Danlin Huang

Honors Thesis

Does a Causal Relationship Between International Trade and Travel Really Exist? Evidence from the U.S. and Its PTA Partner Countries

Abstract

It is widely accepted that international trade is positively correlated with international travel. This paper, for the first time, investigates whether there is a causal relationship between trade policy and international travel demand using an event study on the US and its trading partners with Preferential Trade Agreements (PTAs). With a panel data of 141 countries during the period of 1990-2017, the econometric results show that despite the strong positive correlation between trade policies and international passenger volume, there is no causality in this relationship, rejecting the causal linkage established in existing literature.

I. Introduction

In the past few decades, the world has been experiencing globalization and the opening of borders. Accompanying this phenomenon is the increase of international flow of goods and services, as well as international travelers. Literature has been exploring the relationship between trade and tourism because of two major reasons: firstly, it is academically intriguing to study this complex relationship since international travel flow is essentially a component of international trade flow (Kulendran and Wilson, 2000). Secondly, tourism, which consists of business and leisure traveling, is an important part of the economic development of any country. This industry has been expanding rapidly in recent years and has led to increased benefits for related businesses such as hotels, restaurants and travel agencies. However, due to endogeneity problems, the question whether a causal relationship exists between trade and tourism remains open. The answer to this question is even more relevant and timely today because of the growing

tension over international trade recently and the rising threat of a global trade war. People on all sides are worrying about how the respective trade policies would influence tourism. The airline industry is potentially the biggest victim. Airline companies fear that the reduced trade will limit passenger travel. Nonprofit organizations such as the World Travel and Tourism Council have expressed concerns about the impact of uncertainties from a trade war on business travel, a significant driver of profits for airline companies. They are also worried that the result of high tariffs will lead to less investment in infrastructure like airports and hotels (Hepher and Bryan, 2018). Therefore, it is a great timing to re-dive in and analyze this relationship to answer the above question, and this paper attempts to do so.

The relationship between trade and travel is straightforward-- it is largely believed that the higher trade volume is in a country, the higher travel flows are, and vice versa. Figure 1 is an example of this close relationship in the US. The underlying reason is intuitive. Tourism can be classified into two categories: business travel and leisure travel. When a country increases the import and export of goods and services, companies are incentivized to travel abroad to negotiate more deals and buy or sell more products. However, when a country becomes more trade-averse, less international business will be conducted thus international travel will decrease. From a leisure-travel perspective, according to Kulendran and Wilson (2000), the increased import and presence of foreign products due to increased international trade will lead to consumer's interest and awareness of the products' source countries, which attracts more travelers. International trade also incentivizes countries to improve infrastructure and develop better transportation and communication systems, which results in more leisure travel. On the other hand, if a country becomes less open to trade, it often times infers political problems between two countries

(Grossman and Helpman 1995), which will influence public opinions on the destination country. Tourism is a very vulnerable industry that can be impacted by a lot of external causes, political environment being a huge one (Cohen 1984). Controversial issues, new administration's policies can all determine a destination's appeal to tourists. For example, when President Trump placed travel bans on visitors from six Muslim countries, the country experienced a huge dip in international visits. President Trump issued three travel bans on January, March, and September in 2017. As shown in Figure 2, the number of international visitors in the U.S. dropped tremendously compared to the same periods last year. Even though the ban was only imposed on six countries, U.S. international travel from other countries was affected as well because such policies have shaped U.S. non-friendly global image. Once safety concerns arise, or visa application process becomes stricter, international travel demand will decrease. Above all, there is a general consensus that international trade is positively related to international travel. In fact, a number of researchers have studied this relationship and found causal links between international trade and international travel. For example, Habibi, Rahim, Ramchandran, and Chin (2009) focused on Malaysia and found that a one percent increase in international trade causes a 0.02 percent increase in the short term and 0.22 percent in the long term in the number of international tourist arrivals. Leitao (2010) discovered a similar linkage in Portugal.

Using the evidence from the United States and its trading partners, this paper aims to empirically and rigorously evaluate this perceived causality established in existing literature and show that while there is a strong correlation between trade and travel, there isn't any causal linkage between the two flows. To deal with serious endogeneity problems that are plaguing current literature, I adopt an event-study strategy to estimate the effect of Preferential Trade Agreements

(PTAs) between the U.S. and its trading partners on international travel between them. The U.S. is the largest economy and one of the top three tourist destinations in the world, and the world's largest trader, as shown in Table 1 and 2. It is therefore the best candidate for an event study on trade and travel. The U.S. has established 14 PTAs, treaties that remove barriers to trade and set rules for international commerce amongst the participating countries, with 20 of its trading partners. Table 3 shows the partner countries and their characteristics before the implementation of PTAs. The U.S. established PTAs for both economic reasons, such as increasing economic benefits from increased trade and investment, and non-economic reasons, such as supporting U.S. allies. By reducing import tariffs and easing trade regulations, PTAs facilitate flows of trade and investment.

I use a panel of country-year-month level data of the number of passengers traveled through air between the U.S. and 141 trading partners during the period of 1990-2017 to analyze whether more trade between U.S. and its partners lead to more international travels. There are in total 27,230 observations, and each observation is year, month, and a pair of countries—US and Country *i*. The data have shown that countries that have PTAs with the U.S. have experienced an increase in international passenger volume. Figure 3 regresses log of total passengers between the U.S. and Country *i* and shows that over the years, countries with PTAs have experienced higher and increasing passenger flows, while the number of passengers has remained lower and largely constant in the remaining countries. Indeed, trade is positively associated with international travel, which is consistent with the general perception. However, the results of the event study suggest that such relationship is not causal like prior empirical studies have found.

Therefore, my contribution to the literature emerged from a thorough investigation of this causal relationship by using the event study methodology that no other research has used before.

The remainder of the paper is organized as follows: Section II of the paper discusses the literature on U.S. international trade and factors that impact air travel demand, and how this paper is the first to use an event study analyzing the relationship between the two. Section III details the data, model, and methods used in this study. Section IV presents the empirical findings and robustness checks. Section V concludes, highlighting the limitations of the current study and directions for future research.

II. Literature Review

A. Travel Demand

Understanding the determinants of travel demand, specifically air travel volume, is important to understanding the trade-tourism narrative. There is ample literature examining international air travel. Some early works studied geo-economic determinants such as the impact of distance between countries (Richmond 1957), flight fares (Jung & Fujii 1976), consumer's wealth (Alperovich & Machnes 1984), population (Bilotkach 1987), and GDP (Jorge-Calderón 1997) on air travel demand. In the past few decades, empirical work has been focusing on industry specific determinants such as the quality of air service (Anderson & Kraus 1981), competition between airlines (Bilotkach 2005) and the role of low-cost carriers (Boonekamp et. al 2018). However, the literature is relatively scant in regard to the assessment of the effect of international trade on international travel demand. Therefore, there is the motivation to further investigate this relationship building on top of existing literature.

B. International Trade and International Travel

Amongst the handful of studies on international trade and international travel demand, the most commonly used methodology is cointegration analysis and Granger causality tests. To the best of my knowledge, this paper is the first to attempt to analyze this relationship by using an event study strategy.

The most important work that explores the interdependencies between trade flows and traveler flows is done by Kulendran and Wilson (2000). The authors used cointegration Granger causality analysis and concluded that: first, business arrivals Grander-cause trade (with the evidence of Australia and its trading partners, USA and UK); second, trade leads to tourism (in respect to the same partners); third, leisure tourism also leads to trade (in the case of Japan). The same procedure was used and further developed by almost all the subsequent studies on the subject and similar results were drawn: Shan and Wilson (2001) established the presence of a bidirectional causality between trade and tourism in China. Fry, Saayman and Saayman (2010) conducted a study for South Africa and found a similar Granger bidirectional causality. Tsui and Fung (2015) used the same model to investigate and demonstrate the nature of this relationship among Hong Kong and Mainland China, Taiwan, and the U.S. from 2002 to 2012. The remaining studies use a dynamic panel demand model to shed light on this causality linkage. Surugiu, Leitao, and Surugiu (2011) studied international tourism demand in Romania with the inflow of data from 23 countries and concluded that a 1% increase in international trade contributed a 0.466% increase in the number of international tourist arrivals. Chaisumpunsakul and Pholphirulb (2018) looked at the trade openness index of Thailand and found that a 1%

increase in trade share to GDP caused a 0.046% and 0.807% increase in short-term and long-term foreign tourism demand respectively. My contribution to the literature emerged from a newly designed empirical strategy—event study on the subject of international trade and travel.

In addition, my paper fills a gap in the current literature in a number of other ways. First, as shown above, many studies examine trade volume, while my paper is one of the few that focuses on trade policy, specifically, trade agreements between countries, which are much more exogenous. Second, with the exception of Chaisumpunsakul and Pholphirulb's work, the majority of existing literature has done a case study on one country and selected a small number of trading partners to analyze. My study, on the other hand, is much more powerful with 141 country pairs in a longer time frame. Lastly, all the research only takes into consideration of tourist arrivals in one country and neglects the tourist outflow to the trading partners. My paper addresses this issue by incorporating travel data in both directions and building a more complete narrative of the relationship between trade flows and travel flows.

C. Event Study

Event study methods are mostly used in financial economics to examine the impact of corporate events on a firm' stock prices. It was first invented by Fama, Fisher, Jensen, and Roll (1969). Fama (1991) later used event study to examine post-event returns to test market efficiency. MacKinlay (1997) developed a most commonly used event study methodology. There are many other important works done using event studies, but a through literature review on this subject is out of the scope of this paper. Beyond financial economics, event studies are useful in many other areas such as accounting, law, management, political science where they are used to

examine the effect of regulations on a subject. However, literature that uses event studies to analyze trade policies is scarce, and most of them use the traditional event-study method that only draws firm-level results. For example, Thompson (1993) employed a stock market event study to analyze the impact of United States Free Trade Agreement on the manufacturing industries in Canada. Breinlich (2015) did a similar work on the effect of the Canada-United States Free Trade Agreement of 1989 (CUSFTA) on the profits of Canadian manufacturing firms. Hence, my paper fills a gap in literature by being the first to adopt and redesign the event-study methodology to analyze the impact of trade policies, specifically PTAs between the U.S. and its trading partners, on international travel flows.

III. Empirical Analysis

A. Data and Variables

This section describes the data used for the analysis. Based on the accessibility of relevant data, I use a panel of country-year-month level data of the U.S. and 141 countries from the period of 1990 to 2017. The sample size is 27,230 and each observation is year, month and a pair of countries—US and Country *i.* This is shown in Table 4 along with some descriptive statistics of the observations and variables used in the econometric estimation.

a. International Air Passenger Data

Unlike many other empirical studies that use the data of tourist arrivals to analyze the relationship between trade and tourism, my paper uses the number of passengers traveled by air from and to the U.S. and Country *i* as a proxy for tourist data. The advantage is that passenger data is available on a monthly level from the year 1990, while tourist data is mainly available on

a yearly or quarterly level, which renders it less powerful. Moreover, when there is a large number of Country *i* in the sample, it is difficult to obtain and organize tourist data from the country of interest to its trading partners, which is why most literature only focuses on tourist arrivals rather a combination of tourist inflow and outflow. Since this paper does not intend to separate business and leisure travelers, the aggregate air passenger data is a good proxy for tourism and enables my research to capture a more comprehensive narrative that other studies have not been able to do.

The data of international air passenger volume between the U.S. and Country *i* are obtained from U.S. Department of Transportation's Bureau of Transportation Statistics (BTS). It includes all traffic arriving at and departing from U.S. airports on commercial international flights carried by U.S. and foreign airlines. I collected monthly data on the number of passengers flown by air between the U.S. and countries in the sample.

b. PTA Data

As stated before, this paper is one of the few studies that uses trade policies to analyze the casual relationship between international trade and travel and is the only one that adopts an event-study strategy with PTA data. PTAs are important for international trade because they can directly change total trade volume for a member country by creating new trade or indirectly by diverting trade from other countries. When trade to barriers are reduced or eliminated, goods and services that are covered by the agreement will become cheaper and more readily available, thus imports and exports of the countries in the agreement will increase. Even though PTAs other than NAFTA have had small impact on U.S. total trade, this will not pose any threat to the analysis

because the event study is intended to focus on the trade volume between the U.S. and the member countries, not U.S. total trade. In fact, U.S. trade with these countries have increased a considerable amount. The boost in total trade is more notable for member countries because most of them are relatively small, and that market access can lead to a significant growth in those countries' total trade flows. The International Trade Commission concluded that PTAs "have led to an increase of 30 percent to 114 percent in each partner's trade over a 10 year period after an agreement has entered into force" (United States International Trade Commission). Therefore, using PTAs is an interesting and new way of studying trade policies and their impact on international travel.

Most importantly, I choose PTAs for the purpose of this study because they are much more exogenous than other measurements of trade such as trade volume and tariffs in the casual system of international trade and travel. There are fewer factors that affect PTAs that might also influence travel. PTAs also have more exogenous variation, which will lead to convincing findings on causality.

The countries that the U.S. has PTAs with and the dates when the treaties became effective can be found on the official website of the Office of the United States Trade Representative. The United States has free trade agreements in force with 20 countries, but the study only includes 19 countries because the treaty established with Israel is outside of the time frame of the event study.

c. GDP Data

GDP is used as a control variable in the study because it is an important determinant of air travel to particular destinations. GDP is one of the most crucial factors of air travel demand as analyzed in the literature (Jorge-Calderón, 1997, Abed et al., 2001, Grosche et al., 2007). All of them found that GDP has a positive effect on international air travel volume. Intuitively, the "richer" the country is, the more people will be traveling internationally, both for tourism and for business. Therefore, it is important to control for GDP to analyze the effect of international trade on travel.

Yearly data of GDP from the year 1990 to 2017 are obtained from International Monetary Fund. Since there is no monthly data on this variable, for the purpose of this study, GDP is assumed to grow or slow down at a constant, uniform rate throughout year. The yearly data are transformed to monthly data.

B. Model and Methods

In my empirical analysis, I study the effects of international trade on international travel by using a panel of country-year-month level data of the U.S. and 141 countries from the period of 1990 to 2017 and adopting an event-study methodology. The sample size is 27,230 and each observation is year, month, a country pair—US and Country *i.* I adopt a similar event study specification used by Alfaro-Urena, Manelici and Vasquez (2019). The empirical specification in this paper is:

$$\log Passenger_{it} = \alpha_i + \lambda_t + \sum_{k=\underline{C}}^{\bar{C}} \theta_k D^k_{it} + \eta GDP_{it} + \mu_{it}$$

where $Passenger_{it}$ is the outcome variable—the total number of international passengers between the U.S. and Country *i* in year-month *t*; α_i is a country fixed effect, and λ_t is a year-month time

fixed effect. I define the event-dummies as: $D^{k}_{it} = \mathbb{1}[t = \tau_i + k]\ \forall k \in (\underline{C}, \overline{C})$, $D_{it}^{\overline{c}} = \mathbb{1}[t \geq \tau_i + \overline{C}]$, and $D_{it}^{\underline{C}} = [t \leq \tau_i + \underline{C}\ ]$, where $\mathbb{1}$ [.] is the indicator function and τ_i is the first month after the PTA went effective; GDP_{it} is the nominal GDP of $Country_i$ in year-month t, and the unit is in millions of current U.S. dollars; μ_{it} is an error term. I set the time frame of the event study to be 5 years, which is 60 months, before and after the event happened. I also remove one dummy variable to avoid multicollinearity. I normalize $\theta_{-12} = 0$ and set $\underline{C} = -60$ and $\overline{C} = +60$. I will thus compare the number of air passengers in event month *k* to the number in event month *-12*, which is one year before the PTA went into effect.

In this study, I use two different specifications to analyze the relationship between international trade and travel: the first control group contains 19 countries, the second includes all 141 countries with an attempt to see the impact of PTAs on their bilateral passenger volumes.
As discussed above, most literature has adopted Granger causality to analyze the casual relationship between international trade and travel. However, this methodology might not be the best in the context of this topic. First of all, some researchers have found that Granger causality values do not reveal real causality at all. Hu et al., (2009) have proven in their study that higher Granger causality value is not equivalent to higher causality, and vice versa, thus Granger causality cannot establish real causality. Even without the support of the above finding, I would argue the same. Granger causality, in easy terms, takes two time-series and asks whether movements in one precede movements in the other. This is not the best way to establish causality of international trade on travel because it's still plagued by endogeneity problems by using trade volume data and not accounting for anticipation, seasonality, and other important factors in establishing causality. Moreover, Granger causality testing is a time-series study, which is less

powerful than the panel data that I use. With panel data, I can exploit variation provided by the differential timing of the trade agreements across US-Country *i* trips. In short, the event-study strategy that I adopt is more suitable and convincing in analyzing the causality in the two relationships than Granger causality.

IV. Results and Discussion

Before conducting any analysis, I use the same regression defined above to test and show the validity of the model. With the event-study specification, I regress the log of total trade volume between the U.S. and Country *i* on event dummies with two control groups. As discussed above, I expect that trade and the implementation of PTAs are highly correlated. Figure 4 shows the result: reassuringly, despite some fluctuations, the event dummies are largely insignificant before PTAs, and became 90% statistically significant after the events. It suggests that PTAs indeed cause more trade conducted between the U.S. and its partner countries.

After showing the validity of the event-study model, I implement the same specification used and defined above to estimate the effect of PTAs on international air travel passenger demand. Due to the large number of event-dummies, a regression table is not included. Figure 5 plots the event-study coefficients (θ_k) from two different regressions of the first specification—19 countries that have PTAs with the US. The dependent variable is log passenger volume, and the independent variables are 120 event dummies. Regression (1) has 5397 observations and regresses the log of passenger volume on the event dummies, excluding the control variable; Regression (2) has 5220 observations and includes GDP as a control variable. Country and time fixed effects are used for both regressions. As shown in the graphs, the coefficients barely

changed after the control variable is added. It suggests that there isn't significant omitted variable bias when GDP isn't controlled. The events of PTAs might have picked up the effect of GDP of member countries on international travel since they are highly correlated as discussed before.

The event is defined as the year-month when a PTA was established between the U.S. and Country *i*. θ_{-12} is the coefficient of 12 months (one year) prior to the treaty went effective, and it's normalized to zero. Therefore, the interpretation of the coefficients is relative to the passenger volume 12 months before. For example, the coefficient θ_{12} in Regression (2) is -0.0068. The event-study model predicts that the passenger volume 12 months after PTAs were established are on average 0.68% fewer than the passenger volume 12 months before the agreements. In order to show causality of the event on the outcome variable, all the event-dummies before the event time (0 on the x-axis) need to be statistically insignificant, and all dummies after should be significant. The vertical lines reflect the 95% confidence intervals, and all results except for the 60^{th} month before the signing of the agreement contain 0, thus are all statistically insignificant. From this specification, it can be concluded that there is no causal relationship between trade policy and travel, and that PTAs do not cause these countries to conduct more travels with the US.

Figure 6 plots the event-study coefficients (θ_k) based on the second specification—all 141 countries in the sample. The two regressions are the same as in the first specification. The number of observations is 29,732 and 27,230, respectively. In this specification, we see similar results: the coefficients and trend are almost identical in both regressions, and all coefficients

except for D_{-60} are statistically insignificant. It can be concluded that countries with PTAs do not necessarily lead to an increase in bilateral travels because a causal relationship is not established. One noticeable change from the first specification to the second that is that, with more countries added in the data, the seasonality of the nature of tourism is more obvious. We see a consistent up-and-down movement of the passenger data within each year. Despite the fluctuations, the trendline is slightly upward sloping, which is consistent with the general conception that trade and travel are positively correlated.

Since the passenger data I collected are bidirectional, it is interesting to see whether trade policy affects one direction more than the other. For example, countries that have PTAs with the U.S. have undergone a positive growth in both GDP and FDI, which could lead to more leisure and business travelers to the US. On the other hand, PTAs have not had a huge impact in the economy of the US, thus does not cause more travels abroad. I test this hypothesis by adjusting the original regression and splitting $\log Passenger_{it}$ into two directions: $\log PasfoUS_{it}$, the total number of passengers traveled from the U.S. to Country *i* in year-month *t*, and $\log PastoUS_{it}$, the total number of passengers traveled from Country *i* to the U.S. in year-month *t*. The other variables remain the same. The specifications are adjusted to be the following:

$$\log PasfoUS_{it} = \alpha_i + \lambda_t + \sum_{k=\underline{C}}^{\bar{C}} \theta_k D^k_{it} + \eta GDP_{it} + \mu_{it}$$

$$\log PastoUS_{it} = \alpha_i + \lambda_t + \sum_{k=\underline{C}}^{\bar{C}} \theta_k D^k_{it} + \eta GDP_{it} + \mu_{it}$$

The results of the above regressions based on two specifications and are shown in Figure 7 and 8, which are similar to what are found above: a positive correlation between trade policy and

passenger volume is shown, and yet the results are still statistically insignificant. Therefore, I conclude that trade policies do not affect have a separate effect on the inbound or outbound travelers between the U.S. and its member countries. The hypothesis that trade affects one direction of travel flows more than the other is rejected.

I also conduct several other analyses to make sure the results are robust. Since the time frame of the event study is chose arbitrarily, I reset the $\underline{C}$, $\overline{C}$ to be -24 and 24, -36 and 36, -48 and 48 and run the same regression again. As shown in Figure 9, all of the results are consistent with the ones before: event dummies are insignificant after the event month, so causality between trade policy and tourism cannot be established, even though they are positively associated.

I perform another robustness check by using year level data in replace of year-month data. Even though yearly data is less powerful than monthly data, it helps reduce the noise of the fluctuations in the data and visualize the trend and correlation more easily. Table 5 and 6 present the results from the first and second specification respectively on all the analyses done above with annual data, including two different regressions and the breakdown of the inbound and outbound passengers. Figure 10 and 11 plot the full regression. The results are consistent with previous analyses: no causality between trade and travel are established. The upward sloping trendline is clearer with fewer data points, confirming the claim that trade and travel are positively correlated.

Overall, the panel data and event-study methodology that I use allow me to conclude that despite the positive correlation, there isn't a causal relationship between international trade and travel.

However, it is beyond the scope of this study to test the mechanisms through which trade policies influence international travel and the reason why the causation doesn't exist. It is an important area that requires future research.

V. Conclusion

It's academically intriguing and timely to study the effect of international trade on international travel. Many existing studies have found a causal linkage between the two, but they are still plagued by endogeneity problems. I use a panel data of the U.S. and 141 countries that covers the period of 1990 to 2017 and adopt an event-study strategy on PTAs, which are more exogenous than trade volume and other trade policies, to rigorously and systematically test this causal relationship. The results show that international trade does not lead to international travel, even though they are highly correlated. This finding is robust to alternative measures of event time frames and variable data. However, this paper is only a first and preliminary attempt of using event study and PTAs to analyze this relationship. More empirical exploration is needed build a stronger and more sophisticated model.

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Appendix

Figure 1. Tourist Arrivals and Trade Volumes for the U.S. (2004-2017)

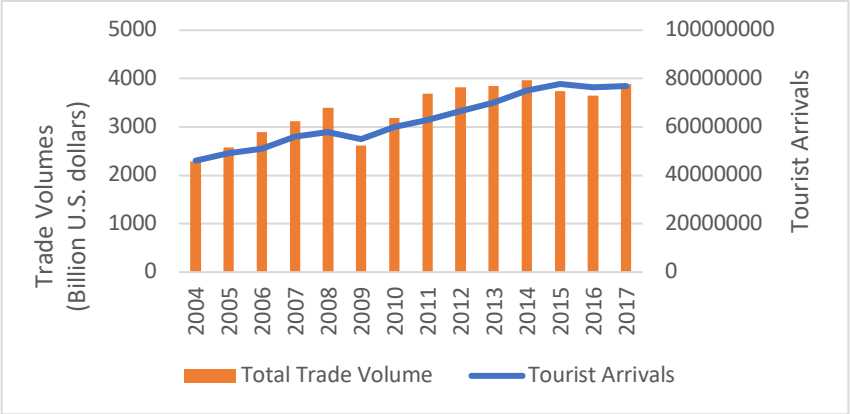


Figure 1 Source: The Census Bureau and the World Bank

Figure 2. Percent Change of Monthly International Visits to the USA in 2017 (compared to 2016)

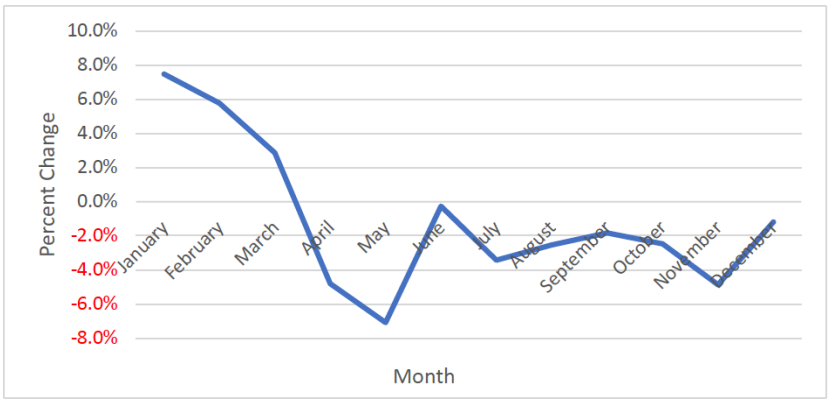


Figure 2 Source: U.S. Department of Transportation

Figure 3. A Comparison of Passenger Volume between Countries with PTAs and the Remaining Countries

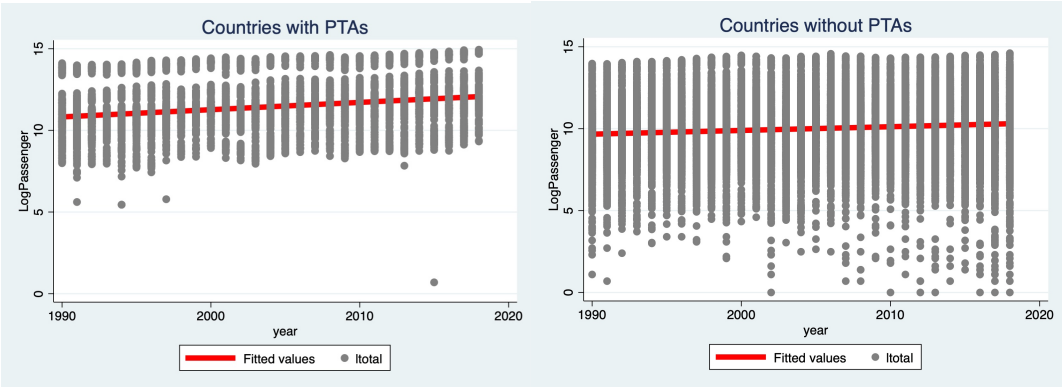


Figure 4. Change in Total Trade Volume between U.S. and Country *i*
After PTAs Became Effective

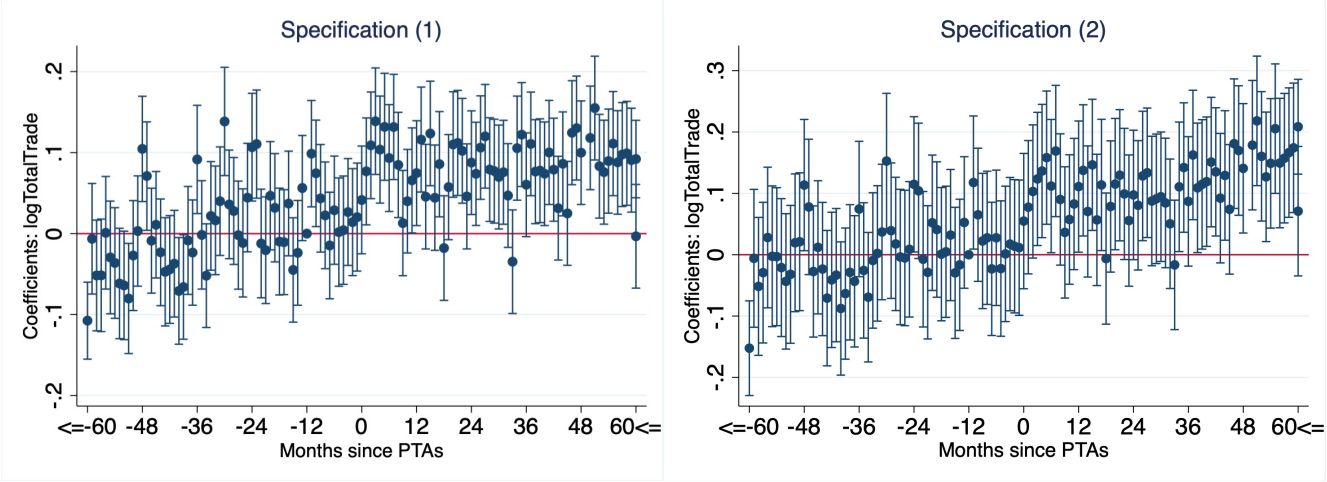


Figure 5. Change in Passenger Volume After PTAs Became Effective
with Evidence of 19 countries

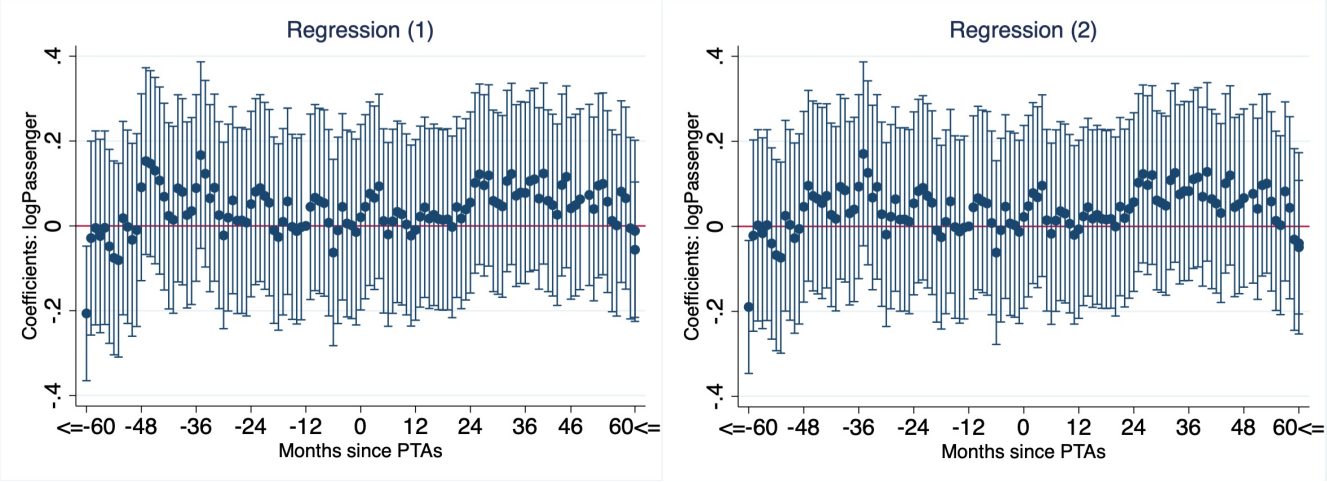


Figure 6. Change in Passenger Volume After PTAs Became Effective with Evidence of 140 Countries

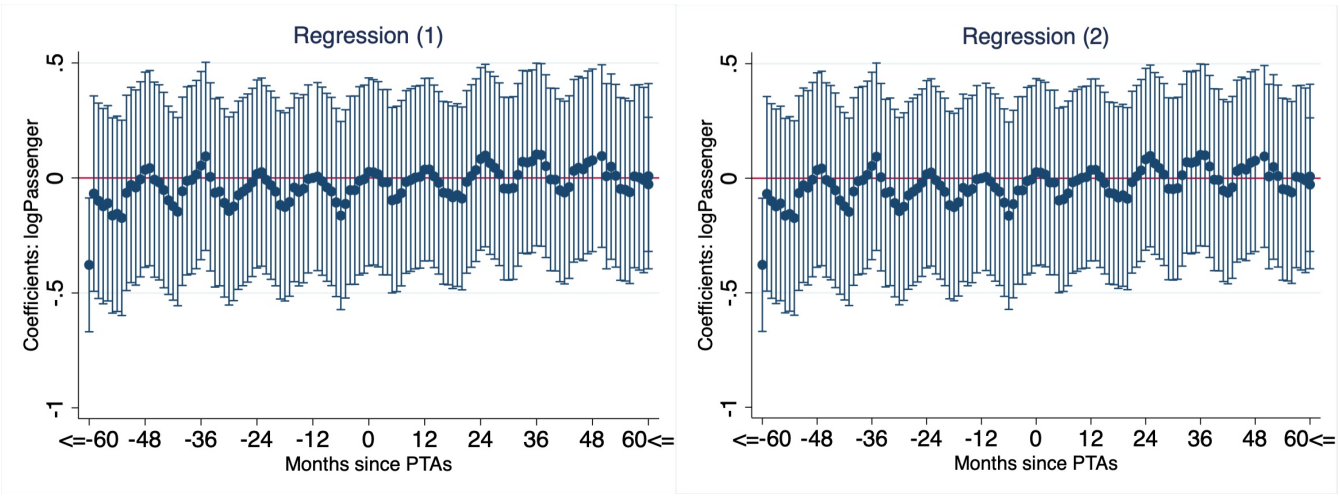


Figure 7. Change in Passenger Volume from the U.S. to Country *i* After PTAs Became Effective

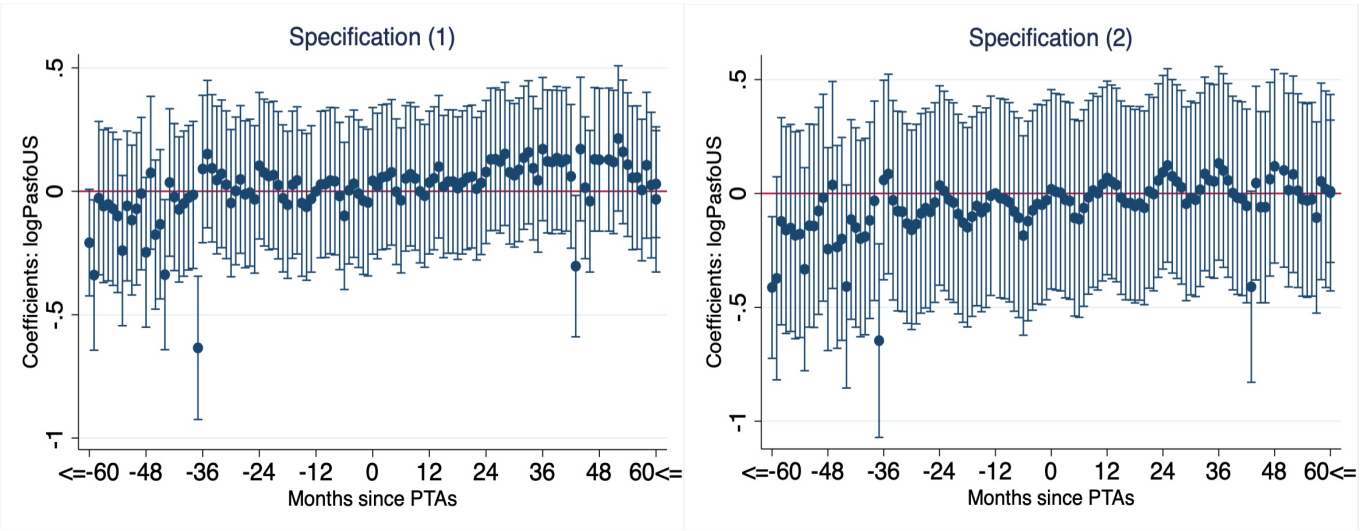


Figure 8. Change in Passenger Volume from Country *i* to the U.S. after PTAs Became Effective

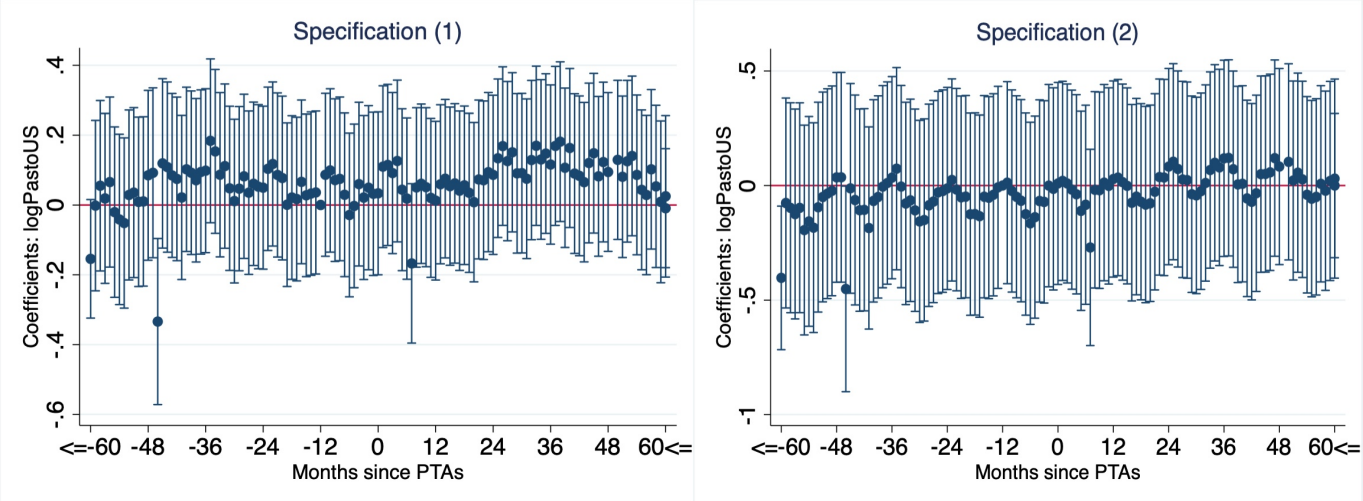
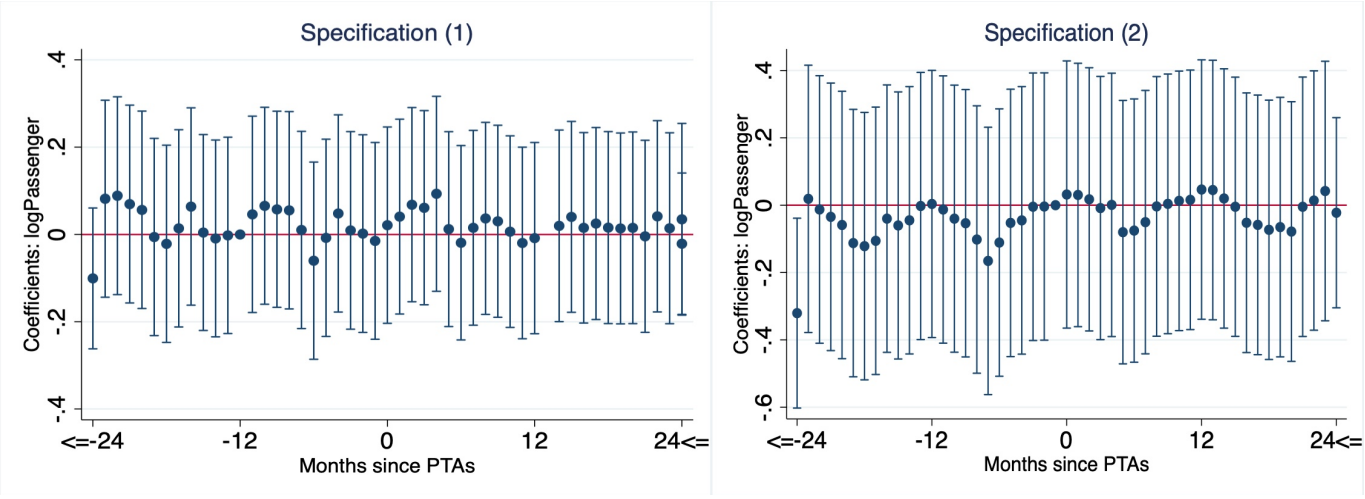
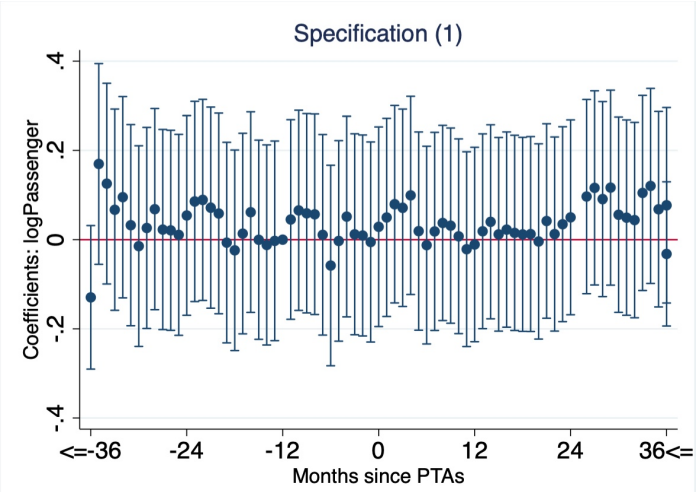
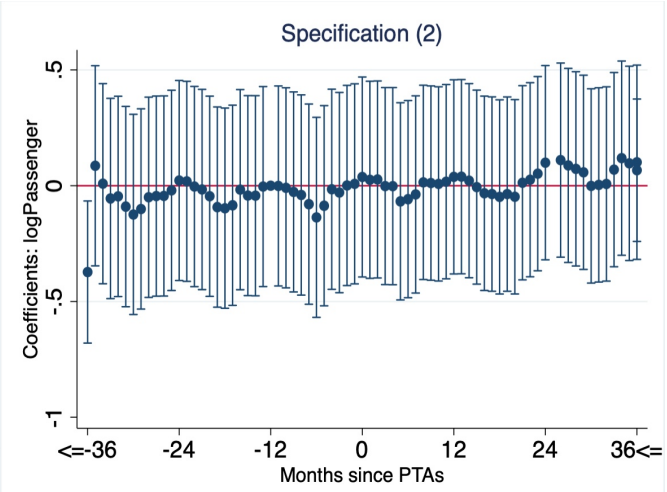
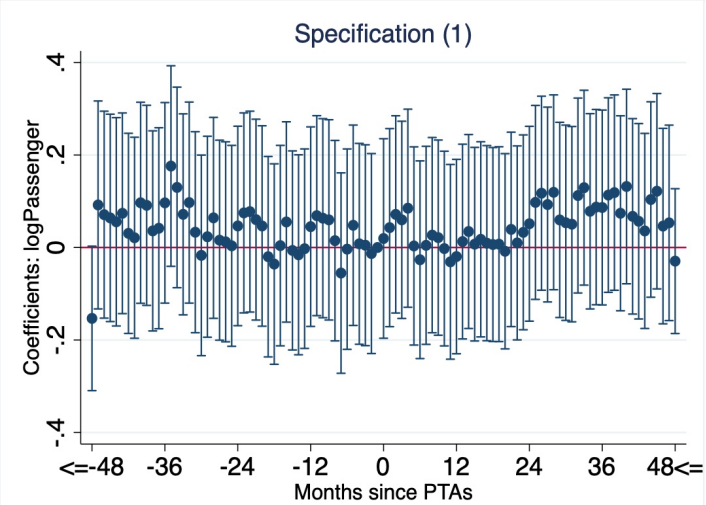


Figure 9. Change in Passenger Volume after PTAs Became Effective
Using Different Event Windows




Specification (1)
Coefficients: logPassenger
-.4
-.2
0
.2
.4
<=-36
-24
-12
0
12
24
36<=
Months since PTAs


Specification (2)
Coefficients: logPassenger
-1
-.5
0
.5
<=-36
-24
-12
0
12
24
36<=
Months since PTAs


Specification (1)
Coefficients: logPassenger
-.4
-.2
0
.2
.4
<=-48
-36
-24
-12
0
12
24
36
48<=
Months since PTAs

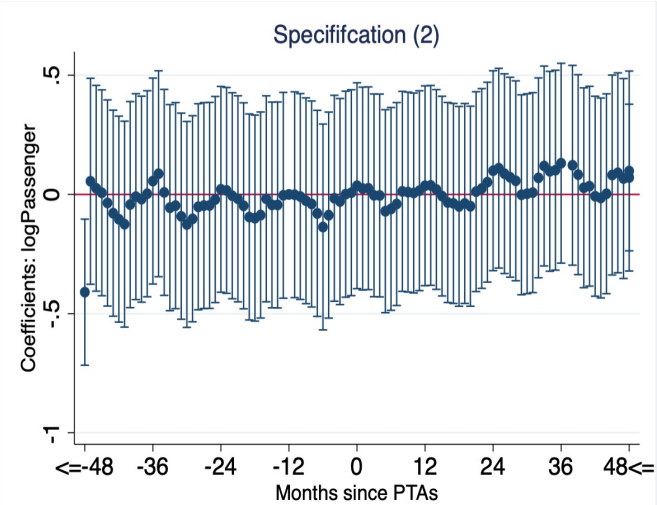
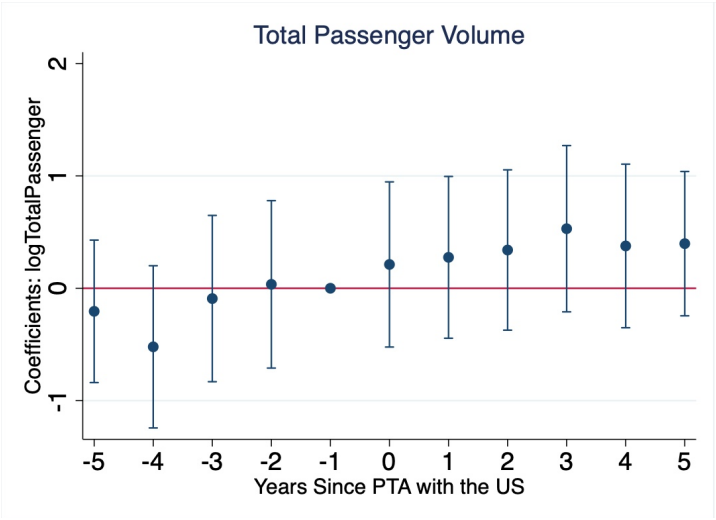
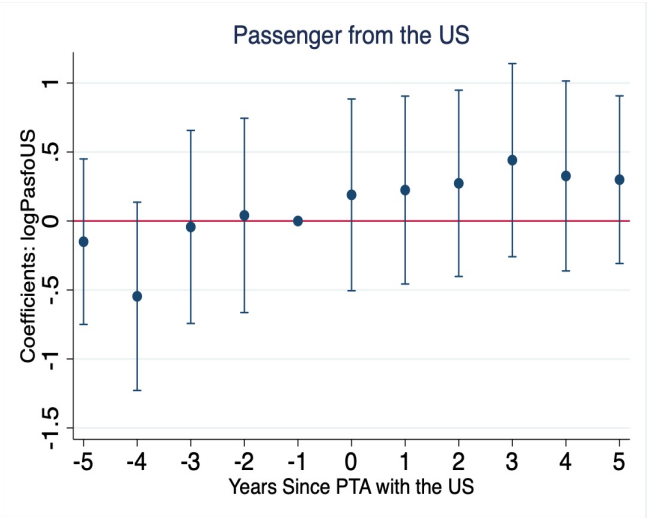

Specifiifcation (2)
Coefficients: logPassenger
-1
-.5
0
.5
<=-48
-36
-24
-12
0
12
24
36
48<=
Months since PTAs

Figure 10 Change in Passenger Volume after PTAs Became Effective Using Yearly Data (specification 1)





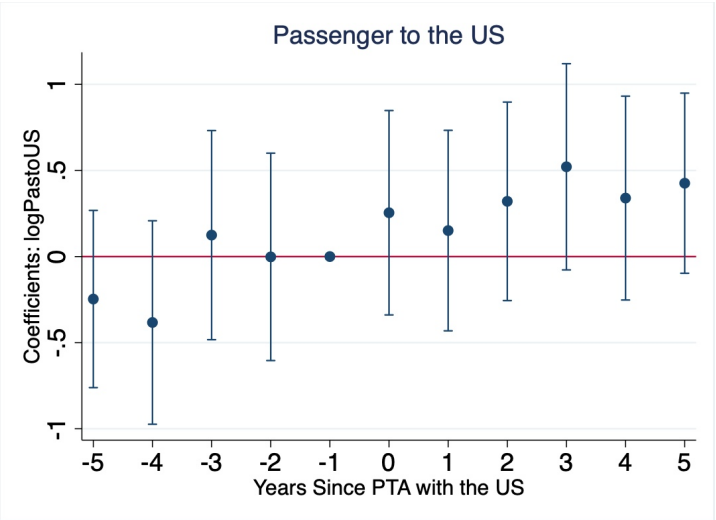


Figure 11. Change in Passenger Volume after PTAs Became Effective Using Yearly Data (specification 2)

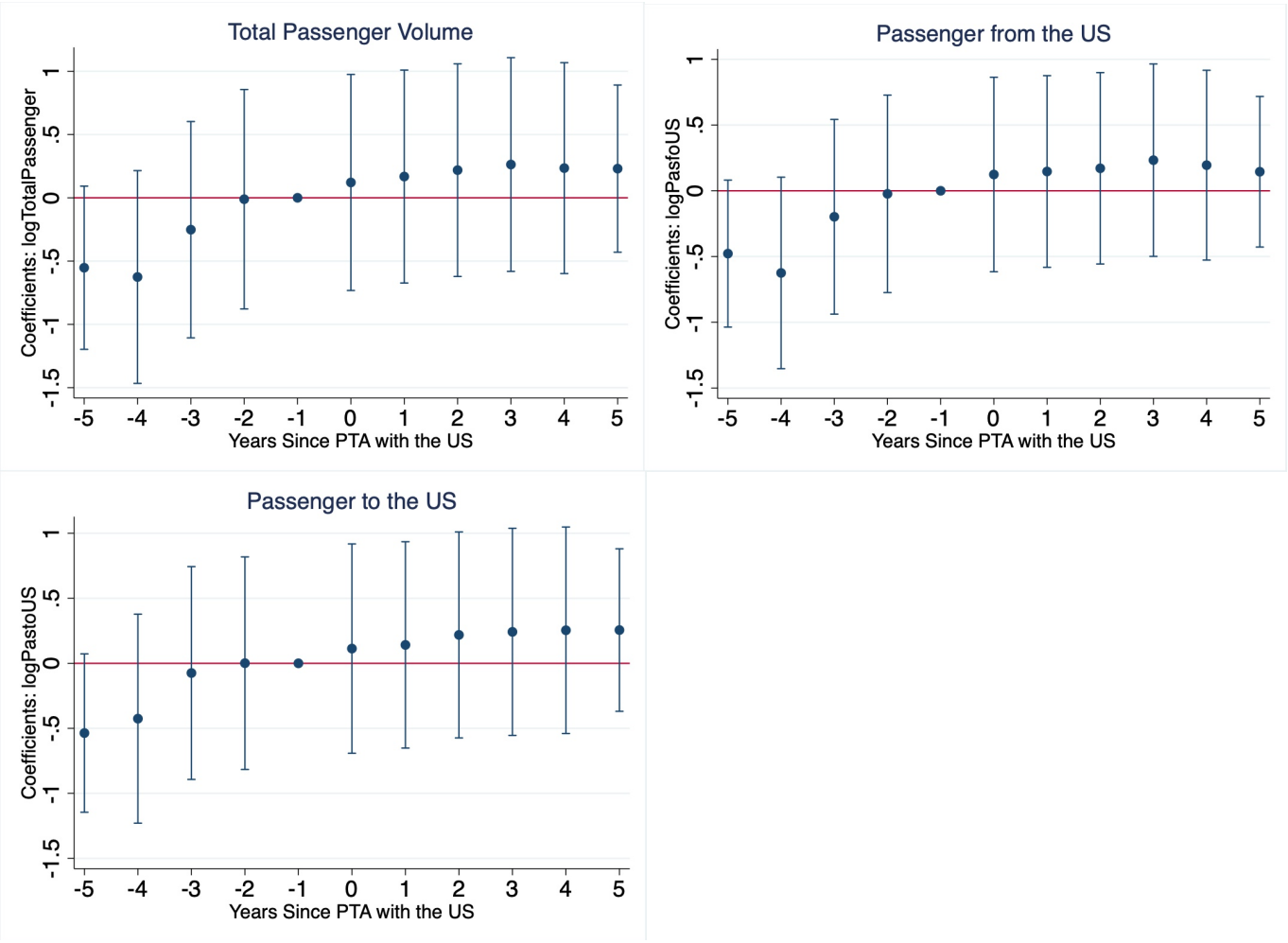


Table 1. The World's Most Visited Countries in 2017

Rank	Country	International Visitors (millions)
1	France	86.9
2	Spain	81.8
3	United States	76.9
4	China	60.7
5	Italy	58.3
6	Mexico	39.3
7	United Kingdom	37.7
8	Turkey	37.6
9	Germany	37.5
10	Thailand	35.4

Table 1 Source: The World Bank

Table 2. The World's Largest Trading Countries in 2017

Rank	Country	Imports (billions)	Rank	Country	Exports (billions)
1	United States	2,408.48	1	China	2,263.33
2	China	1,843.79	2	United States	1,546.72
3	Germany	1,166.84	3	Germany	1,448.30
4	Japan	671.92	4	Japan	698.12
5	United Kingdom	644.06	5	Netherlands	652
6	France	624.02	6	Korea, Republic of	573.7
7	Hong Kong	589.91	7	Hong Kong	550.27
8	Netherlands	574.93	8	France	535.19
9	South Korea	478.48	9	Italy	506.23
10	Italy	452.2	10	United Kingdom	445

Table 2 Source: International Monetary Fund

Table 3. Partner Countries of PTAs and Country Characteristics Before the Year of Implementation

Characteristics of Partner Countries of U.S. Trade Agreements Before the Year of Implementation

Percent

Partner Countries	Year in Which Agreement Was Implemented	Cumulative GDP of Partner Countries (Percentage of U.S. GDP)	Share of Total U.S. Trade	Trade-Weighted Average MFN Import Tariff Rates of Partner Countries	Trade-Weighted U.S. Average MFN Import Tariff Rates
Israel	1985	0.7	n.a.	n.a.	n.a.
Canada	1989	9.7	19.9[a]	8.2[b]	n.a.
NAFTA[c]	1994	16.3	28.0	n.a.	4.7
Jordan	2001	0.1	*	18.9	2.8
Australia	2004	5.3	1.0	4.0	2.8
Chile	2004	0.9	0.3	6.0	2.8
Singapore	2004	0.9	1.6	*	2.8
CAFTA-DR[d]	2005	0.9	1.5	6.6	2.5
Bahrain	2006	0.1	*	5.6	2.4
Morocco	2006	0.5	*	19.9	2.4
Oman	2006	0.2	*	4.7	2.4
Peru	2007	0.6	0.3	6.8	2.4
Colombia	2012	1.4	1.0	9.1	2.6
Panama	2012	0.2	0.3	6.8	2.6
South Korea	2012	8.2	2.7	7.3	2.6

Table 3 Source: Congressional Budget Office

*Notes: CAFTA-DR = Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and the Dominican Republic; MFN = most-favored nation; NAFTA = North American Free Trade Agreement; n.a. = not applicable; * = between zero and 0.05 percent*

Table 4. Summary of Descriptive Statistics of Observations and Variables

	count	mean	sd	min	max
partner countries	141	-	-	-	-
logPassenger	32,442	10.34799	1.836806	0	14.91051
year	32,442	1280.767	1556.299	9.749662	9901.971
month	32,442	6.516799	3.448098	1	12
partner countries' GDP	29,810	1280.767	1556.299	9.749662	9901.971

Notes: 120 event dummies are not included

Table 5. Effect of PTAs on Passenger Volume Using Yearly Data (specification 1)

	(1)	(2)	(3)	(4)	(5)	(6)
	log (Total Passenger)		log (Passenger from US)		log (Passenger to US)	
5 years before event	-0.206	-0.205	-0.154	-0.150	-0.222	-0.246
	(0.321)	(0.323)	(0.303)	(0.306)	(0.261)	(0.262)
4 years before event	-0.535	-0.535	-0.555	-0.554	-0.368	-0.371
	(0.367)	(0.368)	(0.347)	(0.347)	(0.301)	(0.301)
3 years before event	-0.101	-0.101	-0.0499	-0.0484	0.138	0.132
	(0.377)	(0.377)	(0.356)	(0.356)	(0.309)	(0.309)
2 years before event	0.0120	0.0121	0.0271	0.0275	0.0178	0.0161
	(0.379)	(0.379)	(0.358)	(0.358)	(0.306)	(0.306)
Year of event	0.179	0.179	0.171	0.170	0.278	0.280
	(0.372)	(0.373)	(0.352)	(0.352)	(0.301)	(0.301)
1 year after event	0.252	0.252	0.211	0.211	0.165	0.168
	(0.366)	(0.366)	(0.345)	(0.346)	(0.296)	(0.296)
2 years after event	0.329	0.329	0.266	0.266	0.328	0.328
	(0.363)	(0.364)	(0.343)	(0.344)	(0.294)	(0.294)
3 years after event	0.520	0.520	0.434	0.435	0.533	0.528
	(0.377)	(0.377)	(0.356)	(0.357)	(0.305)	(0.305)
4 years after event	0.365	0.364	0.320	0.319	0.345	0.348
	(0.370)	(0.371)	(0.350)	(0.351)	(0.302)	(0.302)
5 years after event	0.405	0.405	0.302	0.303	0.425	0.417
	(0.327)	(0.327)	(0.309)	(0.310)	(0.266)	(0.266)
annualGDP		-0.000000220		-0.00000111		0.00000597
		(0.00000919)		(0.00000875)		(0.00000746)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Ajusted R^2	0.81	0.83	0.81	0.81	0.83	0.83
# Observations	471	471	469	469	460	460

Standard errors in parentheses
="* p<0.05 ** p<0.01 *** p<0.001"

Table 6. Effect of PTAs on Passenger Volume Using Yearly Data (specification 2)

	(1)	(2)	(3)	(3)	(5)	(6)
	log (Total Passenger)		log (Passenger from US)		log (Passenger to US)	
5 years before event	-0.571	-0.535	-0.479	-0.446	-0.528	-0.525
	(0.327)	(0.332)	(0.283)	(0.287)	(0.306)	(0.313)
4 years before event	-0.636	-0.624	-0.634	-0.621	-0.434	-0.429
	(0.427)	(0.433)	(0.370)	(0.375)	(0.405)	(0.413)
3 years before event	-0.264	-0.252	-0.198	-0.188	-0.0756	-0.0719
	(0.434)	(0.440)	(0.376)	(0.381)	(0.412)	(0.421)
2 years before event	-0.0284	-0.0222	-0.0299	-0.0268	-0.00409	-0.00591
	(0.440)	(0.447)	(0.382)	(0.386)	(0.412)	(0.420)
Year of event	0.104	0.0982	0.110	0.106	0.106	0.104
	(0.434)	(0.440)	(0.376)	(0.380)	(0.405)	(0.414)
1 year after event	0.155	0.143	0.147	0.138	0.121	0.117
	(0.428)	(0.433)	(0.371)	(0.375)	(0.400)	(0.408)
2 years after event	0.225	0.214	0.174	0.162	0.229	0.223
	(0.427)	(0.433)	(0.370)	(0.374)	(0.399)	(0.408)
3 years after event	0.283	0.270	0.260	0.243	0.258	0.253
	(0.429)	(0.435)	(0.372)	(0.376)	(0.401)	(0.410)
4 years after event	0.261	0.245	0.219	0.200	0.274	0.260
	(0.423)	(0.429)	(0.367)	(0.371)	(0.400)	(0.409)
5 years after event	0.289	0.272	0.202	0.178	0.301	0.290
	(0.335)	(0.340)	(0.291)	(0.294)	(0.314)	(0.321)
annualGDP		-0.00000444		-0.00000303		-0.000000608
		(0.00000382)		(0.00000339)		(0.00000386)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Ajusted R^2	0.86	0.86	0.86	0.86	0.84	0.83
# Observations	2868	2716	2773	2626	2719	2577

Standard errors in parentheses

="* p<0.05 ** p<0.01 *** p<0.001"