that higher-skilled travelers are better able to transfer information about trading opportunities. Together, the evidence provides support for the many U.S. Department of Commerce export promotion programs designed to bring prospective importers to the U.S. to facilitate trade matchmaking.

Keywords: information transfer; business and social networks; trade costs; travel.

JEL Classification: F1.

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1 Introduction

Over the last half-century, tariffs and non-tariff barriers to international trade have fallen considerably around the world as countries join regional and multilateral trading agreements; yet substantial barriers still exist and many countries continue to trade a disproportionate amount intra-nationally.[1] This world of significantly lower trade policy barriers and declining transport costs has shifted the focus of economic research towards more informal border barriers to trade. Based on evidence from a number of studies and a wide range of countries, Anderson and van Wincoop (2004) estimate national borders pose tariff-equivalent barriers of 44 percent. Although national borders are not easily erased, attempts to decrease the costs associated with borders may help enhance international trade opportunities and increase income levels.[2]

Border barriers to trade may include language and cultural barriers (e.g., Frankel, Stein and Wei (1998)), currency barriers (e.g., Rose (2003)), security barriers (e.g., Anderson (2000)), and informational barriers (e.g., Portes and Rey (2005)). Business and social networks that cross national borders may lessen the impact of these informal trade barriers. In particular, networks may help to provide efficient matches between buyers and sellers, transfer information about the local culture, customs and consumer markets, and provide informal contract enforcement through social sanctioning or blacklisting, where formal contracts are not easily enforced (Rauch 1999).

The importance of networks in generating trade is becoming increasingly recognized in the international economics literature.[3] Research has also concluded that networks are less effective at creating trade for homogeneous goods, for which prices can convey the relevant information about the profitability of trading the product, than for differentiated goods, for which a matching of buyers and sellers in characteristics space is necessary (Rauch 1999).

In view of the existence of informational barriers to trade, it is not surprising that recent research has found that the use of communication tools and the costs of communication have robust associations with bilateral trade. This is the case for bilateral telephone traffic (Portes and Rey 2005) and the internet (Freund and Weinhold 2004). In this paper, I extend the literatures on informational barriers to trade, business and social networks, and communication in trade by studying the impact of bilateral international travel on bilateral international trade. An important

[1] McCallum (1995) estimates that even after the establishment of the Canada-U.S. Free Trade Agreement (FTA) in 1988, trade between Canadian provinces was more than 20 times the level of trade between Canadian provinces and U.S. states, even after controlling for distance and size.

[2] For evidence on the relationship between international trade and income, see Frankel and Romer (1999) and Feyrer (2009).

[3] For a complete survey of the literature on business and social networks in international trade, see Rauch (2001).

way in which people build and maintain networks is through face-to-face meetings. If networks are transnational, these meetings will require international travel. More precisely, this research presents evidence for international business travel as an input to international trade.

I am, of course, not the first to recognize the importance of international travel for international trade. Frankel (1997) writes:

> Consider a kind of export important to the United States: high-tech capital goods. To begin sales in a foreign country may involve many trips by engineers, marketing people, higher ranking executives to clinch a deal, and technical support staff to help install the equipment or to service it when it malfunctions.

In fact, there is already some support in the literature for the idea of international travel as a mechanism to overcome informal barriers to international trade (e.g., Kulendran and Wilson (2000) for Australia, Aradhyula and Tronstad (2003) for the Arizona-Mexico border region, and Cristea (2009) for U.S. states). This paper, however, offers a number of important contributions to the current literatures on international travel and international trade and communication in international trade, in large part due to the depth of a survey from the U.S. Department of Commerce on all outbound travelers from the United States. First, in a study on how international visits by economists affect their future research productivity, Hamermesh (2006) declares, "with the exception of Kulendran and Wilson (2000), the relationship between international travel and international trade has not been studied." This is surprising, given the many mechanisms through which trade and travel are linked. Also, this is the first paper, to my knowledge, to use this rich international travel data in economics.[4] Next, I go beyond the previous work to estimate the effects of international travel on international trade using both time-series (Aradhyula and Tronstad (2003) rely only on cross-sectional information) and cross-section (Kulendran and Wilson (2000) use only the time series dimension) information to identify a causal relationship between international business travel and international trade. I exploit the increased security concerns post-September 11 and the subsequent relative changes in U.S. visa policy towards citizens of Visa Waiver Program and non-Visa Waiver Program countries to instrument for international travel in a quasi-difference-in-difference methodology.

Also, unlike available data on telephone traffic and internet use, the international travel data identifies the traveler's main purpose of trip as business or leisure, allowing for a deeper exploration of the link between communication and international trade. This distinction allows me to be certain

[4]Tourism researchers use this data frequently. See, for example, Bai, Jang, Cai and O'Leary (2001) and Cai, Lehto and O'Leary (2001).

that any positive impact of business travel on international trade is not merely a reflection of an omitted variable, leisure travel. I continue to analyze the differential impacts of business travel on export varieties versus export volumes per existing variety to distinguish the impact of business travel on starting new trading relationships (the extensive margin of trade) and expanding existing trading relationships (the intensive margin of trade).

In addition, I distinguish the effects of business travel by the main language of the trading partner, to investigate further the effects of language communication on business networks in international trade. I also use bilateral travel flows to explore more deeply the hypothesis that trade in differentiated products is more information-intensive than trade in homogeneous products and is therefore more strongly associated with face-to-face meetings. Finally, this paper utilizes traveler characteristics, including the traveler's occupation, to investigate the hypothesis that higher-skilled travelers are better able to convey information about profitable trading opportunities.

My results have direct implications for policy. By quantifying the extent to which international business travel causes international trade, this study can help to evaluate the many government programs worldwide that promote business travel for the purpose of creating trade. The U.S. government pursues many such export promotion policies and this research can help to evaluate whether these trade missions, grants for trade shows, and other international trade promotion programs should be expanded or reduced.[5]

I propose an empirical model in which business travel serves as an input to international trade by overcoming informational and communication barriers to trade through face-to-face meetings. The model relates business travel to export volumes and varieties, while accounting for leisure travel. I estimate country-level gravity model regressions using data on international travel and international trade flows for the United States with the rest of the world. Specifically, the Office of Travel and Tourism Industries of the U.S. Department of Commerce conducts a quarterly survey of all outbound travelers from the U.S. on international flights called the *Survey of International Air Travelers* (SIAT). The SIAT includes information on each outbound traveler's country of residence, country of birth, country of citizenship, occupation, main destination, and main purpose of trip. This rich data set has, to my knowledge, never been explored in economics. The international trade data are from the U.S. Census Bureau's *Exports and Imports of Merchandise Trade*. The two data sources are matched by country identifier for the first time in this paper.

[5]Please see appendix A for a more detailed description of U.S. Department of Commerce export promotion programs.

The findings can be summarized as follows. The main results are consistent with the view that business travel for the purpose of communication acts as an input to international trade. Instrumenting for international travel with relative U.S. visa policy changes post-September 11 towards non-Visa Waiver Program countries, 10 percent more business travel to the U.S. by non-U.S. citizen residents of country j leads to a 0.9 percent increase in export relationships from the U.S. to country j and a 1.3 percent increase in the volume of exports given existing varieties. This is the equivalent of approximately 18 new export varieties per country per quarter and $4,300 in additional sales per existing variety.

The effect on new trading relationships is driven by travel from non-English speaking countries, for which communication with the U.S. by other means may be less effective. Moreover, the effect is stronger for differentiated products and for higher-skilled travelers, reflecting the information-intensive nature of differentiated products and that higher-skilled travelers are better able to transfer information about trading opportunities. Only business travel by high-skilled workers from non-English speaking countries enhances the intensive margin of trade, and furthermore the intensive margin increases only for information-sensitive differentiated products.

The remainder of this paper is organized as follows. In the next section, I briefly summarize the literature on business and social networks in international trade, paying special attention to studies related to communication and international trade, international travel and international trade, and the implications of global conflict on travel and trade. Section 3 details the international travel data, the international trade data, and key gravity control variables and provides descriptive evidence in support of this new data. In section 4, I detail the baseline empirical methodology and present results from the analysis alongside. I begin the analysis with the basic gravity model, then refine the results according to the theory outlined in Anderson and van Wincoop (2003) to include terms designed to capture a country's multilateral resistance and to control for bilateral aviation infrastructure. Section 4.3 refines the results further by the residence of the traveler to prepare for the instrumental variables analysis in section 5, which instruments for international travel using the relative changes in U.S. visa policy towards non-Visa Waiver Program countries after the September 11 terrorist attacks. In section 5.1, I distinguish the effects of business travel on international trade by the main language of the trading partner, by product differentiation, and by the skill-level of the traveler. Additional robustness checks using only the set of sea shipments, controlling for additional country-by-time varying transportation costs, zeros in trade and travel flows, and the timing of the business travel input to trade are provided in section 6. The final

section concludes with the broader impacts of this research and proposes some implications for economic policy.

2 Related Literature

In this section, I provide a brief overview of the literature on business and social networks in international trade[6], with special attention to those papers dealing with communication and trade. I also review the extant literature on international travel and international trade and the implications of global conflict for travel and trade.

Communication and international trade Business and social networks in a variety of forms which provide information about profitable trading opportunities have strong empirical support in the literature. Portes and Rey (2005) use annual telephone call traffic data and the number of multinational bank branches to study the importance of cross-country informational networks in trade. They argue informational costs to trade play a substantially larger role than transport costs at decreasing bilateral trade volumes. The coefficient on distance in their standard gravity model is dwarfed by the variables representing the information transmission mechanisms. Their work is reinforced in a recent study by Fink, Mattoo and Neagu (2005) which finds communication costs, arguably a significant element of information costs, negatively impact trade, even after controlling for bilateral telephone traffic. Head, Mayer and Ries (2009) document the impact of distance on trade in services, and demonstrate its decline over time, suggesting declining communication technologies. On the contrary, Freund and Weinhold (2004) argue transport costs still outweigh information costs. Using data from the Internet Software Consortium to count the total number of web hosts in each country, the authors find little evidence that the internet has affected the coefficient on distance in standard gravity models of trade, though an internet presence in the country does have a positive impact on trade flows. This is consistent with a model in which the internet reduces sunk-costs of trading. This finding is reinforced by Blum and Goldfarb (2006) who analyze data on internet activities by U.S. consumers on non-U.S. websites and find that distance matters even online.

Rauch and Trindade (2002) focus on ethnic Chinese business groups worldwide as providing the source of information-sharing, where the strength of the ethnic Chinese network between two countries is defined by the probability that two people selected at random from each country will

[6]For a complete survey of the literature, see Rauch (2001).

both be ethnically Chinese. Their study finds a highly significant and positive effect of ethnic Chinese networks on bilateral trade. Furthermore, the authors confirm the finding in Rauch (1999) that business networks are more effective at generating trade for differentiated goods than for homogeneous goods (those with reference prices).

International travel and international trade The Department of Commerce sponsors trade missions and trade shows with the objective of fostering the U.S. export market. These export promotion programs which rely on international travel suggest a clear causal relationship must exist. Head and Ries (forthcoming), however, document for Canada that after controlling for pre-mission levels of trade, Canadian trade missions have no impact on bilateral trade. Cristea (2009), by contrast, provides support using U.S. state-level data that travel is a valuable input into exporting. The key result in the paper suggests that an increase in the volume of exports increases the demand for business air travel.

For other countries as well there is support in the literature for the idea of international travel overcoming informational barriers to create international trade. Kulendran and Wilson (2000) investigate the link between international trade and international travel flows between Australia and its four largest trading partners: the U.S., Japan, New Zealand, and the United Kingdom using time-series econometric techniques. With quarterly travel data from the Australian Bureau of Statistics separated by purpose of trip, the authors demonstrate that business travel Granger-causes total bilateral trade flows between the U.S. and Australia and business travel Granger-causes total imports from the United Kingdom. These results offer some evidence in support of the idea that businessmen from the U.S. and the U.K. travel to Australia to find buyers for their goods or to meet with established contacts about continuing the relationship. In a similar study, Shan and Wilson (2001) use the Chinese economy as a case study to disentangle the causal relationship between international travel and international trade. Using a Granger no-causality test, the authors conclude that there exists two-way causality between trade and travel, which they argue casts doubt on previous single-equation tourism demand forecasting studies.[7]

Using survey data, Aradhyula and Tronstad (2003) estimate an Arizona agribusiness firm's propensity to trade with Mexican border state, Sonora, as a function of whether the proprietor made a business trip to Sonora state. Controlling for the firm's size relative to other firms selling

[7] A number of studies have also used similar data and techniques to attempt to uncover the relationship between international travel and economic growth (e.g., Gunduz and Hatemi-J (2005) for Turkey, Oh (2005) for Korea, and Kim, Chen and Jang (2006) for Taiwan).

similar products, how long the firm has been in business in Arizona, the importance of geographic diversity for the agricultural product, and the Spanish-speaking skills of the proprietor, the authors find that business travel helped to overcome informational trade barriers along the Arizona-Mexico border, increasing the propensity to trade by up to 51.5 percent.[8]

Implications of global conflict Several papers have documented the negative effects of global conflict on economic activity, including trade and travel.[9] More recently, a few papers have focused specifically on the effects of September 11 on airline activity in the U.S., but, to my knowledge, there has been no empirical study documenting the effects of September 11 on international trade activities.[10] Ito and Lee (2005), for example, examine the impact of September 11 on U.S. airline demand. The authors model both the transitory and permanent components of the shocks from September 11 to conclude that the events of September 11 resulted in a transitory, negative demand shock of approximately 30 percent, in addition to a more enduring demand shift of approximately 7 percent. This is consistent with heightened security measures and U.S. visa policy changes which remained in place long after the initial shock had subsided. Neiman and Swagel (2009) study the implications of post-September 11 changes in U.S. visa policy on travel by affected groups to the United States. In contrast to Ito and Lee (2005), the authors document that visa policy changes in a post-9/11 world had little impact on the decrease in travel, but rather the most significant declines were found among travelers who were *not* required to obtain a visa.

I am not aware of any studies in economics which exploit the country-time variation resulting from the relative changes in U.S. visa policy for Visa Waiver Program and non-Visa Waiver Program countries to study the impact of international travel on international trade.

3 Data

My main data source is a quarterly survey of all international outbound travelers from the United States. I match these key characteristics to country-level bilateral trade flows and other com-

[8]Related work by Spilimbergo (2007) and Spilimbergo (2009) investigates the impact of a foreign education on trade and democracy, respectively. Hamermesh (2006) focuses on the impact of international travel on research and development, inferring how visits to Australia by economists affected their subsequent productivity.

[9]See, for example, Blomberg and Hess (2006) for the effects of international terrorism on international trade through 1999 and Enders and Sandler (1991) for the impact of terrorist attacks in Spain on local tourism during the period 1970 to 1988. Both papers conclude that an increase in global conflict and terrorism decreases travel and trade. By contrast, Berger, Easterly, Nunn and Satyanath (2009) present evidence for the United States during the Cold War that CIA interventions helped to increase the power and influence of the U.S. abroad thus creating a market for U.S. goods and increasing trade from the United States.

[10]Walkenhorst and Dihel (2006) simulate the effects of September 11 on international trade.

plementary country-level data sources to uncover the impact of business travel on international trade.

3.1 International travel data

The international travel data come from the U.S. Department of Commerce, International Trade Administration, Office of Travel and Tourism Industries (OTTI) which conducts a quarterly survey of international outbound air travel from the United States, as part of the nation's research on policy issues related to tourism. The *Survey of International Air Travelers* (SIAT) is an individual-level data set consisting of a representative-sample of overseas travelers from the United States in every quarter from 1993 through 2003.[11]

The SIAT is the most comprehensive study of people traveling overseas from the United States, including both U.S. residents and residents of other countries. Although all information is collected on the outbound flight, U.S. residents answer questions about their upcoming trip abroad (travelers *from* the U.S.), and overseas-residents answer questions about their recent trip to the United States (travelers *to* the U.S.).

The SIAT data is particularly valuable to this research agenda as it offers variables beyond the available information in many other international travel databases. The main variables of interest are the respondent's main country of destination[12] and the purpose of trip. This paper will distinguish between *business* travel, as defined by business, professional, convention, conference, or trade show, and *leisure* travel, as defined by leisure, recreation, holiday, sightseeing, visiting friends, or visiting relatives.[13] The SIAT also has information on the respondent's country of residence, country of birth, country of citizenship, and occupation. Furthermore, directional data (travel to and from the United States) similar to international trade import and export statistics allows an additional dimension not available in other travel statistics.

The main advantage of the SIAT is the long history of quarterly bilateral travel flows by purpose of trip with which I can distinguish between business and leisure travel, by the traveler's country of residence and country of citizenship. Other travel statistics like those in the World Tourism Organization's *Compendium of Tourism Statistics* and *Yearbook of Tourism Statistics* provide data

[11] For details on individual airline involvement, the sampling, and survey weighting procedures of the SIAT, please see appendix B.

[12] For overseas residents, the main destination is always a U.S. city. The corresponding variable for these travelers is the final international port of debarkation.

[13] The SIAT also includes travel for the purpose of government affairs or military; study or teaching; religion or pilgrimage; health treatment; and other. These travel types are excluded from the analysis.

such as total bilateral travel flows (e.g., how many people traveled between the U.S. and Germany) or total flows of business and leisure travel to a country (e.g., how many people traveled on business or leisure to Germany from any other country). Similarly, the U.S. Department of Transportation's *Passenger Origin Destination Survey* used in Cristea (2009) considers only business-class versus economy-class travel, rather than all travel for the purpose of business irrespective of class of travel. With the SIAT, I can identify total flows of business (or leisure) travel between the U.S. and Germany by U.S. residents and overseas residents. Data on U.S. Department of State visa issuances, available annually, do not include information on entries by residents of Visa Waiver Program countries who are not required to obtain a visa to enter the United States and are not systematically classified by the type of visa issued (business or pleasure). Information from the U.S. Department of Homeland Security (formerly Immigration and Naturalization Services) *Yearbook of Immigration Statistics* on non-immigrant admittances are only available annually since 1998 and are also not systematically classified by purpose of trip.

I restrict observations as follows. In order to match the travel characteristics to country-level trade flows, I aggregate the individual-level travel flows within a quarter by main destination and resident-type. Individual observations are weighted by the individual-level SIAT expansion weight.[14] Finally, I exclude the main destinations of Canada and Mexico.[15] The final data set includes a quarterly panel of business and leisure travel from 1993 to 2003 for 173 countries by resident-type.

3.2 International trade data

Official U.S. export statistics are compiled by the U.S. Bureau of the Census from copies of the Shipper's Export Declarations which are required to be filed with local Customs officials at the time merchandise is exported from the country. The U.S. Census Bureau's *Exports and Imports of Merchandise Trade* are available monthly for the years 1993 through 2003, by commodity and trading partner country.

The main variables of interest are the trading partner country code, the 10-digit Harmonized System (HS) commodity code, the 4-digit Standard International Trade Classification (SITC) code, and the value of exports.[16] For the purpose of this research, I also define export varieties between

[14] For more information on SIAT survey weighting, please see appendix B.

[15] While Canada and Mexico are indeed important U.S. trading partners, my goal in excluding these countries is to ensure that I capture virtually all international travel from the United States. A study like this would be difficult for a country like France where significant international travel may take place over land.

[16] "The f.a.s. (free alongside ship) value is the value of exports at the port of export, based on the transaction price

the U.S. and country j to be the number of unique 10-digit HS export commodities that flow between the U.S. and country j and the volume of export flows per existing variety between the U.S. and country j to be the total value of exports over the number of export varieties in a given quarter.

I aggregate the monthly data into quarterly data by trading partner country for the purpose of matching to the SIAT data's main travel destination countries. The final data set includes a quarterly panel of U.S. export volumes and varieties from 1993 to 2003 for 215 countries by product differentiation.

3.3 Traditional gravity controls

Economists have long relied on the gravity model of international trade to help predict trade flows between two countries. For the gravity model estimations, I collect quarterly data on country j's gross domestic product (GDP) and per capita GDP from the International Monetary Fund's *International Financial Statistics*. GDP is measured in current U.S. dollar units. I use the great circle distance from Chicago to country j's major city.[17] To measure the ease of communication in international transactions, I include an indicator for countries with English as the official language from Crystal (2003), a linguist and expert on the English language worldwide. Information on other former British colonies is available from *www.britishempire.co.uk*, a list of landlocked countries was retrieved from the CIA World Factbook, and countries using the dollar as official currency are available from two main sources: the U.S. Department of Treasury's, Office of International Affairs, and Glick and Rose (2002). Preferential trading arrangements between country j and the United States are flagged with information from the Organization of American States, Foreign Trade System, while economic and trade sanctions by the United States on country j are flagged with information from the U.S. Department of Treasury's, Office of Foreign Assets Control and supplemented with historical information from Malloy (2001). Data on U.S. preferential trading agreements and country sanctions programs are detailed in appendix tables C.1 and C.2, respectively.

including inland freight, insurance and other charges incurred in placing the merchandise alongside the carrier at the U.S. port of exportation. The value as defined, excludes the cost of loading the merchandise aboard the exporting carrier and also excludes freight, insurance and other charges or transportation costs beyond the port of exportation" (U.S. Bureau of the Census 2003).

[17] The major city is generally the capital of the country, but in some instances is the city that more closely reflects the country's economic center following Frankel (1997).

Table 3.1: Descriptive Statistics: Travel Data, 1993-2003

	All Resident Travelers	US Resident Travelers	Non-Resident Travelers
All Travel	161,293.6	77,012.4	84,281.2
Business Travel	44,547.6	20,996.3	23,551.4
of which: main	34,245.9	16,423.7	17,822.2
of which: secondary	10,301.7	4,572.6	5,729.1
Leisure Travel	116,746.0	56,016.1	60,729.9
of which: main	75,718.5	36,238.3	39,480.2
of which: secondary	41,027.5	19,777.8	21,249.7
Share of Travelers:			
Clerical & Production Workers	0.103	0.076	0.133
of which: main business	0.009	0.007	0.015
Professional & Managerial Workers	0.672	0.692	0.653
of which: main business	0.199	0.205	0.194

Source: SIAT, 1993-2003.

3.4 Descriptive statistics

The international travel, international trade, and key gravity controls are matched by country code to generate a quarterly panel. The 77 countries in appendix table C.3 that have non-missing data (in logs) for both inbound and outbound travel are chosen for the analysis that follows.

As the SIAT is a relatively unknown dataset, new to the study of economics, in this section I offer some descriptive statistics in support of this unique data source. Table 3.1 reports average values for travel flows between the United States and all other countries for the sample period. For the average quarter and country, there were 161,294 reported travelers with the United States. This includes a number of countries with zero travel flows in many quarters, as well as the United Kingdom which reported almost 3 million travelers (2,768,322) in the second quarter of 2000. Across all countries and time periods, there are more travelers to the United States (non-residents) than from the United States (U.S. residents). Five of the top 10 travel destinations for U.S. residents are also the top 5 travel originations for non-residents (Japan, the United Kingdom, Germany, the Netherlands, and France). U.S. residents also most often travel to destinations such as Italy, Jamaica, the Bahamas, Spain and the Dominican Republic, while non-residents most often travel from countries such as Brazil, Taiwan, Switzerland, Venezuela, and Australia.[18]

Leisure travel exceeds business travel for U.S. resident travelers and non-resident travelers. Roughly a third of all travelers are professional and managerial workers, but an additional ten

[18] The Spearman rank correlation coefficient across all 77 countries in the sample between U.S. residents and non-residents for all travel is 0.8069. The corresponding rank correlation coefficients for main business travel and for main leisure travel are 0.8464 and 0.7548, respectively.

Table 3.2: Descriptive Statistics: Trade Data, 1993-2003

	All Countries	VWP Countries	Non-VWP Countries	English-Speaking Countries	Non-English Speaking Countries
Number of Export Varieties	2,012.8	2,845.3	1,715.3	2,014.2	2,012.4
of which: homogeneous	381.2	537.1	325.2	394.4	376.5
of which: differentiated	1,576.0	2,230.7	1,342.0	1,558.6	1,582.1
Export Value per Variety	325,762.4	547,531.1	246,508.5	266,741.8	346,471.4
of which: homogeneous	300,740.3	480,390.2	236,254.4	207,659.1	333,544.3
of which: differentiated	301,006.4	518.240.0	223,373.3	270,854.7	311,586.0

Sources: U.S. Census Bureau, 1993-2003; U.S. Department of Homeland Security, Yearbook of Immigration Statistics, 1993-2003.

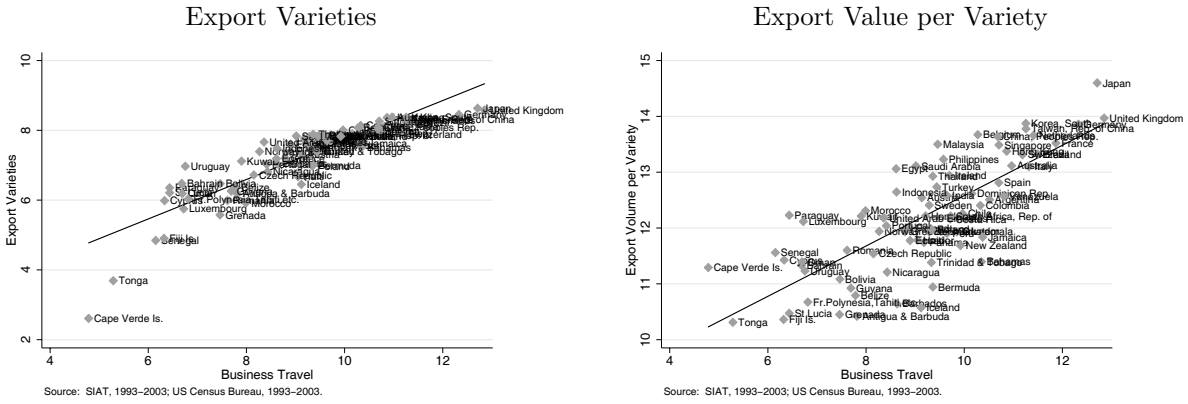

Figure 3.1: International Business Travel and Trade Flows, 1993-2003

percent are clerical and production workers. The bulk of business travel, however, is flown by professional and managerial workers. Interestingly, the probability that low-skilled (clerical and production) workers travel is higher for non-residents than for U.S. residents.

Table 3.2 provides descriptive statistics for the trade data. On average, the United States exported roughly 2,000 unique varieties per quarter, about 1,600 of which are differentiated products and almost 400 of which are homogeneous products. The United States trades more with Visa Waiver Program countries, perhaps reflecting the economic sizes of these countries, but there is little difference in trade patterns across English versus non-English speaking nations.

Figure 3.1 correlates average business travel with the average number of export varieties and value per existing variety over the 44-quarter sample period for each country, demonstrating a strong positive correlation on both accounts. The countries with which the United States trades a lot are also countries with which the United States travels a lot.[19] If there are unobservable, country-specific factors driving both travel and trade with the United States, this would show up in both

[19]See appendix table C.4 for a list of the top 10 travel and trade partners.

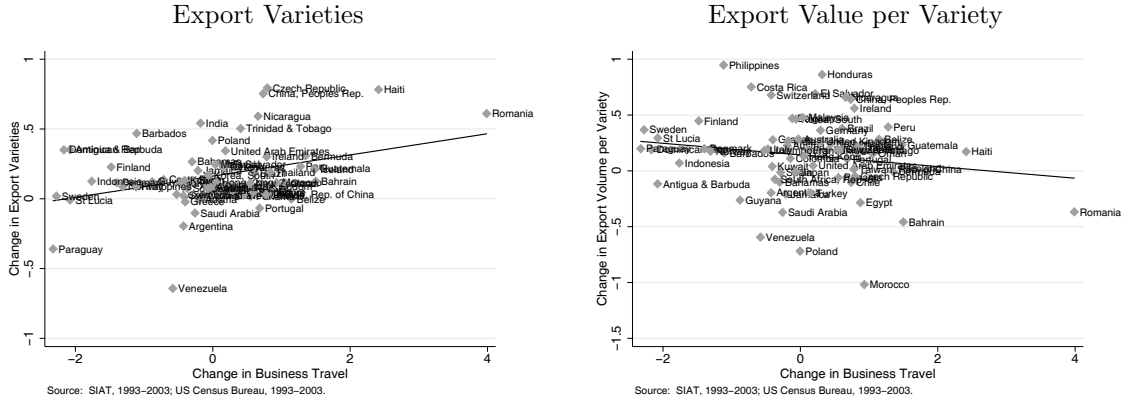

Figure 3.2: Log Changes in International Business Travel and Trade Flows, 1993-2003

high levels of travel and trade. In figure 3.2, I control for these country-specific characteristics and plot the 10-year change in business travel alongside the 10-year change in the number of export varieties as well as the value per export variety for each country. The simple correlations show that countries with strong growth in business travel over the 10-year period also have strong growth in the number of export varieties.[20] There is no similar evidence for the value of exports per existing variety[21], providing some support for the hypothesis that business travel helps to overcome the more informationally-intensive barriers to entry in new markets.

Changes in business travel are highly correlated with changes in leisure travel across countries over time, as is evidenced by figure 3.3. Therefore, similar relationships exist between the growth in leisure travel and the growth in trade over the 10-year period.[22] For this reason, in the analysis that follows, I will explicitly control for any impact of leisure travel on trade using a quasi-difference-in-difference methodology.

4 Baseline Empirical Methodology and Estimation

The objective of this paper is to identify if bilateral business travel acts as an input to international trade. Augmented country-level gravity regressions relate business travel to international trade, accounting for time-varying Anderson and van Wincoop (2003) multilateral resistance terms, bilateral aviation infrastructure, and the differential effects of leisure travel.

[20] A robust OLS regression reports a coefficient of 0.076 with a *t-statistic* of 2.86.

[21] A robust OLS regression reports a coefficient of -0.052 with a *t-statistic* of -1.64.

[22] Robust OLS regressions report a coefficient of 0.071 with a *t-statistic* of 2.43 for the number of export varieties and 0.025 with a *t-statistic* of 0.78 for the value of exports per variety.

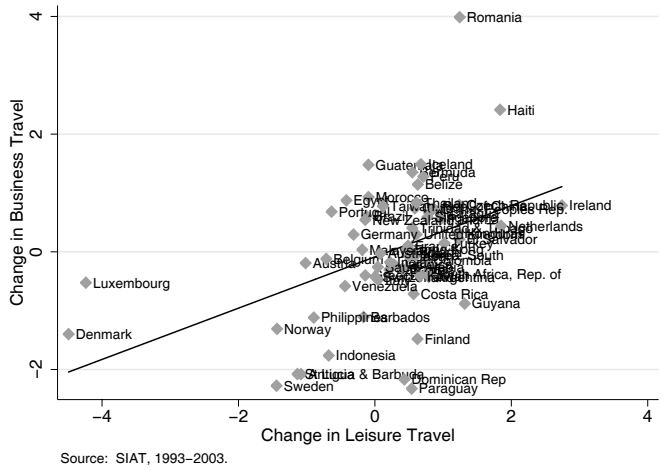

Figure 3.3: Log Changes in Business and Leisure Travel, 1993-2003

4.1 The baseline gravity model

Unlike formal tariff and non-tariff barriers and transportation costs, informal barriers to trade cannot be directly measured and must be inferred through bilateral trade flows. Economists have long relied on the gravity model of international trade to help predict trade flows between two countries. Following the literature, I model factors that influence the flow of trade between countries as multiplicative deviations from a proportional relationship between the bilateral value of trade and the product of the trading partners' attributes as follows:

$$V_{ijt} = \alpha_t(\frac{Y_{it} * Y_{jt}}{d_{ijt}}), \tag{4.1}$$

where i and j index countries and t indexes time. V_{ijt} represents exports from country i to country j in time t, α_t characterizes factors influencing exports that may vary over time but not across countries, and Y_{it} and Y_{jt} reflect the economic attributes of exporter i and importer j in time t. d_{ijt} represents the factors influencing trade between country i and j in time t.[23]

Conventional gravity models (and the baseline gravity framework used in this paper) include measures of economic size and per capita GDP to represent Y_{it} and Y_{jt}. These capture the tendency for richer countries to be more open to trade and the tendency for larger (by population) countries to trade less. Typically, d_{USjt} includes variables such as distance, common language, colonial links, landlocked countries, currency unions, preferential trading arrangements, trade sanctions,

[23]In this paper, I test the effects of business travel to and from the United States on trade with the United States. For this reason, country i will hereafter be referred to as US.

and common borders.[24]

I follow this convention and test the model on two different trade outcomes: export varieties (EV_{USjt}), and export volumes (value) per variety($\frac{EX}{EV}_{USjt}$).[25] Consider the following decomposition of total exports from the United States (EX_{USjt}):

$$EX_{USjt} = EV_{USjt} * \frac{EX_{USjt}}{EV_{USjt}},$$

such that an increase in the total value of exports from the U.S. is a result of either an increase in the number of exported varieties (the extensive margin) or an increase in the value per existing traded variety (the intensive margin) or both. We can think of the distinction as starting a new trade relationship (varieties) versus expanding existing trade relationships (volume per variety). Relating business travel separately to these components of total exports will help to understand the relative importance of business travel at overcoming informational barriers to trade along the extensive and intensive margin of trade. I hypothesize that business travel will be more effective at creating trade along the extensive margin. As varieties already exist in the local market, enhancing the intensive margin of trade is less information sensitive than beginning new trade relationships not yet available in the local market.

Panel A of table 4.1 reports results from classic country-level gravity regressions (log-linearized versions of equation (4.1)), with robust standard errors clustered at the country-level for the 77 countries with non-missing data (see appendix table C.3). Comparing the results for export varieties (column 1 in panel A) and export volumes per existing variety (column 2 in panel A), it seems clear that measures thought to proxy for transportation costs (i.e., distance) may proxy for informational costs or sunk start-up costs as suggested in Grossman (1998).[26] More specifically, distance serves as a strong deterrent of market access for export varieties (that is, a large deterrent to starting trade relationships), but once a variety is exported distance has no impact on maintaining trading relationships. Similarly, speaking the English language, which helps with communication and information transfer in trade, increases the number of export varieties, but has no statistical effect on the volume of exports given existing varieties traded. This evidence reinforces the idea that as policy barriers and transportation costs are falling, research to understand and quantify informational

[24]Because I have excluded Canada and Mexico from the data, no country has a common border with the United States. Nevertheless, any time-invariant effect will be captured in later analyses by the country fixed effects.

[25]While there are also interesting conclusions to be drawn by looking at U.S. imports, the current paper remains focused solely on exports from the United States in order to evaluate the many existing U.S. Department of Commerce export promotion programs. I leave the analysis of U.S. import patterns for future work.

[26]This is confirmed in a recent meta-analysis by Disdier and Head (2008).

Table 4.1: Travel and International Trade: Baseline Gravity Model

	Panel A		**Panel B**		**Panel C**		**Panel D**		**Panel E**	
Dep. Variable:	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$
$\frac{BUS}{LEIS}_{USjt}$							0.118**	0.116**		
							(0.029)	(0.032)		
$\frac{BUS^M}{LEIS^M}_{USjt}$									0.138**	0.134**
									(0.027)	(0.038)
$\frac{BUS^S}{LEIS^S}_{USjt}$									0.033**	0.023
									(0.012)	(0.015)
BUS_{USjt}					0.219**	0.192**				
					(0.033)	(0.036)				
$LEIS_{USjt}$					-0.027	-0.048				
					(0.036)	(0.039)				
$TRAV_{USjt}$			0.145**	0.104**						
			(0.040)	(0.039)						
GDP_{USjt}	0.492**	0.437**	0.308**	0.374**	0.246**	0.348**	0.395**	0.461**	0.353**	0.458**
	(0.069)	(0.038)	(0.060)	(0.055)	(0.049)	(0.057)	(0.036)	(0.038)	(0.032)	(0.044)
$PCGDP_{USjt}$	-0.061	-0.106*	-0.040	-0.097	-0.028	-0.089	-0.044	-0.100	-0.033	-0.088
	(0.056)	(0.051)	(0.048)	(0.054)	(0.042)	(0.054)	(0.047)	(0.056)	(0.045)	(0.062)
$DIST_{USj}$	-0.765**	-0.131	-0.319	0.038	-0.238	0.050	-0.564**	-0.196	-0.493**	-0.201
	(0.235)	(0.148)	(0.194)	(0.165)	(0.156)	(0.162)	(0.157)	(0.137)	(0.136)	(0.141)
ENG_{USj}	0.486*	-0.031	0.238	-0.193	0.193	-0.209	0.464*	-0.005	0.309*	-0.059
	(0.240)	(0.180)	(0.201)	(0.197)	(0.175)	(0.203)	(0.199)	(0.195)	(0.144)	(0.232)
TIE_{USj}	0.124	0.221	0.029	0.322	0.031	0.350*	0.010	0.334	0.159	0.407
	(0.340)	(0.181)	(0.221)	(0.169)	(0.182)	(0.171)	(0.220)	(0.181)	(0.170)	(0.215)
$LAND_{USjt}$	-0.230	0.089	-0.262	0.210	-0.339**	0.145	-0.459**	0.055	-0.451**	-0.030
	(0.224)	(0.237)	(0.165)	(0.243)	(0.117)	(0.230)	(0.156)	(0.248)	(0.153)	(0.260)
DOL_{USjt}	0.369	0.005	0.331	0.002	0.306	-0.006	0.341	0.019	0.285	0.018
	(0.229)	(0.114)	(0.196)	(0.121)	(0.175)	(0.114)	(0.178)	(0.115)	(0.163)	(0.117)
PTA_{USjt}	0.653**	0.294	0.539**	0.244	0.438**	0.166	0.522**	0.229	0.422**	0.170
	(0.116)	(0.433)	(0.101)	(0.401)	(0.081)	(0.376)	(0.092)	(0.384)	(0.078)	(0.359)
SAN_{USjt}	-0.457*	-0.228	-0.249	-0.225	-0.239	-0.267	-0.394*	-0.384	-0.385**	-0.390
	(0.187)	(0.212)	(0.171)	(0.229)	(0.151)	(0.226)	(0.157)	(0.236)	(0.145)	(0.235)
N	3,340	3,340	3,094	3,094	2,894	2,894	2,894	2,894	2,516	2,516
R-squared	0.7124	0.7394	0.7146	0.7502	0.7227	0.7575	0.6723	0.7367	0.6384	0.7236

Note: Robust standard errors, clustered at the country-level, are in parentheses. ** denotes significance at the 1 percent level; * denotes significance at the 5 percent level.
Sources: U.S. Census Bureau, 1993-2003; SIAT, 1993-2003; International Monetary Fund, International Financial Statistics, 1993-2003; Byers (2003); Crystal (2003); www.britishempire.co.uk; CIA World Factbook; U.S Department of Treasury, Office of International Affairs; Glick and Rose (2002); Organization of American States, Foreign Trade System; Malloy (2001); U.S. Department of the Treasury, Office of Foreign Assets Control.

barriers to international trade with the purpose of decreasing the costs associated with these barriers can help to enhance international trade opportunities and increase income levels.

This paper argues that international air travel can help to reduce the informational costs of trade through, for example, face-to-face meetings. Panel B of table 4.1 provides a simple test for this hypothesis and also serves to assess the quality of the SIAT data (never before used in economics). In both specifications, bilateral travel is positively-correlated with bilateral trade. As hypothesized, the elasticity of bilateral travel to bilateral trade is stronger for the number of export relationships than for maintaining export relationships. These results reinforce the evidence in Portes and Rey (2005) and Freund and Weinhold (2004) that communication tools like the telephone and the internet, respectively, have strong associations with international trade. But, unlike data on telephone traffic and internet hosts, the international travel data identifies the traveler's purpose of travel as business or leisure, allowing for a deeper exploration of the link between communication and international trade.

I extend this simple analysis in panel C of table 4.1 to distinguish between business and leisure travel. It has been shown that business networks help to reduce informational costs of trade (Rauch 2001). An important way in which people build and maintain networks is through face-to-face meetings requiring international business travel. Other research has found that leisure travel may also help to increase trade relations using time-series econometric techniques, for example when tourists locate business opportunities while on holiday or learn about new foreign products increasing the local demand for foreign goods upon returning home (Kulendran and Wilson 2000). Business and leisure travel are, however, highly correlated (recall figure 3.3)—a correlation coefficient of 0.8644—making it difficult to estimate independent effects on international trade outcomes as in panel C.[27]

Furthermore, international travel and distance are also highly correlated, as is evidenced by the disappearance of the distance effect in panels B and C. For this reason, in order to accurately measure the impact of business travel on international trade, beyond the impact that distance may have on all variables, in panel D I estimate the impact of business travel *less* leisure travel (in logs, $\frac{BUS}{LEIS}_{USjt}$) on international trade—a quasi difference-in-difference method. If there are reasons that certain countries have significant business and leisure travel with the U.S., and these

[27]When included separately (not reported), business and leisure travel are both positively-associated with the number of export varieties. A 10 percent increase in business travel predicts a 2.0 percent increase in the number of U.S. export varieties, while an equal increase in leisure travel predicts a 1.1 percent increase in varieties exported. By contrast, only business travel has a statistically-significant positive association with the volume of exports per existing variety.

reasons coincide with reasons for significant trade with the U.S. (such as distance), this differenced measure will wipe away any impact of distance (or other cross-country factors which may jointly influence travel and trade flows) on the travel variables, and allows the analysis to concentrate on the impact of differential business travel on international trade.

The results in panel D suggest that a 10 percent increase in the differential between business and leisure travel between the U.S. and country j is associated with a 1.2 percent increase in the number of export varieties from the U.S. and a 1.2 percent increase in the volume per variety. Based on the average country in the average quarter[28], an increase of approximately 7,000 business trips (over leisure trips) per quarter is associated with 27 new export relationships and additional sales of each existing variety of approximately $4,300. Moreover, controlling for international travel in this way helps to reduce the costs associated with the other factors influencing trade relations, such as distance, language, and formal trade arrangements, demonstrating the importance of travel outside conventional gravity factors.

Prior research has argued that one dimension of trade-creating leisure travel is tourists who discover or seek out business opportunities while on holiday. As such, some leisure travel may have business travel trade-creating components. A benefit of the SIAT travel data is the distinction between the traveler's *main* purpose of travel and *secondary* purpose of travel. In panel E of table 4.1, I disaggregate the total business-leisure gap into a main business-leisure travel differential ($\frac{BUS^M}{LEIS^M}USjt$)and a secondary business-leisure travel differential ($\frac{BUS^S}{LEIS^S}USjt$). Main business trips are more effective at creating trade than secondary business trips. Yet, there is a role for the idea in the literature that tourists seek out business opportunities while on vacation—a 10 percent increase in the secondary business travel differential (approximately 3,000 extra business travel trips) increases the number of export varieties by approximately 8.

4.2 The augmented gravity model

The reduced form analysis in the previous section ignores prices and price indices. As these are country-by-time varying and may be correlated with trade costs, Anderson and van Wincoop (2003) update the basic gravity model to a general equilibrium framework, to account for these country-

[28]Recall from table 3.1, the average country made approximately 70,000 fewer business trips than leisure trips with the U.S. in the average quarter.

level price differentials. This transforms equation (4.1) into:

$$V_{USjt} = \alpha_t(\frac{Y^*_{USt} * Y^*_{jt}}{d_{USjt}}), \tag{4.2}$$

where Y^*_{USt} and Y^*_{jt} index the complete economic situation in the U.S. and country j at time t. An important contribution of Anderson and van Wincoop (2003) is that Y^*_{USt} and Y^*_{jt} include country-level price indices or "multilateral resistance terms," which depend on a country's complete set of bilateral trade costs.

Log-linearizing equation (4.2) forms the basis for the empirical estimation ahead:

$$\ln V_{USjt} = \ln \alpha_t + \gamma_1 \ln Y^*_{USt} + \gamma_2 \ln Y^*_{jt} + \Gamma' d_{USjt} + \epsilon_{USjt}. \tag{4.3}$$

As there is no country-level variation within the U.S., $\ln \alpha_t$ and $\ln Y^*_{USt}$ can both be estimated using time fixed effects (δ_t). I include country fixed effects (ϕ_j) interacted with a linear time trend to account for the country-specific, time-varying nature of the Anderson and van Wincoop (2003) multilateral resistance terms in $\ln Y^*_{jt}$, not already captured as in the earlier analysis by GDP (GDP_{jt}) and GDP per capita ($PCGDP_{jt}$).[29] The vector d_{USjt}, designed to capture other factors which influence trade between the U.S. and country j in time t, includes dummies reflecting the official use of the dollar (DOL_{USjt}), a preferential trading agreement with the U.S. (PTA_{USjt}), and trade sanctions imposed by the U.S. (SAN_{USjt}).[30] I also address the possibility that a strong bilateral aviation network may contribute to both international travel and international trade between the U.S. and country j. Micco and Serebrisky (2006) demonstrate that bilateral participation in Open Skies Agreements[31] reduces air transport costs and increases the share of imports arriving by air. I define an indicator variable for preferential aviation agreements (PAA_{USjt}) if the U.S. maintained an Open Skies Agreement or other bilateral aviation agreement (such as a capacity agreement or codesharing[32]) with country j in time t. Finally, d_{USjt} also includes the main variables of interest reflecting the differential main business travel and differential secondary business travel to test the hypothesis that international business travel works as an input to international trade.

[29] The estimates that follow are also robust to the inclusion of non-linear country-specific time trends.

[30] Variables that do not change over time (such as distance) or do not change across countries (such as U.S. per capita GDP) are omitted. As mentioned in footnote 24, these time-invariant and country-invariant effects will be captured by the country and time fixed effects.

[31] An Open Skies Agreement allows air carriers of the U.S. and the foreign signatory to make decisions on routes, capacity, and pricing, and fully liberalizes conditions for charters and other aviation activities including unrestricted codesharing rights (U.S. Department of Transportation, Office of International Aviation 2008).

[32] Please see U.S. Department of Transportation, Office of International Aviation (2008) for more information.

The augmented gravity model specification is as follows:

$$\begin{aligned}\ln V_{USjt} = {} & \gamma_1 \ln \frac{BUS^M}{LEIS^M}_{USjt} + \gamma_2 \ln \frac{BUS^S}{LEIS^S}_{USjt} + \gamma_3 \ln GDP_{jt} + \gamma_4 \ln PCGDP_{jt} \\ & + \gamma_5 DOL_{USjt} + \gamma_6 PTA_{USjt} + \gamma_7 SAN_{USjt} + \gamma_8 PAA_{USjt} \\ & + \gamma_9 t + \delta_t + \phi_j + \phi_j * t + \epsilon_{USjt}, \end{aligned} \tag{4.4}$$

where ϕ_j captures the country-level fixed effects, δ_t represents the quarterly time fixed effects, and ϵ_{USjt} represents an error term that is assumed to be well-behaved, that is, to exhibit no serial correlation and to be orthogonal to all regressors. The country-level fixed effects control for any country-specific, unobservable, and time-invariant characteristic that may affect trade with the United States. The quarterly fixed effects control for any unobservable and country-invariant characteristic that may affect trade with the United States. The parameters of interest are γ_1 and γ_2, the coefficients on differential main and secondary business travel. The specification in equation (4.4) implies that identification in this model is based on changes over time in the differential business travel between the U.S. and a given country j. As in the previous section, the model is tested on two different international trade outcomes: export varieties and export volumes per variety to distinguish the role of business travel in starting new trade relationships and maintaining existing trade relationships.

Results for all travelers are reported in the first panel of table 4.2. Estimates from the theoretically-founded gravity model, controlling for the Anderson and van Wincoop (2003) multilateral resistance terms, suggest that a 10 percent increase in the differential between main business travel and main leisure travel leads to almost one new export relationship per country per quarter (a 0.04 percent increase), but has no statistically significant impact on the volume of exports per existing variety.[33] Business travel helps to overcome the informational barriers in creating new trading relationships, enhancing the extensive margin of exports, but as expanding existing trading relationships is less information-intensive, business travel plays no role in facilitating this trade. Any impact that secondary business travel may have had in the previous analysis has disappeared after controlling for country-specific time trends.[34] I focus the remainder of the analysis on the traveler's *main* purpose of travel, as the main trade-creating travel.

[33]The relatively small quantitative magnitude should not come as a surprise. Most business travel is not for the purpose of creating trade. As an academic economist, I often list my travel to international conferences as business travel, yet this travel does not have any impact on bilateral trade relations.

[34]Perhaps the previous results reflected an omitted country-by-time variable affecting both secondary travel and trade, such as the quality of infrastructure.

Table 4.2: Business Travel and International Trade: Augmented Gravity Model

	All Resident Travelers		**U.S. Resident Travelers**		**Non-Resident Travelers**		**Non-Resident, Non-U.S. Citizen Travelers**		**Non-Resident, Non-U.S. Citizen Travelers**	
Dep. Variable:	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$
$\frac{BUS^M}{LEIS^M}_{USjt}$	0.004*	0.008	0.002	0.006	0.003	0.007	0.003*	0.006	0.003*	0.007
	(0.002)	(0.005)	(0.002)	(0.004)	(0.002)	(0.004)	(0.001)	(0.004)	(0.001)	(0.004)
$\frac{BUS^S}{LEIS^S}_{USjt}$	0.001	0.003								
	(0.002)	(0.004)								
Time FE	X	X	X	X	X	X	X	X	X	X
Country FE	X	X	X	X	X	X	X	X	X	X
Country FE*Trend	X	X	X	X	X	X	X	X	X	X
Lagged Dependent Variable									X	X
N	2,516	2,516	2,730	2,730	2,230	2,230	2,216	2,216	1,772	1,772
R-squared	0.9955	0.9816	0.9956	0.9785	0.9958	0.9853	0.9960	0.9853	0.9973	0.9874

Note: Robust standard errors, clustered at the country-level, are in parentheses. ** denotes significance at the 1 percent level; * denotes significance at the 5 percent level. Other controls, not reported, are described in the text.
Sources: U.S. Census Bureau, 1993-2003; SIAT, 1993-2003.

4.3 Traveler residence

The results from the augmented gravity model in the previous section suggest that business travel with the U.S. may help to overcome informational barriers to the extensive margin of international trade through face-to-face meetings creating new trade opportunities. But, travel statistics, like trade statistics, are directional (outbound travel versus inbound travel and exports versus imports) and as such the aggregate data may confound the more intricate buyer and supplier informational asymmetries. In this section, I distinguish business travel by the residence of the traveler to uncover *how* business travel may serve as an input for trade matches.

Perhaps a more appropriate question to consider is not whether *any* business travel with the U.S. increases sales from the U.S., but rather *how* business travel with the U.S. might increase sales from the United States. Since any transaction involves the matching of a buyer and supplier, international travel as an input to trade matches could occur from either end, i.e., the supplier (U.S. resident) travels abroad on business (e.g., to learn about the export market) or the buyer (non-resident) travels to the U.S. on business (e.g., to learn about the import product). The U.S. Department of Commerce offers export promotion programs in support of both hypotheses: trade *missions* in which U.S.-resident businesspeople travel abroad with the objective to "facilitate market entry and/or increase sales for U.S. suppliers, as well as provide first-hand market information and access to potential business partners" and trade *shows* in which prospective importers travel to the U.S. with the objective of finding U.S. suppliers. As an example, the International Buyer Program offers grants to facilitate travel by non-residents to trade shows in the U.S. and coordinates matchmaking between buyers and suppliers.[35]

Table 4.2 reports results from the estimation of country-level gravity regressions by traveler residence with controls for time-varying multilateral resistance terms, aviation infrastructure, and leisure travel effects as in the previous section. The results indicate that inbound business travel to the U.S. is most-effective at creating new export opportunities for the United States. Non-resident, non-U.S. citizen inbound business travel is positively-related to the number of U.S. export varieties, but outbound business travel from the U.S. by U.S. residents is not statistically-correlated with U.S. export sales.[36] A 10 percent increase in business travel by non-resident, non-U.S. citizens to the U.S. corresponds to a 0.03 percent increase in export varieties from the United States. At the

[35] Please see appendix A for more information on the U.S. Department of Commerce export promotion programs.

[36] This is not simply a sample issue. Results from the restricted set of country-quarters with travel from non-resident, non-U.S. citizens on U.S. residents continue to report insignificant effects of outbound travel on trade.

average for non-resident, non-U.S. citizen business travelers, an increase of approximately 3,000 business trips (all else equal) to the U.S. is associated with approximately 1 additional U.S. export variety per quarter. Together, this evidence provides some support for the many export promotion programs, like the International Buyer Program, designed to bring prospective importers to the U.S. to facilitate trade matchmaking, but casts doubt on export promotion programs which send U.S. residents abroad.[37]

In the case that lagged exports predict both business travel and current exports (as was suggested by Frankel (1997)), the main coefficients of interest will be biased. In the final panel of table 4.2, I also include lags of the dependent variable to capture the persistent impacts of past trade and its determinants, as well as any omitted variable bias which may result from previous trade causing travel.[38][39] The main findings for non-resident, non-U.S. citizen travelers are unchanged with the addition of controls for lags of the dependent variable.

5 Two-stage Least Squares Analysis

The results in the previous section emphasize the role of business travel by non-resident, non-U.S. citizen inbound travelers in helping to overcome informational asymmetries in international trade in order to generate new export varieties. In this section, I make the case for a causal relationship—business travel as an *input* to international trade—using an unanticipated shock to international travel.

However strong the correlation between business travel and bilateral trade, one must be careful not to draw causal inference from the results without further investigation. The classic econometric interpretation of γ_1 in equation (4.4) is that, *ceteris parabis*, business travel impacts export sales. For this to hold, it must be the case that any other determinants of export sales correlated with travel have been removed by the set of controls. Given these controls, the error term is assumed to be exogenous to the main variable of interest, business travel. But, it is clear that any unobserved

[37] This corroborates evidence in Head and Ries (forthcoming) which documents that after controlling for pre-mission levels of trade, Canadian trade missions do not have a positive effect on bilateral trade.

[38] I am aware that this specification may suffer from the well-known Nickell (1981) bias in dynamic panel data models. The Nickell (1981) bias, however, diminishes as the time dimension increases. As I have a relatively long time panel (T=44 quarters), the bias is not a significant concern, and therefore, I opt to use fixed effects estimation rather than difference or system GMM, as in Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998).

[39] Enders and Sandler (1991) and Stock and Watson (2002) suggest determining a model's lag structure by using the maximum appropriate number of lags and then using hypothesis testing to form a more parsimonious model. Hypothesis testing suggests an appropriate lag structure for the number of export varieties of 5 lags, while the optimal number of lags for the volume of exports per variety is one.

heterogeneity or reverse causality will violate this key assumption of ordinary least squares. That is, the main concern in estimating the key coefficient γ_1 is the presence of unobservable shocks to bilateral trade that are also correlated with bilateral travel.

It is arguable that any problems which might arise due to unobserved heterogeneity are accounted for in this analysis through the use of leisure travel as an appropriate counterfactual as described in section 4.1. However, as the quote by Frankel (1997) in the introduction suggests, perhaps sales of a new variety induce more business travel due to after-sales service of the export product. While this may be the case for the outbound traveler results in table 4.2, it is harder to reconcile for the case of inbound non-resident business travel given that the importers and not the suppliers are traveling. Nevertheless, the concern regarding reverse causality is a serious one. Imagine, for instance, a U.S. multinational firm exporting goods to a subsidiary establishment—the larger is the multinational firm, the potentially larger is the export volume and number of exported varieties, and the larger is the need for high-ranking executives to travel from the affiliate to the headquarters in the U.S. for the purpose of inter-company coordination.[40]

This paper identifies the causal link between international business travel and international trade using unanticipated changes in global conflict as instruments for travel. The two stage least squares analysis regresses bilateral exports on the predicted levels of business travel and leisure travel from first-stage estimations in which the exogenous variation in travel is related to U.S. visa policy changes in the aftermath of the September 11 terrorist attacks.[41]

Increased security concerns in a post-9/11 world have had a differential impact on non-resident, non-U.S. citizen travel to the United States. Figure 5.1 shows the sharp decline in average annual business and leisure travel by non-resident, non-U.S. citizen travelers beginning in 2000. On average, business travel to the United States declined by approximately 28 percent between 2000 and 2001, while leisure travel fell by 18 percent in the same period. By 2003, travel had not yet returned to pre-9/11 levels.

However, the impact of 9/11 security concerns on inbound travel is not alone a valid instrument, as post-9/11 security concerns also impacted the flow of trade with the U.S. (due perhaps to increased port inspections).[42] Figure 5.1 displays the log of the average annual number of export

[40]It is not possible to *a priori* sign the direction of the bias due to the possibility that exports may also decrease business travel. For example, in a more globally-integrated world, individuals require less travel as varied cultures and products are available in the home market.

[41]As U.S. visa entry policy changes affect only non-U.S. citizens, the analysis focuses on non-resident, non-U.S. citizen travelers to the United States pre- and post-September 11.

[42]Though the paper does not focus on the events of September 11, Blomberg and Hess (2006) demonstrate the direct effects of global conflict on international trade.

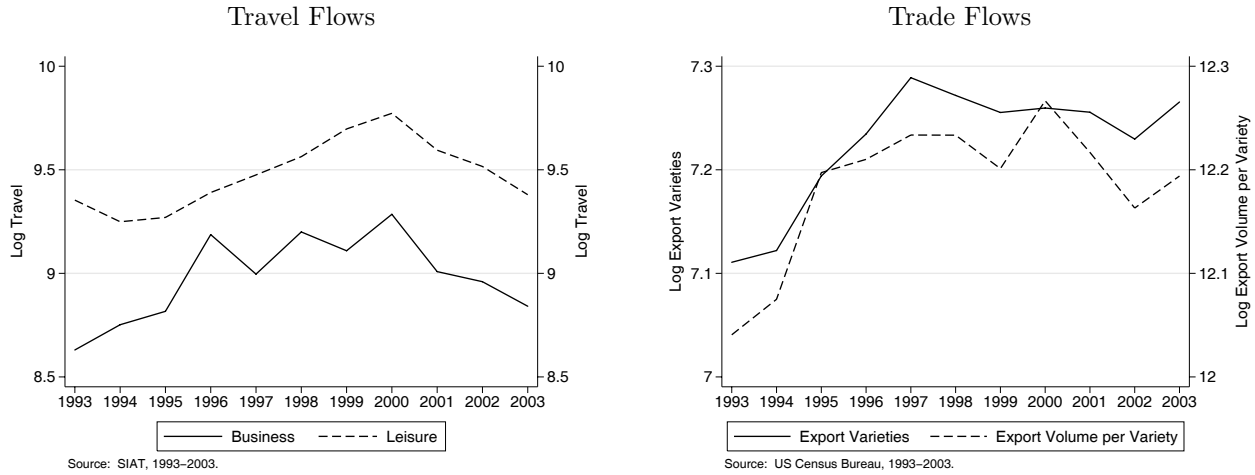

Figure 5.1: International Travel and Trade Flows, 1993-2003

varieties and volume per existing variety. Export sales per existing variety declined by a total of 10 percent in the immediate aftermath of the September 11 terrorist attacks. The number of export varieties dipped slightly between 2001 and 2002 (by approximately 2.5 percent), but by and large remained relatively steady over the post-September 11 period and had returned to 2001 levels by 2003.

In order to construct a valid country- and time-varying instrument for travel that has no direct impact on international trade flows, I first exploit the changes in U.S. visa policy in the aftermath of September 11.[43] Any sweeping changes in U.S. visa policy in the post-9/11 world should not directly affect citizens from Visa Waiver Program (VWP) countries. The VWP, established in 1986, enables nationals of certain countries[44] to travel to the United States for tourism or business for stays of 90 days or less without obtaining a visa. Citizens and residents of non-VWP countries encountered stricter border entry requirements and longer visa wait times after September 11 as a result of the Enhanced Border Security and Visa Entry Reform Act of 2002. The estimation strategy in this paper exploits this differential effect of September 11 security concerns on resident-citizens of VWP and non-VWP countries. While business and leisure travel declined after 9/11 for citizens of both VWP countries and non-VWP countries, the decline was more pronounced for citizens of non-VWP countries who faced stronger visa policies.[45]

Figure 5.2 plots the main variable of interest, the difference between main business travel and

[43] See appendix table C.5 for details on major changes in post-9/11 visa entry requirements.

[44] See appendix table C.6 for a list of VWP countries.

[45] Business travel to the U.S. by resident-citizens of non-VWP countries fell by 24 percent between 2000 and 2001. Leisure travel for these individuals fell by 11 percent. Business and leisure travel by citizens of VWP countries fell by 20 percent and 10 percent, respectively, over the same time period.

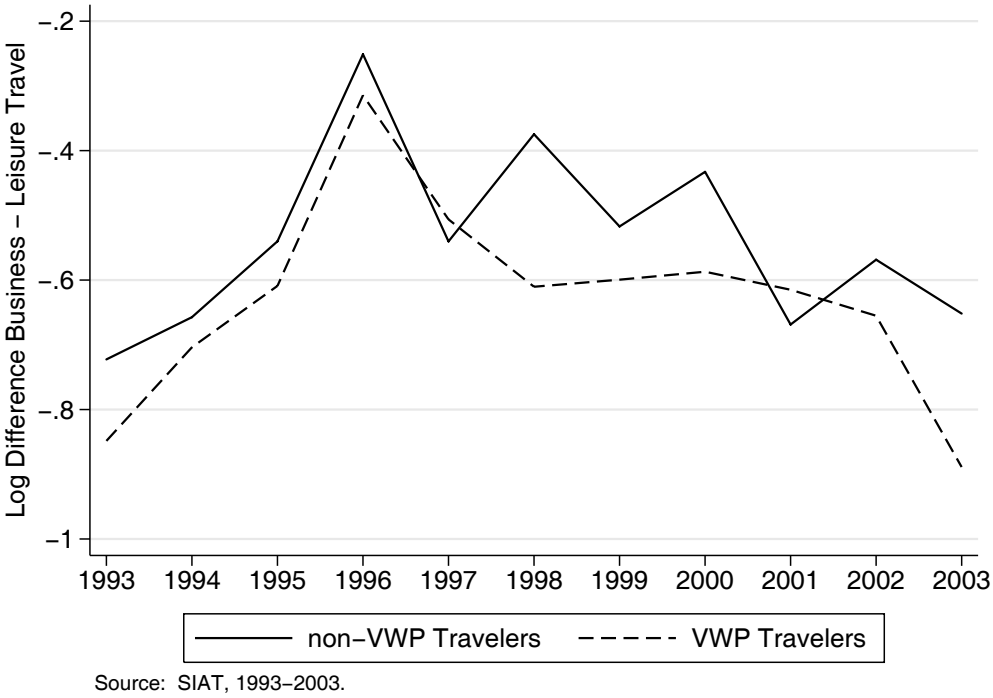

Figure 5.2: Differential Travel Flows by Visa Waiver Program Status, 1993-2003

main leisure travel, over the sample period, by Visa Waiver Program status. Travelers from non-VWP countries report a dramatic decrease in the value of the differential between 2000 and 2001, as the drop in incoming business travel far exceeds the drop in leisure travel. Between 2001 and 2002, non-VWP travelers see a small increase in the differential as business travel regains some strength, yet leisure travel remains at weak post-9/11 levels. Meanwhile, the business-leisure travel gap for travelers from VWP countries remains remarkably steady over the same time period, with only a modest 6 percent decline (relative increase in leisure travel) between 2000 and 2002.

I define an indicator variable equal to one for all quarters from the third quarter of 2001 to estimate the level effects of September 11 ($SEP11_t$). A variable for Visa Waiver Program status (VWP_{USjt}) takes on a value of one for countries participating in the program in quarter t.[46] A pseudo-difference-in-difference estimation, the first-stage analysis regresses bilateral business travel on these level effects and the interaction term (the effect of 9/11 on travel for non-VWP citizens relative to VWP citizens, $SEP11 * VWP_{USjt}$). I have no reason to believe that though 9/11 may have directly affected international trade opportunities through increased port security that trade with VWP countries and non-VWP countries were affected differentially, thus creating both

[46] A select few countries switch into and out of VWP status during the sample period.

a relevant and valid instrument for business travel.[47]

Underlying the main variable of interest, differential business travel, are two endogenous country-by-time variables, main business travel and main leisure travel. Therefore, I also construct an instrument for main leisure travel which exploits the seasonal variation in leisure travel to the United States in the summertime (SUM_t). In order to generate a country-time varying instrument, I interact the summertime dummy with an indicator identifying countries that are located in the Southern Hemisphere ($SUM * SOUTH_{USjt}$). Summer months in the Northern Hemisphere are winter months in the Southern Hemisphere, and as such the summer seasonal shock to leisure travel will be less important for these countries. Again, there is no reason to suspect that trade with southern hemisphere countries is differentially impacted in summer months, allowing for another relevant and valid instrument for leisure travel.

Results from the first-stage regressions are reported in the first panel of table 5.1. Controlling for country-specific trends, business travelers from Visa Waiver Program countries fell by a significantly different margin than business travelers from non-Visa Waiver Program countries in the post-9/11 period. This is consistent with evidence reported in Neiman and Swagel (2009) which finds that the reductions in cross-border entries were largest among those travelers who were *not* required to obtain a visa.[48] Nevertheless, the instrument serves the purpose as a differential shock to incoming business travel for resident-citizens of VWP countries relative to non-VWP countries.[49] Similarly, leisure travel to the United States is significantly higher during summer months, but by a significantly reduced margin for travelers from Southern Hemisphere countries.

Results for the second stage of the instrumental variables analysis for the set of non-resident, non-U.S. citizens are presented in the second panel of table 5.1.[50] Using the unanticipated shocks to bilateral travel as a result of post-9/11 visa policy changes towards residents of VWP and non-VWP countries, as well as the differential seasonal variation in leisure travel with respect to a country's global location, reveals a strong positive effect of business travel on international trade. A 10 percent increase in business travel by non-resident, non-U.S. citizens leads to a 0.9 percent

[47] I have no evidence to support a claim that containers shipped to non-VWP countries were more heavily inspected post-September 11 than containers shipped to VWP countries.

[48] The authors make the following arguments to support the results. First, given the previous "hassle-free" travel for VWP resident-citizens, the enhanced security measures at U.S. airports post-9/11 disproportionately impacted these travelers unaccustomed to such long wait times. Second, the authors hypothesize that travelers from VWP countries may have felt a disproportionate psychological "fear-of-flying" as a result of 9/11.

[49] A relatively small, but strongly significant, partial correlation coefficient (-0.060**) points to a possible problem of weak instruments. Therefore, as suggested by Staiger and Stock (1997), I also report the *F-statistic* and corresponding *p-value* for the instrument, significant at conventional levels.

[50] I include the September 11 dummy, the Visa Waiver Program status dummy, and the summertime dummy in the second-stage analysis to account for any direct impacts of these indicators on international trade.

Table 5.1: Business Travel and International Trade: Two-Stage Least Squares

	First-Stage		Second-Stage	
Dep. Variable:	BUS^M_{USjt}	$LEIS^M_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$
$\widehat{\frac{BUS^M}{LEIS^M}}_{USjt}$			0.090**	0.132*
			(0.021)	(0.059)
$SEP11_t$	-0.262	-0.458	-0.041**	0.001
	(0.226)	(0.246)	(0.010)	(0.031)
VWP_{USjt}	-0.149	-0.139	-0.024	0.021
	(0.239)	(0.269)	(0.016)	(0.050)
$SEP11 * VWP_{USjt}$	-0.350*	-0.265		
	(0.158)	(0.175)		
SUM_t	0.075	0.572**	0.026*	0.008
	(0.152)	(0.132)	(0.010)	(0.029)
$SUM * SOUTH_{USjt}$	0.103	-0.219*		
	(0.082)	(0.092)		
Time FE	X	X	X	X
Country FE	X	X	X	X
Country FE*Trend	X	X	X	X
Lagged Dependent Variable			X	X
Instruments			X	X
F-statistic	7.60**	5.33*		
p-value	0.0059	0.0210		
N	2,283	2,373	1,772	1,772
R-squared	0.8038	0.8045	0.9974	0.9874

Note: Robust standard errors, clustered at the country-level, are in parentheses. ** denotes significance at the 1 percent level; * denotes significance at the 5 percent level. Other controls, not reported, are described in the text.
Sources: U.S. Census Bureau, 1993-2003; SIAT, 1993-2003; U.S. Department of Homeland Security, Yearbook of Immigration Statistics, 1993-2003.

increase in the number of export varieties from the U.S. and a 1.3 percent increase in the volume of exports per existing variety. U.S. Department of Commerce export promotion programs, designed to bring prospective importers to the United States to visit trade shows, help to create new export relationships for U.S. producers and to expand existing relationships.

5.1 Business networks & information transfer

In the previous section, I presented evidence consistent with the importance of business and social networks in international trade for non-resident, non-U.S. citizen travelers, exploiting the changes in U.S. visa policy surrounding the September 11 terrorist attacks, as well as the seasonal variation in leisure travel combined with a country's geographic location, to instrument for bilateral international travel. In this section, I further explore the idea that business travel acts as a conduit for face-to-face communication to seal international export transactions.

Business travel for the purpose of face-to-face meetings is even more important for travelers from non-English speaking countries where communication by telephone or the internet may be less effective. Similarly, the complex nature of differentiated goods requires a larger role for face-to-face meetings to transfer information, whereas such meetings are less important for homogenous products for which prices can convey the relevant information about the profitability of the trade. Finally, we may expect that higher-skilled business travelers may be more effective at understanding the complexities of trading relationships and thus creating new trade opportunities, as international dealings require a certain skill-level.

5.1.1 Main language of trading partner

Table 5.2 reports results for country-level gravity regressions using the instruments described in the previous section, where the main variable of interest is now interacted with the main language of the trading partner country (traveler's country of residence) for the set of non-resident, non-U.S. citizen travelers. Countries are designated English-speaking or non-English speaking by the official language spoken in the country as detailed in Crystal (2003). The interaction effect reports the differential impact of the business-leisure travel gap on international trade for English-speaking versus non-English speaking countries, while the main effect reports the impact of non-English speaking travel on trade. I also report the impact of English-speaking travel and the corresponding *F-statistic* and *p-value* for the estimates jointly significantly different from zero.

Business travel from English-speaking and non-English speaking countries have no statistically different impact on the extensive margin of trade, though the point estimate reports a negative sign suggesting there may be some evidence for the hypothesis that business travel to overcome informational barriers is less important for travelers from English-speaking countries. By contrast, it is clear that the main effect consistent with the idea of business travel as an input to the intensive margin of trade, is largely driven by business travel from non-English speaking countries. A 10 percent increase in business travel by non-resident, non-U.S. citizen travelers from non-English speaking countries increases the value per existing variety sold by the United States to country j by 1.5 percent, while an equal increase in business travel by travelers from English-speaking countries reports a statistically insignificant point estimate of 0.8 percent. Business travel helps all travelers to overcome informational barriers to beginning new trade relationships, but once trade relationships are established only non-English speaking business travelers are effective at enhancing trade relationships where face-to-face communication may be more important.

Table 5.2: Business Travel and International Trade: 2SLS, by Language of Trading Partner

	Non-Resident, Non-U.S. Citizen Travelers	
Dep. Variable:	EV_{USjt}	$\frac{EX}{EV}_{USjt}$
$ENG * \widehat{\frac{BUS^M}{LEIS^M}}_{USjt}$	-0.010	-0.063*
	(0.009)	(0.027)
$\widehat{\frac{BUS^M}{LEIS^M}}_{USjt}$	0.093**	0.147**
	(0.021)	(0.056)
Time FE	X	X
Country FE	X	X
Country FE*Trend	X	X
Lagged Dependent Variable	X	X
Instruments	X	X
English-speaking Travel	0.083**	0.084
F-statistic	15.43	1.95
p-value	0.0002	0.1666
N	1,772	1,772
R-squared	0.9974	0.9875

Note: Robust standard errors, clustered at the country-level, are in parentheses. ** denotes significance at the 1 percent level; * denotes significance at the 5 percent level. Other controls, not reported, are described in the text.
Sources: U.S. Census Bureau, 1993-2003; SIAT, 1993-2003; Crystal (2003).

5.1.2 Product differentiation

Research has shown that business networks are more effective at creating trade for differentiated products than for homogenous goods due to the information-intensive nature of differentiated products (Rauch 1999). If business travel acts as an input to international trade opportunities by helping to overcome the larger informational barriers associated with differentiated products, we should expect to see a larger effect of business travel on trade in differentiated products. Table 5.3 reports results from the estimation of country-level gravity regressions as specified in section 5 for all countries, by product differentiation. I match the Rauch classification of goods from Rauch (1999) to the international trade flows by 4-digit SITC code to test the hypothesis that business travel is more effective at creating trade for differentiated products than for homogeneous goods. I define homogeneous goods to be those goods traded with a reference price.

Business travel leads to new export varieties for both homogeneous and differentiated products in panel A. The finding that business travel increases export varieties of homogeneous goods is hard to interpret as reducing informational costs given that much of the informational content of

Table 5.3: Business Travel and International Trade: 2SLS, by Product Differentiation

	Panel A				Panel B			
	Homogeneous Goods		Differentiated Goods		Homogeneous Goods		Differentiated Goods	
Dep. Variable:	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$
$ENG * \widehat{\frac{BUS^M}{LEIS^M}}_{USjt}$					-0.025	0.001	-0.006	-0.069*
					(0.015)	(0.038)	(0.008)	(0.028)
$\widehat{\frac{BUS^M}{LEIS^M}}_{USjt}$	0.084**	0.115	0.087**	0.138	0.090**	0.115	0.088**	0.154*
	(0.029)	(0.082)	(0.020)	(0.075)	(0.031)	(0.082)	(0.020)	(0.071)
Time FE	X	X	X	X	X	X	X	X
Country FE	X	X	X	X	X	X	X	X
Country FE*Trend	X	X	X	X	X	X	X	X
Lagged Dependent Variable	X	X	X	X	X	X	X	X
Instruments	X	X	X	X	X	X	X	X
English-speaking Travel					0.065*	0.116	0.082**	0.085
F-statistic					4.94	1.72	16.66	1.30
p-value					0.0293	0.1938	0.0001	0.2580
N	1,772	1,772	1,772	1,772	1,772	1,772	1,772	1,772
R-squared	0.9956	0.9723	0.9969	0.9861	0.9956	0.9723	0.9969	0.9862

Note: Robust standard errors, clustered at the country-level, are in parentheses. ** denotes significance at the 1 percent level; * denotes significance at the 5 percent level. Other controls, not reported, are described in the text.
Sources: U.S. Census Bureau, 1993-2003; SIAT, 1993-2003; Rauch (1999); Crystal (2003).

homogeneous goods is reflected in the price. This suggests that business travel (like more general business and social networks) helps to overcome the contracting and security costs associated with trade. Rauch and Trindade (2002) note that ethnic Chinese networks help to generate trade worldwide in homogeneous goods through the informal contracting and social sanctioning that business and social networks offer.

To conclude that business travel helps to create trade opportunities by reducing informational costs, the effect of business travel should be larger for the information-intensive differentiated products. The coefficient estimates alone mask this key result due to differences in the number of homogeneous versus differentiated varieties. Recall from table 3.2, for the average quarter and importing country, the U.S. exports approximately 381 homogeneous varieties and 1,576 differentiated varieties. Therefore, an equal 10 percent increase in business travel by non-resident, non-U.S. citizen travelers creates approximately 3 new homogenous varieties and close to 14—almost five times as many—new differentiated varieties.[51] Furthermore, while business travel may help to create new trade relationships for both homogeneous and differentiated products by helping to overcome the contracting and informational costs associated with trade, once varieties are traded business travel has no statistical effect on expanding the trade relationship.[52]

In panel B of table 5.3, I include the language interaction from section 5.1.1. Confirming priors, inbound business travel by non-English speakers has a stronger impact on international trade than inbound business travel by English speakers. Moreover, this effect is stronger for trade in differentiated products than for trade in homogeneous goods.

Business travel helps all travelers, regardless of main language of communication, to overcome contracting and informational costs associated with beginning new trade relationships increasing the extensive margin of exports in both homogeneous and differentiated products. The negative point estimate on the interaction effect signals that business travel as a form of face-to-face communication from English speaking countries may not be as important an input to new export varieties when communication by other means such as the internet and telephone are available. However, the result from the previous section that non-English speaking business travelers also help to increase

[51] These results stress the relative importance of communication and information transfer for differentiated products over homogeneous products consistent with Berthelon and Freund (2008) which shows that trade in differentiated products has become less "distance-sensitive" over time relative to trade in homogeneous products. The authors argue that the result is likely due to improvements in communication technologies which are more important for differentiated goods, once again reflecting the relative importance of communication for differentiated goods.

[52] Overall, the results partially confirm the model presented in Chaney (2008) in which the impact of trade barriers are dampened by the elasticity of substitution between goods. If business travel helps to overcome informal barriers to trade, the same reduction in trade barriers has a stronger extensive margin effect in differentiated products than in homogeneous products, where even low productivity entrants can capture a relatively large share of the market.

the intensive margin of trade is driven wholly by trade in differentiated products. Business travel by non-U.S. resident, non-U.S. citizens from non-English speaking countries has no impact on the intensive margin of trade in homogeneous goods.

5.1.3 Traveler skill-level

Prospective buyers traveling to the United States to learn about product quality and trade opportunities must understand the complexities of international trade relations and have the ability to identify profitable opportunities. If business travel for the purpose of face-to-face meetings helps to overcome informational barriers to trade, we may expect that higher-skilled individuals who are better suited to convey and absorb information are better able to recognize trading opportunities and create bilateral trade relationships. Table 5.4 discerns the results in panel B of table 5.3 by the skill-level of the traveler. This paper distinguishes between professional and managerial workers (defined to be managers, executives, professional or technical workers) and clerical and production workers (defined to be clerical workers, salespeople, craftspeople, factory workers, and mechanics).[53]

The evidence is consistent with the hypothesis that higher-skilled travelers, as defined by professional and managerial workers over clerical and production workers, are better able to transfer information about profitable trading opportunities. Within each main language-product differentiation group, higher-skilled travelers are more effective at creating new export opportunities. For instance, a 10 percent increase in the number of high-skilled business travelers from non-English speaking countries increases the number of differentiated export varieties by 0.6 percent (almost 10 new varieties), while an equal increase in the number of low-skilled business travelers from non-English speaking countries increases the number of differentiated varieties by 8. Language again plays an important role—an equal increase in the number of low-skilled business travelers from English-speaking countries increases the number of export varieties by 0.4 percent, or 6 new varieties. These same low-skilled business travelers from English-speaking countries have no statistically significant impact on new homogeneous varieties.

Overall, the results report that business travel is a significant input to information-intensive new export varieties. The impact, however, is strongest for travel by non-U.S. resident, non-U.S. citizens of non-English speaking countries where communication by other means may be less effective, for differentiated products, and for high-skilled travelers. Only business travel by

[53]The SIAT also classifies occupations into government/military, homemaker, students, and those travelers who are retired. These travelers are not included in the analysis.

Table 5.4: Business Travel and International Trade: 2SLS, by Traveler Skill-Level

	Clerical & Production Workers				**Professional & Managerial Workers**			
	Homogeneous Goods		**Differentiated Goods**		**Homogeneous Goods**		**Differentiated Goods**	
Dep. Variable:	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$
$ENG * \widehat{\frac{BUS^M}{LEIS^M}}_{USjt}$	-0.003	0.027	-0.011	0.003	-0.021	0.008	-0.001	-0.058*
	(0.012)	(0.023)	(0.008)	(0.023)	(0.015)	(0.031)	(0.010)	(0.024)
$\widehat{\frac{BUS^M}{LEIS^M}}_{USjt}$	0.040*	0.034	0.051**	0.071	0.085**	0.085	0.061**	0.120*
	(0.018)	(0.059)	(0.014)	(0.056)	(0.025)	(0.055)	(0.016)	(0.047)
Time FE	X	X	X	X	X	X	X	X
Country FE	X	X	X	X	X	X	X	X
Country FE*Trend	X	X	X	X	X	X	X	X
Lagged Dependent Variable	X	X	X	X	X	X	X	X
Instruments	X	X	X	X	X	X	X	X
English-speaking Travel	0.037	0.061	0.040**	0.068	0.064**	0.077	0.060**	0.062
F-statistic	3.30	0.87	7.66	1.58	8.15	2.97	11.36	1.55
p-value	0.0747	0.3544	0.0076	0.2141	0.0056	0.0888	0.0012	0.2170
N	811	811	811	811	1,638	1,638	1,638	1,638
R-squared	0.9958	0.9849	0.9960	0.9861	0.9958	0.9737	0.9970	0.9870

Note: Robust standard errors, clustered at the country-level, are in parentheses. ** denotes significance at the 1 percent level; * denotes significance at the 5 percent level. Other controls, not reported, are described in the text.
Sources: U.S. Census Bureau, 1993-2003; SIAT, 1993-2003; Rauch (1999); Crystal (2003).

Figure 5.3: Impact of a 10 Percent Increase in Business Travel

high-skilled, non-U.S. resident, non-U.S. citizens from non-English speaking countries enhances the intensive margin of international trade, and furthermore, the intensive margin increases only for differentiated products. Figure 5.3 summarizes these main findings and reports the impact of a 10 percent increase in business travel on the number of new export varieties shipped from the U.S. to country j.

6 Robustness Checks

In this section, I provide checks for the robustness of the main results. I first test the robustness of the main two-stage least squares results in table 5.1 using only the set of sea shipments and controlling for additional country-by-time varying transportation costs. Then, following recent trends in the gravity model literature, I test the robustness of the results to zeros in both the travel and trade flows. Finally, I consider the timing of the business travel input to international trade.

Table 6.1: Business Travel and International Trade: Robustness Checks

	Sea Shipments		**Crude Oil Prices**		**Ramp-to-Ramp Time**	
Dep. Variable:	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$
$\frac{\widehat{BUS^M}}{\widehat{LEIS^M}}_{USjt}$	0.091**	0.134	0.090**	0.132*	0.069**	0.080
	(0.027)	(0.073)	(0.021)	(0.059)	(0.020)	(0.059)
$DIST * OIL_{USjt}$			-0.001	-0.001		
			(0.001)	(0.002)		
$TIME_{USjt}$					0.005	-0.009
					(0.003)	(0.011)
Time FE	X	X	X	X	X	X
Country FE	X	X	X	X	X	X
Country FE*Trend	X	X	X	X	X	X
Lagged Dependent Variable	X	X	X	X	X	X
Instruments	X	X	X	X	X	X
N	1,772	1,772	1,772	1,772	1,512	1,512
R-squared	0.9959	0.9757	0.9974	0.9875	0.9971	0.9905

Note: Robust standard errors, clustered at the country-level, are in parentheses. ** denotes significance at the 1 percent level; * denotes significance at the 5 percent level. Other controls, not reported, are described in the text.
Sources: U.S. Census Bureau, 1993-2003; SIAT, 1993-2003; Byers (2003); Global Financial Database (2008); U.S. Bureau of Transportation Statistics.

6.1 Mode of transportation

Hummels (2007) provides evidence for the systematic fall in air transport costs and rise in air-borne trade since 1950, while Micco and Serebrisky (2006) demonstrate that bilateral Open Skies Agreements increase the share of imports arriving by air. By contrast, Hummels (2007) finds little change in ocean shipping costs over the same period. Feyrer (2009) confirms that the elasticity of trade with respect to air distance has been increasing relative to the elasticity of trade with respect to sea distance.

In order to be certain that the main results are not simply picking up a reduction in air transportation costs, affecting both air travel and air trade, the first panel in table 6.1 presents results for the estimation of equation (4.4) with instruments as described in section 5 for only those goods shipped by sea. The estimation is certain to be clear of any effect changes air infrastructure may have on trade, and thus any impact of business travel on international trade by ocean freighter is not merely the result of an omitted variable. Results indicate that business travel by air does help to create new U.S. export varieties shipped by sea, providing solid evidence of business travel helping to overcome communication and informational barriers to trade through face-to-face meetings.

6.2 Transportation costs

In the quarters after the terrorist attacks of September 11 and leading into the U.S.-Iraq war, crude oil prices began a steep increase after relative lows of the late-1990s. The second panel of table 6.1 includes an additional control for time-varying transportation costs. As such, any impact of business travel on U.S. export activity is not merely the result of an omitted oil price variable. Average quarterly crude oil close data, available from Global Financial Data, are interacted with great circle distance measures from Byers (2003) to create a country- and time-varying transportation cost ($DIST * OIL_{USjt}$). Accounting for these country-by-time transportation costs, which have no impact on international trade relations when time-varying Anderson and van Wincoop (2003) multilateral resistance terms are included, does not affect the main conclusions that business travel positively impacts U.S. export relationships. It is clear that the causal relationship is not a result of changing oil prices during the sample period.

As an additional test for the impact of transportation costs in trade and travel, I analyze the impact of time as a barrier to trade and travel. Reflecting distance and infrastructure[54], Hummels (2001) reports that the number of days in transport reduces the probability of importing. Similarly, Djankov, Freund and Pham (2010) use World Bank-collected data on the time it takes to transport goods from the factory to the port irrespective of total distance traveled. The authors find that each additional day that is required to transport goods to the shipyard reduces exports from the country. By the same token, delays in air transport may reduce both travel and trade by air. The U.S. Bureau of Transportation Statistics provides data for country-level ramp-to-ramp time as "the time computed from the moment an aircraft first moves under its own power for purposes of flight, until it comes to rest at the next point of landing" for all flight carriers. I calculate the average, minimum, and maximum ramp-to-ramp time for each quarter across all flight origination-destination pairs to assess the impact of time as a barrier to trade and travel, reflecting infrastructure development. The final panel of table 6.1 reports results for the maximum ramp-to-ramp time across all origin-destination pairs between the United States and country j in a quarter ($TIME_{USjt}$). Results controlling for all three variations on ramp-to-ramp time are comparable to the results controlling for changes in oil prices and fail to overturn the main results of the paper.

[54] Limao and Venables (2001) show the importance of infrastructure in transportation costs, especially for landlocked countries.

Table 6.2: Business Travel and International Trade: Robustness Checks

	Zeros in Trade		**Zeros in Trade & Travel**	
Dep. Variable:	EV_{USjt}	$\frac{EX}{EV}_{USjt}$	EV_{USjt}	$\frac{EX}{EV}_{USjt}$
$\frac{BUS^M}{LEIS^M}_{USjt}$	0.003**	0.006	0.004**	0.010*
	(0.001)	(0.003)	(0.001)	(0.005)
Time FE	X	X	X	X
Country FE	X	X	X	X
Country FE*Trend	X	X	X	X
Lagged Dependent Variable	X	X	X	X
N	1,937	2,158	2,054	2,280

Note: Robust standard errors, clustered at the country-level, are in parentheses. ** denotes significance at the 1 percent level; * denotes significance at the 5 percent level. Other controls, not reported, are described in the text.
Sources: U.S. Census Bureau, 1993-2003; SIAT, 1993-2003.

6.3 Zeros in trade and travel

The gravity model literature has grown accustomed to accounting for zeros in bilateral trade relationships (see Silva and Tenreyro (2006) and Helpman, Melitz and Rubinstein (2008)). This is not a significant concern in this analysis given that the United States, as a leading world exporter, trades at least one commodity with most every country in every time period. Nevertheless, in the first panel of table 6.2, I estimate equation (4.4) using Poisson pseudo maximum likelihood to account for the zeros in international trade as suggested by Silva and Tenreyro (2006). As expected, the results are not significantly different from the main results in the last panel of table 4.2 despite the increase in the number of observations.

However, selection into travel may present a serious concern, especially for the set of non-U.S. resident, non-U.S. citizens used in this paper to identify a causal effect of business travel on trade.[55] Many small countries have sporadic bilateral business travel to the United States, resulting in the presence of zero travel. As a simple test to assess the impact of selecting into travel with the United States, I replace all zero travel values (business and leisure) with the minimum value reported by country j within a year. Results, estimated by Poisson pseudo maximum likelihood, are reported in the second panel of table 6.2.

[55]However, recall from footnote 18 that the rankings across U.S. resident and non-U.S. resident travel are highly correlated.

6.4 Timing of information transfer

The basis for the empirical model is that business travel helps to overcome informational asymmetries acting as an informational input to international trade. This suggests that face-to-face meetings may occur prior to and not contemporaneous with international trade—that is, if business travel serves as an input to setting up trade relationships, businesspeople may fly to desinations to set up trade months (or even years) before trade takes place. Furthermore, as Frankel (1997) suggests, perhaps "many trips" are required to begin international transactions. In this section, I return to the results in table 4.2 and estimate the augmented gravity model with lags of the main variable of interest in order to consider the hypothesis that it takes time for business travel to translate into trade opportunities. Using lags of the main independent variable also controls for the possibility of reverse causality as discussed in section 5.

For the set of non-resident, non-U.S. citizens, shown in previous sections to make trade-creating business travel, in table 6.3 I report results from equation (4.4) where the differential contemporaneous main business travel has been replaced by 8 lags (2 years) of the differential business travel independent variable. The results confirm that timing may play a role in face-to-face communication and international trade for both new export relationships and existing export relationships. According to the data, business travel may take up to two years to translate into export opportunities. A 10 percent increase in business travel 3 quarters ago increases the current intensive export margin by 0.1 percent. It takes an additional 2 quarters for business travel to significantly increase the extensive export margin, signalling that the intensive margin of trade is less information-sensitive, as the varieties already exist in the local market. It takes longer for information about new varieties, not yet available in the local market, to be transferred and translated into export opportunities.

The suspicion in Frankel (1997) that it may take "many trips" to clinch a new deal also has some support in the data. Non-resident, non-U.S. citizen buyers travel to the U.S. two years in advance of making a new import variety purchase and again just over a year in advance of making a new import purchase.[56] The cumulative travel in these two quarters is a jointly significant predictor of future export varieties from the United States.

The results for the volume of existing varieties signals the importance of business travel in maintaining existing business network relationships. While most individual lags of business travel are insignificant determinants of trade, cumulative travel is a strong predictor of the intensive

[56] Whether these are the same travelers is not clear in this current analysis, but provides an interesting scope for future work.

Table 6.3: Lagged Business Travel and International Trade: Augmented Gravity Model

	Non-Resident Non-U.S. Citizen Travelers	
Dep. Variable:	EV_{USjt}	$\frac{EX}{EV}_{USjt}$
$\frac{BUS^M}{LEIS^M}_{USjt-1}$	0.0003	0.008
	(0.002)	(0.005)
$\frac{BUS^M}{LEIS^M}_{USjt-2}$	0.002	-0.001
	(0.002)	(0.005)
$\frac{BUS^M}{LEIS^M}_{USjt-3}$	0.001	0.010*
	(0.001)	(0.005)
$\frac{BUS^M}{LEIS^M}_{USjt-4}$	0.002	0.008
	(0.002)	(0.004)
$\frac{BUS^M}{LEIS^M}_{USjt-5}$	0.003*	0.002
	(0.002)	(0.007)
$\frac{BUS^M}{LEIS^M}_{USjt-6}$	-0.002	0.001
	(0.002)	(0.006)
$\frac{BUS^M}{LEIS^M}_{USjt-7}$	-0.001	0.009
	(0.002)	(0.005)
$\frac{BUS^M}{LEIS^M}_{USjt-8}$	0.004*	0.008
	(0.002)	(0.004)
Time FE	X	X
Country FE	X	X
Country FE*Trend	X	X
Lagged Dependent Variable	X	X
Lagged 2 quarters joint	0.002	0.007
F-statistic	0.77	0.71
p-value	0.3855	0.4044
Lagged 3 quarters joint	0.003	0.017
F-statistic	1.17	2.23
p-value	0.2841	0.1413
Lagged 4 quarters joint	0.005	0.025*
F-statistic	1.56	5.07
p-value	0.2167	0.0286
Lagged 5 quarters joint	0.008	0.027
F-statistic	3.65	3.68
p-value	0.0614	0.0606
Lagged 6 quarters joint	0.006	0.028
F-statistic	1.11	3.06
p-value	0.2965	0.0862
Lagged 7 quarters joint	0.005	0.037*
F-statistic	0.56	5.00
p-value	0.4578	0.0297
Lagged 8 quarters joint	0.009	0.045*
F-statistic	1.64	6.35
p-value	0.2065	0.0149
N	1,139	1,139
R-squared	0.9973	0.9888

Note: Robust standard errors, clustered at the country-level, are in parentheses. ** denotes significance at the 1 percent level; * denotes significance at the 5 percent level. Other controls, not reported, are described in the text.
Sources: U.S. Census Bureau, 1993-2003; SIAT, 1993-2003.

export margin. The more business travel between the U.S. and country j, the stronger is the business network, and better maintained business relationship. That the effect grows with time—two years cumulative travel has almost double the impact on the volume of trade per existing variety than does one year of cumulative travel—suggests this is not simply an issue of reverse causality.

7 Conclusion

The qualitative nature and quantitative importance of informal barriers to international trade remains an important question in international economics. Travel helps to overcome these barriers both by building and maintaining transnational information-sharing networks and through direct sales and service effort. This study examines the causal relationship between travel and trade, the relative effectiveness of different kinds of travel and different characteristics of travelers in promoting trade, and the relative importance of travel for trade in different types of goods. All of these results will help policymakers and academics alike to gain a better understanding of how informal barriers to trade work and how large they are.

The main results are consistent with the view that business travel, instrumented with relative changes in U.S. visa policy towards residents of Visa Waiver Program and non-Visa Waiver Program countries in the aftermath of September 11, for the purpose of communication serves as an input to international export sales for U.S. producers. The effect is driven by travel from non-English speaking countries, for which communication with the U.S. by other means may be less effective. Moreover, the effect is stronger for differentiated products and for higher-skilled travelers, reflecting the information-intensive nature of differentiated products and that higher-skilled travelers are better able to transfer information about trading opportunities. The results are robust to specifications controlling for time-varying Anderson and van Wincoop (2003) multilateral resistance terms, bilateral aviation infrastructure, the mode of transportation for export sales and additional controls for country-by-time transportation costs.

My results have direct implications for policy. By quantifying the extent to which international business travel causes international trade, this study can help to evaluate the many government programs worldwide that promote business travel for the purpose of creating trade. Given the results by residence of traveler, the evidence provides support for the many U.S. Department of Commerce export promotion programs, like the International Buyer Program, designed to bring

prospective importers to the U.S. to facilitate trade matchmaking, but casts doubt on export promotion programs which send U.S. residents abroad.

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A Export Promotion Programs

The U.S. Department of Commerce, International Trade Administration sponsors many trade events designed to provide venues for U.S. exporters to meet international buyers, distributors, or representatives. By organizing trade missions and educational seminars, providing matching or export counseling services at trade shows, and recruiting buyer delegations to U.S. trade shows, the U.S. Government helps U.S. exporters expand global sales at trade events.

The U.S. Department of Commerce sponsors trade missions with the objective of fostering the U.S. export market. Trade missions are defined as "missions involving travel to foreign countries by private sector participants and Commerce Department employees in which the Commerce Department recruits and selects participants from the business community." In 2003, the United States organized 27 trade missions overseas reaching 32 countries, and 2 "inward" trade missions in which prospective importers traveled to the United States from abroad. A typical trade mission is attended by 10 to 15 delegates. Government regulations require that all costs incurred by the Department on behalf of the trade mission participants be recovered in full from the participants. As these fees are often expensive for small and medium-sized businesses wishing to enter a new market, many small grants are available to firms to cover these costs through the government's Small Business Administration Grant Resources.

The International Buyer Program (IBP) recruits over 125,000 prospective foreign buyers each year to participate in U.S. trade shows, where U.S. exporters showcase products. As part of the IBP, trade shows are promoted around the world and U.S. Commercial Service Trade Specialists recruit and lead buyer delegations to the 32 IBP trade shows each year. IBP trade shows also offer hands-on export counseling, marketing analysis, and matchmaking services by country and industry experts from the U.S. Commercial Service.

Other export promotion strategies by the U.S. government include the U.S. Trade and Development Agency (USTDA) which directly funds approximately 45 "orientation visits" each year with the purpose of bringing foreign buyers to the United States to become familiar with products for future purchases. U.S. suppliers participating in the visits showcase their products, expertise, and make valuable international contacts. The Special American Business Internship Training Program (SABIT) facilitates firms' foreign market access by funding grants to host foreign managers and scientists for temporary professional training in the United States. The program argues "while many international markets are full of opportunity, there are an equal number of risks that must

be managed for this potential to be realized. SABIT manages innovative training programs that reduce market access barriers and minimize commercial risks for organizations interested in market opportunities."

B Survey of International Air Travelers

The survey program was initiated in the early 1980s by the U.S. Travel and Tourism Administration (USTTA) in response to a growing need for information on the volume, characteristics, and travel patterns of international travelers to and from the United States.[57] Airline involvement is on a voluntary basis among airlines invited to participate.[58] Participating airlines are selected at random from the list of major airlines which voluntarily choose to participate in the program. Flight packages containing approximately 100 questionnaires are distributed onboard U.S. outbound flights to international destinations in twelve languages.[59]

The survey results are weighted to represent the population of travelers to and from the United States based on the Immigration and Naturalization Service (INS) I-92 Form for U.S. residents and the Department of Homeland Security (DHS) I-94 Form for overseas residents. The I-92 Form must be completed for all arriving and departing flights from the United States with the complete number of passengers aboard by citizenship. Each U.S. resident respondent is given a weight based on citizenship information and departure and arrival city pairs. The I-94 Form is required for most non-U.S. resident travelers arriving in the United States. This provides a count of the population of overseas residents by citizenship at specific ports of entry (customs information) with which to weight individual respondents.

C Supplemental Tables

[57] In April 1996, the USTTA was closed due to a lack of funding and the responsibility of the survey was transferred to the OTTI.

[58] Factors influencing the selection of an airline for an invitation to participate in the survey include the airline's market share in the geographic area under consideration, the desirability to have both a U.S. and foreign flag carrier for each area, and the necessity to keep costs at a minimum.

[59] Arabic, Chinese, English, French, German, Italian, Japanese, Korean, Polish, Portuguese, Russian and Spanish.

Table C.1: Preferential Trading Arrangements, 1993-2003

Country-Agreement	Date of Signature	Entry Into Force
Israel	April 22, 1985	August 19, 1985
NAFTA[a]	December 17, 1992	January 1, 1994
Jordan	October 24, 2000	December 17, 2001
Singapore	May 6, 2003	January 1, 2004
Chile	June 6, 2003	January 1, 2004

a. The North American Free Trade Agreement includes Canada, Mexico, and the United States.
Source: Organization of American States, Foreign Trade Information System.

Table C.2: United States Country Sanctions Programs, 1993-2003

Target Country	Beginning Date	Ending Date	Rationale
Afghanistan	July 4, 1999	July 3, 2002	Taliban
Angola	September 26, 1993	May 7, 2003	UNITA
Burma/Myanmar	May 20, 1997	Present	"repression of democratic opposition"
Cambodia		November 25, 1994	
China		Present	Tienenman Square Massacre
Cuba	July 8, 1963	Present	"hostile actions by Cuban government"
Haiti		October 16, 1994	
India	June 1998	Present	nuclear testing
Iran	October 29, 1987	Present	"support for international terrorism"
Iraq	August 2, 1990	July 30, 2004	"invasion of Kuwait"
Liberia	May 23, 2001	January 15, 2004	"illicit diamond trade"
Libya	January 7, 1986	September 20, 2004	
North Korea	January 1, 1950	Present	
Pakistan	June 1998	Present	nuclear testing
Rwanda	May 26, 1994	Present	arms embargo
Sierra Leone	January 19, 2001	January 15, 2004	"illicit diamond trade"
South Africa		May 1994	UN arms embargo; apartheid
Sudan	November 4, 1997	Present	"support for international terrorism"
Vietnam		March 6, 1995	
Yugoslavia	May 30, 1992	May 29, 2003	Kosovo

Sources: Malloy (2001); U.S. Department of the Treasury, Office of Foreign Assets Control.

Table C.3: Countries in Sample

Africa	**Central America**	**Middle East**
Cape Verde	Belize	Bahrain
Morocco	Costa Rica	Cyprus
Senegal	El Salvador	Egypt
South Africa	Guatemala	Kuwait
	Honduras	Oman
Asia	Nicaragua	Saudi Arabia
China	Panama	Turkey
Hong Kong		United Arab Emirates
India	**Europe**	
Indonesia	Austria	**Oceania**
Japan	Belgium	Australia
Korea	Czech Republic	Fiji
Malaysia	Denmark	French Polynesia
Philippines	Finland	New Zealand
Singapore	France	Tonga
Taiwan	Germany	
Thailand	Greece	**South America**
	Iceland	Argentina
Caribbean	Ireland	Bolivia
Antigua & Barbuda	Italy	Brazil
Bahamas	Luxembourg	Chile
Barbados	Netherlands	Colombia
Bermuda	Norway	Ecuador
Dominican Republic	Poland	Guyana
Grenada	Portugal	Paraguay
Haiti	Romania	Peru
Jamaica	Spain	Uruguay
St. Lucia	Sweden	Venezuela
Trinidad & Tobago	Switzerland	
	United Kingdom	

Table C.4: Top 10 Travel and Trade Partners

Main Business Travel	**Main Leisure Travel**
United Kingdom	Japan
Japan	United Kingdom
Germany	Germany
France	France
Brazil	Jamaica
Netherlands	Italy
Italy	Bahamas
South Korea	Netherlands
Taiwan	Brazil
Switzerland	Spain
Export Varieties	**Export Value per Variety**
Japan	Japan
United Kingdom	United Kingdom
Germany	South Korea
Australia	Germany
South Korea	Taiwan
Hong Kong	Belgium
Taiwan	Netherlands
France	China
Netherlands	France
Singapore	Malaysia

Sources: SIAT, 1993-2003; U.S. Census Bureau, 1993-2003.

Table C.5: Major Changes in U.S. Entry Requirements

Legislation	Policy Action
Enhanced Border Security and Visa Entry Reform Act of 2002	Mandated the use of biometrics in U.S. visas. This law requires that Embassies and Consulates must now issue to international visitors, "only machine-readable, tamper-resistant visas and other travel and entry documents that use biometric identifiers."
	In addition to being satisfied that the applicant intends to honor the terms of the visa by returning home, the consular officer must evaluate the security risk presented by the applicant. The Department of State advises, "We carefully examine all applications. Visa applications take longer to process. Advance planning can smooth the visa application process for you."
	All male nonimmigrant visa applicants between the ages of 16-45, regardless of nationality or other factors, must now complete a supplemental application form which helps inform the consular officer's judgment about visa eligibility. Consular officers have the authority to require anyone from any country to complete visa forms if they think it is warranted.

Source: U.S. Department of Homeland Security, Yearbook of Immigration Statistics, 1993-2003.

Table C.6: Visa Waiver Program Countries, 1993-2003

Country	Admitted[a]	Canceled[b]
Andorra		
Argentina	July 1996	February 2002
Australia	July 1996	
Austria		
Belgium		
Brunei		
Denmark		
Finland		
France		
Germany		
Iceland		
Ireland	February 1995	
Italy		
Japan		
Liechtenstein		
Luxembourg		
Monaco		
Netherlands		
New Zealand		
Norway		
Portugal	August 1999	
San Marino		
Singapore	August 1999	
Slovenia	February 1998	
Spain		
Sweden		
Switzerland		
United Kingdom		
Uruguay	August 1999	April 2003

a. Unless otherwise stated, countries have participated in the Visa Waiver Program since its inception as the Visa Waiver Pilot Program in 1986.
b. Unless otherwise stated, countries are currently Visa Waiver Program countries.
Source: U.S. Department of Homeland Security, Yearbook of Immigration Statistics, 1993-2003.