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Abstract

This study investigates the regional economic consequences of tourism expansion, conceptualizing it as a positive demand shock to the local tradable service sector. While traditional regional development strategies emphasize manufacturing exports, we examine how inbound tourism, a growing form of service trade, can promote regional revitalization. Focusing on the rapid increase in inbound tourists to Japan during the 2010s, we employ a shift-share instrumental variable approach using a novel commuting zone-level dataset to identify causal effects. By disentangling the impacts of international and domestic tourists, we identify the distinct effects of inbound tourism on key regional economic indicators: per capita income, youth demographic shifts, and commercial land prices. These gains are spatially concentrated and moderated by regional heterogeneity, with leisure-oriented and seasonal destinations experiencing more pronounced growth. Our findings suggest that strategic promotion of foreign tourism can effectively mitigate regional decline by optimizing resource utilization and population dynamics.

Keywords: Inbound tourism, Regional economic development
JEL classification: E24, F14, F16, F61, Z32

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1. Introduction

In advanced economies under globalization, regional development strategies have often emphasized policies that attract and agglomerate exporting firms. Export-oriented manufacturing firms typically exhibit high productivity growth and are believed to expand regional employment through increased transactions with local small- and medium-sized manufacturing and service firms. Conversely, many service industries are constrained by local demand, are not expected to grow as rapidly as export industries, and generate fewer innovations than manufacturing industries. Consequently, their impact on regional economic development has received limited attention in policy discussions and academic research. However, globalization has also led to enhanced trade in services. Specifically, cross-border movement of people and the associated consumption by foreign visitors, namely inbound tourism, are increasingly viewed as important drivers of regional economic activity.

As the number of tourists worldwide continues to increase, Japan offers a particularly insightful case study. Faced with a declining and aging population alongside the concentration of economic activity in urban areas, the Japanese government has positioned international tourism as a core national strategy for regional revitalization. This policy shift began in 2006 with the enactment of the "Basic Plan for the Promotion of a Tourism-Oriented Country" in 2006 and the subsequent establishment of the Japan Tourism Agency in 2008. Since then, the government has actively facilitated inbound growth through strategic interventions, including relaxing visa requirements for emerging economies and aggressively promoting Low-Cost Carriers (LCCs).

These policy efforts have resulted in an unprecedented surge in arrivals that significantly outpaces global trends. *UNWTO World Tourism Barometer* reported that the global average annual growth rate of international tourist arrivals was approximately 4% between 2010 and 2019. In contrast, according to *Visitor Arrivals to Japan and Japanese Overseas Travelers* by Japan National Tourism Organization, Japan's arrivals soared from 8.6 million to 31.88 million—representing an average annual growth rate of approximately 27%. Although the sector faced a temporary downturn during the COVID-19 pandemic, inbound arrivals have rebounded sharply, exceeding 40 million by 2025. While such growth undoubtedly benefits tourism-related sectors, there is limited empirical evidence on the magnitude of spillovers to other industries and their broader impact on regional economies. Against this backdrop, this study identifies the causal effects of tourism on regional development.

This study investigates the regional economic consequences of tourism expansion by conceptualizing it as a positive demand shock to the local tradable service sector. We construct a novel, high-resolution dataset of overnight stays at the commuting zone (CZ)-level in Japan. A distinguishing feature of our research design is the simultaneous, yet distinct treatment of inbound foreign and domestic tourists. By isolating these two flows, we identify whether foreign demand, often characterized by higher per capita expenditure and distinct seasonal patterns, generates economic spillovers that differ qualitatively and quantitatively from domestic consumption. To identify the causal impact of these shocks, we employ a shift-share instrumental variable (SSIV) approach to address the endogeneity inherent in regional tourism data, wherein unobserved local amenities or infrastructure investments might simultaneously drive both, tourist arrivals and economic outcomes.

This study makes three main contributions. First, we move beyond the narrow focus on hospitality sector employment and examine the broader equilibrium effects on the regional economy by analyzing per capita income, population dynamics, and land prices. This allows us to examine whether tourism-induced demand truly enhances regional fundamentals, such as population growth and rising land values, or whether its effects remain temporary. Second, we uncover a stark asymmetry between tourist origins: while inbound travel from abroad drives structural transformation and persistent growth, domestic tourism has negligible impacts on income and population, suggesting that only external demand triggers the fundamental reallocation of resources. Third, we explicitly account for regional heterogeneity to uncover the mechanisms underlying these impacts. We demonstrate that the economic returns to tourism vary, depending on the nature of tourism demand, such as the degree of seasonality and the primary purpose of travel. Notably, our supplementary analysis reveals that an influx of foreign visitors enhances facility capacity utilization (e.g., occupancy rates), particularly during off-peak periods, thereby generating substantial spillovers into the broader regional economy.

Our analysis reveals four key findings. First, we find that the growth of inbound tourism exerts a significant positive effect on regional economic fundamentals, including per capita taxable income, youth population (15–34 years old), and commercial land prices. Specifically, a one-standard-deviation increase in foreign tourists raises per capita income by 0.5 percentage points over five years, accounting for approximately 20% of the average growth rate. However, these gains are highly concentrated in space. Consequently, positive income effects are absent in many regions. Second, there is a stark asymmetry between tourist origins; unlike the broad impacts of inbound travel, domestic stays have no systematic influence on income or population, impacting only commercial

land prices. Third, economic returns are moderated by regional heterogeneity, with income and population growth being more pronounced in seasonal leisure-oriented destinations. Finally, our analysis clarifies the underlying mechanisms. The superior impact of inbound tourism is primarily driven by higher per capita spending and a qualitative shift in labor demand. The supplementary analysis reveals that an influx of foreign visitors significantly enhances facility capacity utilization (occupancy rates), particularly during off-peak periods, thereby generating substantial spillovers into the broader regional economy.

The significance of these findings lies in revealing the mechanism by which inbound tourism, rather than domestic travel, functions as a superior driver of regional structural transformation. These findings suggest that promoting strategic tourism can serve as a powerful means to mitigate negative externalities, such as regional population decline and underutilized resources. Specifically, while the impact on per capita income is limited, it demonstrates that increased inbound demand can influence regional foundations, such as land prices and youth population growth rates.

This study makes several contributions to existing literature. First, it adds to the growing body of research on the impact of tourism on regional economies. While earlier studies have focused primarily on the correlation between tourist arrivals and country-level GDP, recent studies have utilized regional-level data to identify the causal effects of expanding tourism activities.[1] For instance, Faber and Gaubert (2019) exploit geographic variations in beach quality and the presence of archaeological sites across Mexican coastal municipalities to analyze the long-run effects of tourism. They find that tourism generates large and significant economic gains. Regarding the impact on regional labor markets, Gonzalez and Surovtseva (2025) utilize terrorist attacks in alternative destinations as an instrumental variable (IV) for tourist inflows to Spain, analyzing short-run labor market effects across Spanish provinces. They find a strong positive effect on employment within the tourism industry but no significant impact on aggregate employment. Similarly, Conti et al. (2025) use a shift-share design to analyze employment effects across 600 Italian municipalities and find that tourism-induced job creation occurs only in regions with high initial unemployment, with no significant

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[1] As one of the earliest studies, Balaguer and Cantavella-Jordà (2002) examine the tourism-led growth hypothesis using macro-level data for Spain from 1975 to 1997 and Granger causality tests. Subsequent studies have widely adopted similar approaches, and a survey by Brida et al. (2016) reports that most studies conclude that tourism promotes economic growth using Granger causality test.

impact on local wages. Our study extends the existing literature by differentiating between the growth of domestic and international overnight visitors. Moreover, we examine variables, such as per capita income, population, and land prices, to analyze how the effects of tourism growth vary according to regional attributes.

Second, our study relates to the literature on the causal effects of economic shocks on regional employment (Moretti, 2010; Autor et al., 2023; Dauth et al., 2014). Among these studies, Moretti (2010) estimates the local employment multiplier and finds that new jobs in the tradable sector generate significant employment spillovers into the local non-tradable sector. He also demonstrates that this impact is particularly pronounced in industries that intensively utilize highly skilled workers. Additionally, Greenland et al. (2019) build on Autor et al. 's (2013) methodology to examine how import shocks from China affect population migration in the United States. They find a multi-year lag in population outflows following the "China shock," with these migration responses being most pronounced among younger and less-educated individuals. This study considers tourism as a tradable service sector and examines its broader impact on regional economies.

Third, we contribute to the literature on how regional economic shocks influence real estate prices. Hornbeck and Moretti (2018) examine the spillovers of local total factor productivity (TFP) shocks, demonstrating that while productivity-driven labor demand increases both worker income and housing costs, real income gains remain positive for local workers. In the context of the tourism industry, a growing body of research focuses on the impact of short-term rentals (STRs). For instance, Garcia-López et al. (2020) find that Airbnb expansion significantly inflates rents and house prices in Barcelona. They describe a mechanism in which the expansion of short-term rental platforms reallocates residential units from long-term housing to short-term rentals, effectively reducing the long-term housing supply and contributing to higher rents and prices in the local housing market. Our study extends this line of inquiry by focusing on the heterogeneous effects stemming from the growth of domestic versus international travelers.

The remainder of this paper is organized as follows. Section 2 describes the empirical framework. Section 3 presents the data sources and descriptive statistics. Section 4 reports the main results, Section 5 discusses the findings, and Section 6 concludes the paper.

2. Empirical framework
We estimate the following equation at the regional level:

$$\Delta y_{rt} = \beta_0 + \beta_1 \Delta ft_{rt} + \beta_2 \Delta dt_{rt} + \gamma X_{rt} + \mu_k + \delta_t + \varepsilon_{rt}, \qquad (1)$$

where y_{rt} denotes the outcome variable at the CZ-level. The changes in the outcome variable are defined as follows:

$$\Delta y_{rt} = (\ln y_{rt} - \ln y_{r,t-s}) \times 100,$$

with the lag length s set to three or five years since effects may emerge with a time lag. The variables Δft_{rt} and Δdt_{rt} measure changes in the number of foreign overnight stays (FT_{rt}) and domestic overnight stays (DT_{rt}), respectively, normalized by population as follows:

$$\Delta ft_{rt} = \frac{FT_{rt} - FT_{r,t-s}}{Pop_{r,t-s}}, \Delta dt_{rt} = \frac{DT_{rt} - DT_{r,t-s}}{Pop_{r,t-s}}. \qquad (2)$$

The terms μ_k and δ_t represent regional block fixed effects and year fixed effects, respectively. The causal relationship of interest is the effect of increases in overnight stays on regional economic outcomes. However, since Δy_{rt} and Δft_{rt}, Δdt_{rt} are jointly determined, the ordinary least squares estimate of Equation (1) may be biased. For example, the establishment of a large plant within a CZ may simultaneously improve local economic outcomes and increase the number of business travelers, generating upward bias due to omitted variables. Conversely, tourism promotion policies in rural areas or large-scale reconstruction projects following natural disasters may increase the number of tourists in regions experiencing economic decline, leading to reverse causality and downward bias. To address these issues, we employ a shift–share (Bartik) IV strategy.

Following Foged and Peri (2015) and Sasahara et al. (2023), the IVs for changes in foreign and domestic tourists are defined as follows:

$$\Delta ft_{rt}^{IV} = \frac{\widehat{\Delta FT}_{rt}}{Pop_{r,t-s}}, \widehat{\Delta FT}_{rt} = \sum_{c \in C} \frac{FT_{c,r,t-s-1}}{\sum_r FT_{c,r,t-s-1}}(FT_{c,-r,t} - FT_{c,-r,t-s}), \qquad (3)$$

$$\Delta dt_{rt}^{IV} = \frac{\widehat{\Delta DT}_{rt}}{Pop_{r,t-s}}, \widehat{\Delta DT}_{rt} = \sum_{p \in P} \frac{DT_{p,r,t-s-1}}{\sum_r DT_{p,r,t-s-1}}(DT_{p,-r,t} - DT_{p,-r,t-s}). \qquad (4)$$

Here, the subscripts c and p denote the country of residence of foreign tourists and the prefecture of residence of domestic tourists, respectively. These shares are interacted with changes in overnight stays by country or prefecture in all regions other than region r ($FT_{c,-r,t} - FT_{c,-r,s}$, $DT_{p,-r,t} - DT_{p,-r,s}$). These instruments are commonly referred to as leave-one-out shift-share or Bartik instruments, and are widely used in international and urban economics.

Our empirical strategy exploits regional variation in exposure to aggregate shocks in tourism demand through a shift-share (Bartik) IV approach, as formulated in Equation (7). This identification relies on the assumption that, conditional on an appropriate set of controls, the shift-share instrument is uncorrelated with the error term. Following the framework of Borusyak et al. (2022), we justify this design based on the exogeneity of aggregate "shifts"—namely, the country- or prefecture-level changes in overnight stays. The identifying assumption is that these macro-level shocks are driven by factors external to a specific CZ, but affect local economic activity through the pre-existing importance of specific tourist origin markets in that CZ.

As the impact of tourism growth may vary across regions depending on destination specific tourism demand characteristics, we estimate the following specification to examine the heterogeneous effects.

$$\Delta y_{rt} = \beta_t + \beta_1 \Delta ft_{rt} \times Z_r + \beta_2 \Delta dt_{rt} \times Z_r + \gamma_1 Z_r + \gamma_2 X_{r,t-s} + \mu_k + \delta_t + \varepsilon_{rt}, \qquad (5)$$

where Z_r is a dummy variable capturing the destination specific tourism demand characteristics. As Equation (5) includes interaction terms involving endogenous variables, we adopt the control-function approach proposed by Wooldridge (2015), which provides a convenient way to address endogeneity in such settings. Specifically, we first estimate the following:

$$\Delta ft_{rt} = \alpha + \alpha_1 \Delta ft_{rt}^{IV} + \alpha_2 \Delta dt_{rt}^{IV} + \mu_k + \delta_t + u_{rt},$$
$$\Delta dt_{rt} = \alpha + \alpha_1 \Delta ft_{rt}^{IV} + \alpha_2 \Delta dt_{rt}^{IV} + \mu_k + \delta_t + u_{rt}, \qquad (6)$$

and obtain the residuals $\hat{u}_{rt}^{ft}$ and $\hat{u}_{rt}^{dt}$. These residuals are then included as control variables in the second-stage regression:

$$\Delta y_{rt} = \beta_t + \beta_1 \Delta ft_{rt} \times Z_r + \beta_2 \Delta dt_{rt} \times Z_r + \gamma_1 Z_r + \gamma_2 X_{r,t-s}$$
$$+ \eta_1 \hat{u}_{rt}^{ft} + \eta_2 \hat{u}_{rt}^{dt} + \mu_k + \delta_t + \varepsilon_{rt}. \qquad (7)$$

This approach allows us to address endogeneity while examining heterogeneity in the effects of tourism growth across regions.

3. Data
3.1 Data source
Data on foreign and domestic tourists are obtained from the *Overnight Travel Statistics Survey* compiled by the Japan Tourism Agency (JTA). This official monthly survey has been conducted since 2007 to capture the actual state of overnight travels in Japan. It covers hotels, ryokans, resort hotels, simple lodgings, and company or organizational

accommodation facilities, and collects information on overnight stays by Japanese and foreign guests. For establishments with 10 or more employees, the survey additionally reports the total number of overnight stays by nationality for foreign guests and by prefecture of residence for guests from Japan. As publicly available data are limited to the prefectural level, this study utilizes confidential individual establishment-level data to estimate overnight stays at the CZ-level. Data are available from 2008 to 2019; however, because the construction of IVs requires one-year lagged values, the estimation sample covers the period from 2009 to 2019. Although both total overnight stays and the number of unique guests are available, this study uses total overnight stays.[2]

The outcome variable y_{rt} captures economic activity in each CZ and includes per capita taxable income (from the *Survey of Municipal Taxation Status*, Ministry of Internal Affairs and Communications), population (from the *Basic Resident Register*), and official land prices (JTA). Taxable income reflects the income of residents registered within the CZ and, therefore, does not include the income earned by temporary migrant workers who enter the area during peak tourist seasons. The control variables include the share of the elderly population (aged 65 years and above), population density, female employment share, and share of employment in the secondary sector. The first two variables are obtained from the Basic Resident Register, and the latter two are drawn from the Population Census (Ministry of Internal Affairs and Communications). As the census is conducted every five years, the values from the census during the interval between censuses are obtained by linear interpolation.

To examine regional heterogeneity in the effects of increases in overnight stays, we construct variables Z_r that capture local tourism demand characteristics. The first is the

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[2] One may wonder how the rise of short-term rentals (STRs), such as Airbnb, affects local economic outcomes. However, the penetration of STRs in Japan remains significantly lower than in major Western cities at least in our sample periods. According to Garcia-López et al. (2020), as of 2015, the number of Airbnb listings reached 16,700 in Barcelona, 45,000 in New York, 30,000 in Los Angeles, and 35,000 in Paris. In contrast, the total number of listings across all of Japan was only approximately 21,000 during the same period (Travel Voice, 2015). Unfortunately, our data do not cover STRs. Furthermore, given the limited availability of granular STR data in Japan and their relatively small market share during our study period, it is difficult to rigorously examine their impact within our current empirical framework. Consequently, we leave the analysis of the STR sector for future research as more comprehensive data become available.

seasonality measure of local tourism. We define a dummy variable equal to one if the coefficient of variation of monthly overnight stays in the initial sample year exceeds the median across regions. This measure increases with the degree of seasonality. Thus, it proxies for dependence on highly seasonal tourism facilities, such as ski resorts or beaches. The second is the measure of leisure tourism. If tourists visiting for tourism and recreation spend more on local attractions and activities than business travelers, an increase in leisure tourists is expected to have a significant impact on the regional economy.[3] We compute the regional share of overnight stays for tourism and recreation purposes and construct a dummy variable equal to one if this share exceeds the median. The share of leisure tourists is obtained from the *Overnight Travel Statistics Survey*, which asks accommodation providers to report the shares of total overnight stays by purpose of visit, namely, tourism and recreation versus business.

The geographical unit of analysis is the CZ developed by Adachi et al. (2020). While previous studies often rely on administrative units, such as municipalities or prefectures, these do not necessarily correspond to economically meaningful areas. At the municipal level, extensive cross-municipality commuting can lead to inaccurate measurement of labor market shocks, while prefectures may encompass multiple municipalities with different labor market conditions. Using census data, Adachi et al. (2020) define CZs as groups of municipalities that satisfy a threshold for the share of workers commuting within the same area. In this study, we adopt CZs constructed from municipal commuting patterns observed in 2015. In our analysis, we exclude CZs with fewer than 5,000 residents as outliers. This is because regions with very low population tend to exhibit extremely high values and high variability in changes in the number of overnight stays per capita.[4]

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[3] According to the 2019 Survey on Consumption Trends of Foreign Visitors to Japan (JTA), the average expenditure per trip for foreign visitors was slightly higher for business travelers (¥164,000) than for leisure/tourism travelers (¥155,000). However, examining the breakdown reveals that while the difference is largest in accommodation costs, leisure/tourism travelers spent more on entertainment and other services, as well as shopping.

[4] In less populated regions, the number of hotels is limited, and reported guest numbers often fluctuate significantly. The 5,000-person population threshold is based on the Local Autonomy Act, which stipulates a minimum population of 5,000 as one requirement for a local public entity to be designated as a town. Indeed, comparing the standard deviation of the change in domestic overnight stays over three years (Δdt_{rt}) between areas with

3.2 Data overview

Figure 1 shows the trends in total overnight stays by Japanese and foreign guests, based on the *Overnight Travel Statistics Survey* (JTA). Total overnight stays by foreign guests amounted to 17 million guest nights in 2011 but increased sharply thereafter, exceeding 100 million guest nights in 2019—more than a fivefold increase over eight years. Overnight stays by domestic guests also have an upward trend, rising from 320 million guest nights in 2011 to approximately 400 million in 2019, an increase of approximately 25 percent over the same period.

== Figure 1 ==

Figure 2 shows the average expenditure per trip for Japanese overnight travelers and foreign visitors to Japan in 2019, based on the *Travel and Tourism Consumption Survey* and the *Survey on Consumption Trends of Foreign Visitors to Japan* (both JTA). Expenditure by foreign visitors is limited to travelers visiting for tourism and leisure purposes (excluding cruise passengers) and excludes international transportation costs, such as airfare to Japan. As the average length of stay differs substantially by nationality, per-trip expenditure varies widely across countries. Nevertheless, the travel expenditure by foreign visitors is higher than that of Japanese travelers. Specifically, the average travel expenditure per trip by Japanese overnight travelers is approximately JPY 55,000, whereas foreign visitors spend more than JPY 130,000 on average across all nationalities. Even Korean visitors who tend to have relatively short stays spend approximately JPY 60,000 per trip, exceeding the Japanese average.

To make total travel expenditures comparable by adjusting for differences in length of stay based on nationality, we compute per-night travel expenditure by dividing total travel expenditure by total overnight stays. We use aggregate expenditure from the *Travel and Tourism Consumption Survey* and the *Survey on Consumption Trends of Foreign Visitors to Japan*, and total overnight stays from the *Overnight Travel Statistics Survey*. In 2019, the total travel expenditure of Japanese overnight travelers amounted to 17.2 trillion yen, while that of foreign guests, excluding international transportation costs, was 4.8 trillion yen. Dividing these figures by total overnight stays yields per-night expenditure of approximately JPY 43,000 for Japanese travelers and JPY 48,000 for

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populations under 5,000 and other areas yields values of 21.7 and 9.11, respectively. This confirms that fluctuations in overnight stays exhibit extremely high variability in areas with smaller populations.

foreign visitors, indicating that per-night spending by foreign visitors is approximately 12 percent higher.

== Figure 2 ==

Figure 3 shows the five-year change in the number of domestic and foreign overnight guests per capita by commuting area from 2009 to 2019. The increase in domestic overnight travelers has been geographically widespread, being more pronounced in regional cities than in major urban centers, such as Tokyo and Osaka. In contrast, the growth in foreign overnight guests is highly concentrated in major metropolitan areas with international airports, such as Tokyo, Osaka, and Kyoto. In non-metropolitan areas, foreign overnight stays have increased in regions with well-known ski resorts, such as Hokkaido, Nagano, and Kyushu, which are geographically close to Korea, and around Mount Fuji. However, in regions, such as Tohoku, San'in, and Shikoku, the increase is relatively modest. Overall, the spatial distribution of growth differed markedly between domestic and foreign travelers, with the latter showing a much more geographically concentrated pattern.[5]

== Figures 3 (a) and (b) ==

4. Estimation results

4.1 Baseline results

We now present the estimation results, beginning with the first-stage estimates for Equation (1), as reported in Table 1. The instruments, Δdt_{rt}^{IV} and Δft_{rt}^{IV}, exhibit a strong and positive correlation with their respective endogenous regressors, Δdt_{rt} and Δft_{rt}. Across all the specifications, the first-stage F-statistics exceed the conventional threshold of 10. These results suggest that our instruments possess sufficient predictive power and that the analysis is unlikely to be compromised by weak instrument bias.

== Table 1 ==

The upper panel of Table 2 shows the results of the second-stage estimation for a lag period of $s = 3$, whereas the lower panel shows the results for $s = 5$. Our analysis reveals several key findings. First, the impact of inbound tourism (Δft_{rt}) on both per

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[5] Over the five-year period from 2014 to 2019, the commuting zones that experienced particularly large increases in foreign overnight travelers on a per capita basis include areas around Niseko (Hokkaido), Hakuba (Nagano), Tomamu–Sahoro (Hokkaido), Yakushima (Kagoshima), Motobu (Okinawa), Fujiyoshida (Yamanashi), and Kyoto.

capita income and total population, is consistently positive and statistically significant, remaining robust to various lag specifications. Second, this demographic response is driven primarily by the 15–34-year age group, the only cohort exhibiting a significant positive correlation with foreign traveler growth. Third, the asset-market effects of inbound tourism are concentrated in commercial land prices (*LP-com*), whereas the impact on residential land prices (*LP-res*) remains statistically insignificant. Finally, we find a notable asymmetry regarding tourist origins: in contrast to the broad effects of inbound travel, domestic overnight stays (Δdt_{rt}) yield a significant positive coefficient exclusively for commercial land prices, while income and population outcomes show almost no effect, regardless of the lag period.[6]

== Table 2 ==

One may be interested in identifying shift-share design. To assess the validity of the shift-share design, we conduct a balance test and a series of sensitivity analyses following Borusyak et al. (2022). First, we examine the regional balance by checking for correlations between the IVs and control variables. We then examine whether excluding control variables correlated with the IVs alters the results. We confirm that the estimated coefficient for inbound tourism remains remarkably stable in both magnitude and significance. This stability confirms the validity of our identification method.[7]

Figure 4 illustrates the estimated impact of an increase in foreign overnight stays on

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[6] The impact of domestic tourism on income is sensitive to the lag structure: a negative significant coefficient at a three-year lag becomes insignificant after five years. Given this inconsistency, we conclude that domestic travel—unlike inbound tourism—does not systematically drive regional income growth.

[7] See Adão et al. (2019), Goldsmith-Pinkham et al. (2020), and Borusyak et al. (2022) for a detailed discussion on the identification of shift-share designs. In Appendix Table A3(a), we report the results of a regional balance test examining whether our instruments are correlated with a vector of 16 baseline regional characteristics. While we find significant correlations with six variables (e.g., population density and the employment share of the secondary sector), Appendix Table A3(b) demonstrates that our results are insensitive to the inclusion or exclusion of these specific controls. The stability of the coefficients suggests that the identifying variation is primarily driven by the exogenous components of the shift-share instrument. Note that we do not perform the share-level balance test proposed by Borusyak et al. (2022) due to the limited variation in the origin shares; our data comprise shares for only 47 prefectures for domestic travelers and 13 countries for foreign travelers, which does not provide sufficient cross-sectional variation for such a diagnostic.

per capita income, based on the coefficients reported in Table 2. Drawing on the summary statistics in Appendix Table A1(a), the standard deviation of Δft_{rt} over a five-year period is 1.35. Consequently, a one-standard-deviation increase in foreign overnight stays is associated with a 0.5 percentage point rise in per capita taxable income over five years, or approximately 0.1 percentage points annually. Given that the average five-year growth rate of per capita income in the full sample is 2.6 percent (0.5 percent annually), this estimate implies that inbound tourism contributes to approximately 20 percent of the total income growth.

== Figure 4 ==

However, this baseline result overlooks important regional-level heterogeneities. The five-year median value of Δft_{rt} is only 0.068, with the 75th percentile at 0.255. Applying the coefficient from Column (8) of Table 2 to these values yields modest income effects of 0.024 and 0.09 percentage points over five years, respectively. Even at the 90th and 95th percentiles (0.9 and 2.27, respectively; see Appendix Table A1(b)), the corresponding effects on per capita income remain at 0.3 and 0.8 percentage points, respectively. These findings suggest that the income gains from inbound tourism are highly skewed and concentrated in a limited subset of regions. Our results are consistent with Conti et al. (2025), who find that increases in inbound tourists do not lead to wage growth, and this is likely attributable to the low-wage nature of tourism-related industries, as they point out.

A similar exercise for the youth population and commercial land prices demonstrates that the five-year lag coefficients on inbound foreign travelers are 1.279 and 2.639, respectively. Multiplying these by the median increase in inbound travelers (0.068) implies increases of 0.1 percentage points (0.02 annually) and 0.2 percentage points (0.04 annually) in the youth population and commercial land prices, respectively. As shown in Appendix Table A1, the average five-year changes in both outcomes are negative, suggesting that growth in inbound overnight stays may help offset declines in the youth population and commercial land prices.

4.2 Robustness checks

To validate our baseline findings, we perform several robustness checks, as presented in Table 3. In Panel (a), we exclude Iwate, Miyagi, and Fukushima prefectures, which were the most severely affected by the 2011 Great East Japan Earthquake. In Panel (b), we

exclude the three- and five-year windows beginning in 2009 and 2011 to mitigate the influence of major macroeconomic shocks, specifically the Global Financial Crisis and the earthquake. Such large-scale disasters can distort estimates through multiple channels. For instance, disasters typically cause a sharp decline in the number of foreign tourists. Simultaneously, the conversion of lodging facilities into shelters or housing for reconstruction workers may mechanically increase the number of domestic lodgers. When the reconstruction demand simultaneously boosts the number of overnight stays and regional economic activity, an upward bias in the estimates may occur. Conversely, if domestic overnight stays increase, while the overall regional economy remains sluggish, a downward bias may arise. Despite these potential confounding factors, the results in Panels (a) and (b) remain qualitatively and quantitatively consistent with the baseline estimates in Table 2.

== Table 3 ==

Table 3(c) excludes Tokyo, Osaka, and Aichi Prefectures. These regions host major international gateways and corporate headquarters, attracting a disproportionately large number of business travelers. This specification ensures that our baseline analysis results are not specific to these major metropolitan areas. Similarly, Panel (d) excludes CZ, including Kyoto city. Kyoto is a global tourism hub where overtourism has become an emerging concern. The estimated coefficients remain stable and consistent with the baseline results across all the specifications, as seen in Table 2. These results suggest that our findings are not driven by a few dominant outliers or specific gateway regions but, rather, reflect a broader economic trend across Japanese municipalities.

4.3 Heterogeneous effect of the increase in tourists

Next, we investigate the impact of increased overnight stays on demographic shifts disaggregated by gender and age group. Analyzing gender-specific outcomes is particularly salient, given that tourism-related sectors—notably accommodation and food services—rely heavily on female labor.[8] Figure 5 presents the estimates using gender- and age-specific population changes as dependent variables to identify the demographic

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[8] According to the 2016 Economic Census for Business Activities (Ministry of Internal Affairs and Communications and Ministry of Economy, Trade and Industry), female workers account for 44% of all employed persons across all industries, but this figure rises to 59% in the food service industry and 56% in the hotel and lodging industry.

cohorts that are most responsive to tourism growth. The results reveal distinct patterns between inbound and domestic tourism. An increase in foreign tourists is associated with significant population growth among men aged 25–34 years, whereas for women, the positive effects are more widespread, spanning the 15–24, 25–34, and 45–54-year age cohorts. Conversely, domestic tourism growth yields a significant positive coefficient only for women aged 45–54 years, with the effects for other demographic groups remaining statistically insignificant. The concentration of population gains among younger cohorts in response to inbound tourism may reflect the higher mobility of young, unmarried workers, as well as a greater propensity among younger generations to engage in roles requiring foreign-language proficiency.[9] The finding that the migration response to regional demand shocks is greater among young workers is consistent with Greenland et al. (2019).

=== Figure 5 ===

Figure 6(a) plots the coefficients from regressions of five-year changes in per capita taxable income on changes in foreign and domestic overnight stays, interacted with destination specific characteristics. We estimate two specifications to capture regional heterogeneity. First, comparing the differences among regions with high versus low tourism seasonality (Seasonality H/L), the more pronounced income effects in highly seasonal regions. The results indicate that on comparing regions with large seasonal fluctuations in tourism to those with small fluctuations (seasonal fluctuation H/L), the impact on income is more pronounced in the former. It suggests that gains are concentrated in destinations centered around specific natural endowments, such as ski resorts or beach tourism. A consistent pattern emerges when classifying regions by the prevalence of leisure-oriented travelers (Leisure H/L); income growth is predominantly driven by regions where tourism is geared toward recreation rather than business.

=== Figure 6 ===

Figures 6(b)–(e) extend this analysis to total and age-specific population outcomes. For total population, inbound tourism triggers significant growth specifically in high-seasonality regions. At the cohort level, these gains are concentrated among the 15–34-year age group in both highly seasonal and leisure-oriented regions. This suggests that

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[9] According to the TOEIC Test Taker World Report 2023 (IIBC, 2024), mean TOEIC scores are higher for women than for men. Regarding age-specific trends, scores peak among the 26–30 age group and exhibit a gradual decline with increasing age.

tourism-driven labor demand primarily attracts younger, more mobile workers to specialized recreational hubs. Finally, Figures 6(f) and 6(g) illustrate the impact on official land prices. In contrast to the income results, an increase in inbound travel is associated with rising commercial land prices predominantly in low-seasonality regions (Seasonality L). This disparity likely stems from differences in land supply elasticity: in high-seasonality rural areas, an abundance of underutilized land buffers the price impact of increased tourism demand. Conversely, in low-seasonality metropolitan areas where land is scarce and intensively utilized, the influx of inbound tourists leads to more pronounced upward pressure on land prices.

5. Discussion

The results in Section 4 reveal a stark contrast: while domestic overnight stays have a negligible impact on most regional economic indicators—except for commercial land prices—inbound foreign tourism exerts statistically significant effects on per capita income, the youth population, and land values. In this section, we discuss the potential mechanisms underlying these divergent findings. First, there is a disparity in per capita tourism expenditure. Given that foreign visitors typically exhibit higher average spending, their aggregate economic footprint is inherently larger. In addition to this direct effect, population growth may also contribute to rising incomes. Moretti (2010) demonstrates that increases in high-skilled employment can generate substantial local multipliers. To the extent that inbound tourism boosts the demand for workers with specialized skills, such as foreign-language proficiency, it may amplify spillovers into the broader local economy. Our finding that inbound growth is associated with an influx of the youth population is consistent with this hypothesis, suggesting a reallocation of younger skilled labor toward regions with expanding foreign-oriented business activities.

Second, the smoothing of seasonal or day-of-the-week fluctuations in tourism demand. Domestic tourism in Japan is highly concentrated on weekends, public holidays, and seasonal peaks. Such transitory demand may be met by temporary migrant labor or secondary employment from other local sectors, thereby limiting sustained gains in per capita income or permanent population inflows. In contrast, fixed assets, such as real estate, cannot be easily reallocated to match short-term fluctuations, which may explain why domestic stays correlate significantly only with commercial land prices. However, inbound tourism tends to involve longer and more continuous stays, which enhances the

utilization rates of facilities on weekdays. Furthermore, because holiday schedules vary internationally, a diversified portfolio of inbound markets can mitigate seasonal volatility and foster a more stable and productive economic environment.[10]

As a supplementary analysis, we investigate whether a higher share of foreign tourists enhances resource utilization, as measured by room occupancy rates (ROC), while controlling for the total volume of overnight stays. We calculate the average ROC for each CZ and use its five-year change as the dependent variable. This analysis is restricted to the 2011–2019 period because data on the number of guest rooms required to calculate the room occupancy rates, are unavailable prior to 2011. The baseline specification is as follows:

$$\Delta ROC_{rt} = \beta_t + \beta_1 ROC_{r0} + \beta_2 \Delta fratio_{rt} \times Z_r + \beta_3 \ln T_{rt}$$
$$+ \beta_4 \ln T_{rt}^2 + \gamma_1 Z_r + \gamma_2 X_{r,t-s} + \mu_k + \delta_t + \varepsilon_{rt}. \qquad (8)$$

where the independent variables include the initial room occupancy rate, ROC_{r0} to account for convergence, the change in the share of foreign overnight stays relative to the total stays five years prior ($\Delta fratio_{rt} = \Delta ft_{rt}/(ft_{rt-s} + dt_{rt-s})$), the log of total stays ($\ln T_{rt}$). We also include the same vector of regional characteristics and controls as in Equation (7).

Table 4 provides descriptive statistics for ROC in 2011 and 2019 across different regional profiles. Occupancy levels are systematically higher in major metropolitan areas, regions with low seasonality, and those with a high prevalence of leisure travelers. Notably, ROC increased across all regions over the sample period. Table 5 reports the estimation results for Equation (8). The coefficient on the foreign visitor share is positive and statistically significant. This result remains robust to the inclusion of total overnight stays and their quadratic terms. To further explore the "smoothing effect" hypothesis, Columns (4) and (5) introduce interaction terms with dummies indicating high baseline seasonality (*CV2011 > median*) and a high share of leisure-oriented travel (*Leisure ratio2011 >* median), respectively. In Column (4), the standalone coefficient on the foreign share becomes statistically insignificant, whereas the interaction term with seasonality is positive and significant. This finding suggests that gains in occupancy are

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[10] The positive impact of demand density and the smoothing of demand fluctuations on service-sector productivity has been extensively documented by Morikawa (2011, 2012).

driven primarily by regions with highly seasonal demand, such as ski or beach resorts. These results imply that inbound tourism mitigates underutilization during off-peak periods, thereby smoothing seasonal fluctuations. In contrast, Column (5) shows no significant interaction effect for the leisure-share dummy, suggesting that the smoothing mechanism is specifically linked to the seasonal distribution of demand rather than the purpose of travel itself.

<center>== Tables 4 and 5 ==</center>

6. Conclusion

This study examines the regional economic implications of tourism expansion, formalizing it as a favorable demand shock to the local tradable service sector. Departing from conventional development paradigms that emphasize manufacturing exports, we investigate the capacity of inbound tourism—viewed as a distinct category of service trade—to catalyze regional growth. Leveraging Japan's extraordinary 27% annualized growth in international arrivals during the 2010s, we implement an SSIV design utilizing a newly constructed CZ dataset. By disentangling the effects of international and domestic visitors, we identify their heterogeneous impacts on regional fundamentals, specifically per capita income, youth demographic shifts, and commercial land values.

Our findings reveal that inbound tourism significantly enhances regional fundamentals, whereas domestic tourism yields negligible effects on income and population. Specifically, a one-standard-deviation increase in foreign visitors raises per capita income by 0.5 percentage points over five years. However, these gains are spatially concentrated and moderated by regional heterogeneity, with leisure-oriented destinations experiencing more pronounced benefits. The results suggest that inbound tourism functions as a superior driver of structural transformation compared with domestic travel. Consequently, strategic tourism promotion may serve as a policy tool to mitigate regional population decline and optimize underutilized local resources.

Although this study provides several insights into the causal effects of tourism promotion, it has some limitations that suggest directions for future research. First, it is necessary to further investigate the impact of inbound tourism on wages and labor demand by industry and skill level. Although we document increases in the youth population associated with inbound tourism, it remains unclear whether this reflects inflows of high-skilled workers. Second, the long-run impacts of tourism growth require closer

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examination. Our analysis focuses on relatively short horizons, using three- and five-year lags, but the longer-term effects may differ. Tourism is a resource-dependent sector that tends to exhibit lower productivity growth than manufacturing. Greater reliance on such low-productivity-growth sectors—often discussed in the context of Baumol's cost disease—may have adverse implications for long-term economic growth. Assessing whether such effects arise in practice requires an empirical analysis using longer time spans.

Third, future research should consider the spillover effects on neighboring regions. While we measure tourism growth using overnight stays, many inbound visitors remain based in major cities and undertake day trips to surrounding areas. Therefore, capturing the full impact of inbound tourism requires explicit consideration of these spatial spillovers. Finally, more attention should be given to the negative effects of inbound tourism. In recent years, the growth in foreign visitors has been associated with social challenges, such as the expansion of illegal short-term rentals, rising rents, and congestion in tourist destinations and public transportation. As the socioeconomic indicators used in this study do not fully capture these adverse effects, future studies should incorporate new data sources to analyze these dimensions more directly.

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Table 1   First-stage regression results

	(1)	(2)	(3)	(4)
	$s=3$		$s=5$	
	Δft	Δdt	Δft	Δdt
Δft^{IV}	1.134***	-0.832	1.118***	-0.602
	(0.192)	(0.595)	(0.183)	(0.522)
Δdt^{IV}	0.118	4.957***	-0.0162	4.093***
	(0.170)	(0.970)	(0.135)	(0.771)
N of obs	1,857	1,857	1,391	1,391
First F	19.05	21.74	27.86	19.98

Note: Figures in parentheses are standard errors clustered by commuting zones. Regional block fixed effects, year fixed effects, and control variables for regional characteristics are included. *** indicates statistical significance at the 1% level.

Table 2   Second-stage regression results: Impact of inbound and domestic tourism

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
s=3	Δln(pc income)	Δln(Pop)	Δln(Pop15-34)	Δln(Pop35-49)	Δln(Pop50-64)	Δln(LP-com)	Δln(LP-res)
Δft	0.344**	0.305**	1.344***	0.069	-0.026	2.494*	1.747
	(0.147)	(0.122)	(0.347)	(0.287)	(0.156)	(1.355)	(1.416)
Δdt	-0.096***	0.016	-0.011	0.004	0.084	0.316*	0.061
	(0.029)	(0.018)	(0.074)	(0.025)	(0.057)	(0.172)	(0.067)
# of obs	1,857	1,857	1,857	1,857	1,857	1,857	1,732
KP-test	12.84	12.84	12.84	12.84	12.84	12.84	13.23
s=5	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Δft	0.345*	0.317**	1.279***	0.089	-0.024	2.639*	1.537
	(0.180)	(0.134)	(0.350)	(0.314)	(0.169)	(1.342)	(1.204)
Δdt	-0.049	0.029	-0.036	0.008	0.206	0.722**	0.108
	(0.090)	(0.031)	(0.064)	(0.073)	(0.131)	(0.317)	(0.206)
# of obs	1,391	1,391	1,391	1,391	1,391	1,391	1,299
KP-test	16.54	16.54	16.54	16.54	16.54	16.54	14.97

Note: Figures in parentheses are standard errors clustered by commuting zones. Regional block fixed effects, year fixed effects, and control variables for regional characteristics are included but not reported. Full results are reported in Appendix Table A2. *** indicates statistical significance at the 1% level. KP test stands for Kleibergen-Paap LM test statistics.

Table 3 Robustness checks

(a) Excluding prefectures that suffered severe damage in the Great East Japan Earthquake (Iwate, Miyagi, and Fukushima)

s=3	(1) *Δln(pc income)*	(2) *Δln(Pop)*	(3) *Δln(Pop15-34)*	(4) *Δln(Pop35-49)*	(5) *Δln(Pop50-64)*	(6) *Δln(LP-com)*	(7) *Δln(LP-res)*
Δft	0.305**	0.327***	1.362***	0.091	-0.036	2.509*	1.689
	(0.143)	(0.122)	(0.350)	(0.288)	(0.157)	(1.376)	(1.438)
Δdt	-0.100***	0.012	-0.017	-0.003	0.087	0.279*	0.017
	(0.029)	(0.018)	(0.075)	(0.026)	(0.058)	(0.164)	(0.061)
# of obs	1,721	1,721	1,721	1,721	1,721	1,721	1,596
KP-test	12.83	12.83	12.83	12.83	12.83	12.83	13.19
s=5	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Δft	0.311*	0.330**	1.287***	0.097	-0.026	2.608*	1.421
	(0.172)	(0.136)	(0.354)	(0.317)	(0.170)	(1.356)	(1.223)
Δdt	-0.060	0.027	-0.042	-0.003	0.220	0.628**	-0.005
	(0.089)	(0.030)	(0.066)	(0.074)	(0.133)	(0.305)	(0.201)
# of obs	1,289	1,253	1,253	1,253	1,253	1,167	1,219
KP-test	16.61	16.61	16.61	16.61	16.61	15	15.78

Note: See notes in Table 2.

(b) Excluding years starting from 2009 (GFC) and 2011 (the earthquake)

$s=3$	(1) $\Delta ln(pc\ income)$	(2) $\Delta ln(Pop)$	(3) $\Delta ln(Pop15\text{-}34)$	(4) $\Delta ln(Pop35\text{-}49)$	(5) $\Delta ln(Pop50\text{-}64)$	(6) $\Delta ln(LP\text{-}com)$	(7) $\Delta ln(LP\text{-}res)$
Δft	0.454***	0.325***	1.441***	0.069	-0.061	2.459*	1.995
	(0.160)	(0.121)	(0.362)	(0.277)	(0.163)	(1.348)	(1.572)
Δdt	-0.125***	0.008	-0.023	-0.002	0.048	0.194	0.046
	(0.044)	(0.021)	(0.089)	(0.018)	(0.033)	(0.143)	(0.073)
# of obs	1,395	1,395	1,395	1,395	1,395	1,395	1,299
KP-test	8.338	8.338	8.338	8.338	8.338	8.338	9.720
$s=5$	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Δft	0.439**	0.330**	1.367***	0.070	-0.046	2.887**	1.872
	(0.199)	(0.135)	(0.381)	(0.305)	(0.179)	(1.398)	(1.392)
Δdt	-0.070	0.017	-0.048	-0.020	0.137	0.518*	0.003
	(0.082)	(0.028)	(0.061)	(0.054)	(0.106)	(0.291)	(0.257)
# of obs	929	929	929	929	929	929	866
KP-test	5.639	5.639	5.639	5.639	5.639	5.639	5.555

Note: See notes in Table 2.

(c) Excluding the three largest cities (Tokyo, Aichi, and Osaka)

s=3	(1) Δln(pc income)	(2) Δln(Pop)	(3) Δln(Pop15-34)	(4) Δln(Pop35-49)	(5) Δln(Pop50-64)	(6) Δln(LP-com)	(7) Δln(LP-res)
Δft	0.335**	0.314**	1.363***	0.078	-0.032	2.523*	1.734
	(0.144)	(0.124)	(0.352)	(0.290)	(0.156)	(1.358)	(1.432)
Δdt	-0.098***	0.017	-0.011	0.011	0.071	0.313*	0.062
	(0.029)	(0.018)	(0.075)	(0.026)	(0.053)	(0.170)	(0.067)
# of obs	1,761	1,761	1,761	1,761	1,761	1,761	1,636
KP-test	13.33	13.33	13.33	13.33	13.33	13.33	13.89
s=5	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Δft	0.337*	0.327**	1.304***	0.104	-0.051	2.668**	1.512
	(0.176)	(0.137)	(0.356)	(0.318)	(0.168)	(1.349)	(1.221)
Δdt	-0.047	0.034	-0.026	0.027	0.165	0.712**	0.097
	(0.086)	(0.031)	(0.064)	(0.075)	(0.122)	(0.312)	(0.204)
# of obs	1,319	1,319	1,319	1,319	1,319	1,319	1,227
KP-test	17.67	17.67	17.67	17.67	17.67	17.67	16.12

Note: See notes in Table 2.

(d) Excluding CZ, including Kyoto city

s=3	(1) Δln(pc income)	(2) Δln(Pop)	(3) Δln(Pop15-34)	(4) Δln(Pop35-49)	(5) Δln(Pop50-64)	(6) Δln(LP-com)	(7) Δln(LP-res)
Δft	0.332**	0.303**	1.345***	0.066	-0.033	2.353*	1.740
	(0.148)	(0.123)	(0.351)	(0.291)	(0.158)	(1.362)	(1.433)
Δdt	-0.096***	0.016	-0.011	0.003	0.084	0.318*	0.061
	(0.029)	(0.018)	(0.074)	(0.025)	(0.057)	(0.171)	(0.067)
# of obs	1,849	1,849	1,849	1,849	1,849	1,849	1,724
KP-test	12.80	12.80	12.80	12.80	12.80	12.80	13.17
s=5	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Δft	0.332*	0.315**	1.279***	0.084	-0.030	2.513*	1.529
	(0.181)	(0.136)	(0.354)	(0.318)	(0.171)	(1.349)	(1.217)
Δdt	-0.049	0.029	-0.036	0.007	0.207	0.724**	0.108
	(0.090)	(0.031)	(0.064)	(0.073)	(0.132)	(0.318)	(0.206)
# of obs	1,385	1,385	1,385	1,385	1,385	1,385	1,293
KP-test	16.55	16.55	16.55	16.55	16.55	16.55	14.98

Note: See notes in Table 2.

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Table 4 Room occupancy rate by region

	Seasonality		Leisure share		Tokyo, Aichi, Osaka	Total
	Low	High	Low	High		
2011	0.544	0.430	0.484	0.502	0.541	0.494
2019	0.644	0.525	0.578	0.603	0.664	0.592

Note: "Low" and "high" for both Seasonality and Leisure Share indicate whether each region's seasonality index (or leisure visitor ratio) is below or above the median, respectively. Details of variable construction are provided in the text.

Source: Authors' calculation from the Overnight Travel Statistics Survey (JTA)

Table 5 Impact of inbound tourism on room occupancy rate

Dependent variable: ΔROC	(1)	(2)	(3)	(4)	(5)	(6) Excl. Tokyo, Aichi, Osaka	(7) Excl. Kyoto
			All sample				
ROC_{2011}	-0.350***	-0.355***	-0.373***	-0.395***	-0.374***	-0.367***	-0.371***
	(0.045)	(0.042)	(0.045)	(0.049)	(0.044)	(0.045)	(0.046)
ΔlnT		0.028**	0.034***	0.035***	0.034***	0.030**	0.034***
		(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
ΔlnT^2			-0.032**	-0.033**	-0.034***	-0.027**	-0.032**
			(0.012)	(0.013)	(0.013)	(0.013)	(0.013)
$\Delta fratio$	0.096***	0.065*	0.080**	0.040	0.083*	0.076*	0.083**
	(0.034)	(0.034)	(0.038)	(0.040)	(0.050)	(0.039)	(0.039)
$\Delta fratio*Dum(CV2011>median)$				0.086*			
				(0.050)			
$\Delta fratio*Dum(Leisure\ ratio2011>median)$					0.001		
					(0.061)		
$Dum(CV2011>median)$				(0.009)			
				0.000			
$Dum(Leisure\ ratio2011>median)$					-0.009		
					(0.009)		
Observations	928	928	928	928	928	880	924
R-squared	0.255	0.265	0.274	0.282	0.276	0.270	0.274

Note: See notes in Table 2.

Figure 1 Trend of overnight stays (unit: 10 thousand guest nights)
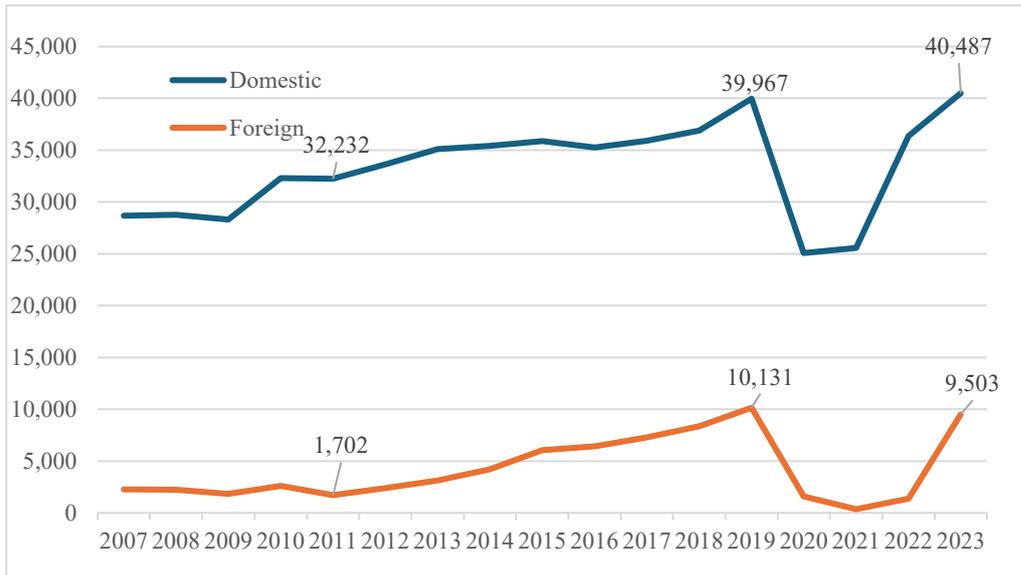
Source: Authors' calculation from Overnight Travel Statistics Survey (JTA)

Figure 2 Per-person travel expenditure per trip for domestic and foreign visitors to Japan (2019, unit: yen)
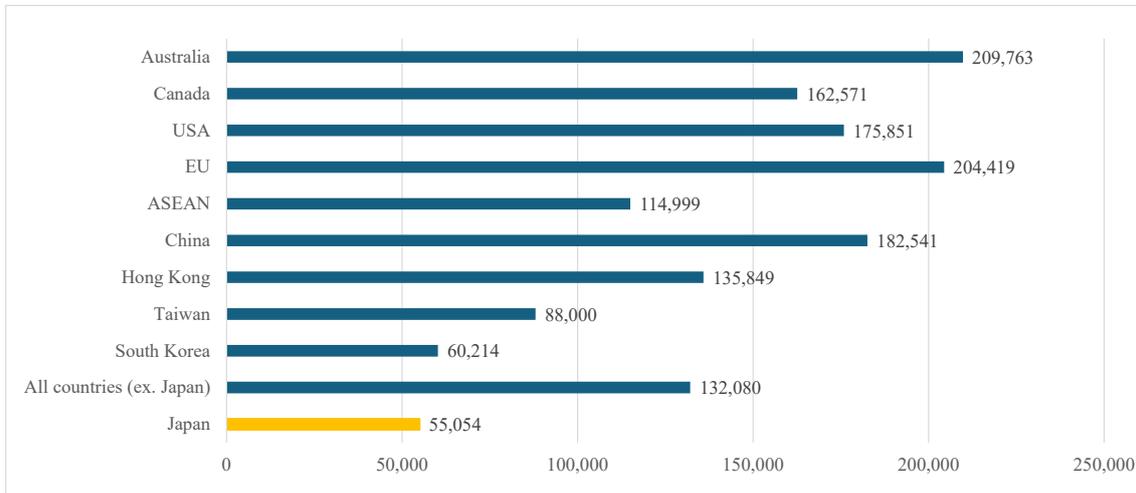
Notes: Travel expenditures of foreign visitors refer to expenditures incurred during their stay in Japan and do not include international airfares or other travel costs to Japan. Foreign visitors in the survey are limited to those whose primary purpose of visit is tourism or recreation (excluding cruise passengers).

Source: Consumption Trend Survey for Travel and Tourism; Consumption Trend Survey of Foreign Visitors to Japan (Japan Tourism Agency)

Figure 3 (a)　Changes in the number of overnight stays for domestic tourists
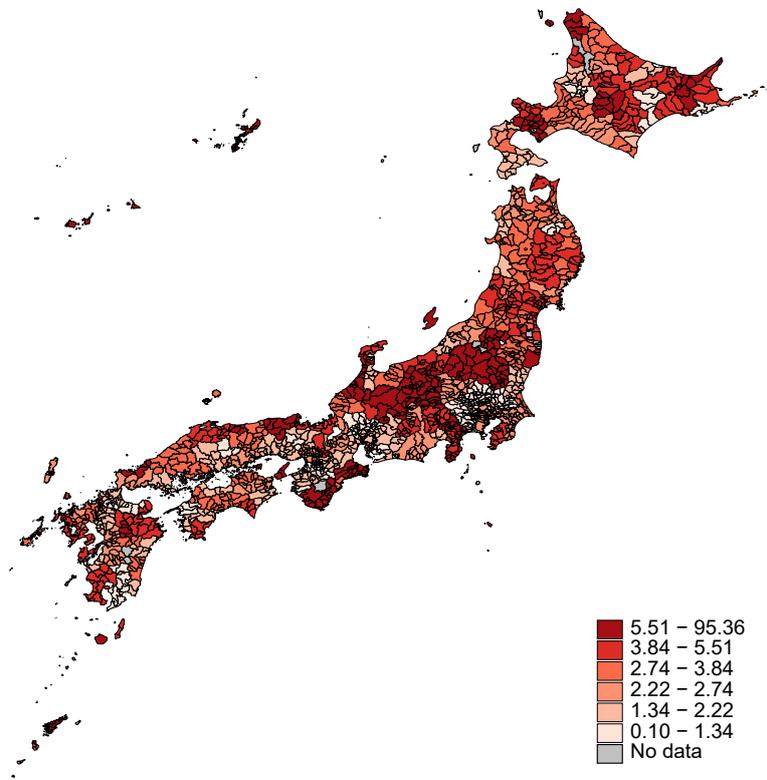
Figure 3 (b)　Changes in the number of overnight stays for foreign tourists

■	0.53 − 11.55
■	0.22 − 0.53
■	0.12 − 0.22
■	0.06 − 0.12
■	0.02 − 0.06
□	0.00 − 0.02
■	No data
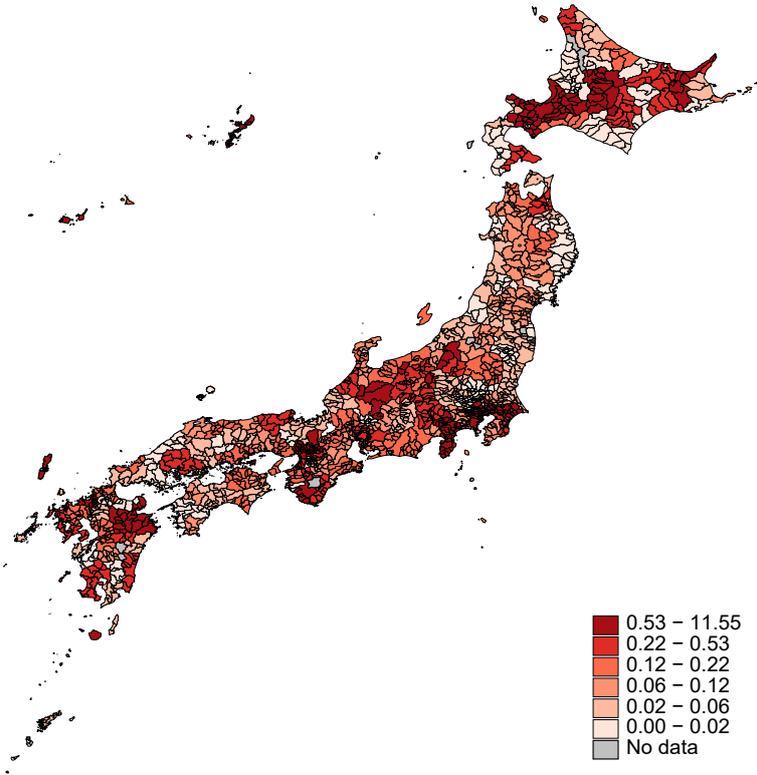
Source: Authors' calculation from Overnight Travel Statistics Survey (JTA)

Figure 4 Marginal effect of the impact of 5-year changes in the number of foreign tourists
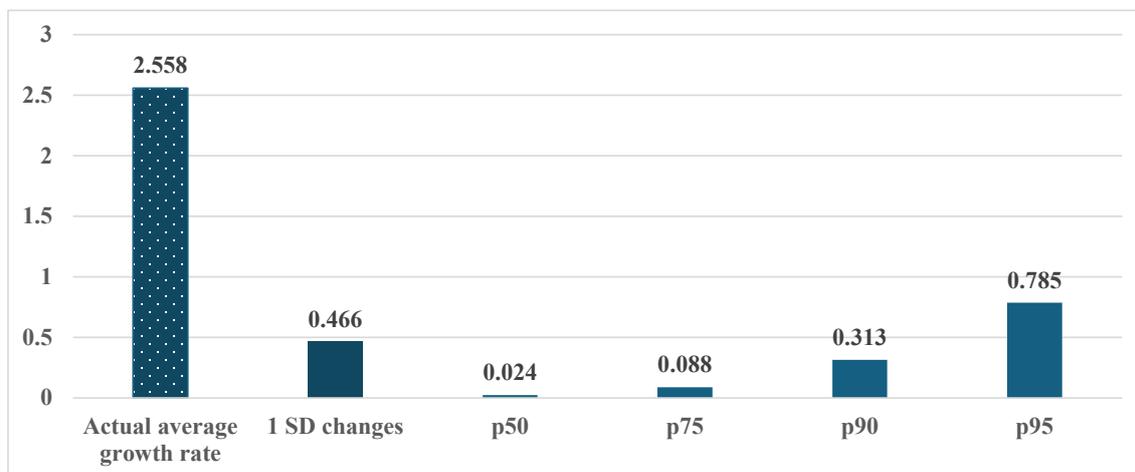
Unit: percent point

Note: See text for detailed calculations.

Figure 5 Coefficient plots for the impact on population by age
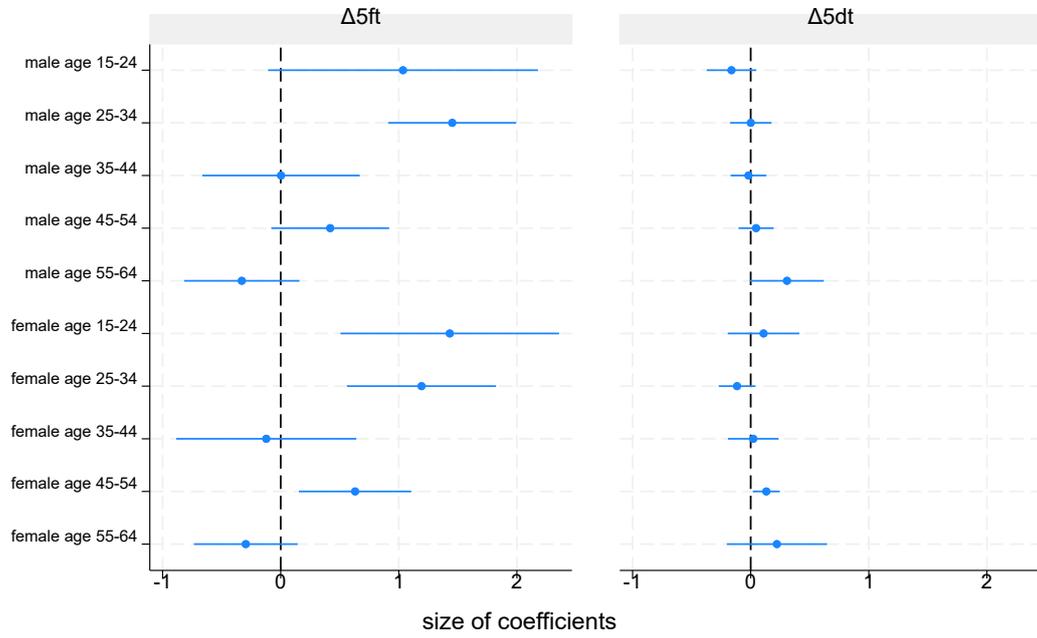
Note: Points on the line represent estimated coefficients, while the line indicates the 95% confidence interval.

Figure 6 (a) Heterogeneous impacts on per capita income across destination attributes

Impact on Δ5ln(per capita income)
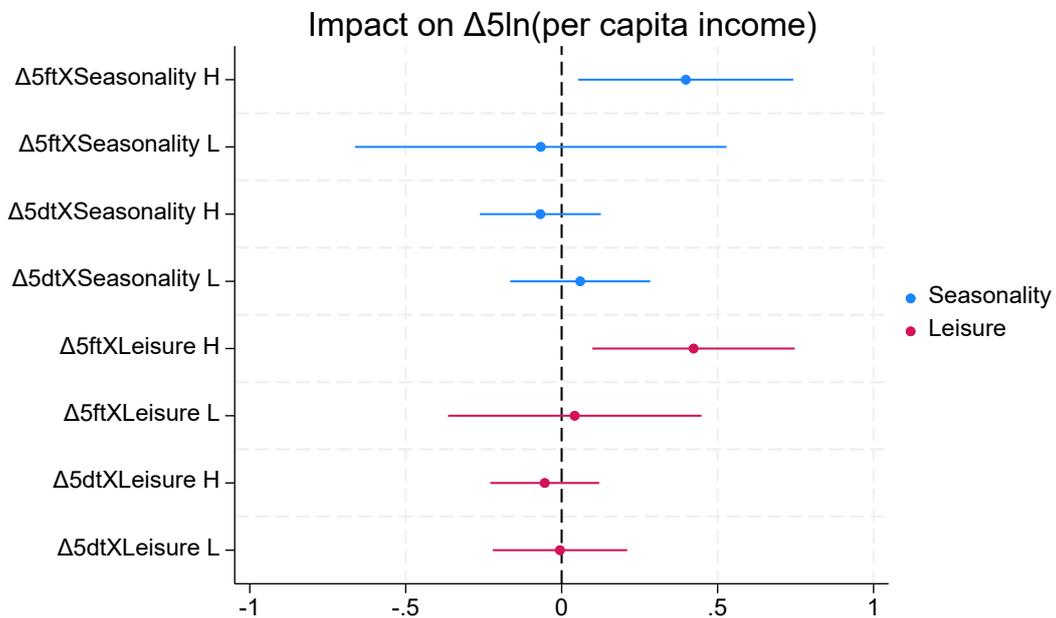
Figure 6 (b) Heterogeneous impacts on population across destination attributes

Impact on Δ5ln(Pop total)
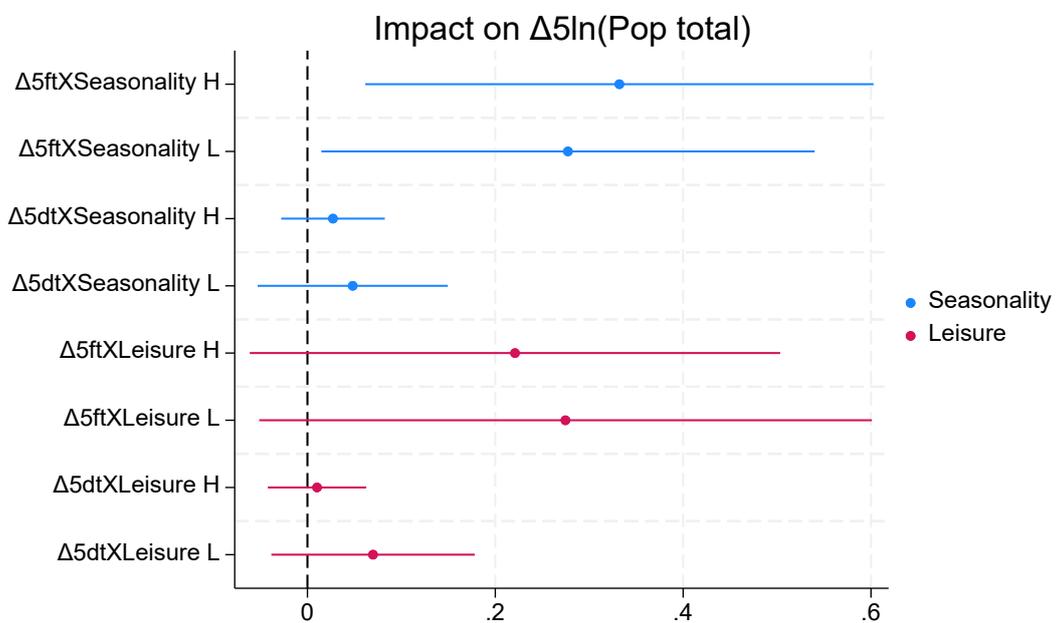
Figure 6 (c) Heterogeneous impacts on population aged 15-34 across destination attributes
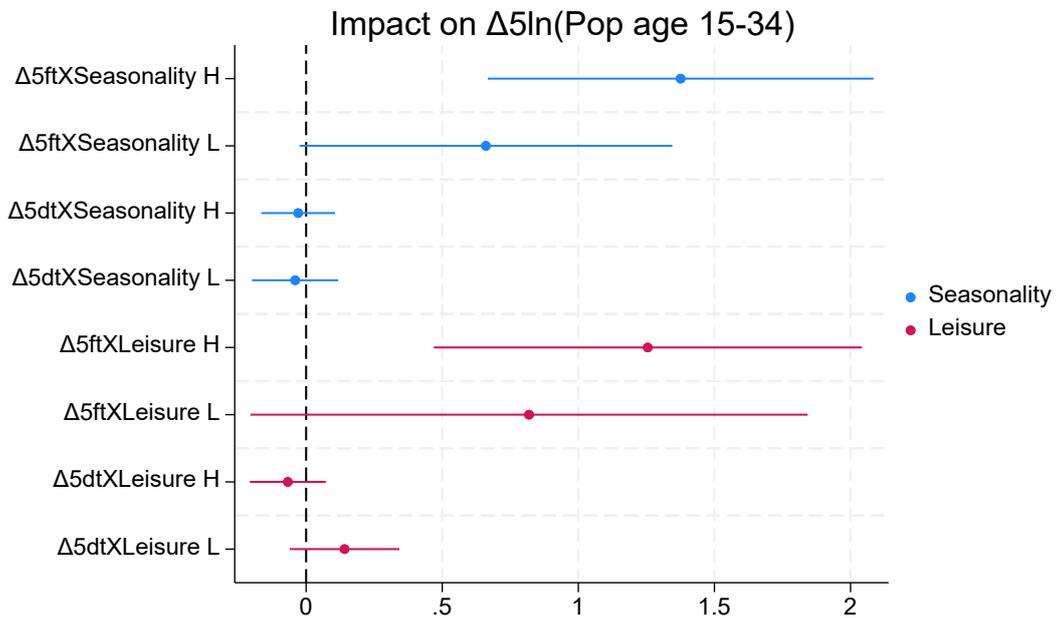
Figure 6 (d) Heterogeneous impacts on population aged 35-49 across destination
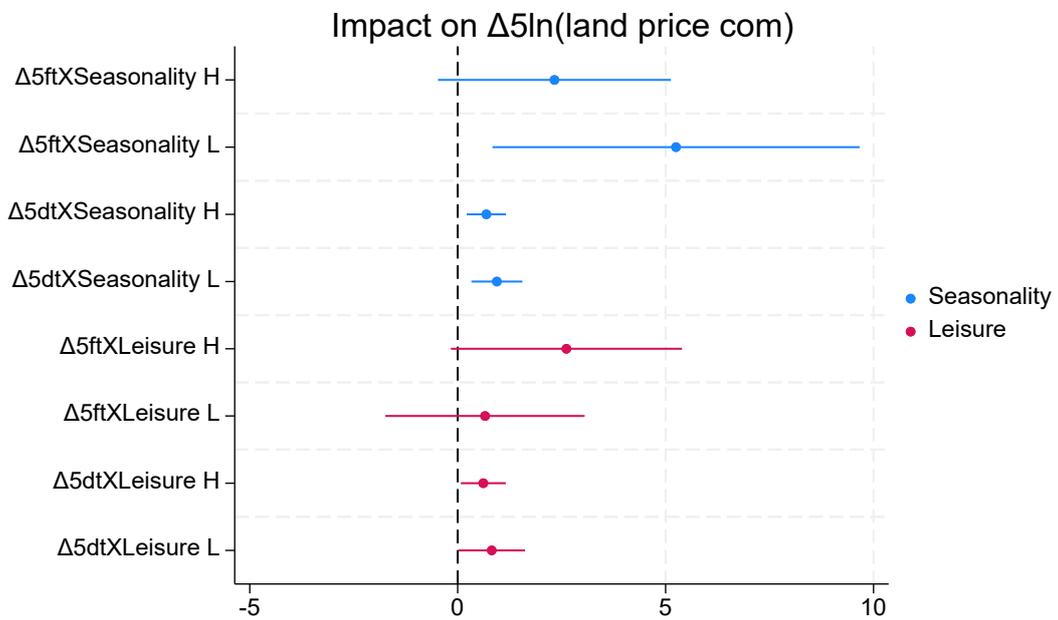attributes
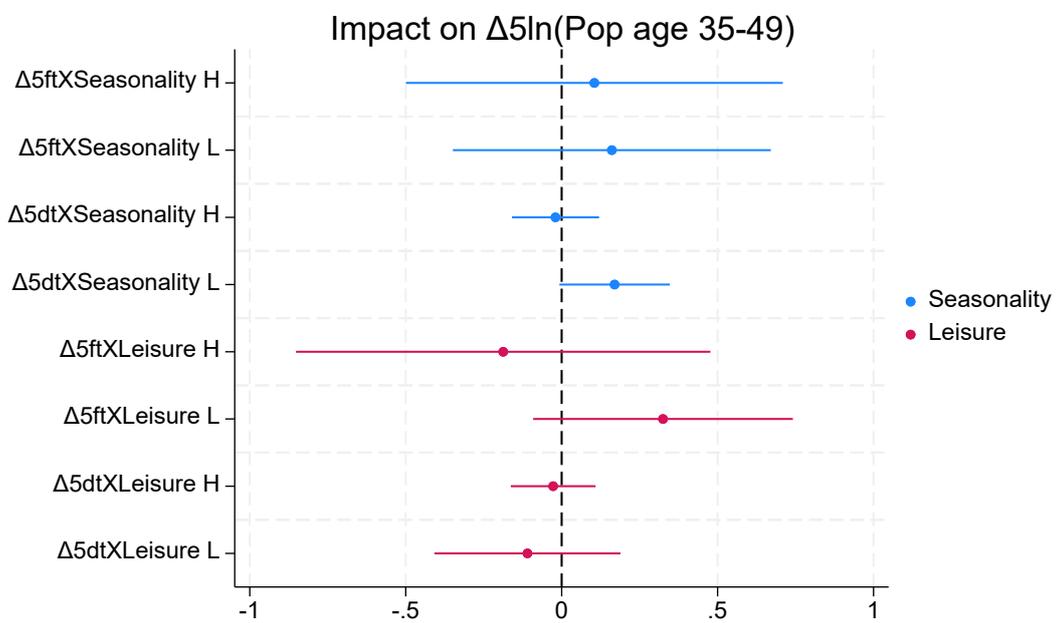
Figure 6 (e) Heterogeneous impacts on population aged 50-64 across destination
attributes

Impact on Δ5ln(Pop age 50-64)
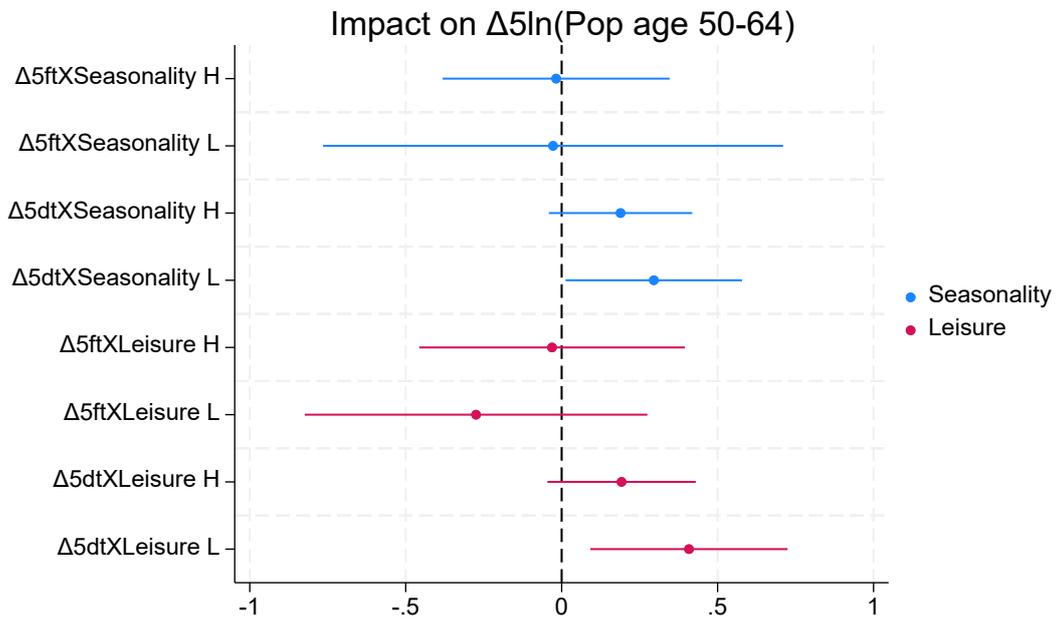
Figure 6 (f) Heterogeneous impacts on commercial land price across destination attributes
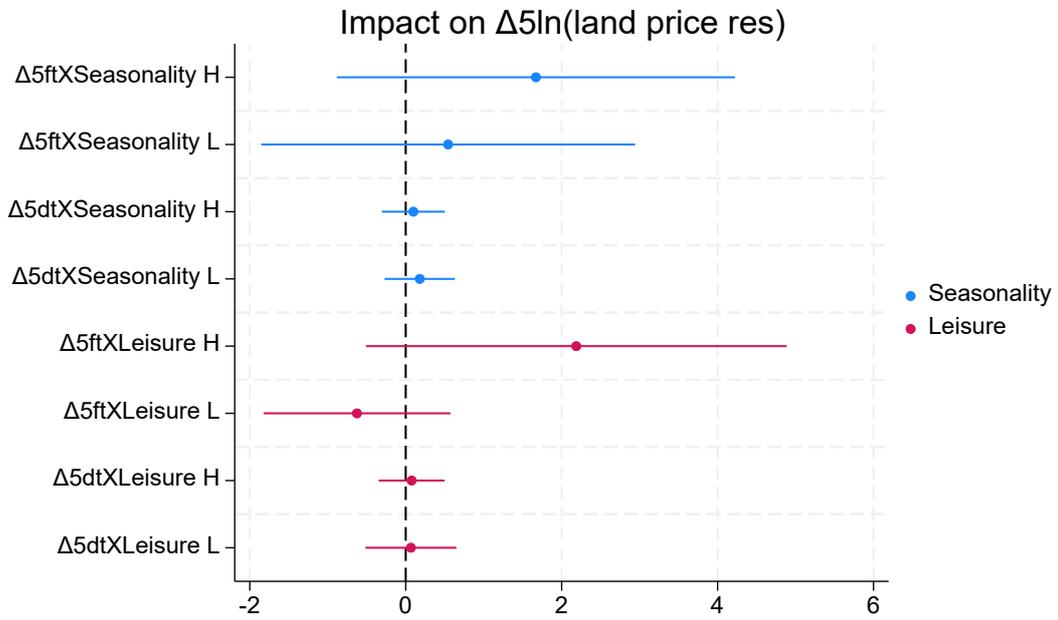

Impact on Δ5ln(land price com)

Figure 6 (g) Heterogeneous impacts on residential land price across destination attributes

Appendix Table A1 Basic statistics

(a) Summary statistics

	N	Mean	SD	p25	p50	p75
Δft	1857	0.265	0.939	0.006	0.033	0.139
Δdt	1857	0.728	4.756	-0.168	0.236	1.085
Δln(pc income)	1857	1.322	3.510	-0.491	1.662	2.984
Δln(Pop)	1857	-2.271	2.275	-3.924	-2.291	-0.775
Δln(Pop15-34)	1857	-6.368	3.509	-8.527	-6.429	-4.282
Δln(Pop35-49)	1857	-1.610	3.508	-3.963	-1.657	0.557
Δln(Pop50-64)	1857	-6.855	4.401	-9.947	-7.169	-3.934
Δln(LP-com)	1732	-6.972	14.130	-15.741	-7.888	0.000
Δln(LP-res)	1811	-6.078	9.858	-11.493	-6.090	-0.995
Aging ratio	1857	0.410	0.037	0.382	0.408	0.437
Population density	1857	5.019	1.423	4.117	4.954	5.852
Female employment ratio	1857	0.461	0.023	0.445	0.463	0.479
Secondary Industry Ratio	1857	0.235	0.067	0.178	0.233	0.281
s=5						
Δft	1391	0.447	1.348	0.016	0.068	0.255
Δdt	1391	0.756	4.335	-0.094	0.339	1.296
Δln(pc income)	1391	2.558	4.363	0.238	2.769	4.663
Δln(Pop)	1391	-3.633	3.562	-6.319	-3.682	-1.125
Δln(Pop15-34)	1391	-10.218	5.057	-13.397	-10.176	-7.271
Δln(Pop35-49)	1391	-2.628	5.403	-6.317	-2.652	1.196
Δln(Pop50-64)	1391	-12.004	6.116	-16.073	-11.997	-7.909
Δln(LP-com)	1299	-11.336	20.309	-24.784	-13.134	-1.342
Δln(LP-res)	1357	-10.033	13.571	-18.176	-10.565	-2.327

(b) Quantile of *Δft*

Δft (s=5)	
p10	0.002
p25	0.016
p50	0.068
p75	0.255
p90	0.908
p95	2.275

(c) Summary statistics for Table 5

	N	Mean	SD	p25	p50	p75
ΔROC	928	0.060	0.079	0.018	0.061	0.105
ROC_{2011}	928	0.494	0.102	0.434	0.504	0.561
$\Delta fratio$	928	0.064	0.114	0.008	0.025	0.074
ΔlnT	928	0.098	0.317	-0.043	0.102	0.242
ΔlnT^2	928	0.110	0.266	0.006	0.029	0.090
Dum(high seasonality)	928	0.440	0.497	0.000	0.000	1.000
Dum(high leisure)	928	0.556	0.497	0.000	1.000	1.000
Aging ratio	928	0.407	0.036	0.380	0.404	0.433
Population density	928	5.022	1.419	4.118	4.964	5.852
Female employment ratio	928	0.461	0.023	0.445	0.463	0.479
Secondary Industry Ratio	928	0.235	0.067	0.178	0.233	0.280

Table A2 (a) Estimation results of Equation (1) by OLS (*s*=3)

OLS	(1)	(2)	(3)	(4)	(5)	(6)	(7)
s=3	*Δln(pc income)*	*Δln(Pop)*	*Δln(Pop15-34)*	*Δln(Pop35-49)*	*Δln(Pop50-64)*	*Δln(LP-com)*	*Δln(LP-res)*
Δft	0.303**	0.216**	0.897***	0.154	-0.094	1.868*	1.872
	(0.118)	(0.087)	(0.255)	(0.169)	(0.108)	(1.120)	(1.451)
Δdt	-0.034**	-0.009	-0.057	-0.002	0.019	0.092	-0.016
	(0.014)	(0.015)	(0.051)	(0.016)	(0.017)	(0.072)	(0.057)
Aging ratio	-7.306*	-38.058***	-26.994***	-46.916***	-56.444***	-48.598**	-53.928***
	(4.343)	(3.191)	(7.071)	(7.851)	(5.707)	(22.792)	(15.571)
Population density	-0.229	0.409***	0.522***	0.456**	0.091	4.283***	1.548***
	(0.153)	(0.082)	(0.182)	(0.191)	(0.160)	(0.772)	(0.462)
Female employment ratio	8.166	-3.941	-30.100***	-10.144	-0.062	8.495	-74.568***
	(5.009)	(3.917)	(8.963)	(9.660)	(7.266)	(32.914)	(20.758)
Secondary Industry Ratio	3.817**	-1.463	-1.301	2.478	-7.246***	-8.177	-3.571
	(1.571)	(1.205)	(3.105)	(2.771)	(2.426)	(7.820)	(6.571)
Observations	1,864	1,864	1,864	1,864	1,864	1,732	1,816
R-squared	0.454	0.783	0.524	0.557	0.665	0.514	0.366

Note: See notes in Table 2.

Table A2 (b) Estimation results of Equation (1) by OLS (*s*=5)

OLS	(1)	(2)	(3)	(4)	(5)	(6)	(7)
s=5	*Δln(pc income)*	*Δln(Pop)*	*Δln(Pop15-34)*	*Δln(Pop35-49)*	*Δln(Pop50-64)*	*Δln(LP-com)*	*Δln(LP-res)*
Δft	0.331***	0.313***	1.167***	0.260	-0.040	2.165**	1.738
	(0.116)	(0.095)	(0.270)	(0.203)	(0.126)	(1.098)	(1.312)
Δdt	-0.040**	0.006	-0.044	0.011	0.069*	0.204**	0.067
	(0.016)	(0.023)	(0.076)	(0.034)	(0.041)	(0.099)	(0.052)
Aging ratio	-20.163***	-18.978**	-60.255***	-34.372***	-75.307***	-89.567***	-76.179*
	(3.294)	(8.370)	(5.500)	(12.368)	(13.177)	(10.265)	(41.134)
Population density	-0.308***	-0.544*	0.724***	1.054***	0.791**	0.180	7.565***
	(0.106)	(0.302)	(0.143)	(0.309)	(0.326)	(0.296)	(1.388)
Female employment ratio	-2.827	13.594	-7.870	-50.920***	-16.167	-7.493	17.755
	(4.688)	(9.344)	(6.886)	(15.677)	(16.255)	(12.791)	(56.736)
Secondary Industry Ratio	-1.777*	7.898***	-1.846	-0.794	5.711	-12.318***	-14.729
	(1.047)	(2.926)	(2.104)	(5.238)	(4.736)	(4.273)	(13.782)
Observations	1,398	1,398	1,398	1,398	1,398	1,398	1,299
R-squared	0.378	0.494	0.816	0.549	0.605	0.635	0.544

Note: See notes in Table 2.

Table A2 (c) Full results of Table 2 (*s*=3)

IV estimation *s=3*	(1) Δln(pc income)	(2) Δln(Pop)	(3) Δln(Pop15-34)	(4) Δln(Pop35-49)	(5) Δln(Pop50-64)	(6) Δln(LP-com)	(7) Δln(LP-res)
Δft	0.344**	0.305**	1.344***	0.069	-0.026	2.494*	1.747
	(0.147)	(0.122)	(0.347)	(0.287)	(0.156)	(1.355)	(1.416)
Δdt	-0.096***	0.016	-0.011	0.004	0.084	0.316*	0.061
	(0.029)	(0.018)	(0.074)	(0.025)	(0.057)	(0.172)	(0.067)
Aging ratio	-7.880	-36.981***	-22.274***	-48.151***	-54.857***	-38.804	-53.726***
	(4.791)	(3.202)	(7.102)	(8.073)	(5.805)	(23.852)	(16.622)
Population density	-0.260	0.446***	0.676***	0.419**	0.148	4.625***	1.566***
	(0.170)	(0.085)	(0.184)	(0.204)	(0.168)	(0.816)	(0.503)
Female employment ratio	8.336	-3.511	-28.649***	-10.217	0.225	12.714	-74.716***
	(5.109)	(3.928)	(9.138)	(9.668)	(7.361)	(32.851)	(20.929)
Secondary Industry Ratio	3.522**	-0.942	0.818	2.015	-6.533**	-3.545	-3.435
	(1.651)	(1.296)	(3.230)	(2.934)	(2.539)	(8.606)	(6.954)
Observations	1,857	1,857	1,857	1,857	1,857	1,732	1,811
Kleibergen-Paap LM test	12.84	12.84	12.84	12.84	12.84	13.23	13.58

Note: See notes in Table 2.

Table A2 (d) Full results of Table 2 (*s=5*)

IV estimation	(1)	(2)	(3)	(4)	(5)	(6)	(7)
s=5	*Δln(pc income)*	*Δln(Pop)*	*Δln(Pop15-34)*	*Δln(Pop35-49)*	*Δln(Pop50-64)*	*Δln(LP-com)*	*Δln(LP-res)*
Δft	0.345*	0.317**	1.279***	0.089	-0.024	2.639*	1.537
	(0.180)	(0.134)	(0.350)	(0.314)	(0.169)	(1.342)	(1.204)
Δdt	-0.049	0.029	-0.036	0.008	0.206	0.722**	0.108
	(0.090)	(0.031)	(0.064)	(0.073)	(0.131)	(0.317)	(0.206)
Aging ratio	-18.598**	-60.119***	-32.729***	-78.823***	-87.310***	-61.660	-87.331***
	(9.365)	(5.507)	(12.338)	(13.652)	(10.584)	(42.326)	(28.867)
Population density	-0.537	0.732***	1.119***	0.682*	0.247	8.045***	2.703***
	(0.330)	(0.146)	(0.321)	(0.349)	(0.313)	(1.449)	(0.846)
Female employment ratio	14.001	-7.883	-51.614***	-16.780	-7.591	25.564	-113.301***
	(9.397)	(6.930)	(15.689)	(16.317)	(12.968)	(57.231)	(35.827)
Secondary Industry Ratio	8.081***	-1.790	-0.181	4.290	-11.729***	-8.323	-4.253
	(2.841)	(2.180)	(5.298)	(4.913)	(4.449)	(15.490)	(11.710)
Observations	1,391	1,391	1,391	1,391	1,391	1,391	1,299
Kleibergen-Paap LM test	16.54	16.54	16.54	16.54	16.54	16.54	14.97

Note: See notes in Table 2.

Table A3 Balance check and sensitivity check

(a) Balance test

	s=3		s=5	
	$\Delta ft^{\,IV}$	$\Delta dt^{\,IV}$	$\Delta ft^{\,IV}$	$\Delta dt^{\,IV}$
Aging ratio	-0.002	0.000	-0.002	0.001
	(0.002)	(0.001)	(0.002)	(0.001)
Population density	-0.065	-0.112***	-0.061	-0.139***
	(0.065)	(0.016)	(0.067)	(0.023)
Female employment ratio	-0.000	0.001	-0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Secondary Industry Ratio	-0.008**	-0.007***	-0.008**	-0.008***
	(0.004)	(0.001)	(0.004)	(0.001)

Note: The figures indicate the coefficients of the regression equation with each control variable as the dependent variable and the instrumental variable as the independent variable. The figures in parentheses indicate the standard error clustered by commuting area. The estimation includes regional block fixed effects and year fixed effects.

(b) Sensitivity check

$\Delta ln(pc\ income)$	(1)	(2)	(3)
Δft (s= 3)	0.344**	0.349***	0.343**
	(0.147)	(0.134)	(0.133)
Δdt (s=3)	-0.096***	-0.094***	-0.094***
	(0.029)	(0.028)	(0.027)
Control variables	All	No	Aging ratio, female ratio
Observations	1,857	1,857	1,857
Kleibergen-Paap LM test	12.84	11.74	11.68
$\Delta ln(pc\ income)$	(4)	(5)	(6)
Δft (s=5)	0.345*	0.351**	0.338**
	(0.180)	(0.165)	(0.164)
Δdt (s=5)	-0.049	-0.047	-0.047
	(0.090)	(0.090)	(0.089)
Control variables	All	No	Aging ratio, female ratio
Observations	1,391	1,391	1,391
Kleibergen-Paap LM test	16.54	13.95	13.93

Note: See notes in Table 2. Column (3) excludes variables that significantly correlate with instrument variable, as indicated in Table 4(a).