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The Impact of Anime Broadcasts on
Economic Growth

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Abstract

This study investigates the long-term effects of media exposure on economic growth by examining quasi-experimental variations in media exposure, facilitated by anime broadcasts featuring Japan's "anime holy lands"—real-world locations depicted in anime. I aim to evaluate the economic growth of municipalities featured in these anime broadcasts using average income and night-time luminosity as indicators. The featured municipalities experience significant economic growth 5 and 13 years after the broadcasts. Population increase, resulting from the influx of new residents following anime broadcasts, is identified as the primary mechanism driving this growth.

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1. Introduction

Extensive evidence underscores the significant and enduring impacts of broadcast media productions, including TV shows and films, on various socioeconomic indicators. These include influencing election outcomes (Durante et al., 2019), reducing fertility rates (Ferrara et al., 2012, Kearney and Levine, 2015), shaping consumption patterns (Bursztyrn and Cantoni, 2016), empowering women (Chong and Ferrara, 2009, Jensen and Oster, 2009), improving educational performance (Kearney and Levine, 2019), and impacting religious participation (Grosfeld et al., 2024). Despite this extensive research, limited attention has been paid to understanding the long-term economic effects of media exposure, particularly in the context of locations used symbolically in such productions. Media exposure often highlights real-world locations, potentially benefiting local economies. For instance, the Academy Award-winning *La La Land* (2016) is credited with boosting tourism in Los Angeles, drawing visitors to its iconic filming locations such as the Griffith Observatory (Martín, 2017). However, the broader economic implications of media broadcasts for these depicted areas and their underlying mechanisms remain poorly understood.

This study leverages the unique context of Japanese animation, known as anime, to explore the impact of media exposure on the economic growth of featured areas. The anime industry has emerged as a significant sector in Japan, annually producing approximately 200 new titles for television and cinema (Association of Japanese Animations, 2023). Some anime prominently feature real-world locations, using actual landscapes and buildings as backdrops for their animated narratives. These real-world sites, known as “anime holy lands” (seichi, in Japanese), have become hubs of cultural activities (e.g., see Appendix Figure A1), evolving from sites visited by dedicated anime fans to being a part of a broader phenomenon known as “anime pilgrimage” (seichi-junrei in Japanese), attracting wider attention to these locations.¹

From 2000 to 2020, out of over 4,000 anime productions, 636 featured real-world locations, resulting in the identification of 3,219 anime holy lands. This equates to approximately 28% of Japan’s 1,902 municipalities hosting anime holy lands. This study explores the economic effects of media exposure by comparing municipalities featured in anime with those that are not. It specifically assesses the influence of anime broadcasts on the economic development of these municipalities, using average income per taxpayer and night-time luminosity as primary indicators.

A critical assumption in this study is that the selection of anime holy lands and the timing of anime broadcasts are exogenous to local economic conditions. However, concerns about potential

¹ Although the terms “holy land” and “pilgrimage” carry religious undertones, these particular sites are not associated with any specific religion and do not bear religious significance.

endogeneity, particularly through omitted variable bias and reverse causality, are acknowledged. These issues arise if the selection of anime holy lands is motivated by a desire to stimulate local economic growth or if economically developed municipalities are more likely to be chosen as model sites for anime. As discussed in the subsequent section, the assumption of exogenous determination is deemed reasonable, providing a quasi-experimental variation in media exposure that facilitates causal inference.

This study employs a difference-in-differences model with two-way fixed effects (TWFE) and event study analysis, following the methodology established by De Chaisemartin and d'Haultfoeuille (2020). This approach assumes that, under the parallel trends assumption, the variation in municipalities resulting from unintended and staggered media exposure facilitates the derivation of causal estimates regarding the impact of anime broadcasts on economic growth.

The results from the event study analysis reveal that both average income per taxpayer and night-time luminosity in the featured municipalities increased 5 and 13 years after anime broadcasts, respectively. Specifically, anime broadcasts led to a 0.5% increase in average income per taxpayer, contrasting with the overall trend of average income declining by -0.65% over the study period. Furthermore, a heterogeneity analysis demonstrates that the economic growth effects of anime broadcasts were significant in municipalities located in rural areas. The analysis confirms parallel pre-trends across all economic growth measures, indicating robustness to alternative definitions and the enduring nature of the observed effects.

The impact of anime broadcasts on economic growth and the nearly decade-long gap between the two indicators can be explained through four potential mechanisms evaluated in this study: (i) population growth, (ii) increased tourism, (iii) changes in local government behavior, and (iv) development within the manufacturing industry. Mechanism analysis suggests that the latter three mechanisms did not significantly contribute to economic growth following anime broadcasts.

The findings of this study indicate that economic growth following anime broadcasts is primarily driven by population growth. Immediately following the airing of anime, the municipalities featured experienced a significant uptick in population. Difference-in-differences estimation results indicate that anime broadcasts increased the population by 5.8%. This surge was consistent across all age groups but was more pronounced among individuals under 20 years of age and those in their 40s and 50s. Further examination reveals that anime broadcasts notably boosted the number of in-migrants, without a corresponding increase in out-migrants, indicating that post-broadcast population growth was mainly driven by the arrival of new residents.

This population surge triggered additional demographic shifts. First, the rise in population led to a notable rise in the number of marriages after anime broadcasts. This, coupled with the growth in

the younger demographic, resulted in a significant increase in births. Concurrently, anime broadcasts were associated with an increase in the older adult population, primarily due to the rise in the number of nursing homes, thereby raising mortality rates. However, the increase in births marginally exceeded the increase in mortality, potentially serving as another driver of population growth.

Overall, this study provides robust evidence that anime broadcasts significantly contribute to the economic growth of the municipalities they feature, primarily through population increase. This mechanism likely explains the observed gap between the effects on average income per taxpayer and night-time luminosity. Economic transformation driven by population growth tends to be gradual, aligning with demographic trends (Peters, 2022). These incremental economic developments are expected to be swiftly reflected in statistical indicators like income per taxpayer. However, night-time luminosity, while useful, may not precisely capture subtle economic shifts initially. Nonetheless, as the economic scale of the featured municipalities expanded, these effects became sufficiently pronounced, facilitating detection through night-time luminosity measurements a decade later. This analysis aligns with previous research illustrating the relationship between population growth and economic advancement as captured through night-time luminosity (Bazzi et al., 2016).

Finally, the reasons behind the population increase, primarily attributed to the influx of immigrants following anime broadcasts, are discussed. This is accompanied by an exploration of the generalizability of these findings to exposure to other forms of media, including non-animated films and television dramas, in contexts beyond Japan.

This study makes a significant contribution to the literature by providing causal evidence of the long-term effects of media exposure on economic growth. Prior research has established that media exposure can lead to various socioeconomic outcomes (DellaVigna and Gentzkow, 2010, DellaVigna and La Ferrara, 2015). Additionally, numerous studies have highlighted the impact of exposure to media, such as TV shows and dramas, on specific behavioral changes (Bursztyn and Cantoni, 2016, Chong and Ferrara, 2009, Durante et al., 2019, Ferrara et al., 2012, Grosfeld et al., 2024, Jensen and Oster, 2009, Kearney and Levine, 2015). Nonetheless, to the best of the author's knowledge, this study is the first to investigate how media exposure contributes to the long-term economic growth of regions depicted in the media.

Moreover, this study adds to the literature by examining the mechanisms through which media exposure fosters economic growth. Several studies have explored the effects of media exposure on tourism performance in filming locations (Kantarci et al., 2017, Kim et al., 2009, Li et al., 2017). Contu and Pau (2022) specifically analyzed the TV series *Game of Thrones (GoT)* and its impact on tourist visits to *GoT* filming sites in Spain, Croatia, and Malta. Their event study analysis underscored the positive and enduring impact on new tourist arrivals. Similarly, qualitative research has

investigated the impact of media exposure on tourism in anime holy lands (Ono et al., 2020, Yamamura, 2015). Although these analyses provide qualitative insights into tourism growth resulting from media exposure, predominantly focusing on individual productions, this study diverges by examining the broader genre of anime rather than specific titles. Consequently, I did not identify direct evidence linking the promotion of anime holy lands to increased tourism. Instead, this study uncovers a previously overlooked driver of economic growth in the context of media exposure: population growth.

This study is closely aligned with literature exploring the dynamics between population growth and economic development. Solid theoretical arguments suggest that larger populations can significantly enhance productivity and, consequently, spur economic growth (Akcigit, 2017, Jones, 1995). These arguments find empirical support in several studies (Burchardi et al., 2020, Hornung, 2014, Sequeira et al., 2020). For example, Bazzi et al. (2016) used night-time luminosity as a proxy for economic development and revealed that population growth resulting from Indonesia's migration program led to an increase in night-time luminosity one to two decades later. The findings of this study closely resonate with earlier observations linking population growth to economic development. Furthermore, while earlier studies have predominantly focused on assessing the impact of population growth through historical trends and policy measures, this study identifies media exposure as a potential catalyst for population growth by attracting new residents.

This study also holds important policy implications. The results do not necessarily imply that media exposure can serve as a policy tool to stimulate economic growth. Economic growth resulting from media exposure primarily stems from population growth, making media potentially effective in countries experiencing population increases. However, in countries grappling with population declines, such as Japan, growth in areas highlighted by media exposure may correspond to a decline in non-featured areas. Therefore, utilizing media exposure as a policy tool could inadvertently exacerbate competition for population among municipalities, rather than uniformly fostering economic growth.

The remainder of this paper is structured as follows. Section 2 provides an overview of Japanese anime and the concept of anime holy lands. Sections 3 and 4 outline the data used in this study and detail the empirical methodology employed. Section 5 presents the econometric findings, while Section 6 discusses the analysis of the mechanisms. Section 7 interprets the results, and finally, Section 8 concludes the study.

2. Background of Japanese Anime

The anime industry has emerged as a significant sector in Japan's economy, exerting considerable influence. In the past two decades, 4,813 new anime programs have been broadcast on television or in theaters, averaging over 200 productions annually (Association of Japanese Animations, 2023). Significantly, the overall revenue of the Japanese anime market has experienced substantial growth, soaring from USD9.1 billion in 2002 to USD22.9 billion in 2021 (Association of Japanese Animations, 2023).² Japanese animation has also gained substantial popularity internationally, with overseas markets accounting for 48% of the total revenue in 2021.

Certain anime programs have drawn inspiration from real-world locations, incorporating actual landscapes and buildings into animated scenes. These locations initially attracted a loyal following among fans, who affectionately referred to them as "anime holy lands." The practice of visiting these revered sites eventually evolved into a popular trend known as "anime pilgrimage." While the concepts of anime holy lands and pilgrimages emerged in the 1990s, they have gained significant popularity since the early 2000s (Okamoto, 2009). The surging popularity of anime in recent years has led to the widespread recognition of and participation in the phenomena of anime holy lands and pilgrimages, not only in Japan but also internationally (Ono et al., 2020).

The Japanese government has also shown keen interest in the concepts of anime holy lands and pilgrimages, acknowledging their potential for boosting tourism (Otani et al., 2018). Key governmental tourism-related institutions such as the Japan Tourism Agency and Japan National Tourism Organization published an anime tourism guidebook and a map of anime holy lands in 2010 and 2011, respectively. In 2012, the government identified anime as a vital element of its tourism strategy in the "Basic Plan for the Promotion of a Tourism Nation." Concurrently, the Ministry of Economy, Trade and Industry outlined tourism strategies aimed at bolstering international inbound tourism through anime, using the term "holy lands." Additionally, in 2017, the Development Bank of Japan (2017) highlighted the potential benefits of promoting anime pilgrimages to drive rural revitalization. Despite substantial interest in leveraging anime for regional development in Japan, most studies conducted are qualitative in nature. These studies often cite numerous examples demonstrating that the recognition of a region as an anime holy land leads to an influx of tourists, increased sales of local products, and heightened community pride (Ono et al., 2020, Yamamura, 2015).

² The total revenue includes income generated from various sources, such as TV and movie broadcasts, online distribution, sales of anime-related merchandise, anime-related music, live entertainment, and overseas distribution of Japanese anime. The conversion rate of 120 yen to the dollar was applied.

In this study, it is imperative to assume that the broadcasting and selection of anime holy lands were exogenous. This implies that the establishment of anime holy lands was not primarily motivated by the intention to stimulate local economies, nor were more developed municipalities likely to be selected as anime holy lands. This assumption is credible for five reasons:

First, a considerable number of anime productions are adaptations of pre-existing content, such as comics, novels, and video games. Thus, decisions to animate these works are often unpredictable. Consequently, the depiction of specific locations in anime frequently reflects the settings of these original works, rather than deliberate efforts to promote regional development or intentionally establish anime holy lands in particular municipalities. Within the dataset used for this study, notably, 82% of the 636 anime titles identified with anime holy lands were based on original works, with only a small fraction being original anime productions lacking pre-existing bases. This narrative-driven selection process inherently reduces any bias toward municipalities with potential for regional economic growth.

Second, locations are designated as anime holy lands often spontaneously by fans, rather than by local governments or businesses explicitly aiming for economic development (Okamoto, 2015). In many instances, these sites gain recognition as anime holy lands through fan activities and word-of-mouth promotion, rather than through structured economic development initiatives. The grassroots nature of anime holy land formation suggests that their establishment is largely independent of deliberate economic planning.

Third, the distribution of anime holy lands across Japan exhibits significant geographical variation. If municipalities experiencing high economic growth were preferentially chosen as anime holy lands, they would likely be concentrated in urban areas or specific regions. However, as discussed later, anime holy lands are widely dispersed throughout the country. This widespread distribution implies that reverse causality—wherein economic growth influences the selection of anime holy lands—is improbable. Further evidence from event study analysis also indicates a lack of a strong correlation between a municipality's economic level and its selection as a model site for anime.

Fourth, the absence of direct financial or institutional support for establishing anime holy lands, as well as the lack of support for development after their recognition, further diminishes the likelihood of endogenous municipality selection. While the Japanese government has focused on tourism policies associated with anime holy lands, no specific subsidies are allocated for creating anime for this purpose. This remains the case even after a municipality is acknowledged as hosting an anime holy land; no government financial assistance is available for subsequent community development.

Finally, potential concerns may arise regarding the influence of exposure to other forms of media, such as movies and TV dramas. If interest in filming locations of other forms of media similarly increased and was associated with the designation of anime holy lands, this could introduce bias in the estimation. Indeed, filming locations for movies and dramas are often also referred to as holy lands in Japan, although they do not attract as much attention as anime-related sites. Figure 1 illustrates Google Trends search indices from 2004 onward, combining the terms anime, movie, and drama with “holy lands.” The blue line in Figure 1 indicates that search interest for anime and holy lands significantly surpasses that for movies and dramas, represented by the orange and dark gray lines, respectively. Consequently, the impact of non-anime media on the selection of holy lands appears to be negligible.

3. Data

Anime Holy Land Data.—Data on anime holy lands were extracted from the Anime Holy Land Pilgrimage Map database (Dip Corporation, 2023). This database provides information on the addresses of anime holy lands and the corresponding titles of the respective anime works. The anime works covered in this database span various formats, including TV and movie anime, and works distributed online. Using this information, details of the municipalities identified as hosting holy lands and the years in which the anime series were broadcast were compiled. After data cleaning, 3,219 anime holy lands, linked to 636 anime works, were identified. As depicted in Figure 2, anime holy lands are distributed widely throughout Japan. Given that 4,813 new animations aired between 2000 and 2020, these 636 anime works constitute approximately 13% of the total number of animations broadcast during this period.

The presence of holy lands within each municipality was assessed based on the geographical information of the anime holy lands. In the year 2000, anime holy lands were identified in only 32 municipalities, and by 2020, this number had expanded to 533. As the total number of Japanese municipalities used in the analysis is 1,902, the 533 municipalities with anime holy lands in 2020 account for approximately 28% of the total (the cumulative count of municipalities hosting holy lands is illustrated in Figure 3).

Economic Indicators.—This study primarily relies on two data sources to gauge economic growth at the municipal level. The first data source used in this study comprises official government statistics. Specifically, data on total taxable income and the number of taxpayers, provided by the Statistics

Bureau of Japan (2023), were employed to calculate the income per taxpayer at the municipal level from 2000 to 2020.

The second source comprises night-time luminosity data obtained from Chen et al. (2021). This dataset provides a comprehensive record of global night-time light data captured by satellites. Night-time luminosity data have been widely used in previous studies as a proxy for economic development (Bazzi et al., 2016, Henderson et al., 2012). In this study, the average night-time luminosity was calculated for all 1,902 municipalities across Japan for the same two-decade period, spanning 2000 to 2020. This measure serves as another crucial indicator of local economic development.

Additional Data.—In addition to primary data, this study used demographic data obtained from the Statistics Bureau of Japan (2023). This dataset offers municipal-level details, including the number of in-migrants and out-migrants, marriages, and divorces, along with financial data such as municipal expenditures and revenues. Information on population size, fertility, and mortality rates for each municipality was sourced from the Basic Resident Registration (Ministry of Internal Affairs and Communications, 2023). Unfortunately, municipal-level tourist data from government statistics are unavailable. To address this gap, data provided by local governments from each prefecture were collected. Out of Japan’s 47 prefectures, 30 provide publicly accessible numbers of municipal-level tourists.³ Although resulting in an unbalanced dataset, this approach yielded valuable information on tourist numbers in 1,100 municipalities, covering 58% of all municipalities in Japan.

Finally, this study incorporated data from the Tiiki brand survey conducted by the Brand Research Institute (2022). Targeting 30,000 participants, the survey collected data on individuals’ awareness of 20 randomly selected municipalities and the channels through which they acquired information about each municipality. Initiated in 2006, the survey has accumulated data on the visibility of 1,000 municipalities across Japan. Specifically, the survey includes a question on whether respondents had become aware of each municipality through anime works.

Summary statistics for the main variables are reported in Appendix Table A2.

4. Empirical Strategy

The primary research design entails a difference-in-differences event study using the year of anime broadcast as the event. The regression model is represented as follows:

$$(1) \quad Y_{it} = \sum_{k=-20}^{20} \beta_k \times Anime_{itk} + \rho_i + \tau_t + \varepsilon_{it},$$

³ The data sources for these 30 municipalities are outlined in Appendix Table A1.

where Y_{it} is the outcome of interest (i.e., income per taxpayer or night-time luminosity) in municipality i in year t . The function $Anime_{itk}$ is an indicator of k years since the anime broadcast for municipality i in year t . The estimated coefficients, $\hat{\beta}_k$, measure the change in the outcome in year t for the municipalities featured in anime compared to those that are not. $k = -1$ was set as the reference year. Additionally, I included municipality fixed effects, ρ_i , and event time fixed effects, τ_t , to control for unobserved time-invariant differences across municipalities and time. Standard errors were clustered at the municipal level. For benchmark estimations, this study employed the robust estimators proposed by De Chaisemartin and d'Haultfoeuille (2020), hereafter referred to as DCDH estimation.

In addition, a difference-in-differences approach, a model similar to Equation (1), was also employed:

$$(2) \quad Y_{it} = \beta Anime_{it} + \rho_i + \tau_t + \varepsilon_{it},$$

where $Anime_{it}$ is a dummy variable that takes the value of one if the anime modeled on municipality i is aired, and zero otherwise. In this model, I estimated Equation (2) using ordinary least squares with standard errors clustered at the municipal level.

The identifying assumption for estimating Equations (1) and (2) is that in the absence of anime broadcasts, the economic growth trajectories of municipalities with and without anime holy lands follow parallel trends. This assumption, along with the notion that average treatment effects are homogeneous across treated municipalities and over time, allows the coefficients of β_k vectors in Equation (1) and β in Equation (2) to identify the average treatment effect on the treated municipalities' economic growth resulting from anime broadcasts. While the parallel trends assumption is not directly testable, the potential for pre-existing trends is examined by estimating Equation (1). Subsequent analysis supports the validity of the parallel trends assumption.

5. Results

5.1. Main results

Event Study Figures.—Figure 4 illustrates the impact of anime broadcasts on municipal-level economic growth. Panel A plots the coefficients of DCDH estimations for the effect of anime broadcasts on average income per taxpayer. Prior to the animated broadcast, the event study regression coefficients are largely statistically insignificant, affirming the parallel trends assumption.

This suggests comparability between municipalities with and without anime holy lands. Post broadcast, coefficients within the five-year interval are zero and lack statistical significance. However, five years after anime broadcasts, there is a noticeable and significant increase in the average income per taxpayer, with an average increase of approximately 2%. These findings indicate that municipalities with anime holy lands experience economic growth roughly half a decade following the broadcasts.

Panel B showcases the results for night-time luminosity. Consistent with the analysis of average income, Panel B demonstrates no pre-trends in the event study regression coefficients. Regarding post-anime broadcast effects, night-time luminosity exhibits a significant increase, aligning with the average income per taxpayer outcomes. However, unlike the average income per taxpayer results, this increase occurs approximately 13 years after the broadcast.

Regression Results.—Table 1 presents the estimates of β in Equation (2). For average income per taxpayer, shown in Column 1, we found that anime broadcasts significantly increased income. With an effect size of 0.005, this translates to a 0.5% increase in average income per taxpayer following anime broadcasts. While this increase may seem modest, it is noteworthy considering Japan's low economic growth rate and stagnant average income. Over the period from 2000 to 2020, the National Survey of Living Standards reported an average change in household income of -0.65%, reflecting a downward trend. Similarly, our data show an average change rate of -0.56% in income per taxpayer. Thus, the findings suggest that amidst declining overall income, the positive impact of anime broadcasts helps counteract this downward trend.

By contrast, for night-time luminosity, shown in Column 2, the coefficient of anime broadcasts is negative. However, given the mean of night-time luminosity (6.055), the observed coefficient of -0.314 is relatively small. Furthermore, this difference is not statistically significant.

5.2. Robustness

I conducted four robustness checks to validate the main findings: (i) conducting an estimation by anime type, (ii) excluding municipalities with multiple treatments, (iii) excluding original anime, and (iv) excluding municipalities with zero night-time luminosity.

First, the impact was assessed based on anime type, categorizing the dataset into TV anime (broadcast on television) and movie anime (screened in cinemas). Given the potential for films shown in cinemas to attract more public interest, separate event study analyses were performed for each type.

The results, illustrated in Appendix Figure A2, show consistent patterns with the benchmark results, indicating increases in average income per taxpayer and night-time luminosity 5 and 10 years after anime broadcasts, respectively.

Second, I recalculated estimates after excluding municipalities subjected to multiple treatments. Some municipalities are featured in various anime, becoming holy lands for multiple productions. Appendix Figure A3 illustrates the distribution of treatment frequencies among these municipalities, revealing that half received a single treatment, while the remainder experienced two or more. The analysis was refined to include only municipalities receiving a single treatment; the event study outcomes are presented in Appendix Figure A4. Contrary to the benchmark findings, no significant increase in night-time luminosity is detected (Panel **A2** of Figure A4). However, for average income per taxpayer, a notable increase is observed starting 10 years after anime broadcasts (Panel B), indicating a delayed but generally similar trend as that in the benchmark.

Third, to account for the influence of original animations, I conducted a regression analysis excluding municipalities featured in the broadcasts of these original anime. The event study results are presented in Appendix Figure A5. After removing the municipalities associated with original animation from the analysis, outcomes for both average income per taxpayer and night-time luminosity remain consistent with the main findings, suggesting that the exclusion of these unique cases does not significantly alter the overall results.

Lastly, the issue of zero night-time luminosity was addressed. Some municipalities recorded zero values in their night light data throughout the study period. Prior research has indicated the risk of overestimating results when including areas with zero luminosity (Chen and Nordhaus, 2011). However, in our dataset, only 15 municipalities, representing 1% of the total observations, reported zero values during the study period, minimizing potential estimation bias. The estimation outcomes depicted in Appendix Figure A6 confirm our expectations. Excluding these 15 municipalities with zero values does not significantly alter the results for average income per taxpayer or night-time luminosity compared with the benchmark analyses.

5.3. Heterogeneity

To explore potential heterogeneity in the effects of anime broadcasts, an event study analysis was conducted, categorizing municipalities into urban and rural areas.⁴ In this study, analyzing heterogeneity based on anime popularity was not feasible owing to the absence of a standardized

⁴ The categorization of urban municipalities follows the Japanese government's definition, which identifies large and core cities as those with populations exceeding 300,000.

popularity index for the anime, which varies because of differences in broadcast times, media, and intended audiences.

The results, depicted in Figure 5, show that regarding night-time luminosity, both urban and rural municipalities exhibit an upward trend a decade after anime broadcasts, although the outcomes are not statistically significant (Panels B1 and B2). Regarding average income per taxpayer, urban municipalities (Panel A1) experience a marginally significant uptick around the fifth year, but the sustained growth observed in the benchmark analysis is not substantiated. By contrast, rural municipalities (Panel A2) exhibit a consistent rise in average income from the fifth year after anime broadcasts. These findings suggest that anime broadcasting is particularly effective in increasing income, especially in rural municipalities.

6. Mechanisms

This section explores potential mechanisms driving the impact of anime broadcasts on economic growth. One plausible factor is population growth: municipalities acknowledging anime holy lands post broadcast may experience population increases, thereby expanding the market size and driving economic expansion. Additionally, an influx of tourists, especially anime fans, visiting these areas might stimulate economic growth. Other factors worth considering include potential rises in local government spending on urban development post broadcast, or growth in the manufacturing sector attributed to the production and sale of anime-related merchandise. The subsequent section examines these possibilities and explores their underlying mechanisms.

Population Growth.—Municipalities with designated anime holy lands may experience population growth following anime broadcasts because the depiction of these locales in anime may incentivize migration. An increase in population size is known to contribute to enhanced productivity and economic growth (Akcigit, 2017, Jones, 1995, Peters, 2022). Should anime broadcasts influence individuals' migration choices, it could lead to heightened migration to these municipalities, resulting in population growth.

Panel A of Figure 6 illustrates the impact of anime broadcasts on population dynamics. Prior to the event, the coefficients hover near zero and are statistically insignificant, indicating no notable pre-existing differences between the groups. However, following anime broadcasts, there is a marked and continuous increase in population, suggesting that municipalities recognized as anime holy land hosts experience population growth as a consequence of anime broadcasts. The difference-in-differences estimation in Column 1 of Table 2 reveals that anime broadcasts lead to a significant population

increase, with coefficients demonstrating an average growth of 5.9%. Given that the average population change in municipalities during this timeframe decreases by -0.24%, the observed 5.9% increase illustrates a significant impact.

Further detailed analysis in Panels B–E of Figure 6, which categorizes population changes by age group, reveals that population growth spans all demographics. Slightly larger increases are observed among individuals under 20 years of age and those in their 40s and 50s, suggesting an increase in the number of young families. The difference-in-differences estimates presented in Appendix Table A3 corroborate this trend. The coefficients reveal that the population of those under 20 and those in their 40s and 50s expanded by 8.1% and 9.3%, respectively, following anime broadcasts. Meanwhile, the 20s and 30s age group also experienced significant growth, albeit at a lower rate of 4.9% compared with the other age brackets.

To explore the causes of population growth, I performed an event study analysis focusing on migration patterns of both in-migrants and out-migrants. Panel F displays the results, with in-migrants represented by blue circles and out-migrants represented by gray diamonds. After anime broadcasts, both indicators exhibit an upward trend; however, the increase in in-migrants surpasses that of out-migrants. The results of the difference-in-differences estimation, as shown in Columns 2 and 3 of Table 2, exhibit consistent patterns. Anime broadcasts significantly boost the number of in-migrants to featured municipalities by 2.7% (Column 2), while the coefficient for out-migrants is slightly below zero, yet negligible and statistically insignificant (Column 3). These findings suggest that the population increase is primarily attributable to the influx of new residents following anime broadcasts.

Furthermore, population growth among younger generations has led to demographic shifts. Panel G provides insights into marriage and divorce. An increase is observed in the number of marriages (marked by blue circles) after anime broadcasts. Meanwhile, divorce figures, depicted with gray diamond markers, level off around the seventh year after anime broadcasts, highlighting the increasing disparity between marriage and divorce. The rise in both marriages and the younger generation's population has also impacted the fertility rate. Panel H illustrates the significant improvement in birth numbers following anime broadcasts (blue circles). This increase in birth numbers is particularly noteworthy in Japan, where the fertility rate is notably low (1.34) compared with other developed nations. Conversely, mortality rates (gray diamonds) are also increasing, reflecting the growing population of older individuals, especially those in their 60s and older. However, the overall population of the featured municipalities is increasing, with the number of births surpassing the number of deaths. The regression analysis, shown in Columns 4 and 5, consistently indicates that anime broadcasts lead to significant increases in both fertility and mortality rates of 6.5% and 5.1%, respectively. Notably, the fertility coefficient is marginally higher than the mortality

coefficient, exceeding it by 1.4 percentage point. These findings from the difference-in-differences estimations further affirm that anime broadcasts play a role in driving population growth.

Finally, to understand the increase in the population aged over 60 years, the impact of anime broadcasts on the number of nursing homes and general hospitals was examined, as shown in Panel I. As the figure indicates, a significant increase in nursing homes is observed following anime broadcasts (blue circles), implying an enhanced residential environment for older adults. By contrast, the number of general hospitals has seen minimal growth (gray diamonds). These findings indicate that the rise in the number of nursing homes, which provide residential options for older adults, is a key factor in the increased older adult population. It is important to note that many individuals who move into nursing homes following anime broadcasts are most likely retired. Since average income per taxpayer is one of the economic measures applied in this study, an uptick in this segment of the population, assuming that they are retired and without income, would not affect this specific economic indicator.

Increase in Tourists.—Qualitative research has extensively explored the role of anime broadcasts in enhancing tourism, reflecting the growing interest of the Japanese government (Ono et al., 2020, Yamamura, 2015). Panel A of Figure 7 depicts tourist arrivals in municipalities following anime broadcasts. While a surge in tourism is anticipated shortly after an anime airs, the analysis in this study does not uncover significant evidence supporting sustained increases in tourist numbers in subsequent years. The coefficients remain largely unchanged around zero after the broadcasts, despite widening confidence intervals. Furthermore, the difference-in-differences estimation results in Column 6 of Table 2 consistently indicate negligible and statistically insignificant coefficients for anime broadcasts. Hence, anime broadcasts may have minimal impact on tourism as a mechanism for economic growth.

This finding contrasts with those of previous qualitative studies on anime pilgrimages and research on locations depicted in the media such as movies and dramas (Contu and Pau, 2022, Kantarci et al., 2017, Kim et al., 2009, Li et al., 2017). These studies often focus on specific, well-known works like *GOT*, diverging from the broader approach adopted in this study. While a single prominent anime work may trigger a surge in tourism to its depicted location post broadcast, such occurrences are rare given the annual release of approximately 200 new anime titles. Consequently, the impact of anime on tourism numbers may lack uniformity.

Changes in Local Government Behaviors.—Anime broadcasts may influence the actions and policies of local governments in featured municipalities, potentially prompting intensified urban planning and

development efforts. The previously observed population growth could be linked to local government initiatives aimed at enhancing city infrastructure and livability. If these assumptions hold, one might expect a significant rise in local government development expenditure immediately following anime broadcasts.

Panels B–I of Figure 7 detail the local government expenditures, providing insights into changes post anime broadcast. For instance, Panel B focuses on expenditures for promoting agriculture, forestry, and fisheries, displaying a post-broadcast increase in the coefficient. However, owing to a wide confidence interval, this increase lacks statistical significance. Likewise, expenditures on infrastructure and urban planning, closely tied to urban development, remain largely unchanged, with coefficients hovering near zero in Panels D and E, indicating no notable pre- or post-broadcast spending surges in these sectors. Further analysis of spending on social welfare, health, and firefighting shown in Panels F, G, and H, respectively, reveals no significant increases. The sole notable post-broadcast expenditure increase is observed in the education sector. Panel I indicates an approximate 10% rise in education spending, occurring approximately 10 years after anime broadcasts. However, this increase likely stems from demographic changes, particularly the growth in the population of individuals under 20 years old. Thus, the observed increase in education expenditure is more likely a response to youth population growth rather than a direct outcome of anime broadcasts' impact on economic growth.

Manufacturing Industry Development.—The anime industry not only relies on anime broadcasting but also generates revenue from selling anime-related merchandise. In 2021, merchandise sales constituted 24% of the Japanese anime industry's total revenue of USD2.29 billion. Qualitative reports highlight partnerships between the anime sector and local manufacturers to produce anime-themed products in areas featured in anime (Okamoto, 2015). This surge in manufacturing and industrial activities post anime broadcasts may contribute significantly to driving economic growth in these regions.

Panels J, K, and L of Figure 7 present the estimated impacts on key manufacturing sector indicators, including the number of manufacturing establishments, the number of manufacturing employees, and the value of manufactured goods shipped. Surprisingly, all manufacturing-related indicators show a significant decline following anime broadcasts. Although this outcome may appear negative, it aligns with previous observations of population growth within the model municipalities. An expanding population typically stimulates demand for non-manufacturing industries, particularly those in the service sector, indicating a potential shift in the region's economic structure toward services. This shift is supported by the increased number of nursing homes, as highlighted in Panel I

of Figure 6, suggesting a growing service orientation. Consequently, these findings suggest that anime broadcasting is unlikely to promote development in the manufacturing sectors of the model municipalities.

7. Discussion

The evidence suggests that the primary driver of economic growth following anime broadcasts is likely population growth, fueled by the influx of new residents and an increase in the birth rate. This mechanism could explain the approximately decade-long delay between the impact on average income per taxpayer and night-time luminosity, as illustrated in Figure 4. Economic changes stemming from population growth tend to unfold gradually, aligning with the pace of demographic expansion (Peters, 2022). This gradual economic shift is expected to be quickly reflected in statistical measures, allowing for the observation of a significant increase in average income per taxpayer within the comparatively short period of five years.

Although night-time luminosity serves as a valuable proxy for regional GDP, it may not precisely detect minor economic fluctuations. Initially, the economic impact of population growth may be too subtle to detect through night-time luminosity. However, as the economic magnitude of the model municipalities increased over time, these effects became sufficiently significant to be reflected in night-time luminosity after 13 years. This interpretation aligns with prior research, including a study in Indonesia, where it took 10–20 years for the economic consequences of population growth due to immigration to become evident in night-time luminosity measurements (Bazzi et al., 2016).

Shifting focus from economic dynamics to demographic changes, a key question arises: What, beyond the movement of older adults to nursing homes, attracted new migrants to the municipality after anime broadcasts? A plausible explanation for this is the popularity of anime, which potentially heightened the visibility of the model municipality, thereby attracting people to migrate. Alternatively, anime broadcasts may not have dramatically changed the municipality's overall visibility but may have boosted local residents' awareness of, attachment to, and pride in their community, thereby distinguishing the model municipality from its surrounding areas.

The former can be tested using data from the Tiiki brand survey. By conducting an event study analysis on municipal-level visibility, as shown in Panel A of Appendix Figure A7, it is found that visibility does not increase post broadcast, but instead decreases significantly. The reason for this decrease in visibility remains unclear. Nonetheless, these findings suggest that merely airing anime does not boost a municipality's general visibility. This conclusion is further supported by additional

data from the Tiiki brand survey, which uses an indicator to assess whether respondents learned about the municipality through anime. If anime broadcasts effectively increased municipal visibility, a higher percentage of respondents would report it as their source of information. However, as indicated in Panel B of Appendix Figure A7, there is no increase in the percentage of respondents who recognized the municipality through anime. Moreover, when assessing recognition through alternative channels such as news, guidebooks, and local government promotions, no increase in visibility attributable to anime broadcasts is detected across any of these estimations. Consequently, these results challenge the notion that anime broadcasts significantly raise the awareness of a municipality and motivate migration.

It is inherently challenging to quantify the possibility of differentiation from surrounding municipalities through changes in residents' perceptions.⁵ Nevertheless, qualitative studies on anime pilgrimages have shed light on the perceptual shifts among residents of municipalities featured in anime regarding their communities (Yamamura, 2018). For example, Okamoto (2009) reported that after their hometowns gained recognition as anime holy lands, local residents started to appreciate the ordinary landscapes and places in their hometowns, recognizing new value and developing a stronger sense of community pride. This change in perception could significantly influence individuals' decisions regarding relocating to areas near these locations, especially considering that approximately 80% of relocations in Japan are motivated by work or education (Cross Marketing, 2019). Given that the location for work or study is predetermined, potential movers often choose their residence from nearby municipalities. In such scenarios, a municipality's status as an anime holy land coupled with its residents' pride and attachment may serve as a compelling factor for prospective migrants to choose it as their new home. This interpretation aligns with the findings of this study and existing quantitative research, although direct verification remains elusive and warrants further exploration.

Although this study presents compelling evidence that anime broadcasts contribute to economic growth in Japanese municipalities through population increase, questions arise regarding the generalizability of these findings, given the focus on a specific media type (anime) within a particular country (Japan). However, the fascination with media-associated locations extends beyond Japan and anime. Similar interest in sites featured in movies and dramas has been reported in the United States (Martín, 2017), Europe (Contu and Pau, 2022), New Zealand (Li et al., 2017), and South Korea (Kim

⁵ Although the Tiiki brand survey data allow for an assessment of visibility differences relative to neighboring municipalities' averages, this measure only captures a change in general visibility. It fails to serve as an indicator of local residents' recognition or the municipality's differentiation from its neighbors, which are the key aspects targeted for investigation.

et al., 2009), suggesting potential universality in the economic impact of media exposure across different regions and media types.

New Zealand, where the globally successful *The Lord of the Rings* series was filmed, serves as a pertinent example. Appendix Figure A8 outlines the population change rate in New Zealand districts that were used as filming locations versus in those that were not, starting in 1997. Before the year 2000, preceding the film series' release, districts featured in the films showed a lower population change rate than districts not used for filming, with an average decline of -0.15%, indicating a decreasing trend. However, during the release period, with the first movie screening in 2001 and the last in 2003, the population change rate in filming districts not only improved but also matched that of non-filming districts. Subsequently, the rate of population change in the filming areas consistently surpassed that in the non-filming areas, reversing the pre-release trend. Since 2001, the average rate of population change in filming locations has been 1.4%, compared to 1.1% in non-filming areas, indicating a statistically significant difference. Although these findings drawn from basic statistical analyses do not provide conclusive evidence, they align closely with the trends observed in this study, suggesting a similar impact of media exposure on economic growth in other contexts.

Finally, the findings of this study prompt a discussion on the feasibility of leveraging anime for local economic development as a policy strategy. This study reveals that anime broadcasts can stimulate population growth in featured municipalities by attracting new immigrants. In countries experiencing overall population growth, such as the United States, leveraging the appeal of media holy lands, including those from anime, could strategically promote migration to targeted regions, thereby fostering local economic growth. However, the situation differs significantly in countries facing national population decline, as seen in Japan. In such contexts, population increases in anime-featured municipalities imply corresponding decreases elsewhere, essentially redistributing rather than adding to the population. While the Japanese government has shown a keen interest in anime, primarily for tourism promotion, utilizing it as a policy tool under these circumstances essentially exacerbates population competition between municipalities. Therefore, meticulous planning is essential to mitigate unintended consequences of regional population distribution.

8. Conclusion

This study leveraged the concept of anime holy lands to assess the influence of anime broadcasts on the economic development of featured municipalities. The results indicate a noticeable increase in both average income per taxpayer and night-time luminosity in the model municipalities, occurring 5 and 13 years after the broadcasts, respectively. Particularly noteworthy is the 0.5% rise

in average income per taxpayer attributed to anime broadcasts. Mechanism analysis suggests that this economic growth primarily stems from population expansion due to the influx of new residents and a heightened birth rate following anime broadcasts.

While previous research on media exposure has primarily focused on its immediate effects on aspects such as birth rates, divorce rates, and voting patterns, this study underscores the broader and longer-term impacts of media exposure, including the phenomenon of anime holy lands. These findings highlight the necessity for deeper exploration of the intricate social and economic ramifications of media exposure.

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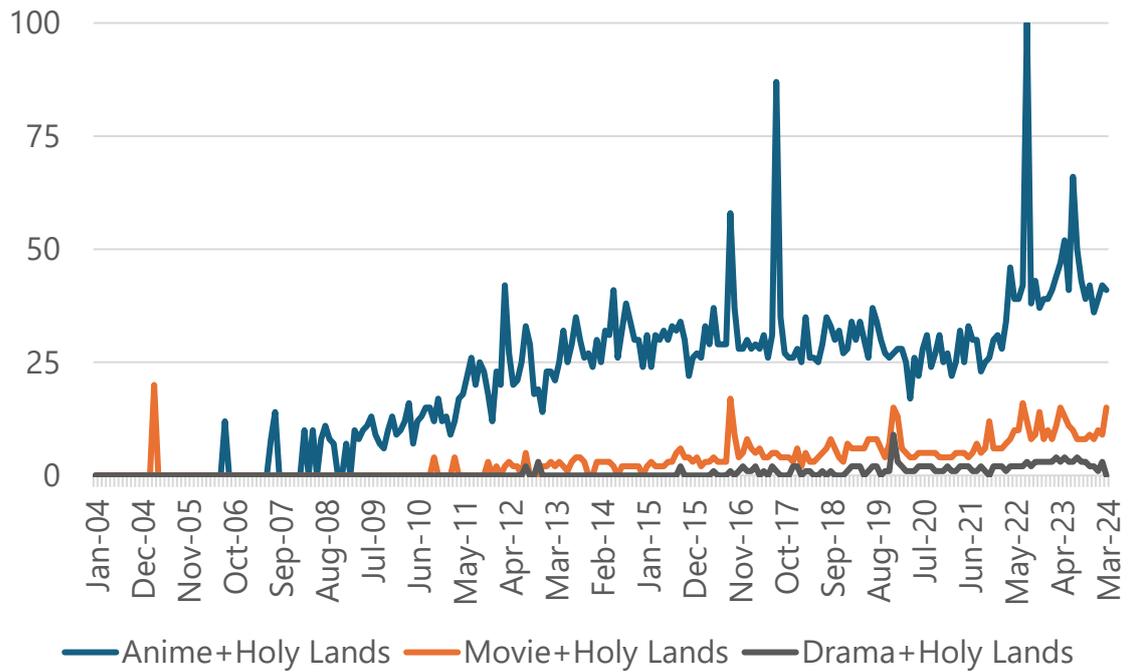


Figure 1. Monthly Google searches

Note: Values on the vertical axis indicate the search indices obtained from Google Trends. The blue line represents the search results for the term “anime holy places,” while the orange and dark gray lines represent the search results for movies and dramas, respectively.

Sources: Search index values are obtained from Google Trends.

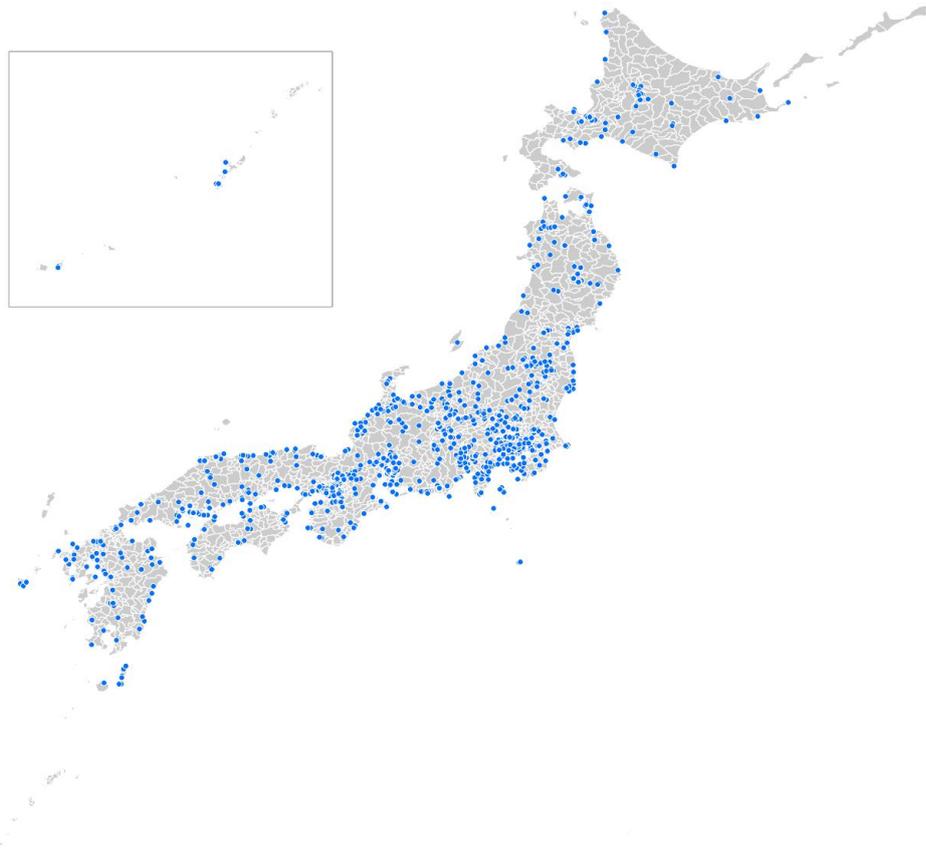


Figure 2. Locations of anime holy places in Japan

Note: The blue dots represent the locations of anime holy lands.

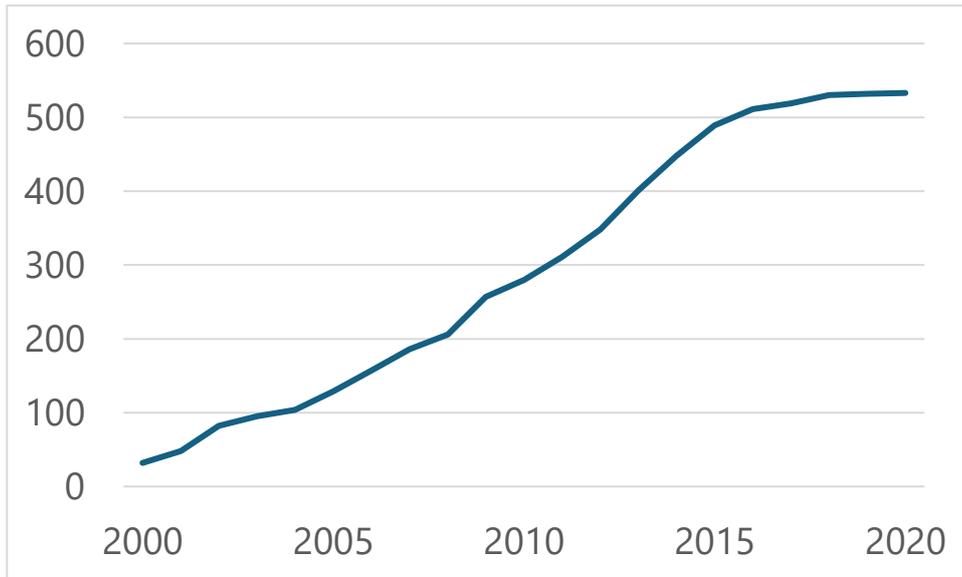


Figure 3. Number of municipalities with anime holy lands

Note: Prepared by the author based on the Anime Holy Land Pilgrimage Map database.

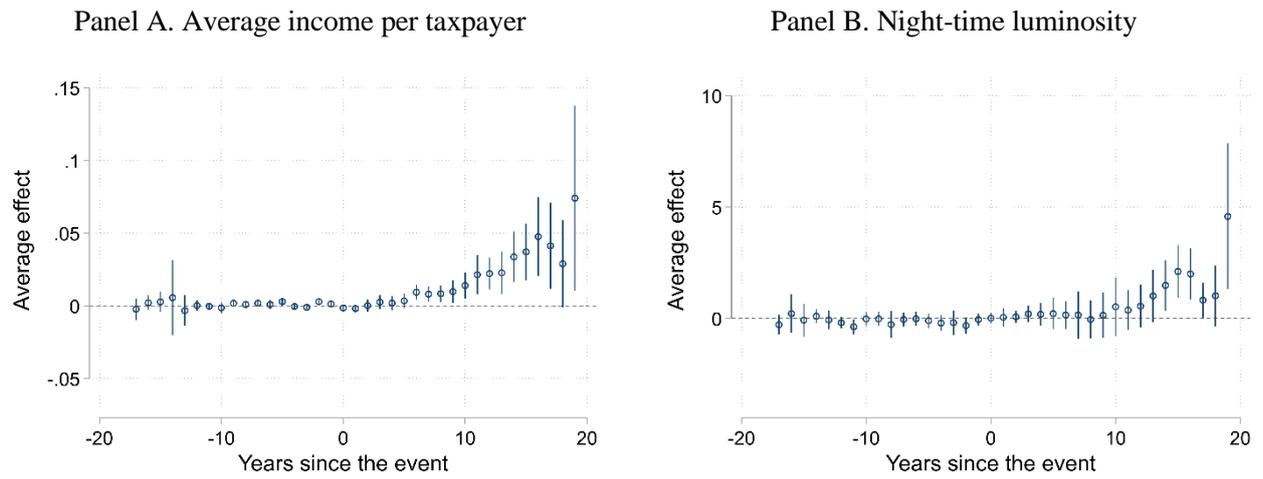
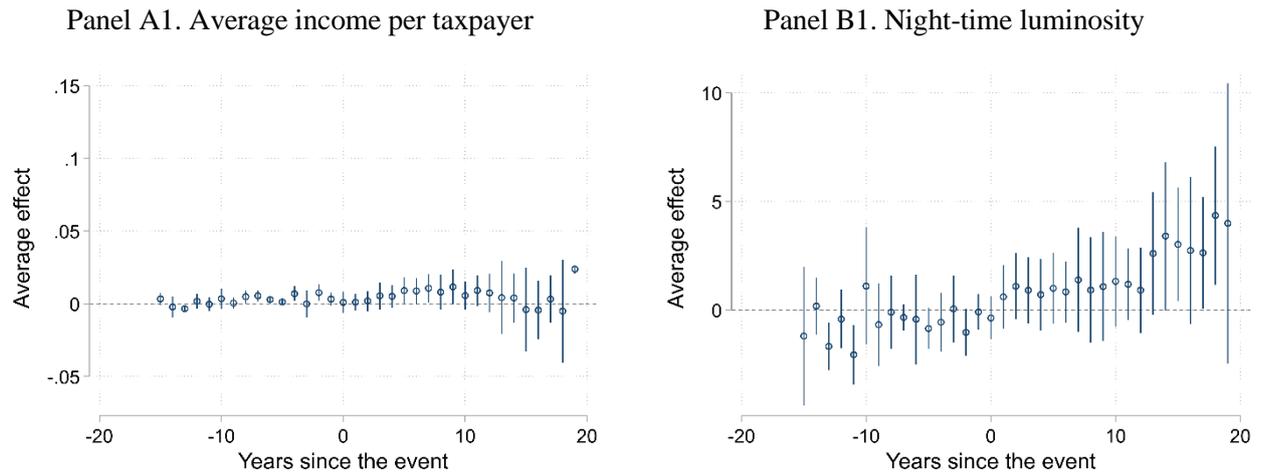


Figure 4. Anime broadcasts and local economic development

Notes: This figure illustrates the event study estimates and their 95 percent confidence intervals, following De Chaisemartin and d’Haultfoeuille (2020). Panel A corresponds to the regression results for average income per taxpayer, whereas the results for night-time luminosity are shown in Panel B.

Urban Municipalities



Rural Municipalities

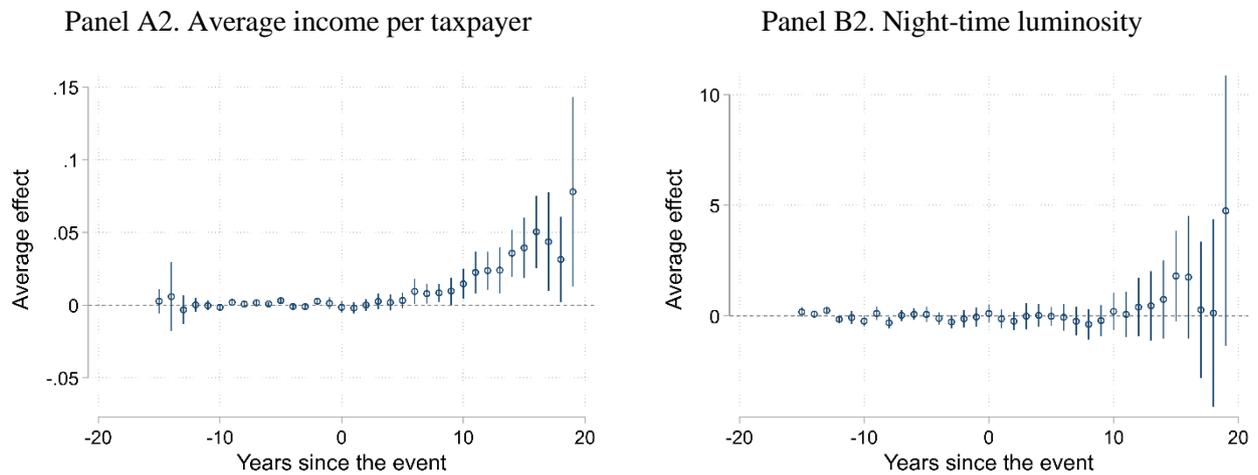


Figure 5. Heterogeneity: Estimation for urban and rural municipalities

Notes: This figure illustrates the event study estimates and their 95 percent confidence intervals, following De Chaisemartin and d'Haultfoeuille (2020). Panels A1 and A2 correspond to the regression results for average income per taxpayer, whereas the results for night-time luminosity are shown in Panels B1 and B2.

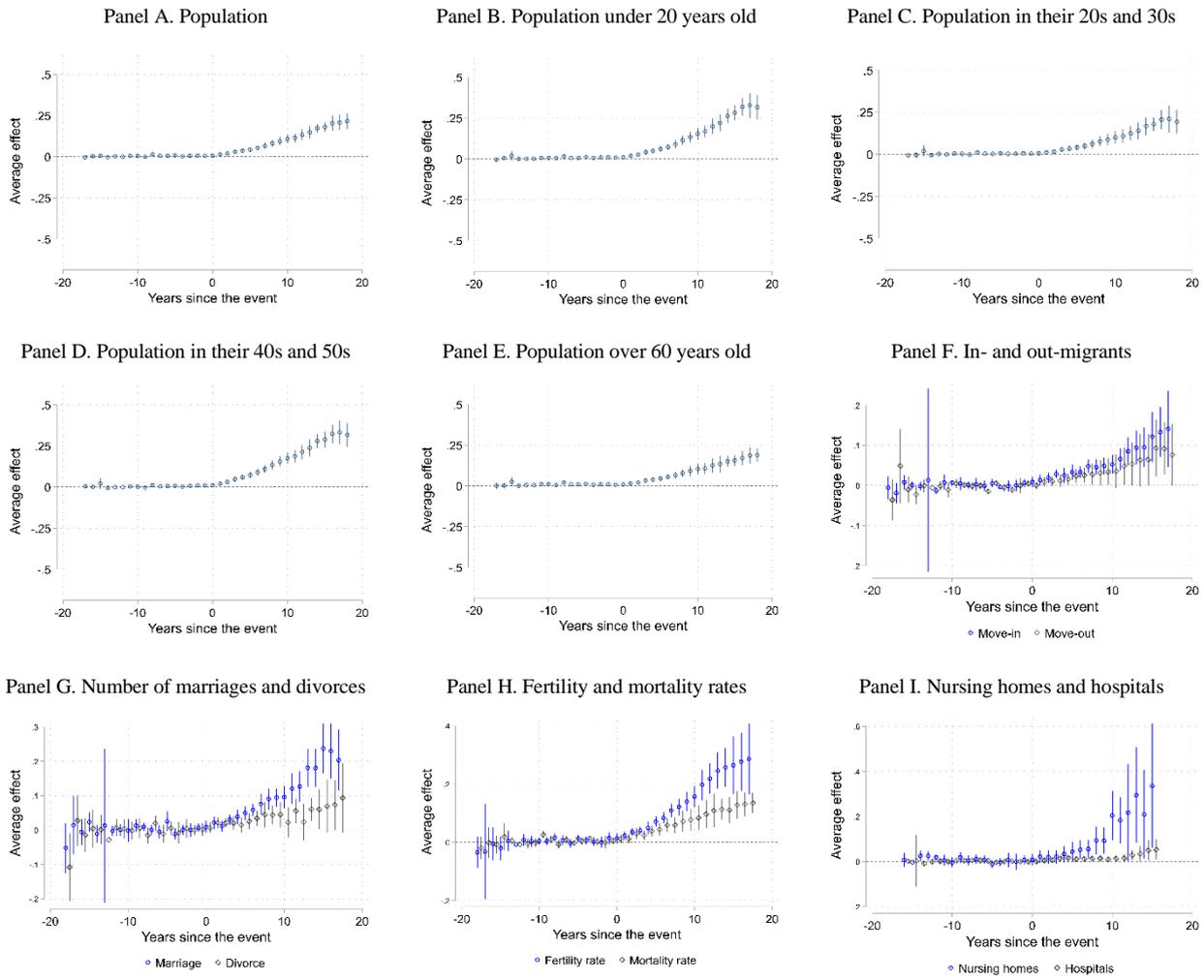
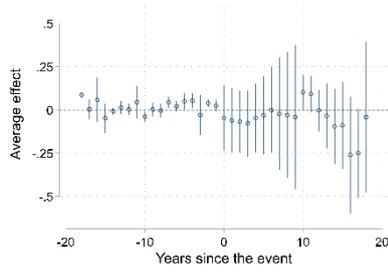


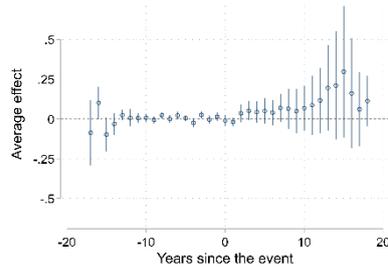
Figure 6. Mechanisms: Population growth

Notes: This figure shows the event-study estimates and their 95 percent confidence intervals using De Chaisemartin and d’Haultfoeuille (2020).

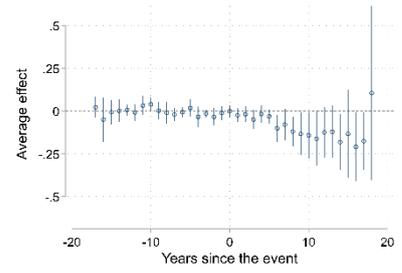
Panel A. Number of tourists



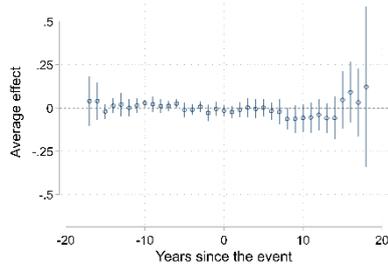
Panel B. Agriculture, Forestry, and Fisheries



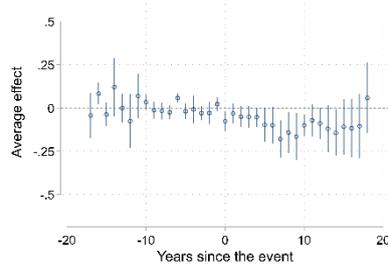
Panel C. Commerce



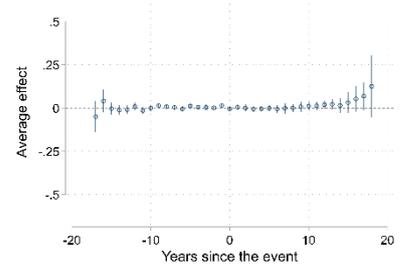
Panel D. Infrastructure



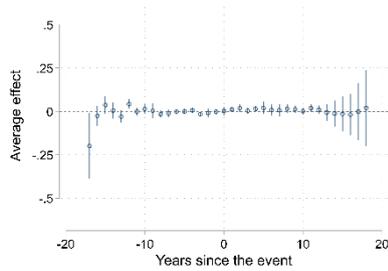
Panel E. Urban planning



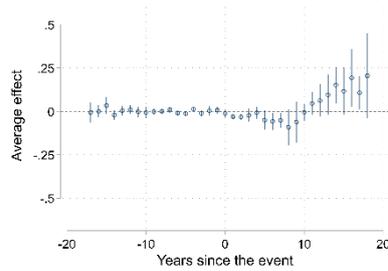
Panel F. Social welfare



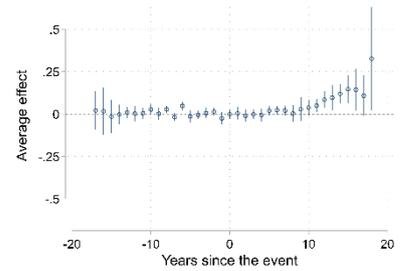
Panel G. Health



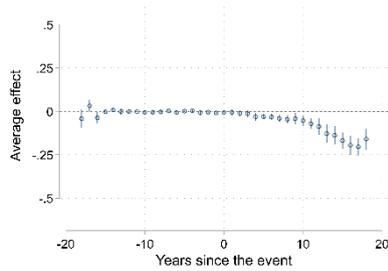
Panel H. Fire fighting



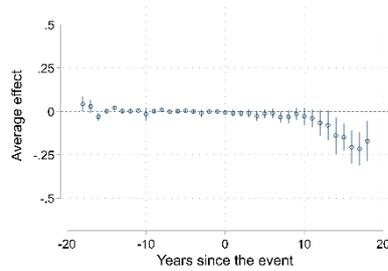
Panel I. Education



Panel J. Number of manufacturing establishments



Panel K. Number of manufacturing employees



Panel L. Value of manufactured goods shipped

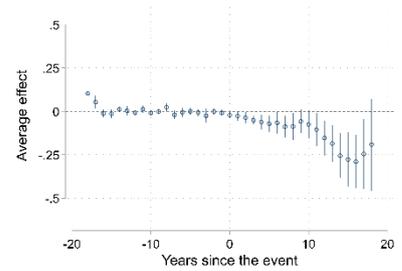


Figure 7. Mechanisms: Increase in tourists, local government expenditures, and industrial development

Notes: This figure shows the event-study estimates and their 95 percent confidence intervals using De Chaisemartin and d'Haultfoeuille (2020).

Table 1—Anime broadcasts and economic growth

	(log) Income per taxpayer (1)	Night-time luminosity (2)
Anime broadcasts	0.005* (0.002)	-0.314 (0.195)
Observations	36,140	39,942
Municipality FE	Yes	Yes
Year FE	Yes	Yes
Mean	7.969	6.055

Notes: The anime broadcasts variable is a dummy variable that takes the value of one if the anime modeled on municipality i is aired, and zero otherwise. Standard errors are reported in parentheses and are clustered at the municipal level. All regressions include municipality and year fixed effects. * indicates significance at the 5% level.

Table 2—Mechanisms: Effects of anime broadcasts on demographic indicators and tourist

	(log) Population (1)	(log) In-migrants (2)	(log) Out- migrants (3)	(log) Fertility (4)	(log) Mortality (5)	(log) Tourist numbers (6)
Anime broadcast	0.059** (0.007)	0.027** (0.007)	-0.002 (0.007)	0.065** (0.010)	0.051** (0.007)	0.003 (0.068)
Observations	36,166	39,457	38,082	36,166	36,166	18,800
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The anime broadcasts variable is a dummy variable that takes the value of one if the anime modeled on municipality i is aired, and zero otherwise. Standard errors are reported in parentheses and are clustered at the municipal level. All regressions include municipality and year fixed effects. * and ** indicate significance at the 5% and 1% levels, respectively.

Appendix: Additional Figures and Tables

Panel A: Anime scene



Panel B: Anime holy land



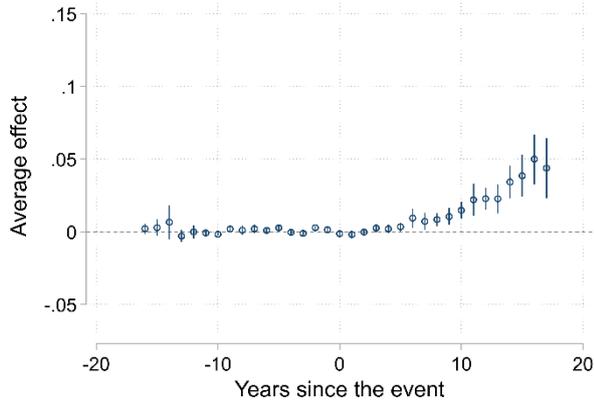
Figure A1. Comparison of an anime scene with its real-world location (anime holy land)

Note: Panel A depicts a scene from the movie *Your Name*, directed by Makoto Shinkai (Tokyo: CoMix Wave Films, 2016). Panel B shows the corresponding location in Hida, Gifu Prefecture, Japan, which is known for inspiring anime settings (latitude: 36.30331, longitude: 137.11244).

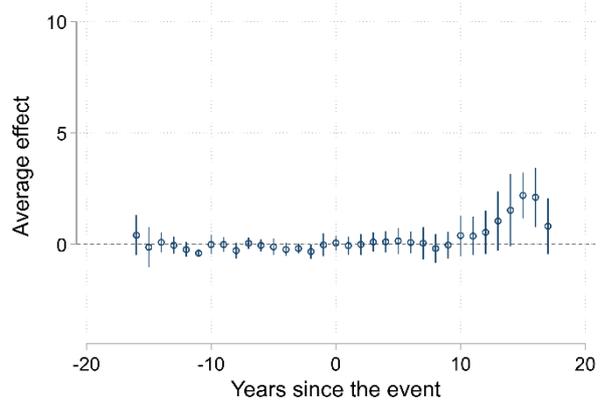
Sources: Both images were sourced from BEST T!MES (<https://www.kk-bestsellers.com/articles/-/7835/>).

TV Anime Works

Panel A1. Average income per taxpayer

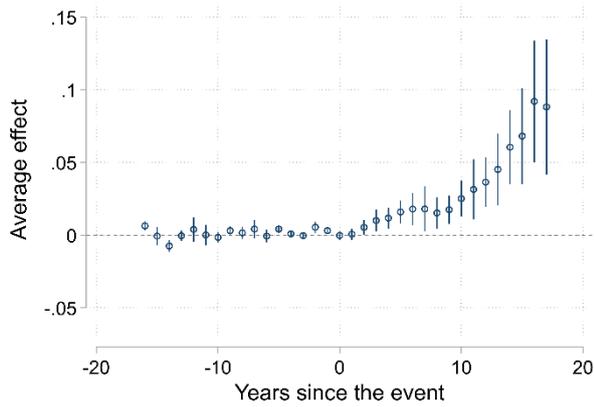


Panel B1. Night-time luminosity



Movie Anime Works

Panel A2. Average income per taxpayer



Panel B2. Night-time luminosity

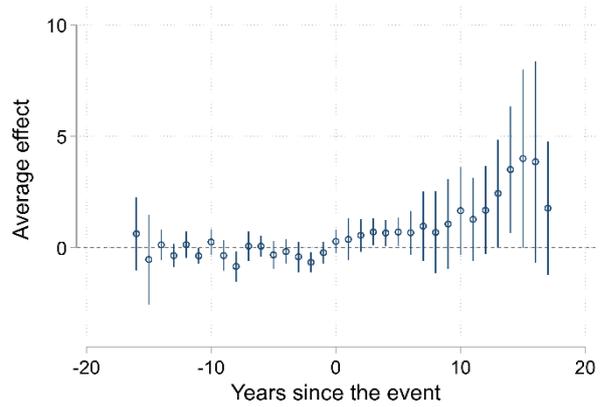


Figure A2. Robustness: Estimation by Anime types

Notes: This figure illustrates the event study estimates and their 95 percent confidence intervals, following De Chaisemartin and d'Haultfoeuille (2020). Panels A1 and A2 correspond to the regression results for average income per taxpayer, whereas the results for night-time luminosity are shown in Panels B1 and B2.

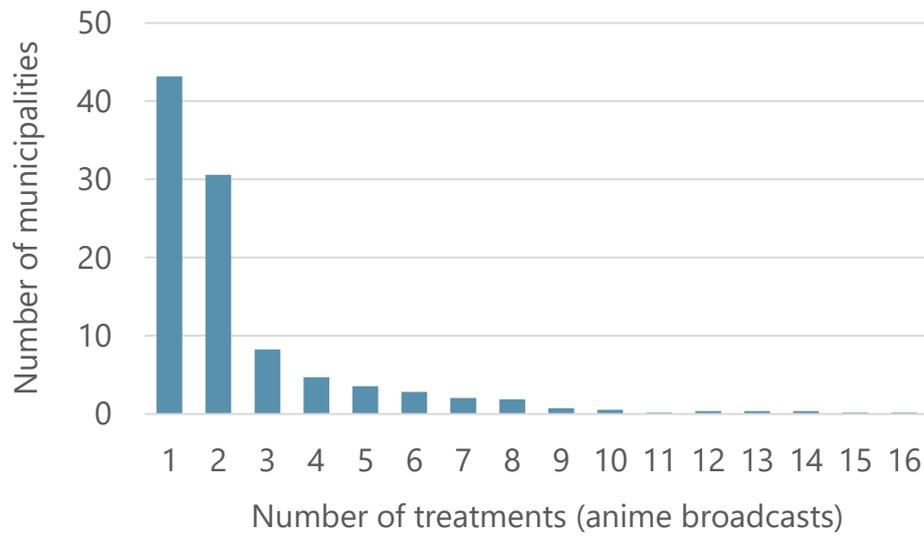
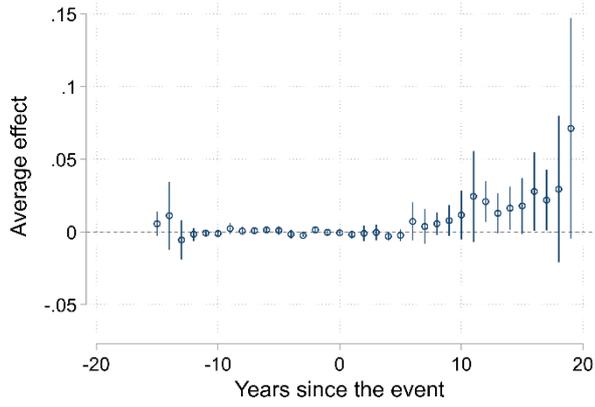


Figure A3. Number of treatments (anime broadcasts) and number of municipalities

Notes: The horizontal axis indicates the number of treatments (anime broadcasts) during the study period, while the vertical axis represents the number of municipalities.

Panel A. Average income per taxpayer



Panel B. Night-time luminosity

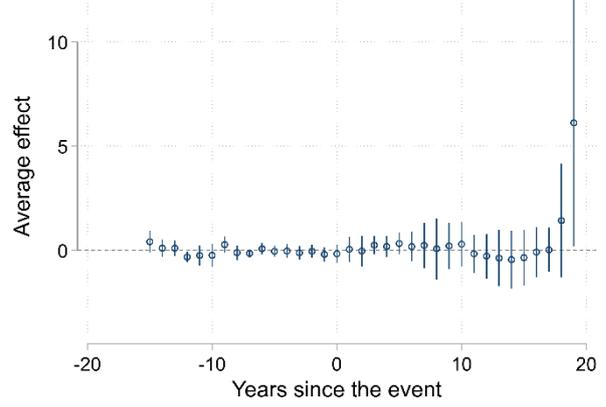
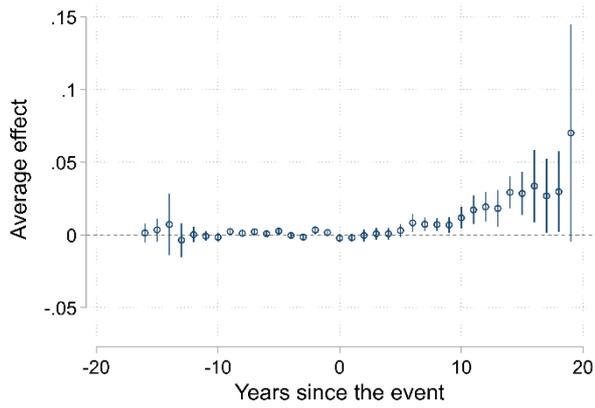


Figure A4. Robustness: Estimation excluding municipalities with multiple treatments

Notes: This figure illustrates the event study estimates and their 95 percent confidence intervals, following De Chaisemartin and d’Haultfoeuille (2020). Panel A corresponds to the regression results for average income per taxpayer, whereas the results for night-time luminosity are shown in Panel B.

Panel A. Average income per taxpayer



Panel B. Night-time luminosity

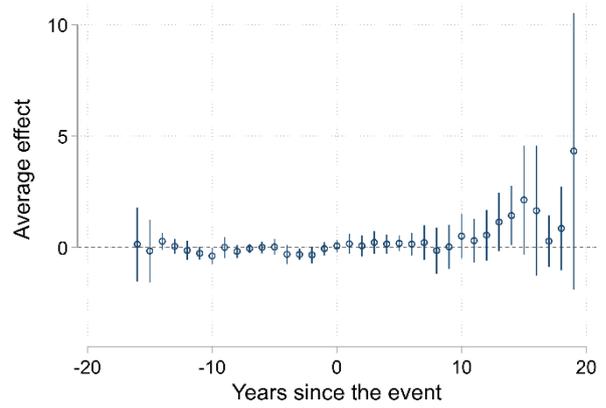
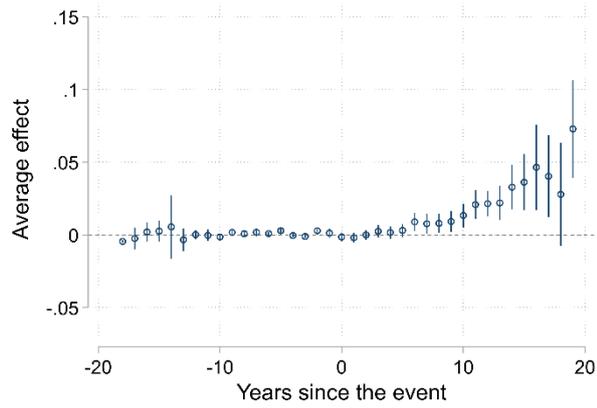


Figure A5. Robustness: Estimation excluding original anime

Notes: This figure illustrates the event study estimates and their 95 percent confidence intervals, following De Chaisemartin and d’Haultfoeuille (2020). Panel A corresponds to the regression results for average income per taxpayer, whereas the results for night-time luminosity are shown in Panel B.

Panel A. Average income per taxpayer



Panel B. Night-time luminosity

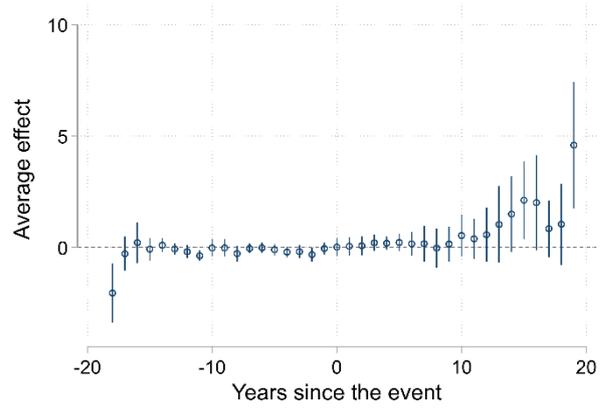
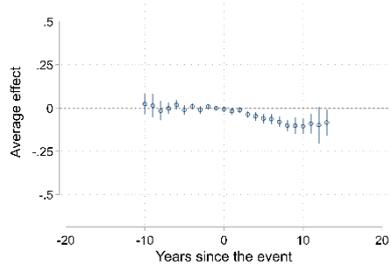


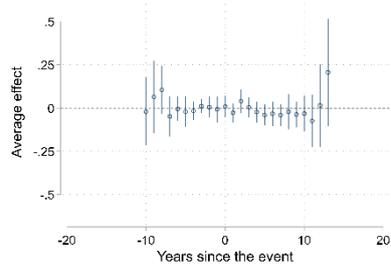
Figure A6. Robustness: Estimation excluding municipalities with zero night-time luminosity

Notes: This figure illustrates the event study estimates and their 95 percent confidence intervals, following De Chaisemartin and d’Haultfoeuille (2020). Panel A corresponds to the regression results for average income per taxpayer, whereas the results for night-time luminosity are shown in Panel B.

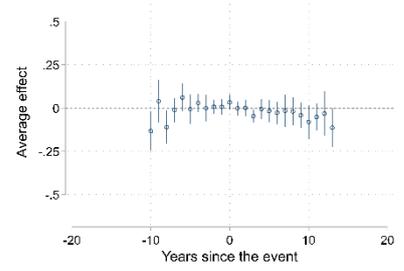
Panel A. Visibility



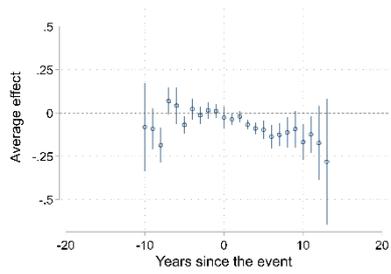
Panel B. Visibility via anime



Panel C. Visibility via News



Panel D. Visibility via guidebooks



Panel E. Visibility via local government

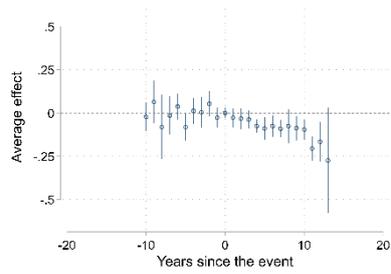


Figure A7. Mechanisms: Visibility

Notes: This figure illustrates the event study estimates and their 95 percent confidence intervals, following De Chaisemartin and d'Haultfoeuille (2020).

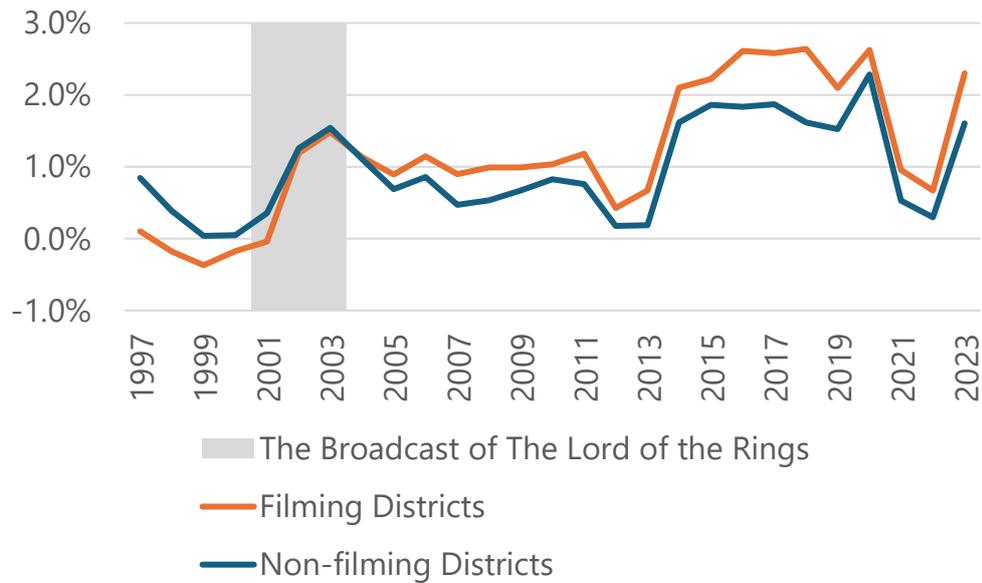


Figure A8. Annual population change at the district level in New Zealand

Notes: The orange line represents the percentage change in population in the district where *The Lord of the Rings* movie series was filmed. The blue line illustrates the population changes in other districts that were not featured in the movie. The movie series consists of three parts; the first part released in 2001 and the series concluded in 2003.

Source: Population data were sourced from NZ.Stat (<https://nzdotstat.stats.govt.nz/wbos/index.aspx>, accessed March 5, 2024)

Table A1: List of tourist data sources

- Akita prefecture <https://www.pref.akita.lg.jp/pages/archive/9790>, accessed June 17, 2023
- Aomori prefecture <https://opendata.pref.aomori.lg.jp/dataset/dataland-583.html>, accessed June 18, 2023
- Chiba prefecture <https://www.pref.chiba.lg.jp/kankou/toukeidata/kankoukyaku/>, accessed July 1, 2023
- Fukui prefecture <https://www.pref.fukui.lg.jp/doc/kankou/fukuiken-kankouyakusu.html>, accessed July 1, 2023
- Fukuoka prefecture <https://www.pref.fukuoka.lg.jp/contents/kankoutoukei.html>, accessed May 13, 2023
- Fukushima prefecture <https://www.pref.fukushima.lg.jp/sec/32031a/kanko-koryu3.html>, accessed June 17, 2023
- Gifu prefecture <https://www.pref.gifu.lg.jp/page/13276.html>, accessed May 7, 2023
- Gunma prefecture <https://toukei.pref.gunma.jp/kankou/>, accessed May 31, 2023
- Hiroshima prefecture <https://www.pref.hiroshima.lg.jp/site/toukei/doukou-index.html>, accessed July 1, 2023
- Hokkaido prefecture <https://www.pref.hokkaido.lg.jp/kz/kkd/irikomi.html>, accessed May 7, 2023
- Ibaraki prefecture <https://www.pref.ibaraki.jp/shokorodo/kanbutsu/kikaku/doutaityousa.html>, accessed May 31, 2023
- Iwate prefecture <https://www.pref.iwate.jp/sangyoukoyou/kankou/toukei/index.html>, accessed June 20, 2023
- Kanagawa prefecture <https://www.pref.kanagawa.jp/docs/b6m/cnt/f80022/p27746.html>, accessed June 19, 2023
- Kyoto prefecture <https://odcs.bodik.jp/260002/>, accessed July 24, 2023
- Saitama prefecture <https://www.pref.saitama.lg.jp/a0806/kankoutoukei2.html>, accessed March 7, 2023
- Mie prefecture <https://www.pref.mie.lg.jp/D1KANKO/84074013374.htm>, accessed July 1, 2023
- Miyagi prefecture <https://www.pref.miyagi.jp/soshiki/kankou/statistical.html>, accessed May 30, 2023
- Miyazaki prefecture <https://www.pref.miyazaki.lg.jp/kanko-suishin/kanko/miryoku/20221125131219.html>, accessed June 18, 2023
- Nagasaki prefecture <https://www.pref.nagasaki.jp/bunrui/kanko-kyoiku-bunka/kanko-bussan/statistics/kankoutoukei/296549.html>, accessed May 25, 2023
- Niigata prefecture <https://www.pref.niigata.lg.jp/sec/kankokikaku/1245960085415.html>, accessed May 29, 2023
- Saga prefecture <https://www.pref.saga.lg.jp/kiji00362356/index.html>, accessed February 2, 2024)
- Shiga prefecture <https://www.pref.shiga.lg.jp/ippan/shigotosangyou/kanko/317747.html>, accessed May 26, 2023
- Shimane prefecture https://www.pref.shimane.lg.jp/tourism/tourist/kankou/chosa/kanko_dotai_chosa/, accessed July 1, 2023
- Shizuoka prefecture <https://toukei.pref.shizuoka.jp/toukeikikakuhan/data/tyoukijikeiretu/kankou.html>, accessed May 24, 2023
- Tochigi prefecture <https://www.pref.tochigi.lg.jp/f05/irikomishukuhaku.html>, accessed April 24, 2023
- Toyama prefecture <https://www.pref.toyama.jp/140111/kensei/kouhou/toukei/kj00013393.html>, accessed June 30, 2023
- Wakayama prefecture <https://www.pref.wakayama.lg.jp/prefg/062400/doutai2.html>, accessed June 18, 2023
- Yamagata prefecture <https://www.pref.yamagata.jp/kensei/shoukai/toukeijouhou/commerce/index.html>, accessed May 31, 2023
- Yamaguchi prefecture <https://www.pref.yamaguchi.lg.jp/soshiki/91/21711.html>, accessed May 31, 2023
- Yamanashi prefecture <https://www.pref.yamanashi.jp/kankou-k/17390378357.html>, accessed June 18, 2023

Table A2: Summary statistics

	Mean	SD	Observations
(log) Average income per taxpayer (1,000 JPY)	7.969	0.162	36,140
Night-time luminosity	6.055	11.729	39,942
(log) Total population	10.218	1.452	36,166
(log) Population under 20	8.467	1.524	37,716
(log) Population in their 20s and 30s	8.662	1.612	37,716
(log) Population in their 40s and 50s	8.875	1.485	37,716
(log) Population over 60	8.848	1.368	37,716
(log) Number of in-migrants	6.884	1.601	36,166
(log) Number of out-migrants	6.982	1.507	36,166
(log) Number of marriages	4.779	1.623	39,450
(log) Number of divorces	3.828	1.593	39,449
(log) Number of births	5.261	1.621	36,166
(log) Number of deaths	5.709	1.293	36,166
(log) Number of tourists	13.206	1.795	18,800
<i>Local government expenditure (1,000 JPY)</i>			
(log) Agriculture, forestry, and fisheries	12.963	1.604	34,420
(log) Commerce	12.32	1.421	34,420
(log) Infrastructure	13.037	1.121	34,420
(log) Urban planning	11.931	4.3	34,420
(log) Social welfare	13.674	1.205	34,420
(log) Health	13.883	1.137	34,420
(log) Fire fighting	13.075	1.121	34,420
(log) Education	14.106	1.178	34,420
(log) Number of manufacturing establishments	10.436	2.215	36,272
(log) Number of manufacturing employees	3.979	1.448	37,591
(log) Value of manufactured goods shipped (million JPY)	7.232	1.845	37,260
Visibility	2.88	0.643	14,451
Visibility via anime	0.215	0.78	14,451
Proportion of urban municipalities	0.107	0.309	39,942

Table A3: Estimation results for other demographic indicators

	(log)	(log)	(log)	(log)	(log)	(log)
	Population	Population	Population	Population	Nursing	(log)
	under 20	ages 20s	ages 40s	over 60	homes	ospitals
	years old	and 30s	and 50s	years old		
	(1)	(2)	(3)	(4)	(5)	(6)
Anime broadcast	0.081**	0.049**	0.093**	0.076**	0.035**	0.016*
	(0.009)	(0.008)	(0.009)	(0.008)	(0.013)	(0.008)
Observations	37,716	37,716	37,716	37,716	33,780	37,600
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The variable anime broadcast is a dummy variable that takes a value of one if the anime modeled on municipality i is aired, and zero otherwise. Standard errors are reported in parentheses and clustered at the municipality level. All regressions include municipality and year fixed-effects. * and ** indicate significance at the 5% and 1%, respectively.

Table A4: Estimation results for local government expenditure

	(log) Agriculture, Forestry and Fisheries (1)	(log) Infrastructure (2)	(log) Urban development (3)	(log) Social welfare (4)	(log) Health (5)
Anime broadcast	0.037 (0.024)	-0.048** (0.019)	-0.103* (0.048)	0.023** (0.008)	-0.012 (0.010)
Observations	34,420	34,420	34,420	34,420	34,420
Municipality FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

	(log) Fire fighting (6)	(log) Education (7)	(log) Number of manufacturing establishments (8)	(log) Number of manufacturing employees (9)	(log) Value of manufactured goods shipped (10)
Anime broadcast	-0.046** (0.014)	-0.000 (0.010)	-0.055* (0.022)	-0.030** (0.010)	-0.001 (0.016)
Observations	34,420	34,420	36,270	37,591	37,260
Municipality FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Notes: The variable anime broadcast is a dummy variable that takes a value of one if the anime modeled on municipality i is aired, and zero otherwise. Standard errors are reported in parentheses and clustered at the municipality level. All regressions include municipality and year fixed-effects. * and ** indicate significance at the 5% and 1%, respectively.

Table A5: Estimation results for visibility

	Visibility via:				
	(log) Visibility (1)	(log) Anime (2)	(log) News (3)	(log) Guidebooks (4)	(log) Local government (5)
Anime broadcast	-0.042** (0.010)	-0.012 (0.019)	0.014 (0.022)	-0.069** (0.021)	-0.032* (0.015)
Observations	14,408	14,408	14,408	14,408	14,408
Municipality FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Notes: The anime broadcasts variable is a dummy variable that takes the value of one if the anime modeled on municipality i is aired, and zero otherwise. Standard errors are reported in parentheses and are clustered at the municipal level. All regressions include municipality and year fixed effects. * and ** indicate significance at the 5% and 1% levels, respectively.