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Regional Impacts of International Tourism Boycott: A China-Japan Conflict

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Abstract

We examine the regional impacts of a Sino-Japan territorial dispute that sparked a Chinese consumer boycott of travel to Japan from August, 2012. We find that the boycott caused large and regionally heterogenous effects in Japan. The boycott's negative impacts are larger for Japanese prefectures with higher pre-boycott dependency on visitors, especially tourists, from China. While the intensity of the boycott effects is strongest within the first six months, we find significant negative impacts even when averaging across 24 months post-boycott. Our results demonstrate the importance of diversification across traveler types and countries of origin in providing travel services.

Key words: Consumer boycott; Travel services trade; Tourism; Diaoyu/Senkaku Dispute; Regional impacts; Political conflict

JEL classification codes: F14, F51, F52, Z30

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1 Introduction

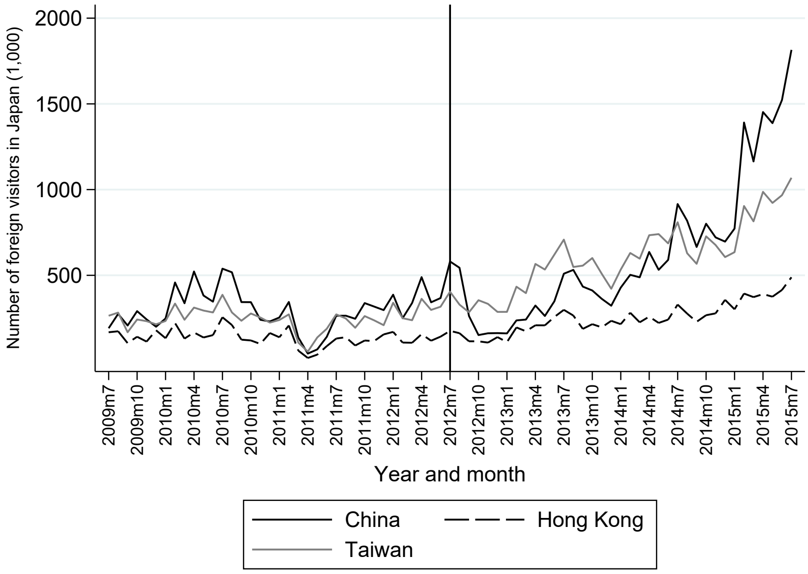
China has been the world's largest source country for international tourists since 2012 and the largest country of origin for visitors to Japan since 2015.[1] These trends imply that the impacts of any political conflicts with China are a concern for many countries that have increasing tourism relationships with China, including Japan. This paper examines the impacts of China's political conflict with Japan on inbound travel in Japan, focusing on the Diaoyu/Senkaku Islands conflict that sparked Chinese protests and consumer boycotts from August, 2012. This conflict is one of the biggest disputes between China and Japan in the post-World War II period. Figure 1 illustrates the magnitude of the Chinese consumer boycott shock on the number of visitors from China, Hong Kong and Taiwan to Japan. While visitors from all three sources decline sharply after the Great East Japan Earthquake of March 11, 2011, the boycott-induced decline from August, 2012 is particularly large for visitors from China and larger in magnitude than the earthquake-induced decline.

While political conflicts such as the 2012 Sino-Japan dispute originate at the national level, the impacts may differ between regions within a boycotted country because travelers have heterogeneous preferences regarding places to visit within a country. Figure 2 displays the quartiles distribution of Japanese prefectures' dependency ratios on visitors from China between January, 2007 and July, 2012. The China dependency ratio is the average monthly share of visitors from China to total visitors from foreign countries. This ratio varies across prefectures from a low of 3.7 percent to a high of 44.1 percent. Prefectures in the lowest quartile are mostly located in Kyushu and Okinawa in southern Japan or in northern Honshu while prefectures in the highest quartile are found in central Honshu.

Regions also differ in their degree of economic dependence on travel-related industries. Figure 3 presents the employment share of the accommodation and food services

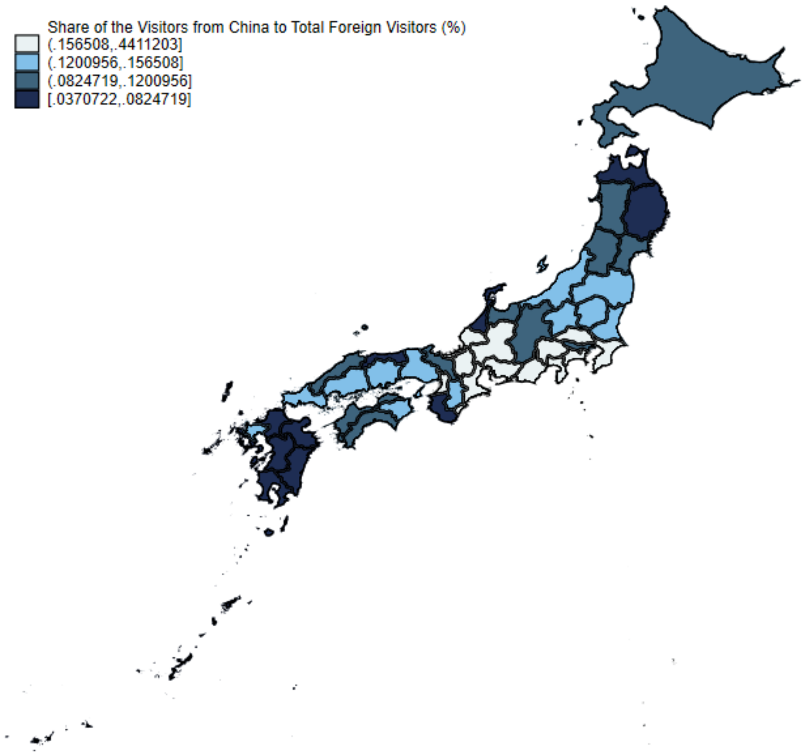
[1] Based on UNWTO Tourism Data Dashboard data on outbound tourism and tourism flows accessed on February 2, 2024; https://www.unwto.org/tourism-data/global-and-regional-tourism-performance.

Figure 1: Number of Visitors from China, Hong Kong & Taiwan



Notes: Monthly visitors are measured by the total number of people who reside outside of Japan times the number of nights stayed in Japan (unit: 1,000 person-nights).
Source: Japan Tourism Agency (2020), *Overnight Travel Statistics Survey*.

Figure 2: Share of Foreign Visitors from China Pre-boycott, by Japanese Prefecture



Notes: A lighter color indicates a larger Chinese visitor dependency pre-boycott (i.e., January 2007–July 2012). The Japan map data is obtained from here.
Source: Japan Tourism Agency (2020), *Overnight Travel Statistics Survey*.

industry and the share of foreign visitors by prefecture in Japan in 2018.[2] This figure shows that the employment share of the accommodation and food services industry accounts for between 4.55 percent and 8.76 percent of prefecture-level employment, with particularly high levels in Okinawa and Kyoto. The share of visitors from foreign countries varies even more widely from 1.71 percent to 36.47 percent, with Tokyo and Osaka being the prefectures that are the most dependent on foreign visitors among all accommodated visitors. Figure 3 illustrates the strong positive correlation between the accommodation and food services employment shares and the share of visitors from foreign countries ($r = 0.624$). In other words, the figure illustrates the importance of foreign visitors for tourism-dependent prefectures in Japan.

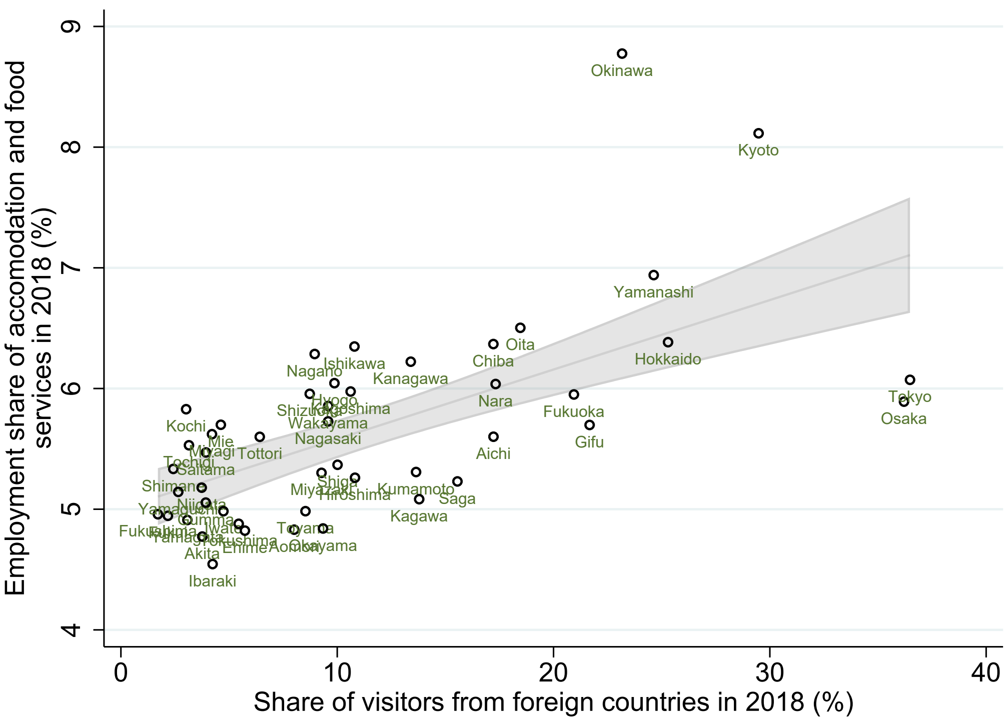
Despite these wide disparities at the prefecture level, to our knowledge, the regional heterogeneity of the boycott impacts has not been previously explored. Prior literature on consumer boycotts tends to focus on national-level outcomes.[3] An exception is Ahn et al. (2022), but that study focused on a Korean consumer boycott of travel to Japan from July, 2019, and examined relatively short-term impacts (i.e., 6 months) due to the coronavirus pandemic that impacted worldwide travel from early in 2020.

For this study, we have the advantage of a longer panel dataset to use in examining longer-term impacts of the Chinese consumer boycott of travel to Japan. We address the following research questions: 1) Did the impacts of a Chinese consumer boycott differ between regions within Japan, and if so, how?; 2) How long can impacts be detected post-boycott using triple- and double-differences designs?; and 3) Were the negative impacts of the Chinese consumer boycott offset by other foreign or Japanese domestic travelers? Using the foreign visitor data (i.e., number of accommodated-visitor nights) for each prefecture and month spanning 18 years of available data (i.e., 2007–2019), we first use event study analysis to examine the likely longevity of the boycott effects. This guides us in narrowing our panel length when we then employ triple-

[2]Note that there is no formal industry classification for "tourism" in national statistics since tourism services spread across various industries, some of which are consumed by both foreign and local residents (e.g., transportation, entertainment, accommodations and food services). As a short cut, we focus on the employment share in accommodation and food services.

[3]For example, see Cheng and Wong (2014), Heilman (2016, 2019), Jin et al. (2019) and Li et al. (2021).

Figure 3: Employment Share of Accommodation and Food Services, by Prefecture



Notes: The vertical axis indicates the employment share that is defined as the ratio of employment of accommodation and food services to total employment, by prefecture. The horizontal axis indicates the share of foreign visitors in 2018, where visitors are measured by the total number of people who reside outside of Japan times the number of nights stayed in Japan (unit: 1,000 person-nights). The solid line indicates the fitted values from the linear ordinary least squares estimation and the gray areas indicate the 95 percent confidence interval (CI).

Sources: RIETI (2021) *R-JIP Database* and Japan Tourism Agency (2020) *Overnight Travel Statistics Survey*.

differences (i.e., difference-in-difference-in-differences, DDD) and double-differences (i.e., difference-in-differences, DID) methods to estimate the impacts of the boycott at the prefecture level and over different time intervals post-boycott. By examining such regional heterogeneity and the longevity of boycott effects, this paper seeks to contribute to local tourism policy and management.

Our analysis builds upon Ahn et al. (2022) but we extend the analysis in several ways. First, as previously mentioned, we have a longer panel for examining post-boycott effects. This allows us to test for boycott effects over different time intervals, while we also use event study analysis to guide our decisions regarding the likely longevity of the boycott effects. Secondly, we analyze the possible substitution between boycotting Chinese travelers and Japanese domestic travelers, which has not been considered in previous literature. For this analysis, our treatment variable captures prefecture-level dependency on Chinese visitors relative to all visitors both foreign and domestic. Ahn et al. (2022) utilizes a treatment variable that focuses on prefecture-level export dependency on visitors from one boycotting country relative to all foreign visitors. Thirdly, while we treat China (i.e., the People's Republic of China) as the main boycotting country for our analysis, we also include Hong Kong and Taiwan in some estimations to examine their consumer boycott activities, too.[4]

Our results confirm that prefectures with high dependency on visitors from China before the boycott suffer disproportionate losses due to the Chinese consumer boycott. In the first six months of the boycott, a 25th percentile prefecture for pre-boycott dependency on visitors from China suffers a loss of 19.5 percent of its accommodated-visitor-nights provided to visitors from China while a 75th percentile prefecture suffers a loss of 26.1 percent. We show that this disproportionate effect is because tourists are more likely than non-tourist visitors to participate in the consumer boycott and tourists differ from non-tourists in their destinations within Japan. Prefectures in Japan with high dependency on visitors from China also tend to have high depen-

[4]This approach is supported by Heilmann's (2016) DID results finding by far the strongest (negative) boycott effects for China's merchandise trade with Japan, smaller impacts on Hong Kong's trade with Japan and insignificant impacts for Taiwan's trade with Japan.

dency on *tourist* visitors from China, making them more vulnerable to a Chinese consumer boycott.

At the aggregate level for foreign visitors, we find that a 25th percentile prefecture for China dependency loses 11.9 percent of its total foreign visitors and a 75th percentile prefecture loses 19.9 percent of its foreign visitors in the first six months post-boycott by China's consumers. Slightly smaller but similarly disparate aggregate boycott effects on foreign visitors across prefectures are found when Hong Kong visitors are included in the analysis as potential boycott participants, along with visitors from China. While the boycott effects involving visitors from China are strongest within the first six months, we find that the negative impacts are significant even when averaged across 24 months after the boycott began. When Hong Kong visitors are included along with visitors from China, the estimated aggregate boycott effects are significant only over the first six months of the boycott.

Unfortunately, when domestic visitors are included in our analysis of boycott effects, we are unable to pursue our DID estimation due to violations of the common trends assumption. Domestic travelers play a dominant role in the accommodated-visitor nights data when they are included in the sample, which greatly reduces our treatment effect of prefecture-level pre-boycott dependency on visitors from China. With this sample, prefectures have disparate visitor trends in the pre-boycott period that are not correlated with their dependency on visitors from China. Our inquiry is the first to consider the substitution potential between domestic and foreign consumers, but we are unable to complete this inquiry.

Our research directly relates to previous work on consumer boycott effects on international trade.[5] This prior research has focused on bilateral and aggregate export effects but has not considered regional effects nor whether domestic demand can substitute for lost sales abroad for a boycotted country/region. Several prior stud-

[5]See, for example, Ashenfelter et al. (2007), Chavis and Leslie (2009), Clerides et al. (2015), Heilmann (2016), Heilmann (2019), Pandya and Venkatesan (2016), Luo and Zhai (2017), Jin et al. (2019), Yu et al. (2020), Li et al. (2021), Ahn et al. (2022), Kim and Kim (2022), and Antoniades et al. (2023). Heilmann (2016) and Yu et al. (2020) provide excellent literature reviews on consumer boycotts.

ies have examined various China-Japan disputes.[6] Focusing specifically on the 2012 Diaoyu/Senkaku Islands dispute, Heilmann (2016) finds the negative effects on merchandise imports from Japan are strongest for China (i.e., −29 percent), smaller for Hong Kong (−6 percent) and insignificant for Taiwan using a DID design. Sun et al. (2021) examine boycott effects in four major Chinese cities and find that the negative effects on the sales of Japanese automobiles were strongest in Nanjing, the site of the Battle of Nanjing in 1937, and weakest in Beijing, where local government agencies discouraged public boycott activities. These aforementioned studies of the 2012 Chinese consumer boycott are similar to our study in their use of DID methods, but they differ from our study in using shorter post-boycott intervals for their analyses.[7] Our study is the first, to our knowledge, to find evidence of negative boycott effects even when averaging those effects across 24 post-boycott months.

Several previous studies have focused on the impact of China-Japan political disputes on traveler flows from China to Japan (e.g., Zhou et al. (2021) and Su et al. (2022)). These studies use inbound traveler data to examine the impacts of political disputes on visitor arrivals. Su et al. (2022) find that China-Japan political relations Granger-cause China-to-Japan visitor arrivals, but not the reverse visitor flow. Zhou et al. (2021) estimate that China-to-Japan visitor flows deviate by 7 percent from trend in the three months following a typical China-Japan political shock. Cheng et al. (2017) use Japan National Tourism Organization (JNTO) data to describe an average loss of almost 40 percent in monthly arrivals from China in October through December, 2012, due to the Diaoyu/Senkaku Islands dispute.

While visitor arrivals data is a useful metric of international travel activity, it may underestimate consumer boycott effects that occur not only through the extensive margin of travel services trade but also through the intensive margin. In the travel services context, we can apply the "extensive margin" concept to the number of travelers

[6]For example, see Davis and Meunier (2011), Fisman et al. (2014), Heilmann (2016), Kim et al. (2016), Cheng et al. (2017), Yu et al. (2020), Li et al. (2021), Sun et al. (2021), Zhou et al. (2021) and Su et al. (2022).

[7]Sun et al. (2021) uses a six-month post-boycott interval and Heilmann (2016) uses a 17-month post-boycott interval while we analyze boycott impacts up to 36 months post-boycott.

(i.e., importers) while the "intensive margin" concept corresponds to the purchases of travel services per traveler or importer. Melitz's (2003) model of trade with heterogeneous firms developed the framework for examining the extensive and intensive margins of trade from the perspective of firms that select in or out of exporting. Here we adapt the terminology to describe international travelers who select in or out of importing travel services. In addition to canceling trips (i.e., an extensive margin effect), travelers may shorten the length of planned trips to participate in a boycott (i.e., an intensive margin effect). Our study provides a more comprehensive assessment of the economic effects of the consumer boycott by using data on accommodated-visitor nights as an indicator of visitors' spending and the corresponding travel services revenue losses due to boycott activities (i.e., the combined extensive and intensive margin effect).

In the next section, we summarize the Diaoyu/Senkaku islands conflict that sparked the Chinese consumer boycott in 2012. Data is presented in Section 3, followed by the disaggregate-level (i.e., bilateral) analysis in Section 4, which includes a discussion of tourist versus non-tourist boycott participants. Section 5 presents our aggregate-level analysis of impacts on foreign visitors in total, followed by an aggregate-level analysis of impacts on foreign and domestic visitors in Section 6.[8] Section 7 concludes.

2 The Diaoyu/Senkaku Islands Conflict in 2012

The dispute involves a group of eight uninhabited islands in the East China Sea referred to as the Senkaku islands in Japan (JPN), the Diaoyu Islands in People's Republic of China (PRC) and as the Tiaoyutai islands in the Republic of China Taiwan (ROC). Territorial claims to these islands became a source of Sino-Japan conflict following the 1969 discovery of huge deposits of oil and hydrocarbons in the waters surrounding the islands (Chansoria, 2018).[9] In 1970-1971, the PRC asserted that the Diaoyu Islands

[8] Robustness checks of our results at both levels of analysis are presented in the paper's appendices.

[9] The discovery was made during a geophysical survey conducted in 1968 and 1969 by the United Nations Economic Commission for Asia and the Far East.

were historically part of Taiwan, which makes them part of the PRC. The PRC dated its claims to the Diaoyu Islands back to the Ming (1368-1644) and Qing (1644-1911) dynasties by referencing maps made by Chinese and a few non-Chinese cartographers that show the Islands colored the same as Taiwan and named "Diaoyu".[10]

According to Japan's Ministry of Foreign Affairs (MOFA), the Japanese Government incorporated the islands into Japanese territory, specifically as part of Okinawa prefecture, in January, 1895, after conducting a survey in 1885 that concluded that no other state previously had claimed the islands as part of its territory.[11] After WWII, the Senkaku Islands were placed under United States administration as part of Okinawa in the San Francisco Peace Treaty. According to MOFA, the Senkaku Islands were part of the territory over which administrative rights were returned to Japan under the 1972 Okinawa Reversion Agreement between the United States and Japan.

In asserting its sovereign rights to the islands, the Japanese government sold the islands to the Kurihara family in 1978 but leased them back again in 2002 to enable enforcement of its ban on private landings (by foreigners or Japanese) on the islands. From 2006 to 2011, activists from China, Hong Kong and Taiwan arrived at the disputed islands on several occasions to demonstrate China's sovereignty but they were expelled by Japan's navy each time.

In August 2012, an island visit by 14 Chinese activists from Hong Kong and mainland China resulted in their arrest and deportation. That visit prompted a group of 10 Japanese activists, including five conservative local politicians, to swim ashore and plant Japanese flags on Uotsuri, the largest of the disputed islands, on August 18, 2012. The unauthorized visit set off a formal complaint from the Chinese government and street protests in many Chinese cities that included vandalism against Japanese-owned businesses and Japanese-branded autos, which were overturned.[12] The Chinese protestors were further enraged by the Japanese government announcing its in-

[10] See Sato and Chadha (2022) for details.

[11] Ministry of Foreign Affairs webpage focused on the Senkaku Islands, accessed on October 16, 2023. The survey occurred in the aftermath of the First Sino-Japan War (1884-1885) when Japan took control of Taiwan.

[12] Details provided in archived Washington Post article "Japanese activists land, raise flags on disputed island, provoking Chinese protests", August 18, 2012.

tention to buy the Diaoyu/Senkaku Islands from the private owners in August, and then completing the purchase in September, 2012. Anti-Japan protests spread to at least 72 cities in mainland China and to Hong Kong by mid-September, 2012.[13]

For the purposes of this study, the shock to Japan's economy caused by the Chinese consumers' boycott of travel to Japan can be considered an exogenous event, which helps us to identify a causal relationship between the boycott and inbound travel services. For at least five years prior to August 2012, activist landings on the disputed islands occurred without sparking a major political conflict. It seems unlikely that the strong public outrage in China that sparked the consumer boycott could have been anticipated even by the 10 Japanese activists who visited the disputed islands in a "tit-for-tat" response to a visit by Chinese activists in August 2012.

3 Data

3.1 Source

Our main variable of interest, or outcome variable, is the inbound travelers to prefecture i in Japan from foreign country j, which is measured by the number of visitors to prefecture i from country j at time t (year-month). The Japan Tourism Agency, the Government of Japan, provides the main source of the data in the *Overnight Travel Statistics Survey* (*Shukuhaku Ryokou Toukei Chousa* in Japanese).[14] This monthly survey is conducted for accommodation services establishments. The survey covers all establishments that employ 10 or more workers and includes randomly sampled establishments employing fewer than 10 workers. The survey collects information on the establishments' location and the number of foreign visitors, by their country of residence and by their travel purpose, but the published data is aggregated to the prefecture level and has some limitations described below. Note that "foreign" visitors are defined as visitors who reside in countries other than Japan, so foreign national

[13] According to Martina and Yue Jones (2012) and Broadhead (2012).

[14] The same data is used in Ahn et al. (2022) to examine a Korean boycott of travel to Japan.

visitors who reside in Japan are excluded while Japanese national visitors who reside outside of Japan are included if they stay in accommodation establishments while visiting Japan.

While this dataset has several advantages, it also has some limitations. First, some of the information, such as the number of visitors by country of residence, is available only for establishments with 10 or more workers, so small establishments are excluded from our analysis. AirBnB-type vacation rentals are not included if they are small, individually-owned establishments. The survey data also does not include foreign visitors who stay in the homes of their relatives and/or friends.

Second, the country of residence data is available only for 20 major foreign countries as of the year 2023.[15] The number of major countries reported depends upon the period. The data is available for 18 countries before April 2015, for 15 countries before April 2013, and 12 countries before January 2011. The residence data for China, Hong Kong and Taiwan is available from January 2007. We initially consider the period between January 2007 and December 2019 to cover the longest panel possible but exclude the impacts of the COVID-19 pandemic-induced travel restrictions. Third, the purpose of travel is not available by the prefecture visited and country of residence of visitor, so we cannot explore the boycott activities of tourists versus non-tourist travelers using this data.[16] Lastly, the survey data exclude single-day visitors since no accommodation services are involved. These caveats imply that the accommodations survey data do not cover all inbound visitors. As a result, the maximum number of observations is 95,316 (= 47 prefectures $\times$ 13 origin countries (12 consistently reported countries plus a "rest-of-world" aggregate for foreign visitors) $\times$ 156 months). We introduce event study analysis in later sections to further guide our decisions on the lengths of pre- and post-boycott periods to include in our estimations.

While we acknowledge the aforementioned limitations, a final advantage of our main data source is the inclusion of accommodations data for domestic visitors (i.e.,

[15] For convenience, we use the term "countries" to cover both countries and regions/territories (e.g., Hong Kong, Taiwan) that are reported in the data.

[16] Instead, we use visitor survey data in Section 4.3 to explore possible differences in boycott participation between tourists and non-tourist visitors from China.

visitors who reside in Japan), in addition to the data on visitors from foreign countries. For one section of our analysis, Section 6, we include domestic travelers along with inbound travelers, thereby bringing our total number of origin countries to 14.

3.2 Descriptive analysis

We use the data on accommodated-visitor nights to show Japan's reliance on visitors from the top five sources of foreign visitors, plus a rest-of-world (ROW) aggregate, in Figure 4. Panel A shows the overall upward trend in foreign visitors, except during the 2008–2009 global financial crisis and the 2011 earthquake disaster. Visitors from China in particular grow rapidly from about 2014. In Panel B, the shares of the top five source countries combined has held steady at above 60 percent, but the combined share of visitors from China, Hong Kong and Taiwan has grown from just under 35 percent in 2007 to a range of 48 to 52 percent between 2015 and 2019.

While visitors from China, Hong Kong and Taiwan represent a majority of recent foreign visitors to Japan, domestic travelers in Japan still dominate the accommodated-nights data, as shown in Figure 5. Domestic travelers account for a declining share of the total accommodated-nights, with 92.7 percent in 2007 but only 79.8 percent in 2019.

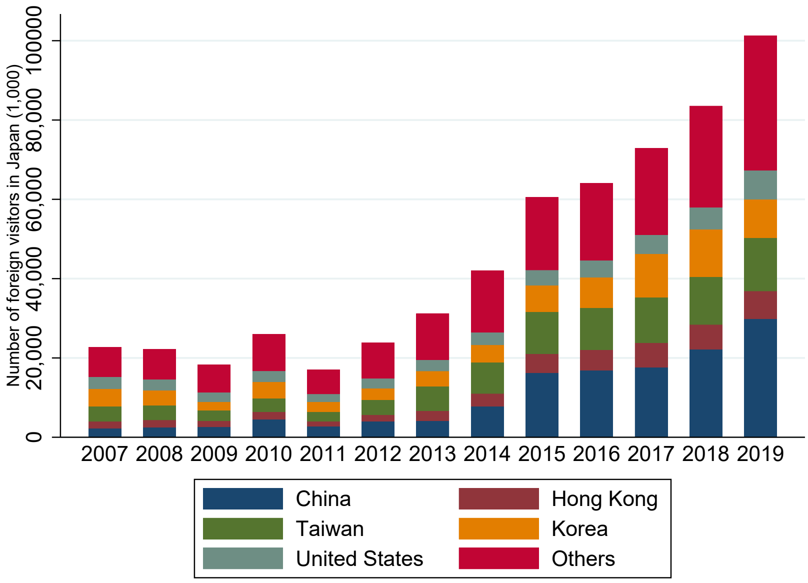
For our focus on the regional impacts of the Chinese consumer boycott of travel to Japan, we use the data on visitors from foreign countries to calculate each prefecture's pre-boycott (i.e., January 2007–July 2012) dependency on visitors from China relative to visitors from all foreign countries.[17] The relationship between this pre-boycott China dependency and the percentage changes in the number of visitors from China for the year before to the year after the boycott (i.e., August 2011–July 2012 to August 2012–July 2013) are shown in Figure 6.[18] This figure indicates a negative correlation ($r = -0.334$), which suggests that Japanese prefectures with high pre-boycott dependency on Chinese visitors are more likely to be impacted by the boycott. Of course, this figure illustrates only a correlation not a causal relationship. In the next section,

[17] Table A1 shows summary statistics for the monthly average share and number of foreign visitors by country and prefecture in the pre-boycott period, ranked from most- to least-China dependent prefecture.

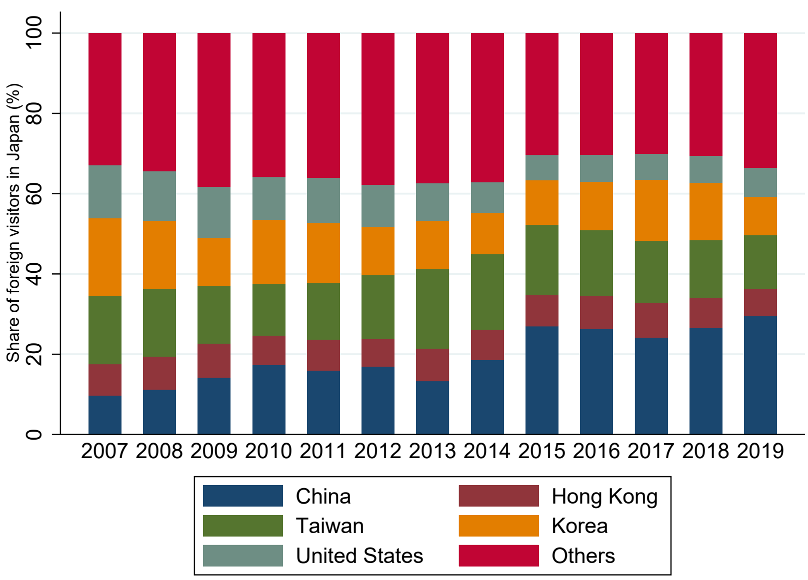
[18] The horizontal axis corresponds to the China visitor dependency values used in Figure 2.

Figure 4: Number and Share of Foreign Visitors, by Country

Panel A. Number of foreign visitors in Japan, by country



Panel B. Share of foreign visitors in Japan, by country

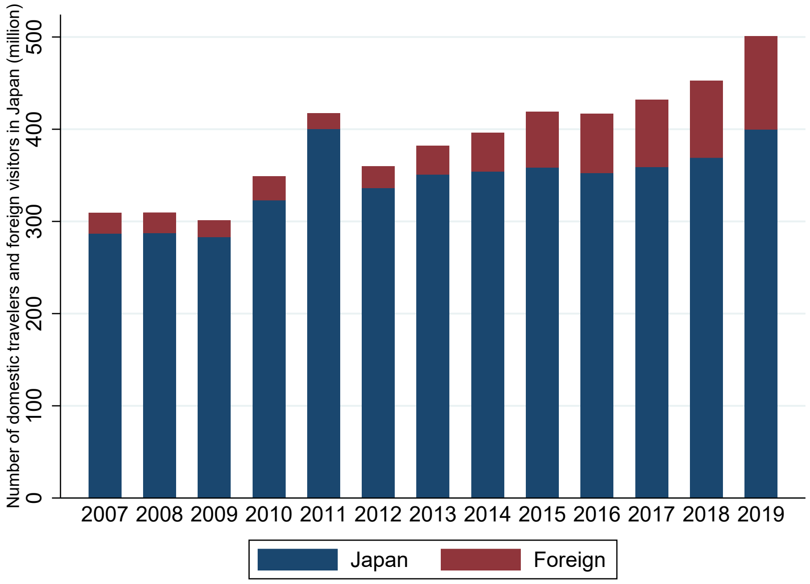


Notes: The number of foreign visitors on Panel A is measured by the total number of people who reside outside of Japan times the number of nights stayed in Japan (unit: 1,000 person-nights). The share of foreign visitors on Panel B is calculated from the number of foreign visitors, by country, on Panel A.

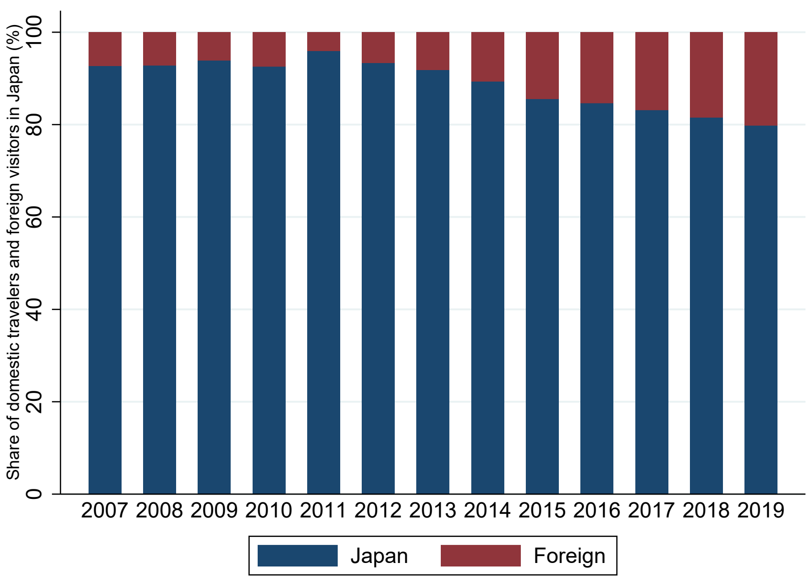
Source: Japan Tourism Agency (2020), *Overnight Travel Statistics Survey*.

Figure 5: Number and Share of Domestic Travelers and Foreign Visitors

Panel A. Number of domestic travelers and foreign visitors in Japan



Panel B. Share of domestic travelers and foreign visitors in Japan

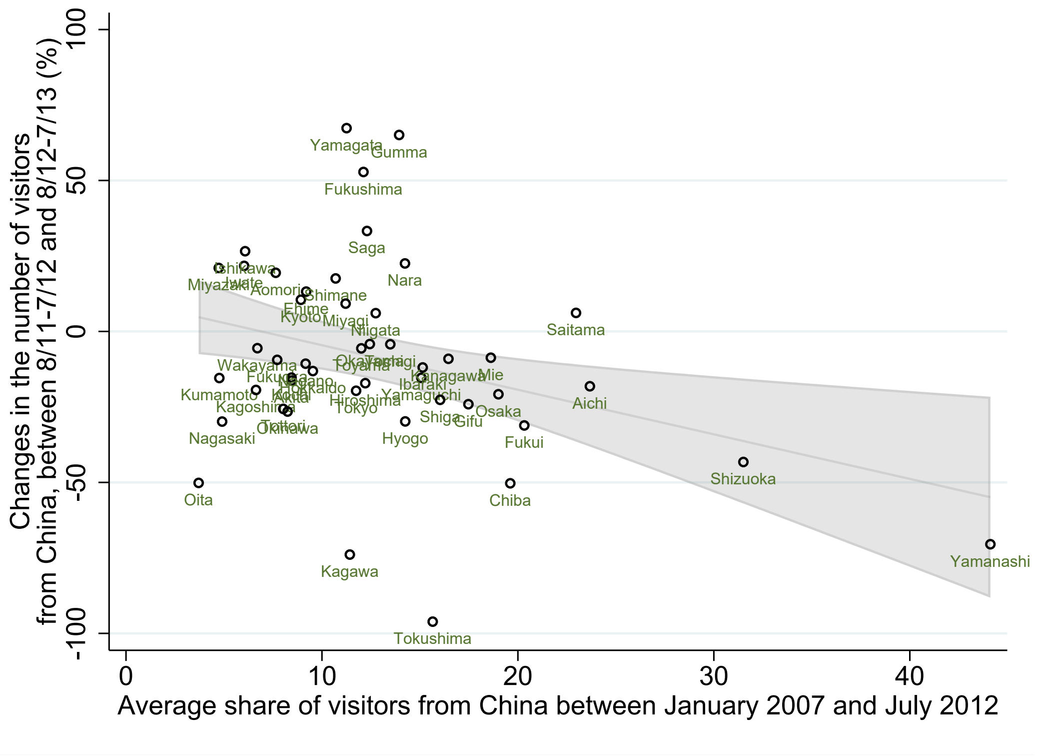


Notes: The number of domestic travelers on Panel A is measured by the total number of people who reside in Japan times the number of nights stayed while the number of foreign visitors on Panel A is measured by the total number of people who reside outside of Japan times the number of nights stayed in Japan (unit: 1,000,000 person-nights). The shares of domestic travelers and foreign visitors on Panel B are calculated from the number of domestic travelers and foreign visitors on Panel A, respectively.

Source: Japan Tourism Agency (2020), *Overnight Travel Statistics Survey*.

we use a more rigorous econometric design to investigate this relationship.

Figure 6: Changes in the Number of Visitors and the Share of Visitors from China



Notes: The vertical axis indicates the log difference in the number of visitors from China between August 2011–July 2012 and August 2012–July 2013, by prefecture. The horizontal axis indicates the share of foreign visitors from China between January 2007 and July 2012. The solid line indicates the fitted values from the linear ordinary least squares estimation and the gray areas indicate the 95 percent confidence interval (CI).

Source: Japan Tourism Agency (2020) *Overnight Travel Statistics Survey*.

4 Disaggregate-level Analysis: Foreign Visitors

4.1 Methodology

We utilize a DDD estimation model (Wooldridge, 2007) to evaluate the impact of the boycott on prefecture-level inbound travelers. The DDD model enables us to estimate a model of inbound travelers from home country j to prefecture i in Japan at time t (i.e., month-year), Y_{ijt}. We hypothesize that a prefecture's inbound travelers from China are more likely to be impacted by the boycott if it has a high pre-boycott dependency on Chinese travelers. In this context, we need a continuous, not a binary, variable to capture regional dependency on visitors from China. Therefore, our treatment group is captured by a continuous variable (i.e., differing levels of exposure to treatment), as in Milone et al. (2023). Each prefecture's number of accommodated foreign visitors is influenced by other factors such as prefecture-specific tourism resources and/or country-specific factors. For example, some prefectures such as Yamanashi attract visitors because they have famous landmarks such as Mount Fuji. In addition, China's close proximity to Japan leads to larger visitor flows from China.[19] We include prefecture- and country-fixed effects to control for such prefecture- and country-specific factors. To control for the seasonality of travel and secular trends, we include time- (i.e., month-year-) fixed effects.

We use Poisson Pseudo Maximum Likelihood (PPML) estimation to avoid the problems with log-linearization detailed in Santos Silva and Tenreyro (2006) and instead adopt a multiplicative treatment effect. We utilize PPML estimation for the following regression equation:

$$\begin{aligned} Y_{ijt} &= \exp[\alpha + \psi_i + \psi_j + \psi_t + \beta_1(s_i \times \text{Post}_t) + \beta_2(s_i \times \text{CHN}_j) \\ &\quad + \beta_3(\text{CHN}_j \times \text{Post}_t) + \gamma(s_i \times \text{CHN}_j \times \text{Post}_t)] \times \varepsilon_{ijt}, \end{aligned} \tag{1}$$

where ψ_i, ψ_j, ψ_t are prefecture-, country-, time- (i.e., month-year-) fixed effects, respectively; s_i is prefecture i's dependency on Chinese travelers that is measured by the average share of visitors from China to total visitors from foreign countries in prefecture i before the boycott (i.e., between a start date determined by event study analysis below and July 2012); CHN_j is an indicator variable taking the value one if home country j is "China" and zero otherwise; Post_t is the post-boycott indicator that takes the value one after the boycott started (i.e., from August 2012); and ε_{ijt} is an error term. We consider three definitions of our "China" indicator variable: 1) China (i.e., PRC); 2) China and Hong Kong; and 3) China, Hong Kong and Taiwan.

[19] For additional examples of differences in the behavior of inbound visitors to Japan based on the visitors' countries of origin see Shapoval et al. (2017).

Note that the inclusion of ψ_i and ψ_j preclude the inclusion of s_i and CHN_j by themselves in our estimation equation (i.e., to avoid collinearity). Our parameter of interest is γ which indicates the differential effect of the boycott on prefectures according to their pre-boycott dependency on visitors from China.[20]

For Y_{ijt}, we focus on inbound travel from country j to Japanese prefecture i in time t (i.e., month-year). We measure inbound travelers Y_{ijt} by the number of visitors (i.e.,accommodated-visitor nights) from country j to prefecture i at time t. The dependent variable is expressed as the actual (not log) value.

A key assumption underlying the DDD model is a common trends assumption: in the absence of treatment (i.e., the boycott in our study), the difference between the control and treatment groups is constant over time. Wing et al. (2018) propose one method of evaluating the common trends assumption is to check group-specific linear trends. This involves a regression of the outcome on the treatment variable, group- and period-fixed effects, and each group effect interacted with a linear time index. For our analysis of the common trends assumption, we use the pre-boycott data and the following regression equation:

$$\begin{aligned} Y_{ijt} &= \exp[\alpha + \psi_i + \psi_j + \psi_t + \eta_1(s_i \times \text{CHN}_j) + \eta_2(s_i \times \text{Trend}_t) \\ &\quad + \eta_3(\text{CHN}_j \times \text{Trend}_t) + \lambda(s_i \times \text{CHN}_j \times \text{Trend}_t)] \times \varepsilon_{ijt}, \end{aligned} \tag{2}$$

where Trend_t is a time trend; and the definitions of the variables are the same as that of equation (1). Similar to equation (1), s_i, CHN_j and Trend_t cannot be included by themselves due to the collinearity with ψ_i, ψ_j and ψ_t. If the pre-boycott trend is common between prefectures as well as between China and other countries, λ will be insignificant.

In addition to testing for group-specific linear trends in the pre-boycott period, we conduct event study analysis as an alternative check for common pre-trends. For an event study analysis at the disaggregate-level, we replace the post-boycott dummy

[20] We propose an explanation of this potential differential effect in Section 4.3.

Post_t in equation (1) with a full set of month-year dummies, denoted as d_t:

$$\begin{aligned} Y_{ijt} &= \exp[\alpha + \psi_i + \psi_j + \psi_t + \sum_t \beta_{1t}(s_i \times d_t) + \beta_2(s_i \times \text{CHN}_j) \\ &\quad + \sum_t \beta_{3t}(\text{CHN}_j \times d_t) + \sum_t \gamma_t(s_i \times \text{CHN}_j \times d_t)] \times \varepsilon_{ijt}, \end{aligned} \tag{3}$$

Event study plots of the coefficients of interest (i.e., γ_t in equation (3)) provide a visual method of checking the common pre-trends assumption without imposing a linearity restriction on potential differences between more- and less-treated prefectures. These plots also provide a visualization of the likely longevity of the boycott effects, which we use to determine the panel lengths used in our DDD estimation in the following section.

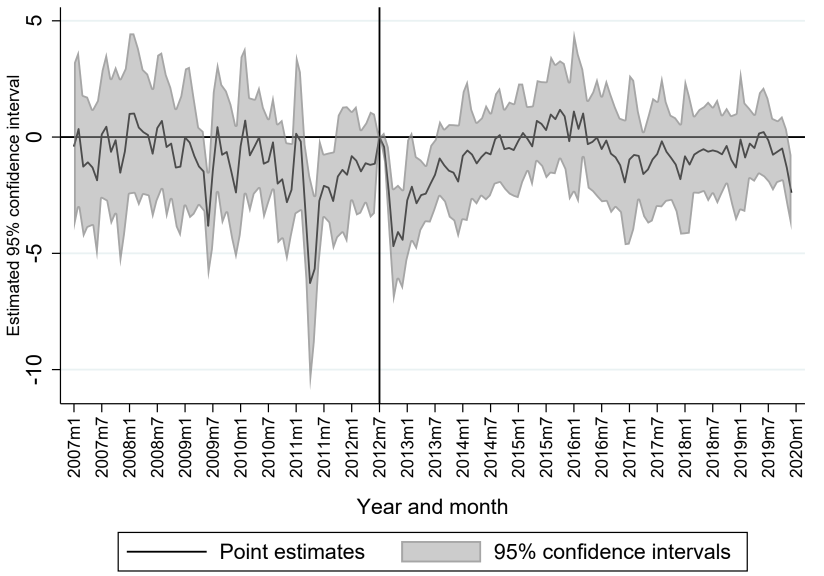
4.2 Estimation results

Our first step is checking the common trends assumption and determining the panel length for our estimations by using event study analysis. Figures 7, 8 and 9 show the 95% confidence interval results for our main variable of interest, γ_t, from equation (3) using indicators for China, China and Hong Kong (ChinaHK) and China, Hong Kong and Taiwan (ChinaHKT), respectively. Figures 7 and 8 show for China and ChinaHK visitors that the common trends assumption is mostly met for all pre-boycott periods except for short periods following the Great East Japan Earthquake in March, 2011.[21] Figure 9 shows more periods pre-boycott in which the common trends assumption is violated using the ChinaHKT indicator. We confirm below that the common pre-trends assumption is violated only for the ChinaHKT indicator, so we do not use DDD estimation with this indicator.

Focusing on the post-boycott periods in Figures 7 and 8, we see negative deviations in our DDD coefficient from the baseline month just prior to the boycott's initiation in August, 2012, and lasting for at most about two years. Based on this evidence, we

[21] Due to the large travel disruptions on the Tohoku region caused by the Great East Japan Earthquake, we conduct robustness checks by excluding six Tohoku region prefectures from our sample. Those results are presented in Appendix B.

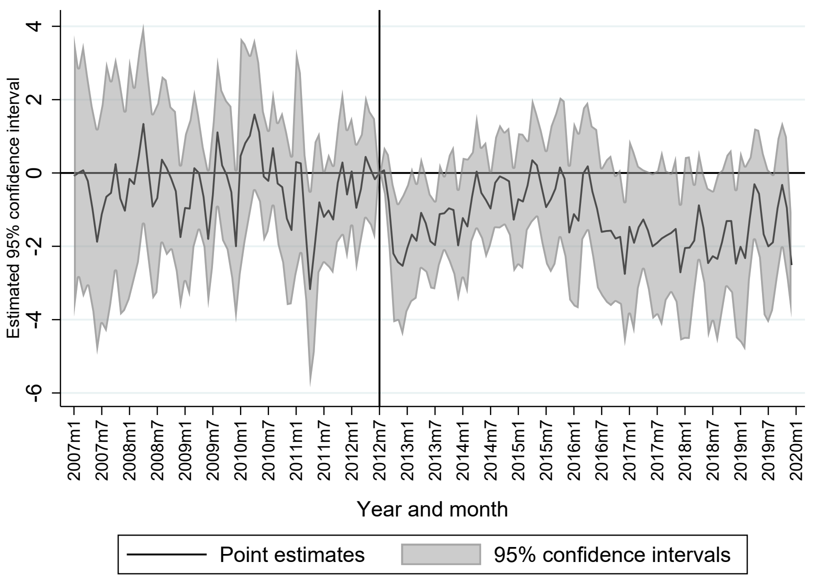
Figure 7: Estimated 95% Confidence Intervals for Disaggregate-level Analysis: China



Notes: This figure displays the 95 percent confidence interval (CI) for the estimated difference-in-difference-in-differences (DDD) coefficients for interactions of month-year dummies with prefecture i's dependency on exports to China. The baseline level is set in July 2012.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

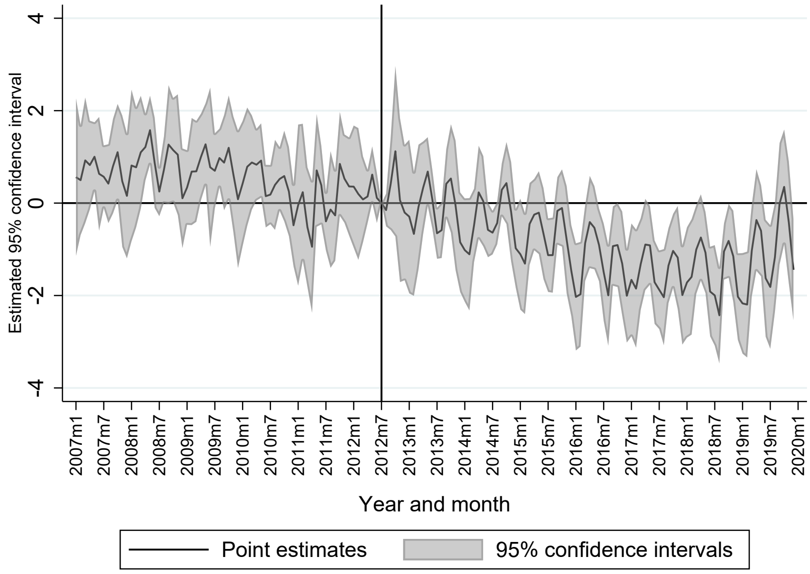
Figure 8: Estimated 95% Confidence Intervals for Disaggregate-level Analysis: China & Hong Kong



Notes: This figure displays the 95 percent confidence interval (CI) for the estimated difference-in-difference-in-differences (DDD) coefficients for interactions of month-year dummies with prefecture i's dependency on exports to ChinaHK. The baseline level is set in July 2012.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

Figure 9: Estimated 95% Confidence Intervals for Disaggregate-level Analyses: China, Hong Kong & Taiwan



Notes: This figure displays the 95 percent confidence interval (CI) for the estimated difference-in-difference-in-differences (DDD) coefficients for interactions of month-year dummies with prefecture i's dependency on exports to ChinaHKT. The baseline level is set in July 2012.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

test for boycott effects up to three years post-boycott, using six-month increments. We also match this maximum post-boycott panel length of three years by limiting our pre-boycott sample to three years. For all subsequent estimations, our maximum panel length extends from July, 2009 to July, 2015.[22]

Next, we formally test the common trends assumption using equation (2) and the pre-boycott data (i.e., July, 2009 to July, 2012), with results reported in Table 1. Columns (1), (2) and (3) show results for our three China indicators (i.e., China, ChinaHK and ChinaHKT), respectively. The table indicates that the estimated coefficients are insignificant for the estimations using China and ChinaHK indicators in columns (1) and (2), respectively, while it is significant for the estimation using the ChinaHKT indicator in column (3). These results support the validity of the common trends assumption for only the China and ChinaHK estimations.

We examine the longevity of the boycott effects using six-month increments for

[22]In Appendix B, we conduct robustness checks by defining s_i using data only from 2007 to 2009, then starting the regression analysis from 2010.

Table 1: Disaggregate-level Analysis: Common Trends Assumption

	(1)	(2)	(3)
$s_i \times \text{CHN}_j \times \text{Trend}_t$	-0.026	-0.016	-0.018*
	[0.028]	[0.024]	[0.010]
CHN and s_i include:			
China	Yes	Yes	Yes
Hong Kong	No	Yes	Yes
Taiwan	No	No	Yes
$s_i \times \text{CHN}_j$	Yes	Yes	Yes
$s_i \times \text{Trend}_t$	Yes	Yes	Yes
$\text{CHN}_j \times \text{Trend}_t$	Yes	Yes	Yes
N	22,607	22,607	22,607
R^2	0.8882	0.8886	0.8980

Notes: Figures in brackets indicate standard errors clustered by prefecture. Prefecture, country and time fixed effects included in each regression. * indicates the significance level at 10 percent.
Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

our post-boycott sample. In Table 2 we present results for equation (1) for truncated samples of our dataset. Columns (1)–(6) present results that include observations extending from six months to three years post-boycott, with each column adding six additional months of post-boycott observations. We present results for China visitors in Panel A and for China and Hong Kong visitors in Panel B of Table 2. The DDD coefficient of interest ($s_i \times \text{CHN}_j \times \text{Post}_t$) is negative and significant for each six-month increment up to 1.5 years post-boycott for visitors from China and it is negative and significant for each six-month increment up to 2.5 years for visitors from China and Hong Kong.

The interpretation of the results in Table 2 requires us to interpret both the ($\text{CHN}_j \times \text{Post}_t$) and ($s_i \times \text{CHN}_j \times \text{Post}_t$) coefficients together. These estimated coefficients can be used along with the distribution of prefectures' pre-boycott dependency on visitors from China to estimate the economic magnitude of the boycott effects as a back-of-the-envelope calculation.[23] Tables 3 and 4 present the distributions of s_i and the estimated economic magnitudes of the boycott's effects for visitors from China and from China-Hong Kong, respectively, for different post-boycott periods of time. Table 3 presents

[23]Harrison and McMillan (2011) and Kambayashi and Kiyota (2015) use a similar strategy to examine the effects of offshoring, and Ahn et. al. (2022) use a similar strategy to estimate the impacts of a consumer boycott.

Table 2: Disaggregate-level Analysis: Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)
Post-boycott period:	0.5 year	1 year	1.5 years	2 years	2.5 years	3 years
Panel A: China						
$s_i \times \text{Post}_t$	-0.831*	-0.742	-0.894	-0.829	-0.983	-1.068
	[0.481]	[0.600]	[0.617]	[0.677]	[0.720]	[0.765]
$\text{CHN}_j \times \text{Post}_t$	-0.107	-0.119	-0.066	-0.037	0.025	0.151
	[0.090]	[0.086]	[0.071]	[0.072]	[0.078]	[0.104]
$s_i \times \text{CHN}_j \times \text{Post}_t$	-1.148**	-1.148**	-0.820*	-0.352	-0.052	0.443
	[0.536]	[0.522]	[0.455]	[0.476]	[0.525]	[0.719]
CHN and s_i include:						
China	Yes	Yes	Yes	Yes	Yes	Yes
Hong Kong	No	No	No	No	No	No
Taiwan	No	No	No	No	No	No
$s_i \times \text{CHN}_j$	Yes	Yes	Yes	Yes	Yes	Yes
N	26,273	29,939	33,605	37,271	40,937	44,603
R^2	0.8863	0.8846	0.8844	0.8851	0.8865	0.8886
Panel B: China & Hong Kong						
$s_i \times \text{Post}_t$	-0.248	0.221	0.430	0.552	0.581	0.613
	[0.459]	[0.584]	[0.653]	[0.680]	[0.703]	[0.727]
$\text{CHN}_j \times \text{Post}_t$	-0.035	0.072	0.135	0.150	0.192**	0.308**
	[0.114]	[0.108]	[0.103]	[0.097]	[0.097]	[0.121]
$s_i \times \text{CHN}_j \times \text{Post}_t$	-1.062**	-1.251***	-1.175***	-0.943**	-0.779*	-0.579
	[0.459]	[0.463]	[0.431]	[0.420]	[0.434]	[0.552]
CHN and s_i include:						
China	Yes	Yes	Yes	Yes	Yes	Yes
Hong Kong	Yes	Yes	Yes	Yes	Yes	Yes
Taiwan	No	No	No	No	No	No
$s_i \times \text{CHN}_j$	Yes	Yes	Yes	Yes	Yes	Yes
N	26,273	29,939	33,605	37,271	40,937	44,603
R^2	0.8870	0.8847	0.8843	0.8849	0.8861	0.8873

Notes: Figures in brackets indicate standard errors clustered by prefecture. Prefecture, country and time fixed effects included in each regression. ***, ** and * indicate the significance level at 1, 5 and 10 percent, respectively.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

the boycott results for visitors from China for post-boycott periods of 0.5, 1 and 1.5 years, which correspond with the estimation results presented in Panel A of Table 2. The average and median of s_i for China are 14.6 percent and 13.3 percent, respectively, while the first and third quartiles are 9.6 percent and 17.0 percent, respectively. The results for each post-boycott period illustrate the heterogeneous effects of the boycott. The impact over the first six months of the boycott is approximately -11.0 percent $(= -1.148 \times 9.6\%)$ for the 25th percentile prefecture while it is roughly -19.5 percent $(= -1.148 \times 17.0\%)$ for the 75th percentile prefecture, as shown in column (3) of the top panel of Table 3. Due to the large estimated changes in log values, these relative magnitude effects can be considered rough estimates of the growth rates of -10.4 percent and -17.7 percent, respectively.

Note that these results are based on the comparison of accommodated visitors from China between prefectures. In order to calculate the effect on accommodated visitors from China relative to other countries, we need to tally the total magnitude using the coefficients of ($\text{CHN}_j \times \text{Post}_t$) and ($s_i \times \text{CHN}_j \times \text{Post}_t$), as shown in columns (4) and (5) of Table 3.[24] A 25th percentile prefecture for pre-boycott dependency on visitors from China suffers a loss of 19.5 percent of its accommodated nights exports to China over the boycott's first six months while a 75th percentile prefecture suffers a loss of 26.0 percent. Each post-boycott period's panel in Table 3 illustrates the heterogeneous impacts of the boycott with gaps between the 75th and 25th percentile prefectures of -5.1 to -6.5 percentage points for visitors from China.[25]

The heterogeneity across prefectures in terms of boycott effects is even wider in the results for visitors from China and Hong Kong in Table 4. This table uses the coefficients of ($\text{CHN}_j \times \text{Post}_t$) and ($s_i \times \text{CHN}_j \times \text{Post}_t$) from Panel B of Table 2, where the DDD coefficient is significant for up to 2.5 years post-boycott. The boycott effect gaps between the 75th and 25th percentile prefectures range from -9.0 to -11.9 percentage

[24] The values in column (4) can be interpreted as percentage point differences in average growth rates between the treated and control groups, while the values in column (5) are estimated average treatment effects on the treated in growth rate terms.

[25] In Appendix C we support the implicit assumption used in Tables 3 and 4 that our DDD coefficient is statistically significant across the distribution of s_i.

Table 3: Impact of the Boycott on Prefectures' Exports to China

Percentile	(1) Coefficient	(2) s_i	(3) (= (1) × (2)) Relative magnitude (log change)	(4) (= (3) + CHN Coeff.) Total magnitude (log change)	(5) Total magnitude converted (growth rate)
Post-boycott period: 0.5 year					
Mean	-1.148	0.146	-0.167	-0.274	-0.240
25%	-1.148	0.096	-0.110	-0.217	-0.195
50%	-1.148	0.133	-0.153	-0.260	-0.229
75%	-1.148	0.170	-0.195	-0.302	-0.260
75-25% gap					-0.065
Post-boycott period: 1 year					
Mean	-1.148	0.146	-0.167	-0.286	-0.249
25%	-1.148	0.096	-0.110	-0.229	-0.205
50%	-1.148	0.133	-0.153	-0.272	-0.238
75%	-1.148	0.170	-0.195	-0.314	-0.269
75-25% gap					-0.064
Post-boycott period: 1.5 years					
Mean	-0.820	0.146	-0.120	-0.186	-0.169
25%	-0.820	0.096	-0.079	-0.145	-0.135
50%	-0.820	0.133	-0.109	-0.175	-0.161
75%	-0.820	0.170	-0.139	-0.205	-0.185
75-25% gap					-0.051

Notes: Exports to China mean the exports of accommodation services to China that are defined as the number of visitors from China (the total number of visitors who reside in China × the number of nights stayed in Japan). Percentile indicates the quartiles of s_i. Coefficients are obtained from Table 2 and CHN Coeff. means ($CHN_j \times Post_t$) coefficient from the corresponding sample period. Growth rate = exp(log change) $-$ 1.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

Table 4: Impact of the Boycott on Prefectures' Exports to China & Hong Kong

Percentile	(1) Coefficient	(2) s_i	(3) (= (1) × (2)) Relative magnitude (log change)	(4) (= (3) + CHN Coeff.) Total magnitude (log change)	(5) Total magnitude converted (growth rate)
Post-boycott period: 0.5 year					
Mean	-1.062	0.208	-0.221	-0.256	-0.226
25%	-1.062	0.139	-0.148	-0.183	-0.167
50%	-1.062	0.194	-0.206	-0.241	-0.214
75%	-1.062	0.250	-0.266	-0.301	-0.260
75-25% gap					-0.093
Post-boycott period: 1 year					
Mean	-1.251	0.208	-0.261	-0.189	-0.172
25%	-1.251	0.139	-0.174	-0.102	-0.097
50%	-1.251	0.194	-0.243	-0.171	-0.157
75%	-1.251	0.250	-0.313	-0.241	-0.214
75-25% gap					-0.117
Post-boycott period: 1.5 years					
Mean	-1.175	0.208	-0.245	-0.110	-0.104
25%	-1.175	0.139	-0.164	-0.029	-0.028
50%	-1.175	0.194	-0.228	-0.093	-0.089
75%	-1.175	0.250	-0.294	-0.159	-0.147
75-25% gap					-0.119
Post-boycott period: 2 years					
Mean	-0.943	0.208	-0.196	-0.046	-0.045
25%	-0.943	0.139	-0.131	0.019	0.019
50%	-0.943	0.194	-0.183	-0.033	-0.032
75%	-0.943	0.250	-0.236	-0.086	-0.083
75-25% gap					-0.101
Post-boycott period: 2.5 years					
Mean	-0.779	0.208	-0.162	0.030	0.030
25%	-0.779	0.139	-0.109	0.083	0.087
50%	-0.779	0.194	-0.151	0.041	0.042
75%	-0.779	0.250	-0.195	-0.003	-0.003
75-25% gap					-0.090

Notes: Exports to ChinaHK mean the exports of accommodation services to ChinaHK that are defined as the number of visitors from ChinaHK (the total number of visitors who reside in ChinaHK × the number of nights stayed in Japan). Percentile indicates the quartiles of s_i. Coefficients are obtained from Table 2 and CHN Coeff. means ($\text{CHN}_j \times \text{Post}_t$) coefficient from the corresponding sample period. Growth rate = exp(log change) − 1.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

points for visitors from China and Hong Kong. Table 4 also demonstrates a clear pattern of dissipating boycott effects over time. The negative estimated boycott effects for the mean prefecture for pre-boycott dependency on ChinaHK visitors shrink from -22.6 percent over the first 0.5 year from the boycott's start, to -17.2 percent over a 1 year period, to -10.4 percent over 1.5 years, and to -4.5 over 2 years. The negative effects are no longer apparent for the average prefecture for pre-boycott dependency on visitors from ChinaHK when measured across 2.5 years post-boycott.

Overall, the results in Tables 3 and 4 confirm that the negative impacts of the boycott are strongest over the first 0.5 to 1 year period post-boycott, but the negative effects are still significant even when averaged across 1.5 years post-boycott for China visitors and 2 years post-boycott for ChinaHK visitors. In addition, our results clearly indicate that prefectures with higher pre-boycott dependency on visitors from China or ChinaHK face larger declines in their quantities of accommodation services provided to visitors from China or ChinaHK. In Section 4.3, we seek to explain this disproportionate boycott effect by using alternate datasets that allow us to estimate tourists versus non-tourist travelers from China.

4.3 Tourists versus non-tourist visitors

In order to explain our disaggregate-level results in the previous section, we need to consider the heterogeneity among Chinese visitors in terms of their propensities to participate in the boycott of travel to Japan. If Chinese travelers are homogeneous in terms of their likelihood of joining the boycott and 30 percent choose to boycott, then we would expect to see every Japanese prefecture lose 30 percent of their visitors from China due to the boycott (i.e., a negative and significant coefficient for ($\text{CHN}_j \times \text{Post}_t$) but not for ($s_i \times \text{CHN}_j \times \text{Post}_t$)). Instead we find *disproportionate* effects in which prefectures that are more dependent on Chinese visitors pre-boycott suffer higher losses on a *percentage basis* than prefectures that are less dependent on Chinese visitors.

To explain the regional disparity in boycott effects, we propose two related hypotheses and provide supporting descriptive evidence for each one. First, we propose that tourists (i.e., leisure travelers) are more likely to participate in the consumer boycott than other types of travelers (e.g., those traveling on business, for schooling or to visit relatives and/or friends).[26] Second, we propose that tourists favor certain destinations in Japan over others. If the same prefectures that have high pre-boycott dependency on Chinese visitors also tend to attract many Chinese tourists rather than non-tourist Chinese visitors, then we have a means of explaining our result of disproportionate bilateral boycott effects based on China dependency.

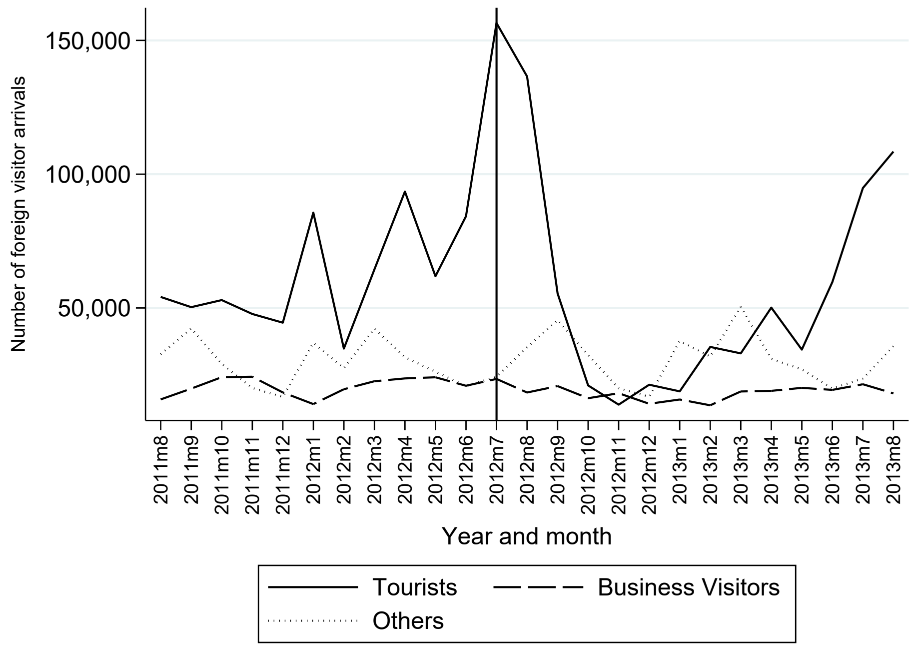
First, to find support for our hypothesis that tourists are more likely to participate in the consumer boycott, we use data on monthly visitor arrivals by country and by purpose, collected by the JNTO. This data is only available at the national level, but allows us to separate visitors into tourists, business visitors and others. Figure 10 presents the monthly arrivals data from one year before to one year after the boycott (i.e., from August 2011 to August 2013) and clearly supports our hypothesis that tourists are the most likely boycott participants. The decline in visitors after August 2012 is strongest for tourists, followed by other visitors, while business visitors show little impact of the boycott. The year-on-year declines in monthly Chinese *tourist* arrivals for October, November and December 2012 are −60.3, −71.0 and −52.1 percent, respectively, while the year-on-year declines in *all visitors* arrivals from China are −34.3, −43.6 and −34.3 percent for those same months, based on the JNTO arrivals data.[27]

Second, to look for support for our hypothesis that Chinese tourists differ in their regional destinations compared with Chinese non-tourist visitors, we need to use regional data on visitors' purpose of travel, which is collected by the Japan Tourism Agency's (2011, 2012) *Consumption Trend Survey for Foreigners Visiting Japan (Hounichi Gaikokujin Shouhi Doukou Chousa* in Japanese). This quarterly survey provides data on inbound visitors who are surveyed at their port of entry or departure. We use this data

[26] Kuo and Lin (2024) find evidence that South Korean tourists were more likely than South Korean business travelers to participate in a boycott of travel to Japan from July, 2019. That analysis was at the country-level for foreign visitors, while this paper uses prefectural-level data.

[27] Kim et al. (2016) and Cheng et al. (2017) use the year-on-year declines in all visitor arrivals from China to roughly estimate boycott effects of −40 percent.

Figure 10: Visitor Arrivals from China, by Purpose



Notes: Monthly visitors are measured by visitor arrivals in Japan.
Source: Japan National Tourism Organization (2024) data downloaded February 3, 2024.

to create a "Chinese tourist dependency" measure to see to what extent each prefecture depends on Chinese tourists relative to all Chinese visitors in the pre-boycott period, and then we compare this measure to our previously defined "China dependency" based on the pre-boycott accommodated-visitor nights data.[28]

We present the comparison of China dependency and Chinese tourist dependency in Table 5. The correlation is positive at 0.2819. We suspect that the correlation statistic may underestimate the positive correlation due to the relatively small sample size of the survey at the prefectural level and the impact of the Great East Japan Earthquake of March 2011 on tourist travelers in particular. The *Consumption Trend Survey for Foreigners Visiting Japan* provides data only from 2011Q2, but we drop the 2011Q2 data because visitors to Japan were severely impacted by the earthquake disaster. Instead,

[28]We use the regional survey data which provides the purpose of travel by nationality and by prefecture visited. The national survey reports some data by nationality and by country of residence and indicates for 2012 that almost all surveyed visitors to Japan who reside in mainland China are Chinese nationals (i.e., 97.3 percent). This high correspondence between country of residence and nationality for visitors from China allows us directly to compare the visitor-night data (based on country of residence) and visitor survey data (based on nationality).

we use data from 2011Q3 to 2012Q2 to calculate Chinese tourist dependency based on one year prior to the Chinese boycott in 2012Q3. With only four quarters of data, the numbers of surveyed Chinese visitors for some prefectures are quite low, including 12 prefectures with less than 10 Chinese visitors surveyed and eight prefectures with zero Chinese tourists surveyed.

Overall, we find descriptive evidence to support our hypothesis that tourists are the most likely participants in the boycott of travel to Japan and some evidence that demonstrates a positive relationship between prefectures' visitor dependency and tourist dependency from China. Prefectures with high dependency on visitors from China also tend to have high dependency on tourist visitors from China and tourists played a dominant role in the consumer boycott. This evidence helps to explain the disproportionate boycott effect found in Section 4.2.

As further confirmation of the importance of boycotting tourists for our results, we conduct a robustness check in Appendix B where we exclude the four most popular tourist destination prefectures for Chinese visitors (i.e., Tokyo, Chiba, Osaka and Kyoto) from the sample and repeat our analysis using a 0.5 year post-boycott interval. Compared with our benchmark results in Tables 3 and 4, we find smaller estimated impacts of the boycott when we exclude these top four Chinese tourist destination prefectures from the analysis. This provides further evidence of the important role of Chinese and Hong Kong tourists in the boycott. Additional robustness checks in Appendix B produce boycott impacts that are either very similar to our benchmark results (i.e., results after excluding earthquake-impacted, Tohoku-region prefectures) or are slightly stronger than our benchmark results (i.e., results using alternative samples for treatment variable and analysis). Our robustness checks overall support the validity of our benchmark results.

Table 5: China Dependency and Chinese Tourist Dependency

Prefecture	(1) China dependency	(2) All Chinese visitors surveyed	(3) Chinese tourists surveyed	(4) Chinese tourist dependency (=(3)/(2))
Total		11,132	7,115	0.6391
Yamanashi	0.4359	642	522	0.8131
Shizuoka	0.3540	276	172	0.6232
Aichi	0.2879	963	641	0.6656
Fukui	0.2413	9	0	0.0000
Chiba	0.2354	638	468	0.7335
Saitama	0.2267	75	6	0.0800
Osaka	0.2186	2,056	1,453	0.7067
Mie	0.2166	43	14	0.3256
Kanagawa	0.1823	932	652	0.6996
Gifu	0.1790	54	9	0.1667
Tokushima	0.1785	10	4	0.4000
Shiga	0.1696	12	3	0.2500
Nara	0.1675	99	50	0.5051
Hyogo	0.1596	254	136	0.5354
Tochigi	0.1531	55	5	0.0909
Ibaraki	0.1521	49	4	0.0816
Kagawa	0.1516	7	2	0.2857
Toyama	0.1494	14	7	0.5000
Niigata	0.1482	25	1	0.0400
Tokyo	0.1381	2,723	1,623	0.5960
Miyagi	0.1375	25	1	0.0400
Okayama	0.1361	17	4	0.2353
Gumma	0.1348	26	8	0.3077
Yamaguchi	0.1330	9	1	0.1111
Fukushima	0.1324	7	0	0.0000
Hiroshima	0.1321	76	5	0.0658
Hokkaido	0.1306	371	286	0.7709
Saga	0.1225	7	0	0.0000
Yamagata	0.1206	4	0	0.0000
Akita	0.1164	13	1	0.0769
Shimane	0.1132	6	0	0.0000
Okinawa	0.1104	138	119	0.8623
Nagano	0.1045	44	8	0.1818
Ehime	0.1020	4	1	0.2500
Kyoto	0.1008	1,020	762	0.7471
Aomori	0.0962	11	0	0.0000
Fukuoka	0.0910	210	53	0.2524
Kochi	0.0860	0	0	NA
Tottori	0.0796	5	0	0.0000
Kagoshima	0.0785	19	13	0.6842
Ishikawa	0.0778	19	8	0.4211
Iwate	0.0730	6	2	0.3333
Wakayama	0.0712	42	21	0.5000
Kumamoto	0.0679	49	22	0.4490
Nagasaki	0.0637	23	5	0.2174
Miyazaki	0.0529	6	2	0.3333
Oita	0.0429	39	21	0.5385
Correlation				0.2819

Notes: China dependency in column (1) defined as the share of foreign visitors from China between July, 2009 and July, 2012 using visitor-night accommodations data. Columns (2)–(4) use survey data collected from foreign visitors to Japan at ports of entry or departure for 2011Q3 to 2012Q2. Chinese tourist dependency defined as number of surveyed Chinese tourists divided by total number of surveyed Chinese visitors to Japan. NA is Not Available. Correlation indicates the correlation between columns (1) and (4).

Source: Authors' estimation, based on *Overnight Travel Statistics Survey* (column (1)) and *Consumption Trend Survey for Foreigners Visiting Japan* (columns (2)–(4)).

5 Aggregate-level Analysis: Foreign Visitors

5.1 Methodology

The previous section found that prefectures on average lost 24.0 percent of their visitors from China and 22.6 percent of their visitors from China-Hong Kong over a six-month period due to the consumer boycott. These results from the prefecture-country-level specification tell us the boycott effect in a "relative" sense: relative to travelers from all other foreign countries. Thus it is unclear whether a given prefecture suffered a "net" negative effect from the boycott since it is possible that travelers from other countries filled in the gap induced by a reduction in travel from China. To address the prefecture-level net effect from the boycott, we need an aggregate prefecture-level analysis of foreign visitors. In this section, we ask the following question: do prefectures with higher pre-boycott dependency on China experience larger declines in total number of travelers from foreign countries as a result of the consumer boycott? Noting that our main outcome variable is the number of travelers to prefecture i in Japan from foreign country j at time t, Y_{ijt}, we can compute each prefecture's total number of foreign travelers: $Y_{it} = \sum_j Y_{ijt}$.

The regression equation is based on a standard DID design as follows:

$$Y_{it} = \exp[\alpha + \psi_i + \psi_t + \lambda(s_i \times \text{Post}_t)] \times \varepsilon_{it}, \tag{4}$$

where the definitions of variables are the same as those defined in Section 4.1. The s_i term captures a type of "exposure to treatment", with the consumer boycott as the "treatment" in this standard DID design. The parameter of interest, λ, captures the differential effect of pre-boycott dependency on China across prefectures. In equation (4), s_i cannot be included by itself because of its collinearity with ψ_i.

The aggregate-level regression to evaluate the common trends assumption in terms of group-specific linear trends is as follows:

$$Y_{it} = \exp[\alpha + \psi_i + \psi_t + \zeta(s_i \times \text{Trend}_t)] \times \varepsilon_{it}, \tag{5}$$

where Trend_t is a time trend; and the other variables are the same as above. The sample for equation (5) is before August 2012 when the boycott started. If the trend is common between prefecture, ζ will be insignificant.

To support our test for common pre-trends and visualize the likely longevity of the boycott effects for the aggregate-level analysis, we again present event study plots. We replace the post-boycott dummy Post_t in equation (4) with a full set of month-year dummies (d_t):

$$Y_{it} = \exp[\alpha + \psi_i + \psi_t + \sum_t \lambda_t(s_i \times d_t)] \times \varepsilon_{it}, \tag{6}$$

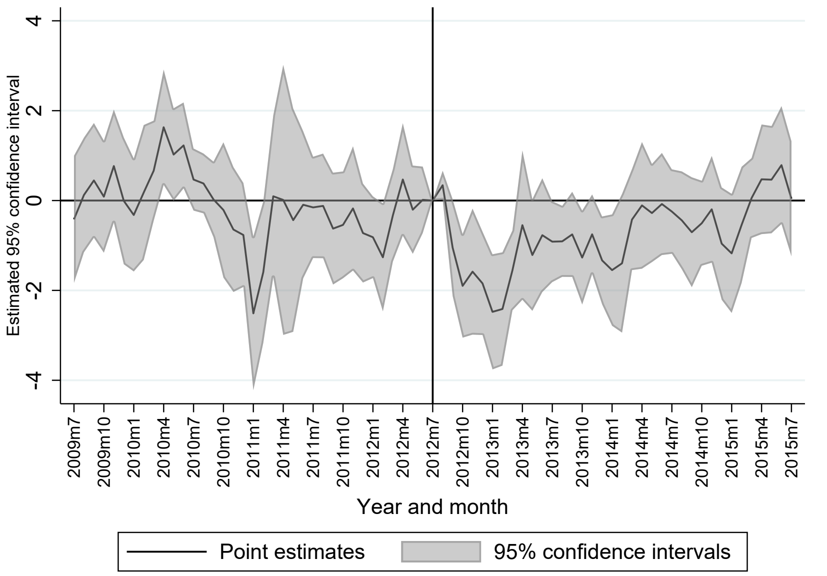
5.2 Estimation results

We first use event study plots to check the common trends assumption and visualize the likely longevity of the boycott effects. Figures 11, 12 and 13 show the 95% confidence interval results for our main variable of interest, λ_t, from equation (6) using treatment effect indicators for visitors from China, ChinaHK and ChinaHKT, respectively. The figures reflect our shortened panel length extending from July 2009 to July 2015. We find that the common trends assumption mostly holds for the aggregate-level analyses for the pre-boycott period for all three definitions of "China" visitors. In addition, Figure 11 illustrates the negative impacts of the boycott on the accommodated nights of all visitors from outside Japan may have lasted up to two years using treatment effects based on pre-boycott dependency on visitors from China alone, while Figures 12 and 13 indicate boycott effects that were shorter using treatment effects based on pre-boycott dependency on visitors from ChinaHK and ChinaHKT.

The event study plots suggest the satisfaction of the common pre-trends assumption for all three China indicators at the aggregate level of analysis, but we also confirm that there are no significant group-specific linear trends by using equation (5). In Table 6, the ($s_i \times \text{Trend}_t$) coefficient is insignificant in all three panels in the common trends column, thereby supporting the validity of the common trends assumption for all three China indicators.

The DID results for equation (4) using six-month increments to detect the longevity

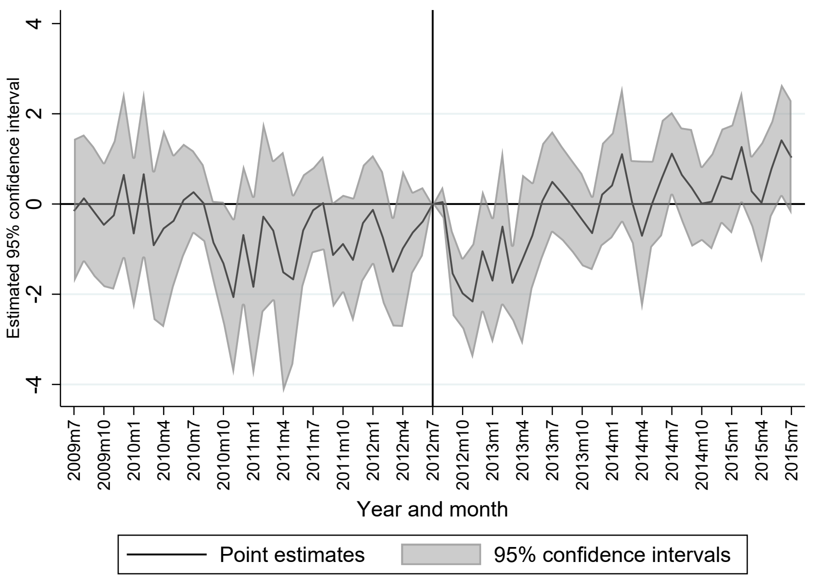
Figure 11: Estimated 95% Confidence Intervals for Aggregate-level Analysis: China



Notes: This figure displays the 95 percent confidence interval (CI) for the estimated difference-in-differences (DID) coefficients for interactions of month-year dummies with prefecture i's dependency on exports to China. The baseline level is set in July 2012.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

Figure 12: Estimated 95% Confidence Intervals for Aggregate-level Analysis: China & Hong Kong



Notes: This figure displays the 95 percent confidence interval (CI) for the estimated difference-in-differences (DID) coefficients for interactions of month-year dummies with prefecture i's dependency on exports to ChinaHK. The baseline level is set in July 2012.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

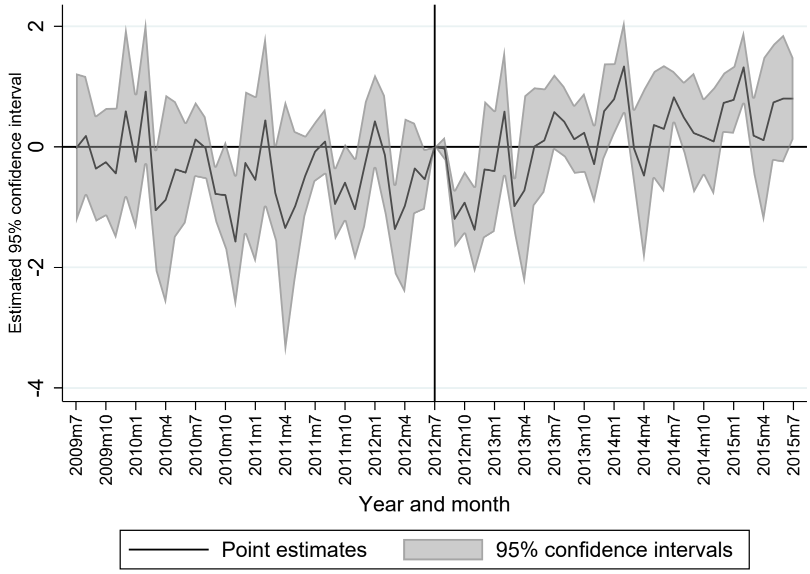
Table 6: Aggregate-level Analysis of Foreign Visitors: Common Trends Assumption & Regression Results

	C.Trends	(1)	(2)	(3)	(4)	(5)	(6)
Post-boycott period:		0.5 yr.	1 yr.	1.5 yr.	2 yr.	2.5 yr.	3 yr.
Panel A: China							
$s_i \times \text{Trend}_t$	-0.026						
	[0.017]						
$s_i \times \text{Post}_t$		-1.312***	-1.197***	-1.146**	-0.871*	-0.804	-0.500
		[0.362]	[0.438]	[0.452]	[0.499]	[0.529]	[0.553]
s_i includes:							
China	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hong Kong	No	No	No	No	No	No	No
Taiwan	No	No	No	No	No	No	No
N	1,739	2,021	2,303	2,585	2,867	3,149	3,431
R^2	0.9807	0.9811	0.9798	0.9802	0.9797	0.9805	0.9806
Panel B: China & Hong Kong							
$s_i \times \text{Trend}_t$	-0.018						
	[0.021]						
$s_i \times \text{Post}_t$		-0.850**	-0.369	-0.041	0.258	0.420	0.655
		[0.403]	[0.529]	[0.576]	[0.598]	[0.610]	[0.617]
s_i includes:							
China	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hong Kong	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Taiwan	No	No	No	No	No	No	No
N	1,739	2,021	2,303	2,585	2,867	3,149	3,431
R^2	0.9807	0.9809	0.9794	0.9796	0.9794	0.9803	0.9808
Panel C: China, Hong Kong & Taiwan							
$s_i \times \text{Trend}_t$	-0.011						
	[0.014]						
$s_i \times \text{Post}_t$		-0.327	0.046	0.287	0.432	0.520	0.652*
		[0.247]	[0.316]	[0.337]	[0.357]	[0.365]	[0.386]
s_i includes:							
China	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hong Kong	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Taiwan	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,739	2,021	2,303	2,585	2,867	3,149	3,431
R^2	0.9807	0.9808	0.9793	0.9798	0.9797	0.9807	0.9812

Notes: Figures in brackets indicate standard errors clustered by prefecture. Prefecture and time fixed effects included in each regression. ***, ** and * indicate the significance level at 1, 5 and 10 percent, respectively. "C.Trends" = common trends.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

Figure 13: Estimated 95% Confidence Intervals for Aggregate-level Analysis: China, Hong Kong & Taiwan



Notes: This figure displays the 95 percent confidence interval (CI) for the estimated difference-in-differences (DID) coefficients for interactions of month-year dummies with prefecture i's dependency on exports to ChinaHKT. The baseline level is set in July 2012.
Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

of the boycott effects are presented in Table 6. Columns (1)–(6) correspond with estimations using post-boycott periods of 0.5 to 3 years. Panel A of Table 6 reports results using treatment effects based on pre-boycott dependency on visitors from China with negative and significant coefficients for $(s_i \times \text{Post}_t)$ in columns (1) through (4). This indicates that prefectures with higher pre-boycott dependency on visitors from China are more likely to suffer significant negative impacts in their total numbers of hosted foreign visitor-nights due to the boycott activities, with impacts that are still significant even when averaged over two years post-boycott.

Panel B of Table 6 reports the DID results using treatment effects based on pre-boycott dependency on visitors from China and Hong Kong. Here we find a negative and significant coefficient for $(s_i \times \text{Post}_t)$ only for the first six months after the boycott. Prefectures with higher pre-boycott dependency on visitors from China and Hong Kong seem to suffer shorter term significant negative impacts in their total numbers of hosted foreign visitor-nights due to the consumer boycott.

Finally, the results shown in Panel C of Table 6 indicate that adding visitors from Taiwan to our treatment variable produces a negative but insignificant coefficient for our DID variable of interest only for the first six months post-boycott. While we were unable to estimate boycott effects for our ChinaHKT indicator at the disaggregate (i.e., bilateral) level, our aggregate level results suggest that residents of Taiwan were the least likely to participate in the travel boycott in 2012 compared with residents of China or Hong Kong. This result is similar to the previously-mentioned study by Heilman (2016) which found insignificant boycott effects on merchandise imports from Japan to Taiwan following the 2012 dispute.

In order to interpret the magnitude of the boycott effects implied by the results in Table 6, we need to consider the distribution of the pre-boycott China dependency variable, s_i. Table 7 computes the magnitude of the boycott effects in log changes (i.e., percentage point differences in average growth rates between the treated and control groups) and then converted to growth rates (i.e., estimated average treatment effects on the treated in growth rate terms) across the relevant distribution of s_i.[29] The results are calculated for the mean of s_i and for the 25th, 50th and 75th percentiles of s_i, using the significant and negative DID coefficients from Table 6.[30]

The top four sections of Table 7 correspond with the results based on pre-boycott dependency on visitors from China over the post-boycott periods of 0.5, 1, 1.5 and 2 years, respectively. The bottom panel of Table 7 provides results based on pre-boycott dependency on visitors from China and Hong Kong for 0.5 year after the boycott started. The mean prefecture based on pre-boycott dependency on visitors from China loses 17.4 percent of its accommodated foreign visitor-nights in the first six months of the boycott. Over the same time period, the mean prefecture for pre-boycott dependency on visitors from China and Hong Kong loses 16.2 percent of its accommodated

[29] In Appendix C we discuss the implicit assumption used in Table 7 that our DID coefficient is statistically significant across the distribution of s_i.

[30] The positive and weakly significant DID coefficient averaged over 36 months post-boycott using the ChinaHKT indicator is not interpreted in Table 7 as a "boycott effect". It reflects the strong upward trend in visitors from Taiwan starting about six months post-boycott which compensates for lingering boycott effects from visitors from China and Hong Kong. Figure 1 shows these changes in accommodated-visitor nights over the July 2009 to July 2015 sample.

Table 7: Impact of the Boycott on Prefectures' Total Foreign Visitors

Percentile	(1) Coefficient	(2) s_i	(3) (= (1) × (2)) Total magnitude (log change)	(4) Total magnitude converted (growth rate)
Panel A: China				
Post-boycott period: 0.5 year				
Mean	-1.312	0.146	-0.191	-0.174
25%	-1.312	0.096	-0.126	-0.119
50%	-1.312	0.133	-0.175	-0.160
75%	-1.312	0.170	-0.222	-0.199
75-25% gap				-0.081
Post-boycott period: 1 year				
Mean	-1.197	0.146	-0.175	-0.160
25%	-1.197	0.096	-0.115	-0.109
50%	-1.197	0.133	-0.159	-0.147
75%	-1.197	0.170	-0.203	-0.184
75-25% gap				-0.075
Post-boycott period: 1.5 years				
Mean	-1.146	0.146	-0.167	-0.154
25%	-1.146	0.096	-0.110	-0.104
50%	-1.146	0.133	-0.152	-0.141
75%	-1.146	0.170	-0.194	-0.177
75-25% gap				-0.072
Post-boycott period: 2 years				
Mean	-0.871	0.146	-0.127	-0.119
25%	-0.871	0.096	-0.084	-0.080
50%	-0.871	0.133	-0.116	-0.109
75%	-0.871	0.170	-0.148	-0.137
75-25% gap				-0.057
Panel B: China & Hong Kong				
Post-boycott period: 0.5 year				
Mean	-0.850	0.208	-0.177	-0.162
25%	-0.850	0.139	-0.118	-0.112
50%	-0.850	0.194	-0.165	-0.152
75%	-0.850	0.250	-0.213	-0.192
75-25% gap				-0.080

Notes: Total foreign visitors mean the accommodation services provided to foreign visitors (the total number of visitors who reside outside of Japan × the number of nights stayed in Japan). Percentile indicates the quartiles of s_i. Coefficients are obtained from Table 6. Growth rate = exp(log change) − 1.
Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

foreign visitor-nights.[31] The estimated boycott effects for the mean prefecture based on China pre-boycott dependency dissipate over time with losses of 16.0 percent, 15.4 percent and 11.9 percent averaged over post-boycott periods of 1, 1.5 and 2 years, respectively.

In comparing the 75th and 25th percentile prefectures based on their pre-boycott dependencies on China and ChinaHK, we find gaps in impacts of -5.7 to -8.1 percentage points, depending on the post-boycott interval and China indicator used.[32] These results confirm the importance of considering regional heterogeneity within Japan in assessing the aggregate impacts of a foreign consumer boycott on inbound travelers.

5.3 Economic implications

While the impact for the average prefecture for pre-boycott dependency on visitors from China (ChinaHK) of losing 17.4 (16.2) percent of foreign visitors' accommodated nights in the six months following the boycott may not sound too impactful, the economic implications of those losses also depend on the spending patterns of foreign visitors. Accommodated-visitor nights reflects quantities of travel services purchased (i.e., number of hosted days/nights), but the prices of those services and visitor spending patterns also matter for estimating the economics impacts of the boycott. In this section we use survey data to answer the following question: do visitors from China or Hong Kong tend to spend more or less than visitors from other foreign regions?

The Japan Tourism Agency has conducted surveys of foreign visitors to Japan at airport and seaport departure areas since April, 2010 (i.e., the "International Visitor Survey" in English).[33] We use the survey's trip expenditure data that includes domestic revenue out of package tour cost, but this data is only available consistently over time by visitors' nationality/region, not by country/region of residence.[34] We also

[31]Robustness checks of these aggregate-level benchmark results using a 0.5 year post-boycott interval are presented in Appendix B.

[32]In Appendix C, we find support for the implicit assumption used in Table 7 that our DID coefficient is statistically significant across the distribution of s_i mainly for the 0.5 year post-boycott interval. That interval corresponds with the largest gaps in boycott impacts of -8.0 to -8.1 percent.

[33]The survey data can be accessed here: https://www.mlit.go.jp/kankocho/en/siryou/toukei/syouhityousa.html.

[34]There is a very high correlation between surveyed residents of and surveyed nationals of China. In

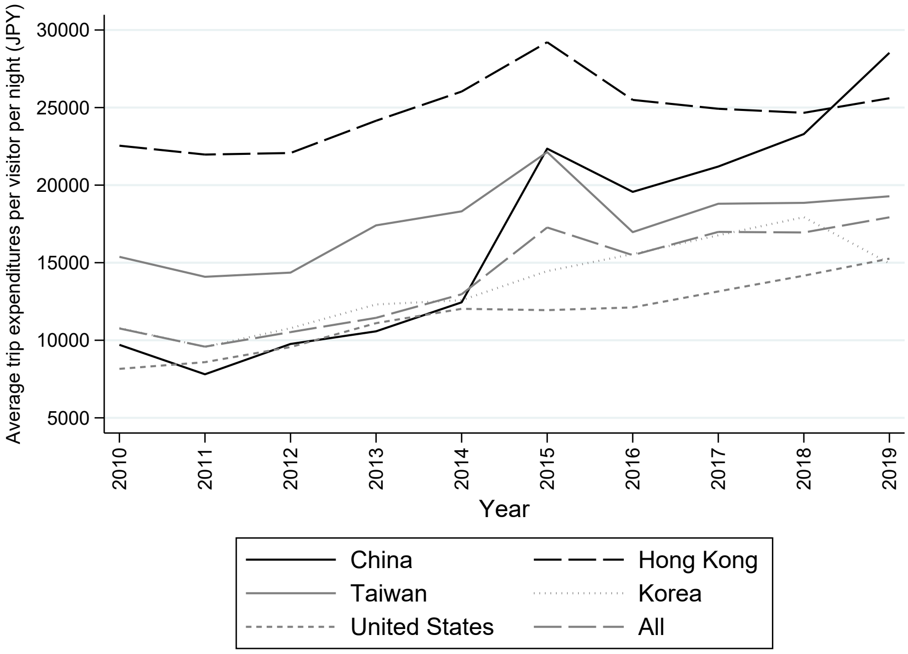
use the average length of stay by nationality/region from the survey to calculate the average trip expenditures per person per day by nationality/region. A cross-country comparison of visitors average daily spending is shown in Figure 14. The figure shows that Hong Kong visitors' average daily expenditures in Japan in the pre-boycott year 2010 (i.e., 22,543 JPY) are more than double the same figure for all foreign visitors on average (i.e., 10,761 JPY).[35] The average daily spending by Chinese visitors (9,705 JPY) in 2010 is slightly below that of the average foreign visitor. Therefore, our 17.4 percent estimated loss for the average prefecture based on pre-boycott dependency on visitors from China may slightly overstate the actual economic loss since Chinese visitors from 2012 to 2014 tended to spend a bit less than the average foreign visitor on a daily basis. However, the high-spending habits of Hong Kong visitors implies that our 16.2 percent estimated loss for the average prefecture based on pre-boycott dependency on visitors from China and Hong Kong combined may under-estimate the economic losses due to the boycott.

Note that the strongest trend displayed in Figure 14 is the increase in daily expenditures by Chinese visitors, who topped Hong Kong visitors' daily spending in 2019 (i.e., 28,528 JPY versus 17,925 JPY). This implies that any future bilateral political conflict that prompts a Chinese consumer boycott of travel to Japan could involve even larger economic losses for Japan's prefectures with high dependency on Chinese visitors than the boycott event in 2012.

2010 (2011), 96.9 (96.8) percent of surveyed visitors from China were Chinese nationals.

[35] The discrepancy is even larger in 2011, but that year's data includes impacts from the Great East Japan Earthquake so we use 2010 data for a pre-boycott comparison.

Figure 14: Average Trip Expenditures per Visitor per Night, by Nationality/Region



Notes: Units for the Y-axis are Japanese Yen (JPY).
Source: Authors' estimation, based on Japan Tourism Agency, *International Visitor Survey*, https://www.mlit.go.jp/kankocho/en/siryou/toukei/syouhityousa.html.

6 Aggregate-level Analysis: Foreign and Domestic Visitors

6.1 Methodology

In Section 4, we estimated large negative and disparate impacts of China's boycott activities on visitor-nights from residents of China and ChinaHK on Japanese prefectures based on their pre-boycott dependency on these visitors. In Section 5, we found that the large negative impacts on visitor-nights from residents of China and ChinaHK were not fully offset by visitors from other foreign countries. The average Japanese prefecture based on pre-boycott dependency on visitors from China (ChinaHK) lost 17.4 (16.2) percent of its foreign-resident-accommodated-visitor nights in the first six months of the boycott. We now address the question: can these negative boycott effects on foreign visitors be offset by the inclusion of domestic (i.e., Japanese) visitors in our analysis? Our methodology follows that of Section 5 but with an expanded sample that includes domestic travelers.

6.2 Estimation results

The inclusion of domestic visitors changes our sample and the distribution of our China dependency indicator, s_i, so we must repeat the test for common trends. Table 8 presents the results for regression equation (5) using our new sample. Each column corresponds with a different China indicator (i.e., China, ChinaHK and ChinaHKT) as in the previous section. The $(s_i \times \text{Trend}_t)$ coefficient is insignificant in all three columns, which typically signals support for the common trends assumption. However, when we check the event study plots for further confirmation of common pre-trends, we do not find support for the validity of the common trends assumption for all three China indicators. Figures 15, 16 and 17 show many instances in the pre-boycott period where the common trends assumption is not met for the DID coefficient using the China, ChinaHK and ChinaHKT indicators, respectively. For this reason, we are unable to pursue DID estimation for this sample.

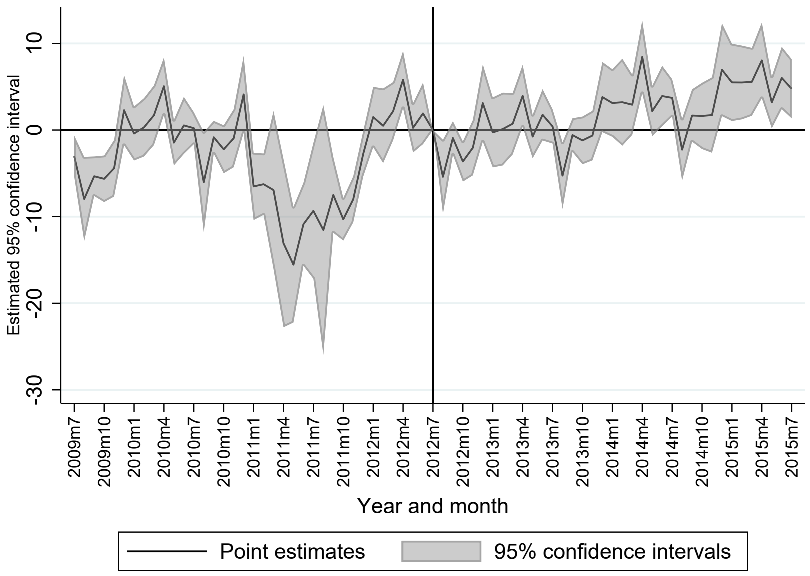
Table 8: Aggregate-level Analysis of Foreign and Domestic Visitors: Common Trends Assumption

	(1)	(2)	(3)
$s_i \times \text{Trend}_t$	-0.017	-0.037	-0.031
	[0.047]	[0.038]	[0.031]
s_i includes:			
China	Yes	Yes	Yes
Hong Kong	No	Yes	Yes
Taiwan	No	No	Yes
N	1,739	1,739	1,739
R^2	0.970	0.970	0.971

Notes: Figures in brackets indicate standard errors clustered by prefecture. Prefecture and time fixed effects included in each regression
Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

While we cannot proceed with formal DID analysis, the event study plots provide descriptive evidence of negative boycott effects within the first six months of the boycott. Figures 15, 16 and 17 indicate some negative short-term boycott effects using

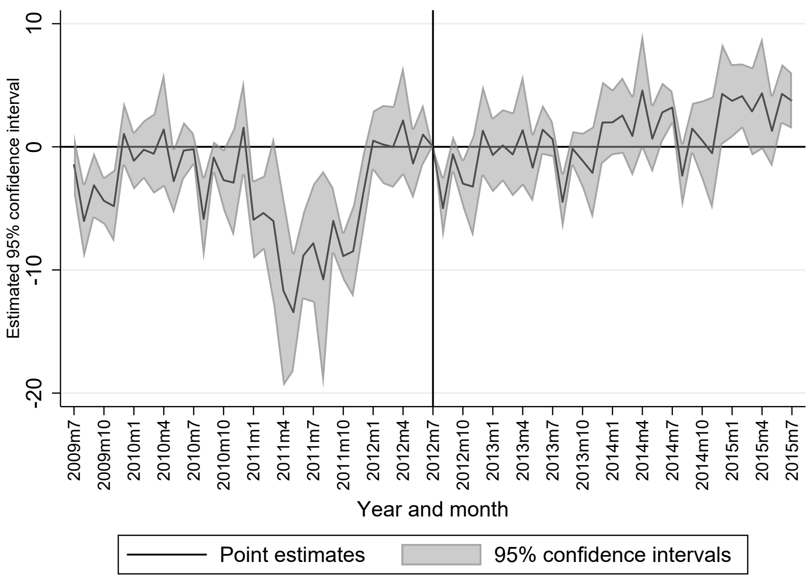
Figure 15: Estimated 95% Confidence Intervals for Aggregate-level Analysis Including Domestic Travelers: China



Notes: This figure displays the 95 percent confidence interval (CI) for the estimated difference-in-differences (DID) coefficients for interactions of month-year dummies with prefecture i's dependency on exports to China. The baseline level is set in July 2012.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

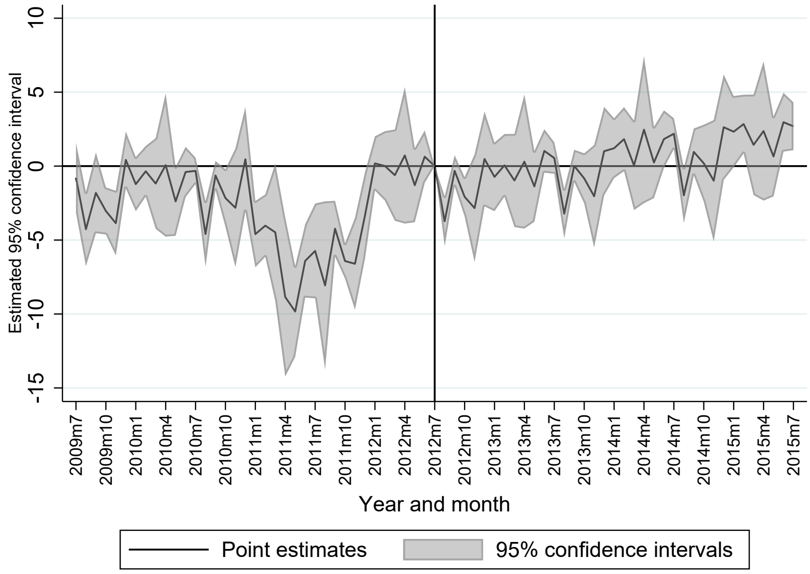
Figure 16: Estimated 95% Confidence Intervals for Aggregate-level Analysis Including Domestic Travelers: China & Hong Kong



Notes: This figure displays the 95 percent confidence interval (CI) for the estimated difference-in-differences (DID) coefficients for interactions of month-year dummies with prefecture i's dependency on exports to ChinaHK. The baseline level is set in July 2012.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

Figure 17: Estimated 95% Confidence Intervals for Aggregate-level Analysis Including Domestic Travelers: China, Hong Kong & Taiwan



Notes: This figure displays the 95 percent confidence interval (CI) for the estimated difference-in-differences (DID) coefficients for interactions of month-year dummies with prefecture i's dependency on exports to ChinaHKT. The baseline level is set in July 2012.
Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

the China, ChinaHK and ChinaHKT indicators, respectively, suggesting that the inclusion of domestic travelers does not completely offset the negative boycott effects on prefectures that are more dependent on China, ChinaHK and ChinaHKT visitors pre-boycott.

Note that at the annual aggregate level (i.e., reflecting a weighted average), the share of foreign visitors in the accommodated-visitor nights data increases from 7.3 percent in 2007 and 6.6 percent in the boycott year of 2012 to 20.2 percent in 2019, as shown in Figure 5. These statistics demonstrate the growing importance of foreign visitors for Japan's economy.[36] They also suggests that any foreign consumer boycotts that arise in the future could have larger effects on Japan's travel industry than our estimates of the 2012 Chinese consumer boycott effects.

[36]Japan economy analyst Jesper Koll considers the growth in inbound tourism to be "the most tangible success story of Abenomics" (Koll, 2018, p. 1).

7 Conclusions

Political conflicts between nations sometimes spark consumer boycotts of products from and travel to the boycotted country. While national leaders address the disputes through international diplomacy, the negative impacts of a boycott at the regional level are typically ignored. Our analysis using prefecture-month data on accommodated-visitor nights for July 2009 to July 2015 along with triple- and double-differences empirical approaches finds strong evidence of regional heterogeneity in the Chinese consumer boycott effects from the Sino-Japan dispute over the Diaoyu/Senkaku islands of August, 2012. Japanese prefectures with high (i.e., 75th percentile) pre-boycott dependency on visitors from China lose 26.0 percent of their visitors from China in the first six months of the boycott while prefectures with low (i.e., 25th percentile) pre-boycott dependency on China suffer bilateral losses that are 6.5 percentage points less severe. Similarly, we find that Japanese prefectures with high pre-boycott dependency on visitors from China and Hong Kong lose 26.0 percent of their visitors from these two places of origin in the first six months of the boycott while prefectures with low pre-boycott dependency suffer losses that are 9.3 percentage points less severe. These disproportionate effects across prefectures can be explained by the positive relationship between pre-boycott dependency on visitors from China (or China and Hong Kong) and pre-boycott dependency on visits by Chinese (or Chinese and Hong Kong) *tourists* who are more likely than non-tourist travelers to participate in the boycott.

At the aggregate level, Japanese prefectures with high pre-boycott dependency on China lose 19.9 percent of their total foreign visitors while prefectures with low pre-boycott dependency on China suffer foreign visitor losses of 11.9 percent in the first six months of the boycott. We find that the negative aggregate effects of the Chinese traveler boycott remained significant even when averaged across 24 months after the boycott's start. Prefectures' aggregate losses of foreign visitors based on pre-boycott dependency on China and Hong Kong visitors are similar for high-dependency (19.2 percent) and low-dependency (11.2 percent) prefectures within the first six months post-boycott, and the boycott effects are significant only for the first six months.

We were not able to formally estimate aggregate boycott effects after including domestic travelers along with foreign visitors due to violations of the common trends assumption. Event study analysis indicates some negative boycott effects in the first few months of the boycott, suggesting that domestic travelers did not completely offset the negative impacts of the boycott. Overall, our results demonstrate the importance of diversification across traveler types and countries of origin in the provision of travel services.

Our research leaves open several possibilities for future research. First, we do not explore the possibility of retaliation by Japanese travelers to the Chinese boycott. Su et al. (2022) found no evidence that Sino-Japan political relations, measured monthly by a Political Relations Index, significantly impacted the flow of visitors from Japan to China over the 1996 to 2017 period.[37] Second, we do not examine the unintended impacts of the Chinese boycott of Japan travel on Chinese airlines and travel services companies that facilitate travel from China to Japan. Chen (2025) finds evidence of negative spillover effects in China of the 2012 Chinese boycott of Japanese cars, which caused 10 to 17 percent reductions in employment in auto parts makers located close to Japanese automobile joint venture plants in China. Lastly, we do not examine the boycott's effects on third countries, like South Korea. Zhou et al. (2021) find evidence that China's outbound travelers to Korea increase, at least in the short-run (i.e., over three months), following China-Japan disputes.

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Appendices

A Appendix Table

Table A1: Monthly Average Share and Number of Foreign Visitors, by Country and by Prefecture

	Average share of visitors, 1/2007-7/2012					Average number of visitors, 1/2007–7/2012				
Prefecture	CHN	HKG	TWN	KOR	OTH	CHN	HKG	TWN	KOR	OTH
Yamanashi	0.441	0.079	0.181	0.041	0.258	15,204	2,504	5,924	1,178	8,004
Shizuoka	0.315	0.039	0.163	0.110	0.373	11,746	1,424	5,688	4,089	13,444
Aichi	0.237	0.030	0.153	0.099	0.481	17,871	2,276	11,534	7,438	35,804
Saitama	0.230	0.012	0.062	0.148	0.549	1,369	68	373	879	3,302
Fukui	0.203	0.053	0.324	0.108	0.311	304	93	639	163	474
Chiba	0.196	0.037	0.121	0.040	0.607	30,278	5,377	17,993	5,655	84,693
Osaka	0.190	0.090	0.129	0.204	0.387	41,082	18,725	26,782	43,121	79,242
Mie	0.186	0.043	0.211	0.155	0.404	1,328	313	1,549	1,027	3,069
Gifu	0.175	0.054	0.291	0.096	0.385	2,436	825	4,461	1,349	5,815
Kanagawa	0.165	0.044	0.083	0.099	0.610	9,867	2,519	4,884	5,684	35,328
Shiga	0.160	0.059	0.357	0.123	0.301	1,397	549	3,443	1,126	2,669
Tokushima	0.157	0.041	0.107	0.083	0.612	248	62	171	123	902
Ibaraki	0.151	0.005	0.043	0.119	0.682	933	30	267	708	4,228
Yamaguchi	0.151	0.012	0.056	0.325	0.456	419	31	163	921	1,231
Hyogo	0.143	0.091	0.173	0.150	0.443	4,415	2,749	5,524	4,624	13,492
Nara	0.142	0.021	0.153	0.142	0.542	517	81	558	515	1,982
Gumma	0.139	0.062	0.326	0.131	0.342	608	301	1,516	553	1,494
Tochigi	0.135	0.054	0.154	0.134	0.523	1,119	520	1,439	1,198	4,516
Niigata	0.127	0.044	0.147	0.226	0.455	907	444	1,284	1,720	3,490
Okayama	0.124	0.037	0.100	0.242	0.496	643	213	556	1,221	2,643
Saga	0.123	0.026	0.150	0.517	0.185	360	74	509	1,703	578
Hiroshima	0.122	0.010	0.065	0.112	0.692	1,983	164	1,082	1,806	12,253
Fukushima	0.121	0.072	0.166	0.302	0.339	693	610	1,216	2,306	1,605
Toyama	0.120	0.061	0.383	0.207	0.230	571	443	2,782	1,490	1,195
Tokyo	0.117	0.072	0.090	0.123	0.597	71,259	44,096	53,514	74,060	357,597
Kagawa	0.114	0.028	0.237	0.212	0.408	322	78	781	648	1,174
Yamagata	0.113	0.079	0.345	0.152	0.311	314	318	1,293	490	764
Miyagi	0.112	0.156	0.208	0.120	0.404	934	1,739	2,339	1,219	3,672
Shimane	0.107	0.010	0.158	0.248	0.476	110	11	171	241	514
Hokkaido	0.095	0.182	0.352	0.136	0.235	15,285	30,080	53,214	21,887	36,037
Ehime	0.092	0.027	0.094	0.299	0.489	304	90	339	1,040	1,679
Nagano	0.092	0.086	0.342	0.098	0.383	1,694	1,691	6,759	1,859	7,080
Kyoto	0.089	0.029	0.102	0.057	0.722	7,762	2,571	8,938	4,564	64,934
Akita	0.085	0.050	0.220	0.388	0.258	251	170	860	1,377	738
Kochi	0.084	0.024	0.183	0.275	0.434	100	25	234	503	508
Okinawa	0.082	0.194	0.301	0.103	0.320	3,493	7,437	9,307	3,217	10,082
Tottori	0.080	0.018	0.143	0.471	0.287	136	37	268	821	424
Fukuoka	0.077	0.053	0.163	0.434	0.273	3,485	2,381	7,393	19,963	11,915
Aomori	0.076	0.062	0.172	0.317	0.373	316	304	959	1,377	1,494
Wakayama	0.067	0.393	0.314	0.099	0.127	523	2,947	2,504	764	941
Kagoshima	0.066	0.098	0.197	0.374	0.265	548	772	1,638	3,691	2,010
Ishikawa	0.061	0.057	0.438	0.102	0.343	715	743	5,943	1,222	4,277
Iwate	0.060	0.187	0.380	0.156	0.217	283	1,132	2,719	775	859
Nagasaki	0.049	0.039	0.235	0.436	0.241	1,299	1,081	6,469	12,947	5,884
Kumamoto	0.048	0.034	0.143	0.634	0.141	969	739	3,377	17,308	3,029
Miyazaki	0.047	0.080	0.288	0.446	0.139	201	467	1,466	3,387	611
Oita	0.037	0.023	0.061	0.541	0.339	865	513	1,416	14,190	7,971

Notes: The number of visitors is measured by the total number of people who reside outside of Japan times the number of nights stayed in Japan (unit: 1,000 person-nights). Prefectures are sorted by the average share of visitors from China. CHN, HKG, TWN, KOR, and OTH indicate China, Hong Kong, Taiwan, South Korea, and other countries, respectively.

Source: Japan Tourism Agency (2020), *Overnight Travel Statistics Survey*.

B Robustness Checks

For all of our robustness checks, we focus on our benchmark results for visitors from China and China–Hong Kong using a 0.5 year post-boycott period to estimate the impacts. First we consider restricting the treatment variable, s_i, to the shorter pre-boycott time period 2007-2009, and using the separate period from January, 2010–July 2013 for our regression analysis. This change means that our continuous treatment variable is based on travel patterns 2.5 to 4.5 years prior to the boycott, while our pre-boycott period starts after our treatment variable has been defined. First, we need to recheck the common trends assumption using this different definition of our China-dependency variable and shorter data sample for our analysis at each level of aggregation. Tables B1 and B2 show a summary of these results using visitors from China and ChinaHK, respectively, to define the CHN and s_i variables.

The first two columns in Tables B1 and B2 show the common trends and DDD regression results at the disaggregate level. The common trends assumption holds for our variable of interest and the DDD coefficients are significant and negative, similar to our results in Table 2. Note that the distribution of s_i has changed so direct comparison of coefficient magnitudes requires additional computations, as in Tables 3 and 4. We present the magnitudes of the boycott impacts for our robustness check results after presenting the regression results for each robustness check. At the aggregate level for foreign visitors, columns (3) in Tables B1 and B2 indicate that the common trends assumption does not hold so the DID results are presented in columns (4) just as a reference.

Second, we test for the sensitivity of our results to the inclusion of the Tohoku region (i.e., Aomori, Iwate, Miyagi, Akita, Yamagata, and Fukushima prefectures) which was severely impacted by the Great East Japan Earthquake of March 11, 2011. We exclude those six prefectures from the data and repeat our analysis at each level of aggregation. Tables B3 and B4 presents these results for China and ChinaHK, respectively. We find no evidence of a violation of the common trends assumption at the disaggregate level of analysis in columns (1) of Tables B3 and B4 or at the aggregate level of analysis using the ChinaHK indicator in column (3) of Table B4. The DDD coefficients of interest in columns (2) are negative and significant for both China and ChinaHK indicators and the DID coefficient in column (4) of Table B4 is negative and insignificant for the ChinaHK indicator. All of these results are similar to our 0.5 year post-boycott benchmark results in the main text. However, the common trends assumption is violated at the aggregate level of analysis using the China indicator in column (3) of Table B3, so the regression results in column (4) of that table are presented just as a reference.

Third, we check the possible effects of outliers on our results by excluding the most popular tourist destinations for visitors from China from our sample. If tourists are the main participants in the consumer boycott, we anticipate that our estimated boycott effects may weaken if we exclude the most popular tourist destinations for Chinese visitors from our sample. The top 10 places for tourists from China are located in the following four prefectures: Tokyo, Chiba, Osaka, and Kyoto.[38] After excluding these four prefectures from the sample, our common trends testing and 0.5-year post-boycott results are shown in Tables B5 and B6 for China and ChinaHK, respectively.

[38]Source: Cross-Border Net, Nov., 2024 article, https://www.cbn.co.jp/archives/4649. Note that we reported high Chinese tourist dependency ratios in Table 5 for these prefectures as follows: Chiba (0.7335), Osaka (0.7067), Tokyo (0. 5960) and Kyoto (0.7471).

Table B1: Summary of Results Using Alternative Samples for Treatment Variable and Analysis: China

	(1)	(2)	(3)	(4)
	Disaggregate-level		Aggregate-level	
	Common trends	DDD results	Common trends	DID results
$s_i \times \text{CHN}_j \times \text{Trend}_t$	-0.025			
	[0.027]			
$s_i \times \text{Trend}_t$	-0.038*		-0.037**	
	[0.022]		[0.017]	
$s_i \times \text{Post}_t$		-0.739*		-1.321***
		[0.411]		[0.280]
$\text{CHN}_j \times \text{Post}_t$		-0.248***		
		[0.068]		
$s_i \times \text{CHN}_j \times \text{Post}_t$		-0.888**		
		[0.444]		
CHN and s_i include:				
China	Yes	Yes	Yes	Yes
Hong Kong	No	No	No	No
Taiwan	No	No	No	No
$s_i \times \text{CHN}_j$	Yes	Yes	Yes	Yes
$\text{CHN}_j \times \text{Trend}_t$	Yes	No	Yes	No
N	18,941	22,607	1,457	1,739
R^2	0.8860	0.8844	0.9809	0.9814

Notes: Figures in brackets indicate standard errors clustered by prefecture. ***, ** and * indicate the significance level at 1, 5 and 10 percent, respectively. Prefecture and time fixed effects are included in all columns' results; country fixed effects are also included in columns' (1) and (2) results. DDD and DID results use 0.5 year post-boycott period.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

Table B2: Summary of Results Using Alternative Samples for Treatment Variable and Analysis: China & Hong Kong

	(1)	(2)	(3)	(4)
	Disaggregate-level		Aggregate-level	
	Common trends	DDD results	Common trends	DID results
$s_i \times \text{CHN}_j \times \text{Trend}_t$	-0.033			
	[0.024]			
$s_i \times \text{Trend}_t$	-0.026		-0.034***	
	[0.018]		[0.013]	
$s_i \times \text{Post}_t$		-0.278		-1.001***
		[0.495]		[0.363]
$\text{CHN}_j \times \text{Post}_t$		-0.098		
		[0.075]		
$s_i \times \text{CHN}_j \times \text{Post}_t$		-1.111***		
		[0.360]		
CHN and s_i include:				
China	Yes	Yes	Yes	Yes
Hong Kong	Yes	Yes	Yes	Yes
Taiwan	No	No	No	No
$s_i \times \text{CHN}_j$	Yes	Yes	Yes	Yes s
$\text{CHN}_j \times \text{Trend}_t$	Yes	No	Yes	No
N	18,941	22,607	1,457	1,739
R^2	0.8856	0.8841	0.9809	0.9813

Notes: Figures in brackets indicate standard errors clustered by prefecture. *** indicates the significance level at 1 percent. Prefecture and time fixed effects are included in all columns' results; country fixed effects are also included in columns' (1) and (2) results. DDD and DID results use 0.5 year post-boycott period.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

Table B3: Summary of Results Excluding Tohoku Region Prefectures: China

	(1)	(2)	(3)	(4)
	Disaggregate-level		Aggregate-level	
	Common trends	DDD results	Common trends	DID results
$s_i \times \text{CHN}_j \times \text{Trend}_t$	-0.023			
	[0.028]			
$s_i \times \text{Trend}_t$	-0.039*		-0.031*	
	[0.020]		[0.017]	
$s_i \times \text{Post}_t$		-0.886*		-1.358***
		[0.484]		[0.363]
$\text{CHN}_j \times \text{Post}_t$		-0.121		
		[0.092]		
$s_i \times \text{CHN}_j \times \text{Post}_t$		-1.095**		
		[0.540]		
CHN and s_i include:				
China	Yes	Yes	Yes	Yes
Hong Kong	No	No	No	No
Taiwan	No	No	No	No
$s_i \times \text{CHN}_j$	Yes	Yes	Yes	Yes
$\text{CHN}_j \times \text{Trend}_t$	Yes	No	Yes	No
N	19,721	22,919	1,517	1,763
R^2	0.8864	0.8841	0.9814	0.9816

Notes: Figures in brackets indicate standard errors clustered by prefecture. ***, ** and * indicate the significance level at 1, 5 and 10 percent, respectively. Prefecture and time fixed effects are included in all columns' results; country fixed effects are also included in columns' (1) and (2) results. DDD and DID results use 0.5 year post-boycott period.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

Table B4: Summary of Results Excluding Tohoku Region Prefectures: China & Hong Kong

	(1)	(2)	(3)	(4)
	Disaggregate-level		Aggregate-level	
	Common trends	DDD results	Common trends	DID results
$s_i \times \text{CHN}_j \times \text{Trend}_t$	-0.016			
	[0.024]			
$s_i \times \text{Trend}_t$	-0.022		-0.021	
	[0.018]		[0.021]	
$s_i \times \text{Post}_t$		-0.276		-0.876**
		[0.457]		[0.401]
$\text{CHN}_j \times \text{Post}_t$		-0.036		
		[0.115]		
$s_i \times \text{CHN}_j \times \text{Post}_t$		-1.057**		
		[0.462]		
CHN and s_i include:				
China	Yes	Yes	Yes	Yes
Hong Kong	Yes	Yes	Yes	Yes
Taiwan	No	No	No	No
$s_i \times \text{CHN}_j$	Yes	Yes	Yes	Yes
$\text{CHN}_j \times \text{Trend}_t$	Yes	No	Yes	No
N	19,721	22,919	1,517	1,763
R^2	0.8869	0.8849	0.9813	0.9814

Notes: Figures in brackets indicate standard errors clustered by prefecture. ** indicates the significance level at 5 percent. Prefecture and time fixed effects are included in all columns' results; country fixed effects are also included in columns' (1) and (2) results. DDD and DID results use 0.5 year post-boycott period.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

Columns (1) of Tables B5 and B6 show no violation of the common trends assumption at the disaggregate level and the DDD coefficients in columns (2) are negative and significant, as in our main results. The results in Column (3) in Table B5 indicate a violation of the common trends assumption at the aggregate level for the China indicator, so the DID results are presented in column (4) just as a reference. The aggregate-level results for the ChinaHK indicator shown in Table B6 support the common trends assumption and the DID coefficient is negative and insignificant, which also is consistent with the results in the main text.

Table B5: Summary of Results Excluding Top Four Tourist Prefectures: China

	(1)	(2)	(3)	(4)
	Disaggregate-level		Aggregate-level	
	Common trends	DDD results	Common trends	DID results
$s_i \times \text{CHN}_j \times \text{Trend}_t$	-0.027			
	[0.035]			
$s_i \times \text{Trend}_t$	-0.033		-0.031*	
	[0.021]		[0.017]	
$s_i \times \text{Post}_t$		-0.559*		-1.127***
		[0.325]		[0.330]
$\text{CHN}_j \times \text{Post}_t$		-0.089		
		[0.127]		
$s_i \times \text{CHN}_j \times \text{Post}_t$		-1.171*		
		[0.646]		
CHN and s_i include:				
China	Yes	Yes	Yes	Yes s
Hong Kong	No	No	No	No
Taiwan	No	No	No	No
$s_i \times \text{CHN}_j$	Yes	Yes	Yes	Yes
$\text{CHN}_j \times \text{Trend}_t$	Yes	No	Yes	No
N	20,683	24,037	1,591	1,849
R^2	0.7976	0.7951	0.9380	0.9391

Notes: Figures in brackets indicate standard errors clustered by prefecture. *** and * indicate the significance level at 1 and 10 percent, respectively. Prefecture and time fixed effects are included in all columns' results; country fixed effects are also included in columns' (1) and (2) results. DDD and DID results use 0.5 year post-boycott period.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

Having introduced our three robustness checks on our benchmark results, we now calculate the magnitudes of the boycott effects for each specification using the DDD or DID regression coefficients along with the appropriate distribution of s_i from Table B7. Table B8 presents our benchmark boycott impacts for 0.5 year post-boycott at the disaggregate level side-by-side with the calculated impacts based on our three robustness checks. Both Panels A (China) and B (ChinaHK) shows similar patterns in comparing results between our benchmark sample and each robustness check. The results for the alternative sample in column (2) are slightly stronger than our benchmark results. The mean prefecture for pre-boycott China dependency loses 29.4 percent of their visitors from China using the alternative sample, while we find a loss of 24.0 percent with our

Table B6: Summary of Results Excluding Top Four Tourist Prefectures: China & Hong Kong

	(1)	(2)	(3)	(4)
	Disaggregate-level		Aggregate-level	
	Common trends	DDD results	Common trends	DID results
$s_i \times \text{CHN}_j \times \text{Trend}_t$	-0.026			
	[0.022]			
$s_i \times \text{Trend}_t$	-0.015		-0.023	
	[0.019]		[0.021]	
$s_i \times \text{Post}_t$		0.080		-0.631
		[0.413]		[0.408]
$\text{CHN}_j \times \text{Post}_t$		0.123		
		[0.122]		
$s_i \times \text{CHN}_j \times \text{Post}_t$		-1.551***		
		[0.482]		
CHN and s_i include:				
China	Yes	Yes	Yes	Yes
Hong Kong	Yes	Yes	Yes	Yes
Taiwan	No	No	No	No
$s_i \times \text{CHN}_j$	Yes	Yes	Yes	Yes
$\text{CHN}_j \times \text{Trend}_t$	Yes	No	Yes	No
N	20,683	24,037	1,591	1,849
R^2	0.7981	0.7960	0.9378	0.9386

Notes: Figures in brackets indicate standard errors clustered by prefecture. *** indicates the significance level at 1 percent. Prefecture and time fixed effects are included in all columns' results; country fixed effects are also included in columns' (1) and (2) results. DDD and DID results use 0.5 year post-boycott period.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

benchmark sample. The results in column (3) for the sample that excludes Tohoku region prefectures are very similar to our benchmark results while the results in column (4) for the sample that excludes the top four tourist prefectures confirm our hypothesis of weaker boycott impacts without these prefectures. The mean prefecture for pre-boycott China dependency loses 22.6 percent of its visitors from China after the most popular tourist destinations have been dropped from the sample. Overall, Table B8 supports the robustness of our disaggregate-level results.

Table B7: Distribution of s_i

	Mean	p.25	p.50	p.75
Panel A: China				
Benchmark (7/2009-7/2012)	0.146	0.096	0.133	0.170
Alternative period (1/2007-12/2009)	0.113	0.063	0.106	0.146
Exclude Tohoku region (7/2009-7/2012)	0.151	0.101	0.136	0.179
Exclude Top 4 Tourist pref. (7/2009-7/2012)	0.143	0.091	0.132	0.168
Panel B: China & Hong Kong				
Benchmark (7/2009-7/2012)	0.208	0.139	0.194	0.250
Alternative period (1/2007-12/2009)	0.182	0.118	0.174	0.211
Exclude Tohoku region (7/2009-7/2012)	0.210	0.138	0.194	0.251
Exclude Top 4 Tourist pref. (7/2009-7/2012)	0.207	0.139	0.192	0.244

Notes: "Pref." = prefectures. s_i measures prefecture $i's$ pre-boycott dependency on visitors from China or ChinaHK.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

We also compare the magnitudes of our results at the aggregate level of analysis, as shown in Table B9. At this level, the robustness check samples failed to satisfy the common pre-trends assumption test in all three cases using the China indicator. Therefore, we cannot convert the DID coefficients into boycott impacts using that indicator. For the ChinaHK indicator, the common trends assumption is met in two out of three robustness check samples, so the boycott impacts are presented in Table B9 for that indicator. The estimated boycott impacts from the sample that excludes the Tohoku region are slightly stronger (i.e., -16.8 percent) than the benchmark sample (i.e., -16.2 percent) for the average prefecture for pre-boycott dependency on visitors from China and Hong Kong, similar to our disaggregate-level findings in Table B8. We use the DID coefficient in column (4) of Table B6, which is statistically insignificant, to calculate an estimated boycott impact in column (4) of Table B9 just as a reference. The insignificant DID coefficient and the less impactful boycott effect associated with the coefficient (i.e., -12.2 percent) confirm our expectation of finding weaker boycott effects after excluding the most popular destinations for Chinese tourists.

Overall our robustness checks demonstrate that our benchmark results provide reasonable estimates of the Chinese consumer boycott impacts. They also confirm the importance of Chinese and Hong Kong *tourists* in driving the consumer boycott.

Table B8: Summary of Benchmark and Robustness Check Results: Boycott Impacts on Prefectures' Exports to China & Hong Kong, 0.5 Year Post-Boycott Period

	(1) Benchmark	(2) Alternative Sample	(3) Exclude Tohoku Region	(4) Exclude Top 4 Tourist Pref.
Panel A: China				
Mean	-0.240	-0.294	-0.249	-0.226
25%	-0.195	-0.262	-0.207	-0.178
50%	-0.229	-0.290	-0.237	-0.216
75%	-0.261	-0.315	-0.272	-0.249
75-25% gap	-0.066	-0.052	-0.065	-0.071
Panel B: China & Hong Kong				
Mean	-0.226	-0.259	-0.227	-0.180
25%	-0.167	-0.205	-0.166	-0.088
50%	-0.214	-0.253	-0.214	-0.160
75%	-0.260	-0.283	-0.260	-0.225
75-25% gap	-0.093	-0.078	-0.094	-0.137

Notes: Benchmark growth rates in column (1) of Panel A (B) are from Table 3 (4). Panel A growth rates in columns (2)–(4) reflect rates calculated using the s_i distribution for each column's sample and the relevant coefficients from Tables B1, B3 and B5. Panel B growth rates in columns (2)–(4) reflect rates calculated using the s_i distribution for each column's sample and the relevant coefficients from Tables B2, B4 and B6.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

Table B9: Summary of Benchmark and Robustness Check Results: Boycott Impacts on Prefectures' Total Foreign Visitors, 0.5 Year Post-Boycott Period

	(1) Benchmark	(2) Alternative Sample	(3) Exclude Tohoku Region	(4) Exclude Top 4 Tourist Pref.*
China & Hong Kong				
Mean	-0.162	NA	-0.168	-0.122
25%	-0.112	NA	-0.114	-0.084
50%	-0.152	NA	-0.156	-0.114
75%	-0.192	NA	-0.197	-0.143
75-25% gap	-0.080	NA	-0.084	-0.059

Notes: * indicates growth rates in column (4) are calculated just for a reference using an insignificant DID coefficient (see Table B6). NA indicates "not available" due to a violation of the common trends assumption for that sample (see Table B2).

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

C High vs. Low China Visitor Dependency: Event Study Analysis

When we interpret our regression results in the main text to estimate boycott impacts at the 75th and 25th percentiles for s_i (i.e., pre-boycott prefectural dependency on visitors from China), we make the implicit assumption that the DDD or DID coefficient of interest is statistically significant across the distribution of s_i. In this section, we use event study analysis to support that assumption by splitting prefectures into high (i.e., at or above median s_i) and low (i.e., below median s_i) dependency groupings and repeat our event study analysis at each level of aggregation for visitors from China. We focus on visitors from China only for this analysis due to page constraints for this paper.

C.1 Disaggregate-level analysis

For the disaggregate-level analysis, we use the following specification:

$$\begin{aligned} Y_{ijt} &= \exp[\alpha + \psi_i + \psi_j + \psi_t \\ &\quad + \sum_k \sum_t \beta_{1t}^k (s_i^k \times d_t) + \sum_k \beta_2 (s_i^k \times \text{CHN}_j) + \sum_t \beta_{3t} (\text{CHN}_j \times d_t) \\ &\quad + \sum_k \sum_t \gamma_t^k (s_i^k \times \text{CHN}_j \times d_t)] \times \varepsilon_{ijt}, \end{aligned} \tag{C1}$$

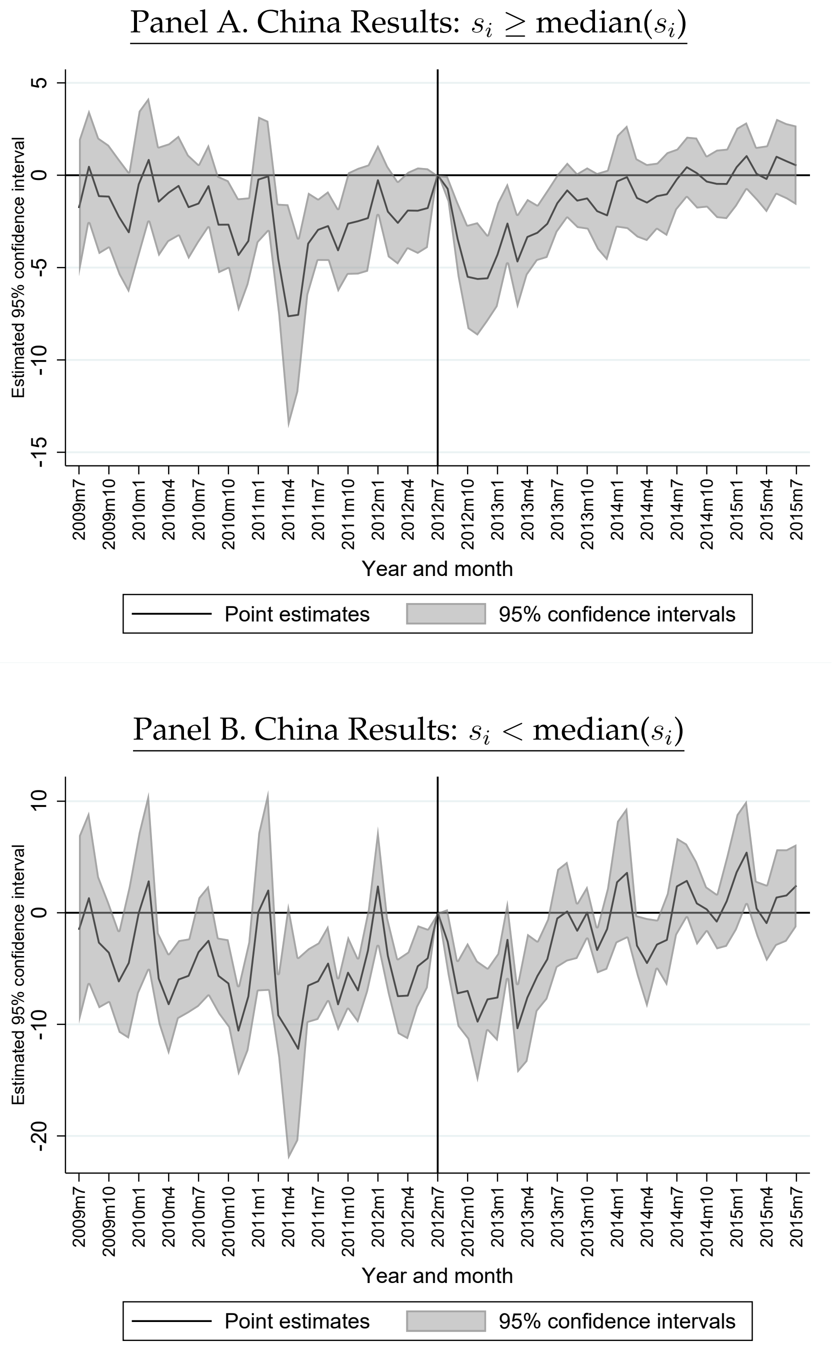
where CHN is China; s_i^k is prefecture i's dependency on Chinese travelers for group $k (= 1, 2)$, where $s_i^1 = s_i$ if $s_i < \text{median}(s_i)$ and $s_i^2 = s_i$ if $s_i \geq \text{median}(s_i)$.

Figure C1 shows our results from equation (C1) for the DDD coefficient, with Panel A (B) showing results for prefectures above (below) the median for China visitor dependency (i.e., 13.3 percent). Panel A confirms that the disproportionate negative impact of the boycott is significant at the 95% level for 11 months post-boycott (i.e., August, 2012 to June, 2013) for the prefectures with higher dependency on visitors from China. For prefectures with below-median dependence on China, Panel B shows the disproportionate negative boycott effect is significant for 9 out of 10 months post-boycott, with an exception in February, 2013. These event study plots are consistent with our DDD regression findings in the main text of disproportionate impacts of the boycott at the 95% level averaged across 12 months post-boycott for visitors from China, as shown in Table 2. The plots also support our implicit assumption used to estimate the magnitudes of the boycott impacts in Table 3 because the DDD coefficient of interest is statistically significant even when prefectures are split into high- and low-dependency groupings.

C.2 Aggregate-level analysis: Foreign

Similar to our strategy in the previous section, we also examine event study plots for our variable of interest at the aggregate level while grouping prefectures into above- and below-median dependency on visitors from China. Our estimating equation is as follows:

Figure C1: Estimated 95% Confidence Intervals for Disaggregate-level Analysis: High vs. Low China Dependence



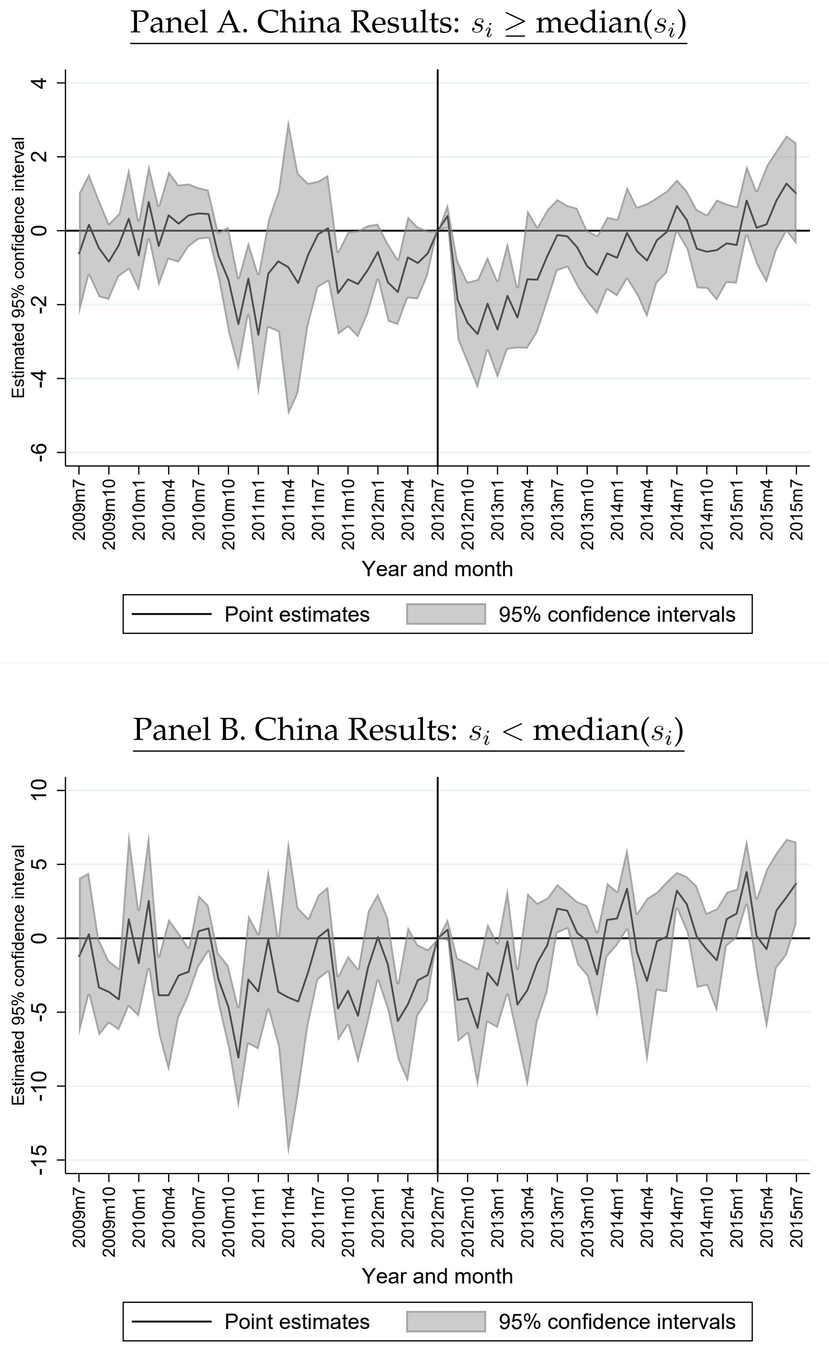
Notes: This figure displays the 95 percent confidence interval (CI) for the estimated difference-in-difference-indifferences (DDD) coefficients for interactions of month-year dummies with prefecture i's dependency on exports to China. The baseline level is set in July 2012.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.

$$Y_{it} = \exp[\alpha + \psi_i + \psi_t + \sum_k \sum_t \lambda^k (s_{it}^k \times d_t)] \times \varepsilon_{it}, \tag{C2}$$

Our results from equation (C2) for the DID coefficient for above-median (Panel A) and below-median (Panel B) prefectures for pre-boycott China visitor dependency are shown in Figure C2. Panel A shows that the DID coefficient is negative and statistically significant at the 95% level in each month from September, 2012 to March, 2013 (i.e., seven months), and it remains negative, but insignificant at the 95% level, for almost 24 months post-boycott for prefectures with high China visitor dependency. The strong and significant results at the monthly level over the first nine months post-boycott, and the lingering but less significant results over the subsequent nine months average out to support our regression estimates in the main text. In Table 6, we show significant and negative DID coefficients at the 95% (or higher) level averaged across 6, 12 and 18 months post-boycott. Panel B illustrates a DID coefficient for prefectures with low China visitor dependency that is negative and statistically significant at the 95% level only from September to November, 2012, and then remains negative but mostly insignificant up to June, 2013 (i.e., 11 months post-boycott). The differences across Panels A and B of Figure C2 imply that our estimated boycott impacts in Table 7 comparing prefectures with high (i.e., 75th percentile) versus low (i.e., 25th percentile) dependency on visitors from China are best supported for 0.5 year post-boycott. At longer post-boycott periods of 1, 1.5 and 2 years, the significant DID coefficient seems to driven by the strong boycott effects on prefectures with above-median dependency on visitors from China. For this reason, we present only the 0.5 year post-boycott impact results for high (75th percentile) and low (25th percentile) China (or ChinaHK) dependency prefectures in our introduction and conclusion.

Figure C2: Estimated 95% Confidence Intervals for Aggregate-level Analysis: High vs. Low China Dependence



Notes: This figure displays the 95 percent confidence interval (CI) for the estimated difference-indifferences (DID) coefficients for interactions of month-year dummies with prefecture i's dependency on exports to China. The baseline level is set in July 2012.

Source: Authors' estimation, based on *Overnight Travel Statistics Survey*.