Economics Honors Thesis:

Japan's furusato nouzei (Hometown Tax):

Which areas get how much, and is it really working?

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Honors thesis submitted in partial fulfillment of the requirements for Graduation with Distinction in Economics in Trinity College of Duke University

Duke University; Durham, North Carolina

2017

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Abstract: In 2015, 7,260,093 individuals donated a total of ¥165,291,021,000 (approximately 1.5 billion USD total) to 1,741 municipalities in Japan using the furusato nouzei system (Ministry of Internal Affairs and Communications). In this paper, I examine this system in two ways. Firstly, I predict the amount of donations each municipality receives based on a number of explanatory variables. Secondly, I run a 2SLS difference-in-differences regression to see if the tax was successfully redistributing wealth from city centers to rural areas, using an increase in municipal-level expenditure as a proxy.

JEL codes: H2, H21, H27
Keywords: Furusato nouzei, hometown tax, urbanization, wealth distribution

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B.S. Economics | Trinity '17

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I. Introduction

In 2008, the furusato nouzei program was launched in Japan. While the direct translation is "hometown tax," furusato nouzei is a misnomer as it is actually a donation to any municipal government within Japan. The amount that one donates in excess of ¥2,000 (a little less than 20 US dollars) becomes a tax credit. For example, if an individual were to donate ¥10,000, ¥8,000 will be deducted from his or her income and resident tax[1]. In essence, the individual is able to pay his or her income and resident tax to a region that he is she does not live in. Such a system is important in Japan where many citizens that grow up in rural areas migrate to city centers for educational and employment opportunities. Thus, while these citizens have grown up benefiting from public services provided for them by rural governments, they become taxpaying residents in urban areas. In addition, the government hopes that this initiative, by allowing taxpayers to choose where their tax will be donated, will provide an opportunity to increase the individual's awareness of and appreciation for the taxes he/she pays. Finally, the government hopes that municipalities will try to attract donations by appealing to taxpayers. In doing so, regions will compete with each other, pushing them to rethink their competitive edge. All of these above dynamics are intended to foster mutually beneficial relationships between taxpayers and local governments that will increase a sense of civic involvement and revitalize regions around the country.

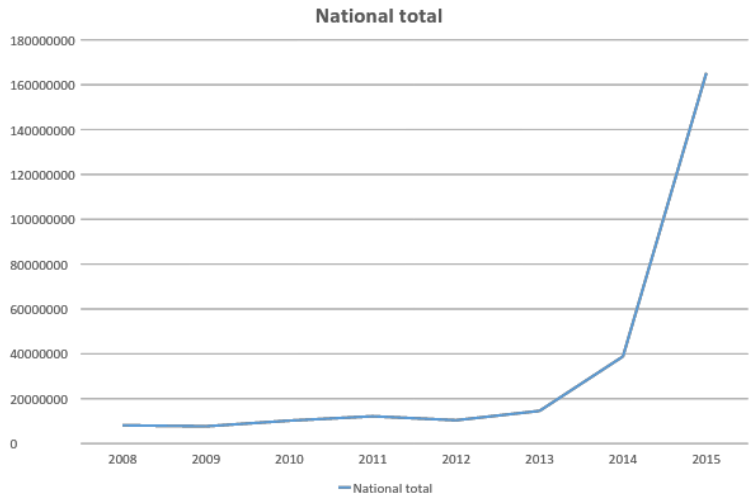
The problems that this tax seeks to tackle are not unique to Japan. In 1955, only 32% of the global population lived in urban areas (Moore, 2003). By 2050, approximately 6.3 billion

[1] The income tax portion is refunded in cash by the end of March of the next financial year. The resident tax portion is deducted as monthly discounts on the total amount that is due for the next financial year.

people, or 70% of the earth's population, is estimated to live in the world's major urban areas (Bretzke, 2013). Consequently, many countries around the world are struggling to revive rural communities that are experiencing population loss. This program, therefore, has potential applications for governments around the world. While this program is almost certainly a politically popular move, it is necessary to evaluate if it is truly effective in fulfilling its purpose.

The furusato nouzei system was developed as a response to various demographic and financial crises in Japan that have taken a particularly large toll on rural areas. Japan, like many other Asian countries, is attempting to stem the flow of mass migration from rural areas to large city centers that accelerated post-World War II, when it experienced unprecedented rates of economic growth and became the second largest economy in the world (Georgescu and Glavan, 2007). According to Matanle and Rausch, "Japan's postwar economic miracle has been achieved at the expense of rural retreat" (Matanle and Rausch, 2011). This urbanization was concentrated in the three major metropolitan regions of Tokyo, Keihanshin (which includes the cities of Kyoto, Osaka, Kobe) and Nagoya (Yamada and Tokuoka, 1996). This trend has also created issues for the urban areas such as high land prices, increased commuting distances and times, poor housing conditions, inadequate infrastructure, and urban sprawl (Nakai, 1988), particularly in the metropolitan fringe areas. While this trend has slowed, it continues today and rural areas are simultaneously weighed down with national issues of a stagnant economy, deflation, and an aging population. In addition, Japan is projected to decline by half a million people per year for the next forty years (Matanle and Rausch, 2011), which further casts doubt on hopes that rural areas can revitalize. According to the Internal Affairs and Communications Ministry, of Japan's 47 prefectures, 39 experienced a population decline, whereas the greater Tokyo metropolitan area has increased its population for 20 consecutive years. A consequence of this trend is that individuals who grew up enjoying public services provided to them by their local, rural municipality often move away to become taxpaying residents in large urban areas.

Figure 1: National total of furusato nouzei donations 2008-2015 in thousands of yen



In 2007, as part of a plan to revitalize rural regions in Japan, Prime Minister Shinzo Abe proposed the furusato nouzei system (Osaki, 2014). The program has been in place since 2008 until the present day. As can be seen in the chart above, the program has increased dramatically in popularity, particularly in the last couple of years[2]. The popularity of this tax stems from the fact that individuals stand to benefit from participating in this program. The first benefit is that it gives the taxpayer the ability to transfer tax dollars to a different location. Secondly, many local governments have started to send thank-you gifts to donors. These gifts are typically specialties from the region, such as local produce or hotel tickets. As the program has increased in popularity, many websites have been created in the past couple of years that help donors to choose a municipality to donate to based on the goods or services he or she wishes to receive. These benefits have caused the program to attract significant media attention, allowing it to gain mainstream appeal. This is almost certainly the reason behind the exponential growth in donation amounts. Finally, some municipalities allow donors to choose how their donation will be used, enabling them to fund broad causes or crowdfund specific projects[3]. This empowers donors, enabling them to use their tax money to help a local economy in the manner they desire.

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2 The nationwide donation totals are: 7,238,631 for 2008; 7,134,216 for 2009 (1% decrease); 9,533,108 for 2010 (34% increase); 10,501,363 for 2011 (10% increase); 9,095,810 for 2012 (13% decrease); 13,298,606 for 2013 (46% increase); and 37,545,278 for 2014 (182% increase)

3 An example of a crowdfunding project is supporting an adoption center in Takashi town of Hiroshima prefecture for "Peace Wanko Japan PROJECT," a nonprofit that aims to reduce the number of dogs killed in public shelters. Another example is supporting Chuo town of Okayama prefecture to provide retired racehorses a second career by retraining them as passenger or therapy horses.

The program, while hugely successful in generating donations, has caused controversy for several reasons. Critics claim the program is unfair as it takes away tax revenue from the larger urban areas that would have otherwise received the tax. Proponents for the tax counter that the decrease in tax revenue that these urban areas experience are a small fraction of their total tax income and that the wealth would be transferred, regardless, in the form of subsidies from the central government. Another controversial factor is that competition among recipient municipalities has intensified, leading them to spend a larger percentage of their donation to offer better thank-you gifts. Some argue that if donors donate solely to receive extravagant gifts, the system has deviated from its initial purpose. Such a system puts certain municipalities, perhaps those that would benefit the most from the tax, at a significant disadvantage.

II. Theoretical Framework

Through my research, I aim to quantify the link between regional characteristics and yearly municipal donation amounts by identifying statistically significant factors that cause an area to receive more or less donations. My first research question is:

1. What regional characteristics affect the size of a municipality's annual furusato nouzei donations, and to what extent?

   $\log\_don\_percap = \beta_0 + \beta_1(\log\_inc\_percap) + \beta_2(pop\_change) + \beta_3(primary) + \beta_4(tertiary) + \beta_5(year) + \beta_6(year \times \log\_inc\_percap) + \beta_7(year \times pop\_change) + \beta_8(year \times primary) + \beta_9(year \times tertiary) + \beta_{10}(year \times region) + \beta_{11}(region) + \beta_{12}(\text{city-level fixed effect})$

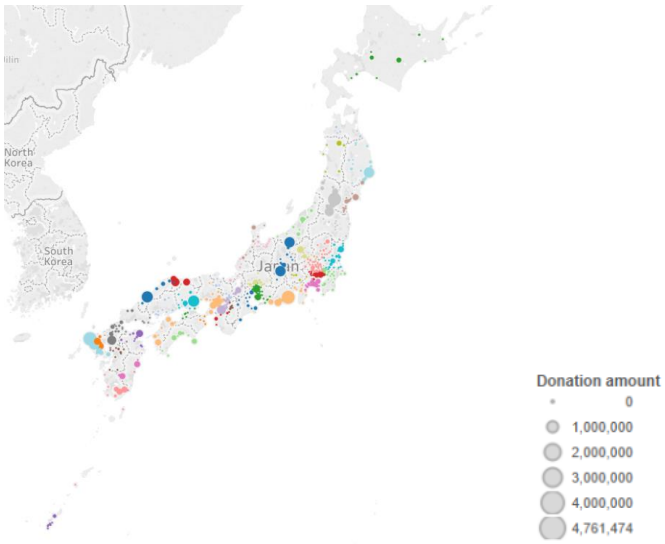
- H_0: for any given municipality, municipal income per capita (*log_inc_percap*); population change compared to the last census (*pop_change*); percentage of the workforce in the primary (*primary*) or tertiary (*tertiary)* industries; and region that the municipality belongs to (*hokkaido, tohoku, kanto, chubu, kansai, chugoku, kyushu, shikoku, okinawa*); interactions between these terms; and city-level fixed effects do not influence the expected amount of donations received (i.e., $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = \beta_{10} = \beta_{11} = \beta_{12} = 0$)
- H_a: for any given municipality, municipal income per capita; population change compared to the last census; percentage of the workforce in the primary or tertiary industries; and region that the municipality belongs to; interactions between these

terms; and city-level fixed effects do not influence the expected amount of donations received (i.e., $\beta_1 \neq 0$ or $\beta_2 \neq 0$ or $\beta_3 \neq 0$ or $\beta_4 \neq 0$ or $\beta_5 \neq 0$ or $\beta_6 \neq 0$ or $\beta_7 \neq 0$ or $\beta_8 \neq 0$ or $\beta_9 \neq 0$ or $\beta_{10} \neq 0$ or $\beta_{11} \neq 0$ or $\beta_{12} \neq 0$)

To test this hypothesis, I run a multiple linear regression using predictor variables to explain the variation in annual donation amounts between municipalities.

These findings can be utilized by local governments that seek to maximize the amount of donations they receive. In doing so, particularly through understanding the relative importance of each regional characteristic, they can adjust marketing strategies to play to their strengths and compensate for their weaknesses. This is particularly important in this crowded and competitive market, where building customer loyalty as quickly as possible is crucial to ensure repeat donations. In addition, analyses of what influences taxpayers to donate will also be informative for determining whether this program can be successfully implemented in places other than Japan that are also seeking methods to revitalize rural economies.

Figure 2: Map of the size of donations (represented by the size of the bubble) between 2008 and 2015 in the 47 prefectures



Next, I examined whether this tax program has been effective. In order to do this, I look into whether annual donation amount, as a new source of revenue, has influenced local government expenditure. My second research question is:

2. Has the “Furusato Nozei” system achieved its goal in revitalizing rural regions by enabling municipalities to increase their annual expenditure?
   predicted_exp $= \beta_0 + \beta_1(\text{log\_inc\_percap}) + \beta_2(\text{pop\_change}) + \beta_3(\text{log\_pop}) + \beta_4(\text{primary}) + \beta_5(\text{tertiary}) + \beta_{11}(\text{region}) + \beta_{12}(\text{city fixed effect})$

- H_0: there was no change in the expected mean annual expenditure per capita from before to after the Furusato nouzei program for the control and treatment groups
- H_a: there was a change in the expected mean annual expenditure per capita from before to after the Furusato nouzei program for the control and treatment groups

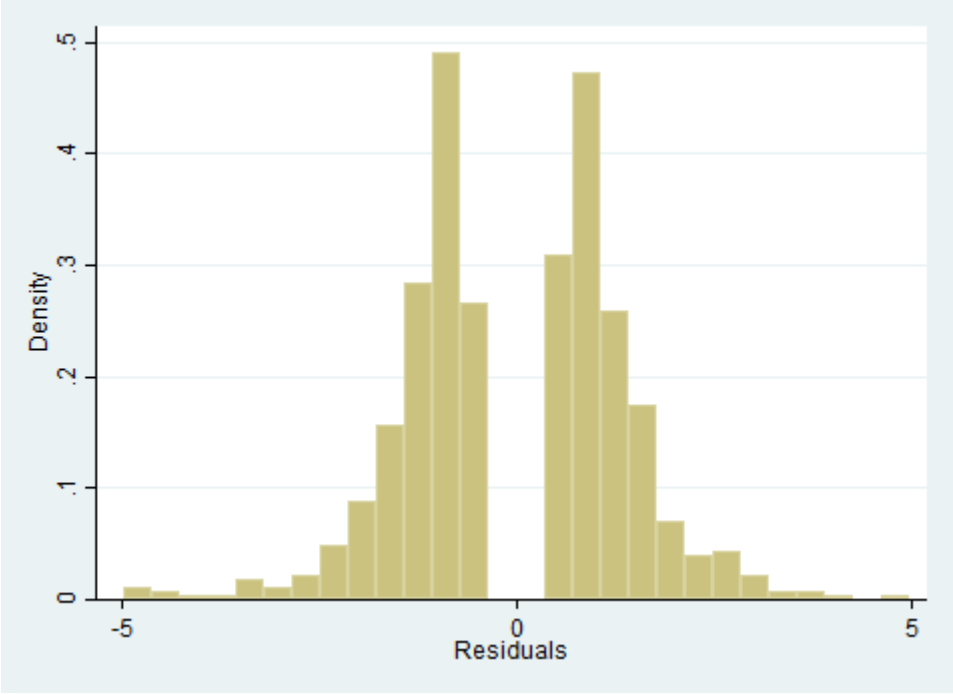
In order to answer my second research question, I run a Two-Stage Least Squares Regression Analysis (2SLS). I decided to do this because the error term for annual municipal level expenditure per capita is likely to be correlated with annual municipal level Furusato nouzei donations per capita. Thus, I replaced donation per capita as an explanatory variable with predicted donation per capita, using the predicted donation values I obtained from the regressions run from my first research question. As I had three separate regressions from my first research question, I have three sets of predicted donation per capita values. As a result, my outputs for this section are separated into three sets, with each set including four regressions. By using an instrument variable, I am able to fulfill the assumption that the dependent variable, annual expenditure per capita, is not correlated with the error term of an explanatory variable, annual donations per capita. Instead, the dependent variable is correlated with the values for annual donations per capita. This ensures that the value of the error terms for my dependent variable is independent of predictor variables. For the four regressions run for each of the three models, regressions 1 and 2 are 2SLS regressions. Regression 3 is not a 2SLS regression as I use the actual donation value instead of the predicted donation value. Regression 4 is also not a 2SLS regression as it does not use donation, predicted or actual, as an explanatory variable.

In order to test if the Furusato nouzei was successful in stimulating the economies of the recipient municipalities, I run a difference-in-differences regression. The control group should be cities that are urban centers where rural citizens have migrated to, and therefore should have been relatively unaffected by the tax (treatment = 0). On the other hand, the treatment group should be rural cities that have been affected by the tax and are experiencing brain drain (treatment = 1). In 2009, donations were minimal and therefore serve as the time

period before the program (t2014 = 0). Ideally, I would use data from 2008, which is the first year of the program with the least traction, but municipal level data are missing for this year. In 2009, governments were still receiving low donation amounts, and so I assumed that they were unlikely to significantly alter their annual expenditures. I used data from 2014 as the after time period (time = 1). This regression quantifies the difference in annual expenditure for municipalities that received high amounts of donations versus that didn't, relative to their trends in 2009.

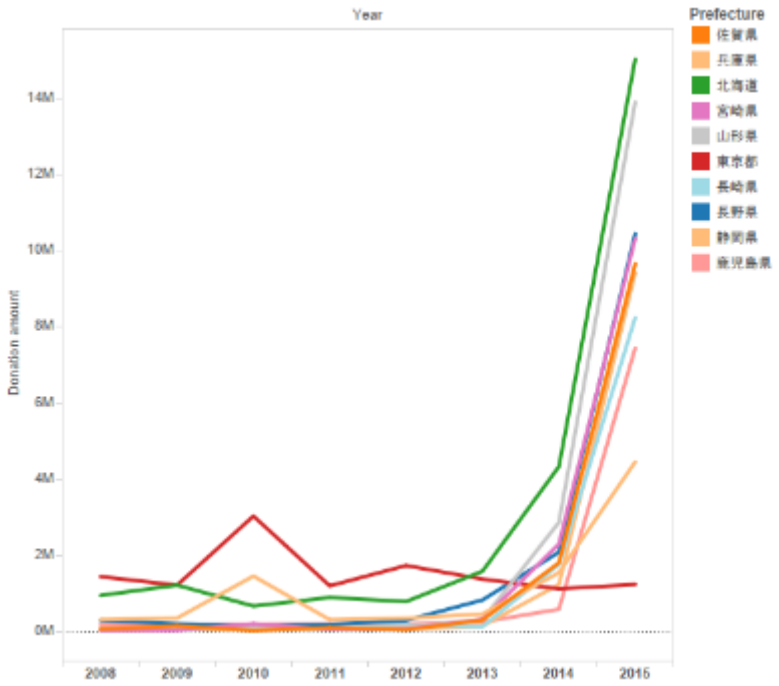
In deciding which cities would serve as treatment or control groups, I used the 2009 data sets. I then regressed log_don_percap three times, each time corresponding to the three models in research question 1. Then, I deleted all observations that were between the 25th and 75th percentile. I created the treatment dummy variable. Observations with a residual below the 25th percentile were treated as controls (treatment = 0) and observations with a residual above the 75th percentile were treated as treated (treatment = 1). It is worth noting that there may be a threshold effect before contributions affect local government expenditure, although my paper does not address this.

Figure 3: Distribution of residuals after deleting residuals that fell between the 25th and 75th percentiles



The main assumption for a difference-in-differences regression is that, in this context, municipal expenditure in both the control and treatment groups would have followed the same trend in the absence of the hometown tax. However, this may not be the case, as Flanagan and Kim found that low-income prefectures were more insulated from economic decline between 1970 and 1973 (Flanagan and Kim, 1982). This is largely due to the fact that low-income prefectures tend to have higher financial dependency on national aid. Therefore, they are less affected by a decline in internally generated resources. On the other hand, high-income prefectures are less dependent on national aid given their relative self-sufficiency. Consequently, when an economic decline hits, they will experience a larger portion of their total revenue decline and will need to increasingly turn to national aid to replace the decrease in their locally generated budget. Research on the Japanese financial crisis in the 1990s also confirmed that rural areas experienced a more severe credit crunch, relative to its urban counterparts (Ishikawa and Tsutsui, 2013). These findings are relevant to my research as the hometown tax was implemented in 2008. Therefore, it is possible that in the years following the financial crisis, prefectures in the treatment and control groups may have adjusted their expenditure differently. This would violate the key assumption for difference-in-differences regressions.

Figure 4: Annual donations per year for the ten prefectures that have received the most total donations. The key reads (top to bottom): Saga, Hyogo, Hokkaido, Miyazaki, Yamagata, Tokyo, Nagasaki, Nagano, Shizuoka, Kagoshima



III. Literature Review

In this section, I will cover my literature review for two separate topics. The first topic is understanding the relationship between the central government and local governments in Japan. The second topic is understanding the motivations behind why people donate.

A. Relationship between the central government and local governments in Japan

The political landscape of Japan, specifically the relationship between the central government and local governments, has implications on the nature and impact of national aid to local governments, and therefore to this study. Understanding this context is also significant for evaluating the motivations behind why the central government may have implemented the hometown tax in the first place.

The Resolution on the Promotion of Decentralization Reform in 1993 and the Comprehensive Decentralization Act in 1999 both sought to change the relationship between the central and local governments from being hierarchical to being equal and cooperative. In reality, however, Japan's political system continues to be characterized by a highly centralized administrative structure in which the national government has a high degree of control over local revenue (Flanagan and Kim, 1982)[4]. For example, under the Local Finance Law, tax rates can only be varied within a narrow range and the Ministry of Home Affairs must approve of all new taxes and local government bond issuances. In addition to financial control, the national government has a high degree of political control. Firstly, local governments are restricted from enacting an ordinance that may conflict with a national law. Secondly, a primary role of local governments is to implement functions that are delegated to them from the national government. Finally, given the financial dependence of municipalities to the national government, local governments must often cater to central guidance in areas that they have the ability to act independently. This is done so that they may be viewed upon

[4] In their paper, Flanagan and Kim focus on the effect of national aid on prefectural level spending. Japan has three levels of governments - central, prefectural and municipal. While my paper is focused on municipal level spending, and there are naturally differences in the ways national aid affects prefectural versus municipal level spending, I have drawn on this study to illustrate the dynamic between the national government and local governments in Japan. A further consideration that must be made is that since Flanagan and Kim published their study, Japan experienced an asset price bubble that led to a recessionary period that continued for two decades. For this reason, their conclusions may not hold anymore.

favorably by central authority figures who determine a large portion of their future finances. All of these factors restrict policy and financial autonomy. However, Flanagan and Kim conclude that policy generation in Japan is generally collaborative in which local governments have the ability to influence the size and priorities of national aid budgets and in which central government policies can influence the local expenditures. Local governments have enough autonomy to be able to introduce innovative policies. The Japanese government has, on occasion, adopted successful policies and spread them to other prefectures. Overall, the central government has a receptive attitude, oftentimes disseminating successful local policies to other areas.

Hirano argues that members of Diets serve not only as representatives of their constituents, but also as pipelines between national and local government funds (Hirano, 2006). This is essential because he describes how all 47 prefectural governments constantly compete to obtain funds from the central government[5]. As a result of this fiscal centralisation, constituents were incentivized to elect candidates who are effective at securing national resources for local purposes. This reality has guaranteed the continuous re-election of Liberal Democratic Party (LDP) candidates and enabled the LDP to maintain its power. Since its creation in 1955, the LDP has sustained political power, with the exception of four non-consecutive years. Pempel calls this political dominance "one of the world's premier examples of uninterrupted conservative rule in an industrialised democracy" (Pempel, 1992).

In addition, as a result of urbanization in Japan following World War II, rural prefectures contained more Diet seats per capita than urban districts and therefore rural votes became almost three times as valuable as an urban vote (Scheiner, 2006; Mulgan, 1997). Taking advantage of this 'negative gerrymander,' the LDP-led national government forged strong relationships with rural constituents, particularly those involved in agriculture, in the form of economic protectionism (Stockwin, 2008). Such measures sustained the LDP's popularity amongst rural areas. Thus, I anticipate this hometown tax is as much an attempt to publicize the central government's attempts to support rural communities as it is a genuine attempt to revitalize stagnant rural economies.

5 For the central government, personal income tax is the largest revenue source and corporate income tax is the second largest revenue source. In comparison, for municipalities, property tax is the largest revenue source, local personal-income tax is the second largest source and local corporate-income tax is the third largest source.

Local governments in Japan, compared to other countries in the OECD, bear a large share of responsibility. After inter-governmental transfer of funds, the expenditures of local governments are approximately twice as large as that of the central government. Local, especially municipal-level, governments are responsible for providing education, basic social services, and public investment, in addition to other miscellaneous services and activities. In 2013, the three major categories for local finance expenditure were social welfare at 24.1%, education at 16.5% and civil engineering works at 12.4% (Tokyo Metropolitan Government). While the central government cannot explicitly dictate local governments' expenditures, according to Ethan Scheiner, approximately 70% of prefectural revenue is provided by the national government (Scheiner, 2005). Therefore it appears to be likely that local government expenditure is highly dependent on the revenue it receives from the central government. For example, while the national government can only request that local governments increase their public works spending it is reasonable to assume that such requests would be respected.

As of 2013, the Japanese government distributed 40% of national taxes to local governments (Tokyo Metropolitan Government). In Japan, there are two major forms of national aid - block grants and specific grants (Steiner, 1965). The first type of grants, block grants, are granted to prefectures largely based on need, and therefore benefit relatively poorer prefectures. These grants are unconditional in that they have no restriction as to how they should be spent. Ishii and Wada explain that these unconditional tax grants from the central government are essentially tax subsidies, similar to the Furusato nouzei. On the other hand, specific grants are conditional and categorical (Flanagan and Kim, 1982). Given the complicated nature of transferring funds, another method for municipalities to raise funds from the national government is to issue bonds. After doing so, the central government can pay for a portion of the interest and amortization, effectively subsidizing the local governments. Bessho of the Asian Development Bank Institute found that "the current grants system discourages municipalities from increasing their own-source revenue" (Bessho, 2016), The Furusato nouzei program is promising, in comparison, as it encourages municipalities to find ways to increase their tax revenue through own-source means that can be converted to gifts for donors.

Flanagan and Kim make an important distinction between the function of national aid in the US versus Japan. They argue that in the US, national aid is commonly used as an incentive to align local government policy with federal policy. In comparison, in Japan, as the central

government exercises more control over local financing, its primary purpose is not as an incentive system for policy alignment. According to Flanagan and Kim, the impact of federal aid on local government expenditure policies in the United States has generally been accepted by economists and political scientists alike. They discuss the debate behind the validity of using national aid as an explanatory variable to explain local spending policies. This debate is relevant when understanding my Research Question 2, as it aims to explain change in municipal expenditure with an increase in revenue from the hometown tax. While the hometown tax is not strictly national aid, it serves a similar purpose in that it is an attempt by the central government to redistribute tax revenues, and consequently enables prefectures with smaller tax bases to increase revenue. The debate can be summarized by two main criticisms. The first, that aid may show up as a constant in the regression equation due to a uniform distribution, does not apply to this paper. As can be seen from the outputs below, the the amount of hometown tax received by each municipality varies significantly and therefore the distribution is not uniform (see Appendix A for histograms of the distribution of the natural logarithm of donations). The second criticism concerns matching grants, which is used as a mechanism for federal control in the US. However, Japan's national government has a much larger influence on local governments and often uses more direct approaches to influence policy on a local level. Thus, in the context of Japan, the two criticisms do not apply. As a result, national aid may be used as a variable that impacts the level of local municipality spending. I hypothesize that national aid will have a stronger impact in Japan given that Japanese local governments have a stronger financial dependency on funds from the national government.

Osman (1966) argues that for national funds to be effective in fulfilling their purpose, a stimulatory effect is required in which expenditures from internal sources must increase beyond the expenditures resulting from the granted aid. This has significant implications for my interpretation of the results from the difference-in-differences regression to answer Research Question 2. If, for example, the hometown tax is not found to have an effect on expenditure, this could mean that federal funds are merely being substituted for state sources instead of stimulating increased local expenditures from internal sources of revenue.

B. MOTIVATIONS BEHIND DONATION BEHAVIOR

To fully understand the motivations behind why people donate in the context of the hometown tax, I will segment participants into two groups. The first group is citizens who are fulfilling the original intent of the tax. This group includes people who wish to support a certain municipality's policies and people who wish to donate to the hometown they moved away from. The second group is taxpayers who are primarily motivated to donate to receive a gift in return. This group is those who donated in 2013 and 2014, as this is when the gift-giving concept became popularized. I have separated these two groups based on the assumption that these groups have different motives. That is not to say these groups are mutually exclusive, and therefore taxpayers can be donating to fulfill both purposes. In the literature review section below, I will outline theories behind why people donate and how they led me to decide on which variables to include in my regression.

- **Identity theory and population change:**

Boenigk examined the effect of two identification constructs on loyalty and donation behaviour (Boenigk, 2013). The first construct is organizational identification or people's perceptions of belonging to a group. The second construct is identity salience or the relative significance of a given identity for defining oneself. This study was conducted in the context of nonprofit sector industries and found that both constructs explain donor loyalty, but not necessarily donation amounts. This loyalty translates to a donor's increased willingness to donate again, give in larger quantities, or recommend the non profit organization to other donors.

Both identification constructs can be applied to my research. By the organization identification construct, I predict that people who emigrated from their childhood home still feel a strong sense of belonging to their hometown. By the identity salience construct, it is also plausible to assume that one's hometown is a salient aspect of that person's identity. Both constructs suggest that people who moved from a certain location are more likely to donate to that city or town. One thing to note is that the study examined donations to a nonprofit organization, whereas this paper is in regards to donations to a governmental organization. I hypothesize that people, in general, are more likely to identify with their hometown than with an NGO and therefore these relationships should be stronger in the context of this study.

For this reason, in running the regression for Research Question 1, I will include population change compared to the last census (5 years ago) as an independent variable. Theoretically, if the original intent of the tax is being fulfilled, that is to donate to one's "hometown, " areas with larger negative population change should receive more donations, as there is a larger population of people who have moved away and are potential donors. This variable should measure the need of the place as well, as it gives the size of the population that is likely to give.

- **Brand theory and income per capita:**

Do Paco discusses how brand image is a differentiating factor for Non Governmental Organizations that are competing for funding (do Paco, 2014). In a similar manner, I will explore how brand image differentiates cities that are competing for donations and affects the extent to which they receive money. He defines "brand" to be a set of perceptions formed about an organization and is closely related to its reputation and identity. In this paper, I will assume a city's "brand" is ingrained within the Japanese given familiarity to that location, which stems from that location's reputation and identity. This assumption is supported by Baker, who claims that familiarity is related with the time that is needed to process information about the brand (Baker at al., 1986).

Naddaff believes that branding has become a crucial tool for the non-profit industry and Webster believes that the brand is the most valuable asset of a non-profit organization (Webster, 2002; Naddaff, 2004). In this way, we can hypothesize that the brand is the most important asset of a city or town and will significantly influence people's likeliness to donate. Einwiller concludes that brand awareness and perception are closely linked to the formation of attitudes, and therefore influence the decision-making processes (Faircloth, 2005). Faircloth argues that public awareness of NGOs leads to more donations, or that there is a positive relationship between brand recognition levels and amount of donations.

Based on similar donation-seeking behaviors between NGOs and the municipalities discussed in this paper, I will use these theories as a justification to include 'income per capita' as an independent variable. I predict that areas with higher income per capita have stronger brand recognition. However, it is unclear whether this brand recognition will affect donation levels in a positive or negative manner. Do Paco's results suggest that familiarity with the NGO

does not contribute to donation amounts. In fact, results from Faircloth's (2005) study suggested that familiarity and willingness to donate were negatively related. On the other hand, Michel and Rieunier (2012), confirmed that familiarity and the intention to donate were positively correlated.

- **Gift theory and % in primary, secondary or tertiary industries:**

Mathur discusses how social exchange theory is an appropriate theoretical framework for identifying the rewards that donors seek through their donation behaviour (Mathur, 1996). While giving may partially be driven by altruistic behavior, it is likely to also be driven by agonistic motives that seek to maximize the donor's utility. Belk claims that gift giving establishes an exchange relationship between the donor and the beneficiary (Belk, 1982). We can see how the hometown tax is similar in that it establishes a mutually beneficial relationship between the municipality and the donor, as the government receives money and also sends gifts, such as local produce or tickets to a local hotel.

Exchange theory posits that individuals engage in specific activities, i.e donate to cities, when they perceive that the marginal benefit from donating will be at least equal to the marginal cost of donating. Given that a tenet of exchange theory is that individuals will attempt to maximize rewards, it is reasonable to assume that individuals may choose to donate to municipalities that can offer the best gifts, ceteris paribus. This also would explain how an increase in media coverage of the gifts that local municipalities were offering was accompanied with a recent spike in donations. I hypothesize that before it became the norm for municipalities to use gifts to attract donors, the marginal cost of donating was perceived to be too high for the majority of Japanese people, relative to the marginal benefit the donations would reap. For this reason, once the notion of receiving gifts became mainstream, I hypothesize that the second group of taxpayers started to donate as they attained the ability to select cities that offer desirable gifts, making the marginal benefit of the tax larger than the marginal cost. This is particularly the case because there is very little cost involved in diverting one's taxes. Hence, I will assume that the nature of the municipality's local economy will significantly affect that area's ability to offer attractive gifts, and therefore to attract donations. Consequently, I will include "% in primary industry" and "% in tertiary industry" as variables in my regression[6]. For example, it may be reasonable to assume that

[6] For % in primary, secondary, or tertiary industry, the value of the variables for any given municipality add up to 100 (i.e., the industries are mutually exclusive and collectively exhaustive). I included the primary and tertiary dummy variables and excluded the secondary dummy variable.

areas with a high percentage in primary industry are likely to be have endowments that they can convert to desirable gifts such as local produce[7]. This in turn could attract donors that are only seeking to obtain the best gifts. One concern is that if municipalities can offer attractive gifts are at a relative advantage to receive donations, this tax could further inequality between municipalities. In other words, municipalities that are not able to provide gifts will struggle, and these municipalities are perhaps those that would benefit from the additional tax revenue the most.

IV. Data

Figure 5: Table of information pertaining to the variables used for the regressions

Variable	**Research Question 1 or Research Question 2**	**Definition**	**Relevant literature review**	**Unit (logs)**
Annual donation per capita *(log_don_percap)*	1 (Y variable), 2 (X variable)	Hometown tax amount each municipality received		Thousands of yen (logs)
Predicted donation per capita (*predicted_don)*	2 (Y variable)	Predicted donation generated by Research Quesion 1		Thousands of yen (logs)
Annual expenditure per capita *(log_exp)*	2 (Y variable)	Annual municipal expenditure		Thousands of yen (logs)
Population change *(pop_change)*	1 (X variable), 2 (control)	Compares population from most recent census to the population from two censuses ago	Identity theory	%
Population	1 (used to	Reported by a 'Resident	Brand	Number of

[7] A website that provides information on various municipal offerings in return for donations (**https://www.furusato-tax.jp/rank.html)** ranked how frequently certain categories were searched. Between November 1 - 30, 2016, the ranking (ordered by number of page views) was as follows: 1) meat (1,911,774); 2) general/everyday goods (1,510,410; 3) fish and shellfish (1,271,641); 4) fruits (1,056,459); 5) crab and shrimp (849,417), 6) rice and bread (792,865); 7) alcohol (717,816); 8) events and tickets (577,750); 9) processed goods (536,607); 10) fashion (531,637); 11) snacks and sweets (508,961); 12) travel (449,438)

(*log_pop)*	calculate *log_inc_percap*), 2 (control)	Register,' which lists the number of people who claim residency in the municipality	theory	people (logs)
Annual income (*log_inc*)	1 (used to calculate *log_inc_percap*)	Annual municipal income		Thousands of yen (logs)
Income per capita (*log_inc_percap*)	1 (X variable), 2 (control)	Annual income/population (code: gen log_inc_percap = log_inc - log_pop)		Thousands of yen/person (logs)
Industry *(primary, tertiary)*	1 (X variable), 2 (control)	Denominator is the total working population, excluding industries that are not classifiable. Numerator is number of people within that working population who are employed in the industry	Gift theory	%
Regions *(hokkaid, tohoku, kanto, chubu, kansai chugoku, kyushu, shikoku, okinawa)*	1 (X variable)	Dummy variable		
Years (*2010, 2011, 2012, 2013, 2014)*	1 (X variable)	Dummy variable		
Interac	2 (X variable)	Interaction term, equal to time*treatment (code: gen interac = time*treatment)		

Notes:

- All municipal level data[8] and donation data are provided by the Ministry of Internal Affairs and Communications.

[8] I combined the municipal level data and donation data by using an Vlookup function on Excel that matched the name of the prefecture and city (prefecture_city). Interestingly enough, the number of observations varies year to year. This is a result of the "Great Heisei-Era Mergers." From April 1999 to April 2016, municipalities merged together to form new or expanded municipalities.

- My data span from 2009 until 2014. I have not included data from 2008 because they do not include expenditure data.
- The sample is not randomly chosen as I will be using all available data. As this paper does not use data that was generated by an experiment, it is difficult to draw cause-and-effect relationships. However, given that there is no sampling error, I am confident that the data will accurately represent reality.
- For variables that had observations that were heavily skewed to the right (annual donation, population, annual income, income per capita and local expenditure), I added 1 to each observation and took the natural log in order to linearize the relationship.
- The industry values are based on a result of a survey that is taken every five years. The data sets before 2010 are based on information from the 2005 survey, whereas the data sets after 2010 are based on the survey that occurred in 2010.

Cleaning up the original data set:

- Data entries for municipal-level donations that were coded as "#N/A" were re-coded as -1. In STATA, these values were excluded (code: drop if log_don == -1)
- As can be seen by Appendix A, many municipalities received donation of 0 yen. As these 0 values disrupted the normality of the data, these values were removed.
- For population change, data would occasionally be inputted as "Δ0.0", which could not be read by STATA. These values were re-coded as 0. In addition, population change data would occasionally be inputted as "-", which also indicated unavailability of data. These entries were re-coded as 999 and removed in STATA (code: drop if population_change == 999)

V. Data Analysis

- **RESEARCH QUESTION 1**

Figure 6: Regression outputs excluding interaction terms and city-level fixed effects

Dependent variable: annual donation per capita (log)

VARIABLES	(1) With city-level fixed effects	(2) Without city-level fixed effects	(3) Without region X year interaction
log_inc_percap	1.047***	1.712***	1.699***
	(0.131)	(0.114)	(0.109)
pop_change	0.00619	-0.0349***	-0.0362***
	(0.00818)	(0.00865)	(0.00843)
primary	-0.0182	0.0180***	0.0197***
	(0.0176)	(0.00690)	(0.00627)
tertiary	0.00671	0.00452	0.00592
	(0.0145)	(0.00609)	(0.00550)
2010	1.377*	2.445**	2.388**
	(0.783)	(1.102)	(1.002)
2011	0.840	1.192	1.216
	(0.786)	(1.091)	(1.011)
2012	1.068	1.464	1.451
	(0.757)	(1.040)	(0.962)
2013	2.718***	2.761***	2.745***
	(0.766)	(1.055)	(0.974)
2014	5.250***	5.367***	5.519***
	(0.757)	(1.035)	(0.955)
chubu	0.0621	0.377***	0.405***
	(0.629)	(0.142)	(0.0571)
chugoku	2.981***	0.347*	0.556***
	(0.638)	(0.184)	(0.0743)
hokkaido	1.399*	0.624***	0.520***
	(0.757)	(0.176)	(0.0703)
kansai	0.540	0.560***	0.456***
	(0.684)	(0.143)	(0.0574)
kyushu	3.923***	0.299**	0.220***
	(0.680)	(0.147)	(0.0589)
okinawa	2.004***	0.402	0.523***
	(0.689)	(0.288)	(0.113)
shikoku	3.874***	0.285	0.257***
	(0.739)	(0.196)	(0.0792)
tohoku	1.499**	0.398***	0.378***
	(0.672)	(0.152)	(0.0624)
Constant	-12.27***	-14.88***	-14.89***
	(1.318)	(0.768)	(0.712)
Observations	9,811	9,811	9,811
R-squared	0.757	0.389	0.386
Adjusted R-squared	0.704	0.384	0.384

Standard errors in parentheses|; *** p<0.01, ** p<0.05, * p<0.1

- **ANALYSIS OF TRENDS FOR EACH VARIABLE**

For the regressions above, the omitted variable for the year dummy variables was 2009 and for the region dummy variables was Kanto[9]. I ran three regressions:

- Model 1: includes city-level fixed effects, as well as interactions between year and: income per capita, population, change, industry and region
- Model 2: includes the same terms as model 1 but excludes city-level fixed effects
- Model 3: includes the same terms as model 2 but excludes the interaction terms between region and year dummy variables

In this section, I view the 2009-2014 time frame as segmented into two groups. The first group of years (2009 - 2012) is the block of time when citizens did not expect to receive gifts in return for their contribution. The second group (2013 - 2014) is when the gift-giving concept became popularized and when donating to receive a gift became the norm. The second group is characterized by an exponential increase in donations. When looking for trends across time, I focus on how the significance of variables may have changed across these two time periods.

a) Constant

The negative and large absolute value of the constant is unsurprising. Many people migrate to Kanto, the baseline region dummy variable, for education and employment. It is the region with the least need for a tax transfer from the central government. The constant term is very similar in models 2 and 3, but it is smaller in absolute value in model 1. With the inclusion of city-level fixed effects, the model predicts the Kanto region in 2009 receives more donations on average than the other two models. This suggests that there is heterogeneity in the donation amounts that municipalities in the Kanto region received. It is reasonable to assume that there are municipalities within Kanto that received considerably less donations than predicted, given Kanto's status as the wealthiest region in Japan. The city-level fixed effect

9 Kanto contains Tokyo, which contains nearly one third of the total population of Japan and cities such as Yokohama, Kawasaki, Saitama and Chiba. It is the most populous region of Japan and the Tokyo-Yokohama district is often considered the core of Japan's commerce and industry. This region also has the largest industrial zone of Japan, formed by the Keihin Industrial Zone and the Keiyo Industrial Region.

controls for these outlying cities and therefore prevents the region constant from being dragged down in value.

b) Income per capita (log)

Income per capita is highly statistically significant at $p<0.01$ for all three models, although the coefficient is smaller for model 1. The positive coefficients mean that, on average and ceteris paribus, a municipality with a larger income per capita[10] will receive more donations. This result is discouraging as it suggests that municipalities that would benefit most from this additional revenue stream (i.e., those with low income per capita) are not the cities that are receiving donations. This questions the success of this program that is meant to benefit municipalities that do not have sufficient resources for its residents.

While the positive coefficient is discouraging, it is consistent with the brand theory I developed in the literature review. I hypothesized that municipalities with higher income per capita are more likely to receive donations because they are differentiated by higher levels of awareness amongst the Japanese public.

Year dummy X income per capita (log)

All statistically significant interaction terms are negative, whereas the coefficient for income per capita is positive. In effect, the interaction terms make the income per capita variable coefficient less positive. In general, the interaction terms become exponentially more negative and considerably more significant as time goes by. The only exception to this pattern is 2011, when none of the models have statistically significant results. This trend is very positive as it suggests that the program is increasingly benefiting municipalities with less income per capita, especially once the gift giving concept is introduced.

The introduction of the gift concept may have allowed for the brand theory to be less relevant. As people started to hunt for the best possible gifts, municipalities with low brand recognition (i.e., lower income per capita) had a means to increase brand value by offering attractive gifts and engaging in aggressive marketing. The gift program could have provided the opportunity for these regions to become better known and therefore receive more donations. However, municipalities with low income per capita are also at an inherent

[10] The population of the regions are (rounded to 0.5 millions): Hokkaido, 5.5 million; Tohoku, 9 million; Kanto, 23 million; Chubu, 22 million; Kansai, 23 million; Chugoku, 7.5 million; Kyushu, 13 million; Shikoku, 4 million; Okinawa, 1 million

disadvantage as they have less resources per capita to expend in order to compensate for their lack of brand recognition. The fact that they have less income per capita could also suggest that they have a weaker economy that hinders their ability to offer competitive gifts.

c) Population change

For the models that exclude city-level fixed effects, population change is highly statistically significant at $p<0.01$ with a negative coefficient. A positive population change means that a municipality is increasing in population. This coefficient tells us that as a municipality's population increases, on average and ceteris paribus, the municipality receives less donations. Intuitively, this is the relationship we would expect, given that the intent of the program is to redistribute tax money from cities that are experiencing an influx of migration. Therefore, these results are consistent with the identity theory developed in the literature review in which I hypothesized that people who move away from their hometown will still feel a strong sense of identity that compels them to donate back home.

Year dummy X population change

All statistically significant interaction terms are negative. This result is promising given that the coefficient for the population change variable was also negative for models 2 and 3. In effect, the interaction terms reinforce the negative relationship that cities with a greater influx of migrants will receive less donations. In general, we can see the trend that the interaction terms become exponentially negative and considerably more significant as time goes by. This finding is very positive as it shows that the program is, over time, increasingly successful in redistributing money to the places that experienced greater population losses, especially once the gift giving concept is introduced. The strengthening of this relationship over time makes sense as municipalities that struggle the most with population loss have the strongest incentive to be aggressive in offering extravagant gifts as a means to increase donations.

d) Industry - primary[11] , secondary[12] or tertiary[13]

For the models 2 and 3, primary industry is highly statistically significant with $p<0.01$. The positive coefficients in the statistically significant years indicate that municipalities with a higher percentage of the economy in the primary industry, on average and ceteris paribus, received more donations. This is consistent with the gift theory introduced in the literature review that theorizes that areas with a high involvement in the primary industry are more likely to have endowments they can convert to desirable gifts. As mentioned in the literature review, popular gifts were predominantly food items.

Tertiary industry is statistically insignificant for every model.

Year dummy X industry

For primary industry, the only two statistically significant interaction terms are in 2012 at $p<0.05$ and 2014 at $p<0.01$. The statistical significance of 2014 is as expected, given the logic I outline in the section above regarding gift theory. The statistical significance of 2012 is a bit more counterintuitive as it precedes the introduction of the gift theory and the statistical significance disappears in 2013.

e) Years

The year dummy variables are: 2009, 2010, 2011, 2012, 2013 and 2014. In these regressions, 2009 is omitted and serves as the baseline. 2010 is statistically significant at $p<0.1$ for model 1 and at $p<0.05$ for models 2 and 3. This suggests that the Kanto region received a bump in donations in 2010. While the coefficients for 2011 and 2012 are positive, neither are statistically significant. This may indicate that donations to the Kanto region increased from 2009 to 2010 and then plateaued until 2013. For 2013 and 2014, all three models are statistically significant at $p<0.01$ and have positive coefficients. Although the coefficient for the 2010 variable was considerably lower in model 1 than models 2 and 3, all three models

11 Primary industry is the sector of the economy that extracts and collects natural resources, as well as by activities such as farming and fishing

12 Secondary industry is the industrial sector of an economy that involves the manufacturing of finished products that are consumed by individuals

13 Tertiary industry is the sector of the economy that provides services to its consumers

had similar coefficients by 2013 and 2014. This may suggest that controlling for city fixed effects is not as relevant for the later years.

f) Regions

Overall and cross-model analysis

The regional dummy variables are: Kanto, Chubu, Chugoku, Hokkaido, Kansai, Kyushu, Okinawa, Shikoku and Tohoku. Most of the coefficients are statistically significant and all of them are positive. Both results are unsurprising given that Kanto is the omitted baseline dummy variable. Kanto contains Tokyo, which is home to nearly one third of the total population of Japan, and is considered the most developed and urbanized area of Japan. Positive coefficients support the success of the program in fulfilling its goal to redistribute wealth from urban to rural areas.

For model 1, nearly all of the regional coefficients are an order of magnitude larger than their respective coefficients in models 2 and 3. The exceptions are Chubu, which is an order of magnitude smaller, and Kansai, which is roughly the same size (exceptions discussed further under 'Regional Coefficients' section). This difference in magnitude may be due to the fact that most regions have certain municipalities that act as outliers and receive less donations than would be predicted from the model. This effectively drags the regional coefficient down when municipal-level fixed effects are not included in the model. Consequently, when city-level fixed effects are included, the regional coefficients increase. Intuitively, this makes sense as donors need to actively decide which city they wish to donate to. Thus, it is likely that there are certain cities within a region that receive less donations than is predicted, given its municipal-level data. This may partially be due to the general public's lack of familiarity with the city. This issue ties back to the brand theory that I developed in the literature review that dictates that people are more likely to donate to places that they are familiar with.

The statistical significance of coefficients in models 1 and 2 provide additional evidence for this theory. Chugoku, Kyushu, Okinawa and Shikoku are less statistically significant in model 2 than model 1. All four regions are highly statistically significant at $p<0.01$ in model 1. However, in model 2, Kyushu is only significant at $p<0.05$, Chugoku is only significant at $p<0.1$, and Okinawa and Shikoku are not statistically significant at all. Therefore, including city-level fixed effects allows for regional coefficients to increase and consequently become more significant. The regions that remain highly statistically significant in model 2 are those

that are more homogeneous, relative to the other regions. Specifically, there are less municipalities that act as negative outliers that pull the regional coefficients down.

The coefficients for models 2 and 3 are very similar in scale and always less than 1. However, one significant difference between the models is that the regional coefficients for model 3 are all highly statistically significant at $p<0.01$. In model 2, only Chubu, Hokkaido and Tohoku are statistically significant at $p<0.01$. It makes sense that removing the region and year interaction terms would increase the significance of the coefficients of certain regions. For example, Okinawa has positive, but statistically insignificant, coefficients for the interaction terms between itself and the year dummy variables. Therefore, in model 2, the positive effect of belonging in Okinawa was partially captured by the interactions and therefore the regional coefficient by itself is statistically insignificant. Once these interactions were removed in model 3, these positive effects were instead combined and captured in the regional coefficient. Therefore, for the regions that are statistically significant in model 2, the effects of belonging to that region surpass the effects that are captured by the interactions between the region and the year dummy variables.

Tohoku and Hokkaido are exceptions to these general trends. When city-level fixed effects are excluded, the coefficient of the Hokkaido dummy variable is more statistically significant, despite becoming smaller. Similarly, Tohoku is highly statistically significant, even after the city-level fixed effects are dropped.

Regional coefficients

Chubu and Kansai are the only variables that are not statistically significant in model 1. These variables are statistically significant at $p<0.01$ for both models 2 and 3. The disappearance of statistical significance when city-level fixed effects are introduced suggests that, on average, donation amounts to Chubu and Kansai do not differ from donation amounts to Kanto. The lack of statistical significance for Kansai is unsurprising because it includes the Keihanshin region, which comprises of Osaka, Kobe and Kyoto and is the second most populated in Japan after the Greater Tokyo Area. The lack of statistical significance for Chubu is also unsurprising as it contains Nagoya, which is the fourth most populated city after Tokyo (Kanto), Yokohama (Kanto), and Osaka (Kansai).

Year dummy X region dummy

The interaction terms between the year and region dummy variables are only included in models 1 and 2. In 2010, we see that all of the coefficients for the interaction terms are negative. This is counterintuitive, as we would expect that all regions would receive more donations than Kanto in 2010. However, the coefficient for the year 2010 is statistically significant and positive, and therefore I assume that Kanto received a large boost in donations in 2010 that was larger than the bump that other regions received in that same year. Hokkaido and Kansai are statistically significant at the $p<0.1$ level for both models and Tohoku is statistically significant at the $p<0.1$ level for model 2.

In 2011, all of the regions are statistically insignificant with the exception of Tohoku, which is statistically significant for model 1 at $p<0.01$. This result is to be expected as Tohoku was affected by a 9.1 magnitude earthquake and tsunami on March 11th of 2011 that led to 15,894 confirmed deaths. Given the increased media coverage of the area and charitable efforts around the nation, it is unsurprising to see that the earthquake influenced people's likeliness to donate to Tohoku. It also makes sense that only model 1 was affected as the earthquake heavily impacted cities by the coast. Therefore, donors who wanted to help with disaster relief were likely to donate heavily to certain cities. This positive inflow of funds for these cities is not captured by the city-level fixed effects and so the regional coefficient is pulled up.

In 2012, all of the regions are statistically insignificant.

In 2013, all of the regions remain statistically insignificant with the exception of Chugoku[14], which is statistically significant at $p<0.01$ for model 1 and $p<0.1$ for model 2. In 2014, Chubu also becomes statistically significant at $p<0.05$. Chugoku becomes even more statistically significant at $p<0.01$ for both models 1 and 2. Tohoku also becomes statistically significant for model 1 at $p<0.05$. These regions appear to be the regions that were able to take advantage of the gift exchange concept that was introduced in 2013 to receive more donations than the model predicts. In my residual analysis, I will further examine such the strategy of such a city.

g) Adjusted R-squared

[14] The Chugoku region's main industries are steel, petrochemical and shipbuilding. These industries were largely established in Japan's post-war era. Hiroshima is known to be Chugoku's hub for culture, government and business.

Although model 1 contains 1,587 more variables to capture each city-level fixed effect, its adjusted R-squared is considerably higher at 0.704 compared to 0.384 for models 2 and 3. Therefore, municipal-level variables that are included in models 2 and 3 account for approximately 40% of the variation in the donation amount each city receives. However, these variables are not sufficient for capturing each city's defining characteristics as cities are highly idiosyncratic.

- **RESIDUAL DATA ANALYSIS FOR RESEARCH QUESTION 1**

In this section, I examine the residuals for the three regressions. A positive residual indicates that donation amounts were higher than the regression predicted. On the other hand, a negative residual indicates that donation amounts were lower than the regression predicted. In the following chapters, I will analyze the municipalities with the thirty most negative and positive residuals.

Model 1:

Looking at municipal level data (see table below), the cities with the 30 most positive residuals were, on average, comparable to cities with the 30 most negative residuals in terms of population, percentage of workforce in the secondary and tertiary industries, annual income, annual expenditure, annual surplus, year that the data was recorded, and annual income per capita[15]. The two sets of cities differ in that the cities with positive residuals, relative to those with negative residuals: experienced 21 times more population loss (although both groups of cities experienced negative population change), had almost twice as much of the workforce in the primary industry, and tended to be data from 2012 as opposed to 2011. As the residual is defined with respect to donations, donation amount was inevitably the greatest differentiator between the two groups of cities. What is surprising, however, is the magnitude of this difference with cities with positive residuals having an annual donation amount that was approximately 12,982 times that of cities with negative residuals.

Models 2 and 3:

The variables for which the cities with positive and negative residuals are comparable on are the same for both models, namely: percentage of workforce in the primary, secondary and

[15] I define the cities with the 30 most positive residuals to be comparable with the cities with the 30 most negative residuals when the ratio of their average value for a given variable is between 0.8 and 1.2.

tertiary industries; annual surplus; year that the data was recorded and annual income per capita.

In these two models, cities with positive residuals, relative to those with negative residuals had: 30-40% less population, significantly less population change, 30% less annual income and 30% less annual expenditure. The magnitude of the difference in donation amounts between cities with positive and negative residuals is even more astounding for these models at roughly 42,000 times.

Figure 7: Table comparing statistics for the 30 most positive and negative residuals

a) Model 1:

residual type	pop	pop_change	primary	secondary	tertiary	income	expenditure	surplus	donation	year	income per cap
negative (average)	86465.0	-0.1	8.6	26.9	63.9	32629890.0	31434427.7	1195462.3	20.5	2011.3	377.4
pos (average)	77753.9	-1.8	14.4	24.2	60.8	31037889.7	30064056.6	973833.1	266618.3	2012.3	399.2
ratio (pos/neg)	0.9	21.0	1.7	0.9	1.0	1.0	1.0	0.8	12982.4	1.0	1.1

b) Model 2:

	pop	pop_change	primary	secondary	tertiary	income	expenditure	surplus	donation	year	income per cap
negative (average)	101295.4	-2.8	10.1	28.5	60.7	38299130.8	36818963.8	1480166.9	10.7	2011.5	378.1
pos (average)	67028.3	0.1	10.3	22.9	66.4	27927830.8	26687715.1	1240115.7	444310.2	2012.6	416.7
ratio (pos/neg)	0.7	0.0	1.0	0.8	1.1	0.7	0.7	0.8	41699.0	1.0	1.1

c) Model 3:

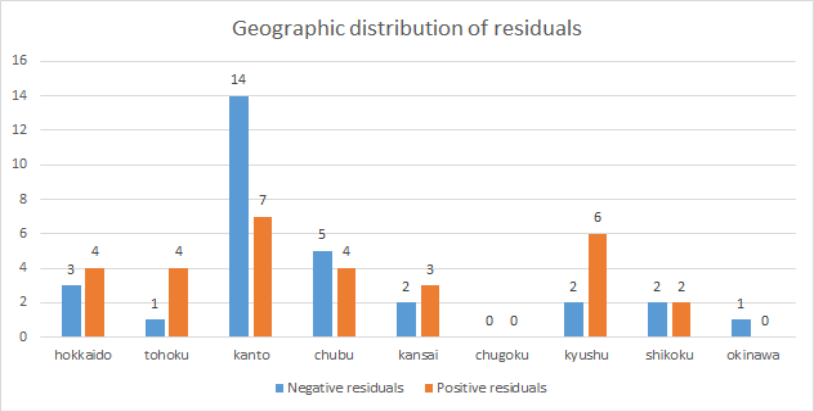
	pop	pop_change	primary	secondary	tertiary	income	expenditure	surplus	donation	year	income per cap
negative (average)	103319.2	-2.4	9.9	29.0	60.6	39270053.0	37718130.1	1551922.9	10.6	2011.6	380.1
pos (average)	67028.3	0.1	10.3	22.9	66.4	27927830.8	26687715.1	1240115.7	444310.2	2012.6	416.7
ratio (pos/neg)	0.6	0.0	1.1	0.8	1.1	0.7	0.7	0.8	42094.1	1.0	1.1

The graphs below display the geographic distribution of the 60 cities for all 3 models. All 3 models have relatively similar distributions. In the next paragraph, I will focus on examining the geographic distribution of residuals for model 1 as the adjusted R^2 value is significantly higher for this model.

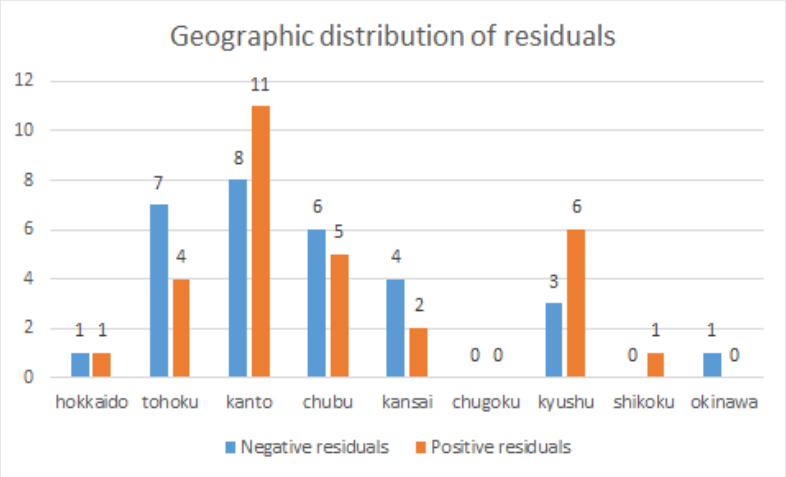
The positive residuals are relatively evenly distributed amongst the 9 regions. The Kanto region, however, stands out amongst the cities with negative residuals as it contains nearly 50% of the cities with negative residuals. The cities with negative residuals in Kanto belonged to the prefectures of: Saitama, Kanagawa (3), Tokyo (4), Gunma, Ibaraki (3) and Chiba (2). We can see that 50% of these cities are located in Kanagawa and Tokyo, which are neighboring prefectures that are included within the Greater Tokyo Area. Therefore, is unsurprising that these cities would have highly negative residuals.

Figure 8: Geographic distribution for the 30 most positive and negative residuals

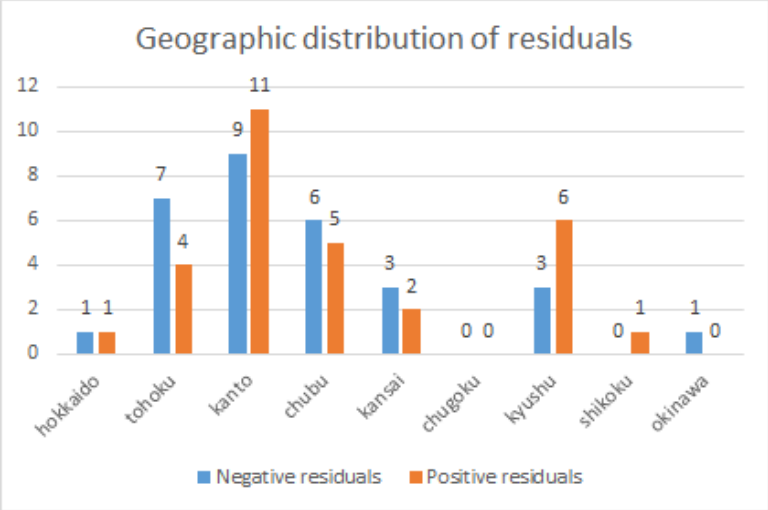
a) Model 1:



b) Model 2:



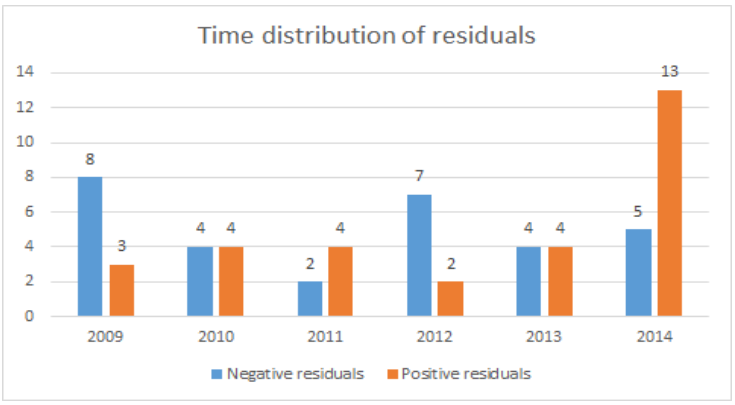
c) Model 3:



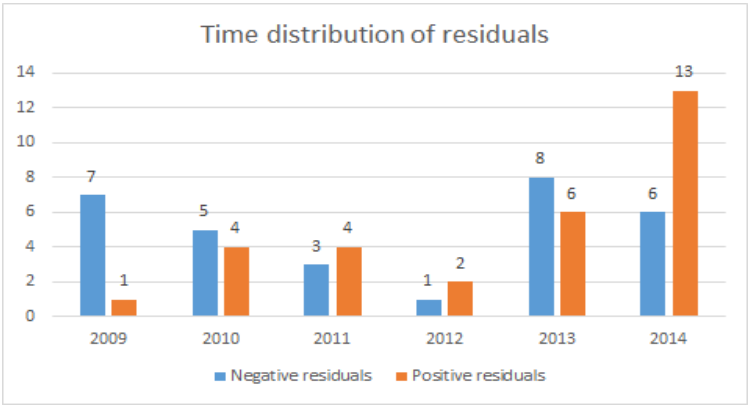
The graph below displays the time distribution of the 60 cities. Yet again, the distributions for the three models are relatively similar. It is unsurprising that 2009 has a relatively high frequency of negative residuals. Cities that are predicted to receive large amounts of donations, due to their municipal-level characteristics, may receive less simply because the program has just started and there are not many donors in general. On the other hand, in 2014, the relatively high frequency of the positive residuals also makes sense. At this time, the program has become mainstream and cities have started taking advantage of the gift giving program to receive more donations than would be predicted by their municipal-level data. From the chart for model 1, we see that 18 of the 60 residuals (30%) are from 2014. Of these 18 observations, more than 70% are positive residuals.

Figure 9: Time distribution for the 30 most positive and negative residuals

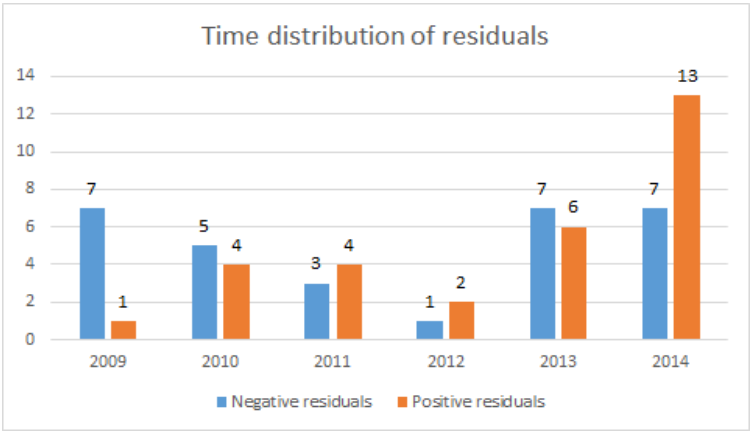
a) Model 1:



b) Model 2:



c) Model 3:



- **Case Study: Hekinan City,** Aichi Prefecture, Chubu Region

In this section I will examine the city with the most positive residual from model 1. I focused solely on model 1 because its adjusted R-squared value is 0.704, which is an 80% increase from the adjusted R-squared values of the other two models.

The city with the most positive residual from model 1 is Hekinan city in 2014. Within Aichi prefecture, Hekinan received the greatest amount of donations. Hekinan received approximately 244,319,144 yen (over 2 million USD) in 2015. This is a staggering sum for a population of roughly 70,000. Hekinan received 3.5 times more donations than the next highest ranking city in Aichi.

Hekinan's most popular gift is its offering of charcoal-grilled eel for donations of 10,000 yen (approximately 100 USD). This eel is cooked by a local restaurant that was started in 1921. Hekinan's proximity to Mikawa Bay allows it to catch a local breed of eel called Mikawa Ishoku-san unagi that is renowned for its taste. Hekinawa also specializes in producing a local eel sauce. Many bloggers have published positive reviews about the quality of the eel that Hekinan sent them in return for their donations. One blogger writes that a benefit of the Furusato nouzei program is that it allows people to enjoy luxury foods that they usually would not be able to afford or obtain. For this reason, he was an adamant advocate for the eel. Another blogger ranked all of the cities that offered eel by price per weight and declared that Hekinan city offered the most eel per 10,000 yen. Yet another blogger reported that demand for eel from Hekinan is so high that there is a three month wait to receive a gift of eel.

From this case study, we see how crucial it is that cities have a differentiated product to offer. Hekinan is fortunate in this regard as it has a product that is only available locally, is considered luxurious and is cooked by a restaurant that specializes in eel dishes. Cities without attractive local specialties to offer will almost certainly struggle to attract donors. Cities than use their local economy and natural resources to offer attractive gifts for urban dwellers have an inherent competitive advantage over cities that are not able to do so. This is clearly an issue for cities that lack the means to differentiate themselves from the 1,718 other cities that are vying for donations. Cities that struggle the most to offer attractive gifts are perhaps those that would benefit the most from additional revenue as the product or service that their local economy depends on is not viewed as desirable by residents of other cities.

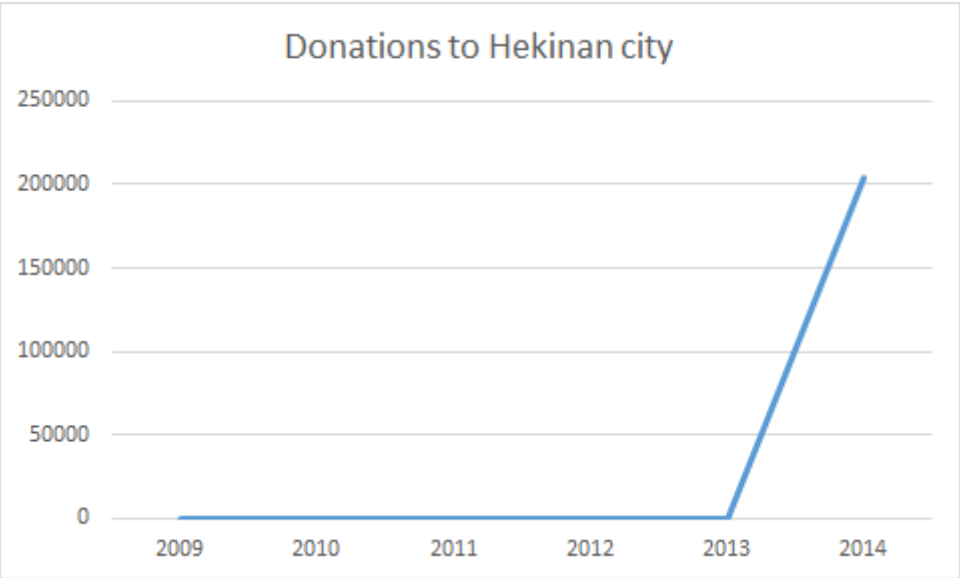
This case exemplifies the role that social media plays in determining the success of a city's initiative. Bloggers are crucial as they are an important source of insight into the

overwhelming number of offerings that are available to donors. Donors can use the testimony of bloggers to filter their options. In fact, many bloggers attributed their decision to order the eel from Hekinan to the recommendations of other fellow bloggers.

Examining Hekinan also provides evidence for a first mover advantage. The success of its eel gift has boosted the popularity of Hekinan's other Furusato nouzei offerings. In 2016, Hekinan offered a gift program of traditional Japanese foods for the new year that sold out within 2 minutes of accepting orders. Thus, cities that establish a reputable name in regards to the quality of their Furusato nouzei gifts may be able to benefit from a base of loyal repeat customers.

One thing that is clear for Hekinan is that it owes part of its success to the effort it has put into this program. The city, when interviewed, declared that the key to its success was in the variety of gifts that it offered. The city has taken full advantage of this opportunity to offer 84 possible gift options that span a wide variety of categories including brewing products, vegetables and meat. The city has managed to do this through partnerships with local companies. Hekinan has also started unique initiatives to encourage people to visit the city. One such example is a history and culinary tour for donors. A more recent launch is the opportunity to rent an amusement park and a tour bus for the day for 1 million yen (approximately 9,000 USD), which Hekinan values at approximately 500,000 yen.

Figure 10: Donations to Hekinan city over time



- **RESEARCH QUESTION 2**

In this section I analyze three sets of regressions. Each set of regressions corresponds to the three regressions I ran for RQ1 and includes four regressions. Two of the four regressions are 2SLS regressions that include predicted donation per capita as an explanatory variable.

The outputs in this data analysis section include all of the variables that were in the regression, excluding interaction terms that were statistically significant at $p>0.05$. In the following sections I will focus on the t2014, treatment and interac variables as all other variables were included in these regressions to serve as controls.

a) Interaction between t2014 and treatment (interac)

As the regressions are difference-in-difference regressions, the difference-in-differences estimator is the coefficient of the interaction term. In all three sets of regressions, the interaction term is never statistically significant. This means that we fail to reject that there was a change in the expected mean annual expenditure per capita from before to after the Furusato nouzei program for the control and treatment groups. This result is very robust as the variable remains statistically insignificant in all 12 regressions.

Although the outputs seem to indicate that the Furusato nouzei program is ineffective, it is possible that a change in municipal level expenditure is not the best measure of success for the Furusato nouzei tax. The donations could be benefiting the local economy without making an impact on annual expenditure level. For example, the local economy may have been reinvigorated in the form of new jobs to meet increased demand for local produce from the gift-giving program.

There are several reasons why these regressions may have not captured the effect of the Furusato nouzei program, even if it was successful at increasing expenditure. The increase in expenditure may not have been large enough for the difference-in-differences estimator to capture. Defining the control and treatment groups based on 2009 data may also cause results to be misleading. Firstly, given that donation amounts in this year were much smaller than in later years, they may have had negligible impact on expenditure decisions. Secondly, after the program became mainstream in 2013, donors largely donate to receive specific gifts in return. Thus, cities in the control group that had highly negative residuals in 2009 may actually have

highly positive residuals in 2014. As incentives have changed, there is no guarantee that the cities in the control group in 2009 are still cities that should be included in the control group for 2014. This same argument applies for cities in the treatment group. Therefore, the difference-in-difference estimator may not have been able to difference away permanent differences between the groups, especially if these differences change over time.

b) Treatment and t2014

The treatment and t2014 variables are only significant in the first model where city-level fixed effects are introduced. In this model, we see that the coefficient for the treatment variable is positive and significant at $p<0.01$ across all four regressions. This means that cities that received more donations than predicted (i.e., those with high residuals) in 2009 had higher average expenditures than cities that received less donations than predicted (i.e., those with low residuals). As the annual expenditure levels of cities varies hugely, it makes sense that this variable is only statistically significant once city-level fixed effects are controlled for.

The t2014 variable is statistically significant with a positive coefficient in regression 2 at p-value<0.01. Regression 2 only differs from regression 1 in that it excludes all interaction terms. Thus we can assume that this significance is reduced once interaction terms between time and other explanatory variables are introduced between time. This assumption is supported by the fact that regression 1 has two interaction terms (t2014 X population change and t2014 X Okinawa) which are positive and statistically significant at p-value < 0.01.

c) Adjusted R-squared

Every regression has an extremely high adjusted R-squared value, with a minimum adjusted R-squared value across all regressions of 0.997. This result is particular surprising as it indicates that despite the absence or presence of a donation per capita explanatory variable, the model is very good at predicting expenditure per capita.

Figure 11: Regression outputs including statistically insignificant interaction terms and city-level fixed effects

Dependent variable: annual expenditure per capita (log)

a) Model 1:

VARIABLES	(1) Predicted donation per capita	(2) Predicted donation w/o interactions	(3) Actual donation per capita	(4) W/o any donation variable
predicted_don	0.0123	-0.0518***		
	(0.0278)	(0.00596)		
log_don_percap			-0.000647	
			(0.000983)	
log_inc_percap	0.878***	0.905***	0.892***	0.891***
	(0.0318)	(0.00896)	(0.00771)	(0.00765)
pop_change	-0.000158	0.00209***	-7.21e-05	-8.15e-05
	(0.000369)	(0.000435)	(0.000329)	(0.000329)
primary	0.00277**	-0.00139	0.00256**	0.00255**
	(0.00121)	(0.00141)	(0.00107)	(0.00107)
tertiary	0.00230**	0.00167	0.00241***	0.00239***
	(0.000938)	(0.00117)	(0.000915)	(0.000914)
t2014	-0.0880	0.0406***	-0.0132	-0.0189
	(0.160)	(0.00844)	(0.0308)	(0.0295)
treatment	2.347***	2.003***	2.285***	2.285***
	(0.143)	(0.0530)	(0.0308)	(0.0308)
interac	-0.000143	0.00227	-0.00258	-0.000143
	(0.00288)	(0.00393)	(0.00469)	(0.00288)
chubu	0.762***	0.678***	0.745***	0.744***
	(0.0582)	(0.0568)	(0.0411)	(0.0411)
chugoku	3.513***	3.397***	3.489***	3.489***
	(0.0677)	(0.0571)	(0.0410)	(0.0410)
hokkaido	-2.305***	-999***	-2.265***	-2.266***
	(0.0993)	(0.0665)	(0.0458)	(0.0457)
kansai	2.365***	954***	2.290***	2.292***
	(0.171)	(0.0774)	(0.0492)	(0.0491)
kyushu	0.842***	0.763***	0.821***	0.821***
	(0.0569)	(0.0411)	(0.0294)	(0.0294)
okinawa	921***	871***	903***	904***
	(0.0501)	(0.0442)	(0.0329)	(0.0328)
shikoku	-247***	-016***	-215***	-217***
	(0.0759)	(0.0528)	(0.0366)	(0.0365)
tohoku	-0.185***	-0.136***	-0.183***	-0.183***
	(0.0318)	(0.0429)	(0.0315)	(0.0315)
t2014 X pop_change	0.00776***		0.00736***	0.00738***
	(0.000926)		(0.000367)	(0.000365)
t2014 X primary	-0.000955*		-0.000726***	-0.000736***
	(0.000536)		(0.000272)	(0.000272)
t2014 X okinawa	0.0336***		0.0319***	0.0320***
	(0.0105)		(0.0108)	(0.0108)
Constant	8.953***	8.920***	8.874***	8.881***
	(0.199)	(0.120)	(0.0958)	(0.0952)
Observations	1,587	1,587	1,587	1,587
R-squared	000	0.999	000	000
Adjusted R-squared	0.999	0.999	0.999	0.999

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Dependent variable: annual expenditure per capita (log)

b) Model 2:

VARIABLES	(1) Predicted donation per capita	(2) Predicted donation w/o interactions	(3) Actual donation per capita	(4) W/o any donation variable
predicted_don	0.0216***	0.0211***		
	(0.00259)	(0.00229)		
log_don_percap			-0.000392	
			(0.000502)	
log_inc_percap	0.947***	0.950***	0.984***	0.984***
	(0.00511)	(0.00363)	(0.00274)	(0.00261)
pop_change	0.000283	0.000481***	-0.000484***	-0.000471***
	(0.000195)	(0.000158)	(0.000178)	(0.000177)
primary	5.40e-05	-7.03e-05	0.000454***	0.000444**
	(0.000177)	(0.000134)	(0.000175)	(0.000174)
tertiary	0.000793***	0.000595***	0.000896***	0.000891***
	(0.000142)	(9.92e-05)	(0.000145)	(0.000144)
t2014	-0.00823	-0.000318	0.0479*	0.0450*
	(0.0250)	(0.00192)	(0.0249)	(0.0247)
treatment	0.000101	8.69e-05	0.00157	0.000101
	(0.00186)	(0.00186)	(0.00267)	(0.00190)
interac	-0.00104	-0.00128	-0.00457	-0.00365
	(0.00266)	(0.00265)	(0.00295)	(0.00270)
chubu	0.00301	0.000390	0.0113***	0.0112***
	(0.00338)	(0.00252)	(0.00331)	(0.00331)
chugoku	0.00978**	0.00974***	0.0174***	0.0173***
	(0.00470)	(0.00341)	(0.00472)	(0.00472)
hokkaido	0.0144***	0.0179***	0.0281***	0.0279***
	(0.00439)	(0.00331)	(0.00418)	(0.00417)
kansai	0.00551	0.00545**	0.0178***	0.0176***
	(0.00359)	(0.00272)	(0.00337)	(0.00336)
kyushu	0.00137	0.00686***	0.00796**	0.00782**
	(0.00365)	(0.00262)	(0.00365)	(0.00365)
okinawa	-0.00215	0.00339	0.00677	0.00655
	(0.00704)	(0.00505)	(0.00712)	(0.00711)
shikoku	-0.00510	-0.00435	0.00113	0.00106
	(0.00496)	(0.00356)	(0.00501)	(0.00501)
tohoku	0.00648*	0.00579**	0.0153***	0.0151***
	(0.00367)	(0.00255)	(0.00360)	(0.00360)
t2014 X pop_change	0.000578**		0.000523*	0.000541*
	(0.000282)		(0.000289)	(0.000288)
t2014 X tertiary	-0.000386*		-0.000414**	-0.000413**
	(0.000197)		(0.000202)	(0.000202)
t2014 X chugoku	0.00173		0.0145**	0.0142**
	(0.00686)		(0.00685)	(0.00684)
t2014 X hokkaido	0.00798		0.0202***	0.0202***
	(0.00603)		(0.00598)	(0.00598)
t2014 X kansai	0.00171		0.0132**	0.0133**
	(0.00537)		(0.00531)	(0.00531)
t2014 X kanto	0.00227		0.0121**	0.0122**
	(0.00522)		(0.00520)	(0.00519)
t2014 X kyushu	0.0127**		0.0230***	0.0230***
	(0.00562)		(0.00560)	(0.00560)
t2014 X okinawa	0.0120		0.0241**	0.0240**
	(0.0102)		(0.0103)	(0.0103)
Constant	0.313***	0.306***	-0.0152	-0.00855
	(0.0422)	(0.0321)	(0.0196)	(0.0176)
Observations	1,587	1,587	1,587	1,587
R-squared	0.998	0.998	0.997	0.997
Adjusted R-squared	0.998	0.998	0.997	0.997

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Dependent variable: annual expenditure per capita (log)

c) Model 3:

VARIABLES	(1) Predicted donation per capita	(2) Predicted donation w/o interactions	(3) Actual donation per capita	(4) W/o any donation variable
predicted_don	0.0205***	0.0199***		
	(0.00252)	(0.00237)		
log_don_percap			-0.000216	
			(0.000527)	
log_inc_percap	0.948***	0.951***	0.982***	0.982***
	(0.00490)	(0.00376)	(0.00275)	(0.00262)
pop_change	0.000360*	0.000601***	-0.000404**	-0.000397**
	(0.000202)	(0.000167)	(0.000184)	(0.000183)
primary	-9.54e-05	-3.99e-05	0.000333*	0.000327*
	(0.000177)	(0.000143)	(0.000174)	(0.000173)
tertiary	0.000601***	0.000537***	0.000695***	0.000691***
	(0.000140)	(0.000105)	(0.000143)	(0.000143)
t2014	-0.0201	-0.000290	0.0332	0.0317
	(0.0240)	(0.00202)	(0.0239)	(0.0236)
treatment	-0.000963	-0.000976	-0.000242	-0.00105
	(0.00197)	(0.00197)	(0.00282)	(0.00201)
interac	-0.00105	-0.00142	-0.00371	-0.00320
	(0.00280)	(0.00279)	(0.00311)	(0.00284)
chugoku	5.79e-05	0.000197	0.00964***	0.00950***
	(0.00269)	(0.00267)	(0.00249)	(0.00247)
hokkaido	0.00509	0.00539	0.0182***	0.0180***
	(0.00384)	(0.00381)	(0.00360)	(0.00357)
kansai	0.0211***	0.0216***	0.0334***	0.0333***
	(0.00336)	(0.00333)	(0.00309)	(0.00307)
kyushu	0.00638**	0.00657**	0.0169***	0.0168***
	(0.00276)	(0.00274)	(0.00251)	(0.00250)
okinawa	0.00907***	0.00931***	0.0139***	0.0138***
	(0.00276)	(0.00275)	(0.00275)	(0.00275)
shikoku	0.000664	0.00141	0.0133***	0.0132***
	(0.00519)	(0.00517)	(0.00508)	(0.00506)
tohoku	-0.00279	-0.00285	0.00256	0.00251
	(0.00374)	(0.00373)	(0.00376)	(0.00375)
chugoku	0.00652**	0.00681**	0.00988***	0.00976***
	(0.00270)	(0.00267)	(0.00274)	(0.00272)
t2014 X pop_change	0.000718**		0.000678**	0.000688**
	(0.000288)		(0.000296)	(0.000294)
Constant	0.314***	0.298***	0.0125	0.0162
	(0.0404)	(0.0333)	(0.0196)	(0.0174)
Observations	1,587	1,587	1,587	1,587
R-squared	0.997	0.997	0.997	0.997
Adjusted R-squared	0.997	0.997	0.997	0.997

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

VI. Further Considerations

While the conclusions from my statistical analyses for Research Question 1 and Research Question 2 may hold for the time frame I am examining, they may not hold for future years as the "Furusato Nozei" system has changed in a number of ways as of 2015. First, the tax

deduction amount, based on the donation, has doubled. Being able to donate more could, in ways I am unsure, influence the donor's' decision of where to donate to (Research Question 1). An increase in the tax deduction amount means that donors are likely to give greater amounts through the system, potentially increasing the impact on local governments, if there exists any (Research Question 2). Secondly, a final tax return is no longer needed if individuals donate to less than five municipalities. The elimination of the final tax reform is especially crucial for employees in Japan who typically do not file their own taxes, as their company generally files on their behalf. This could increase participation rates of this program, potentially making the conclusions drawn from this paper inapplicable to this new population. Thirdly, given a staggering rise in popularity with every year, there is a greater variety of specialty thank-you gifts being offered. Local governments are increasingly looking at the hometown tax as a viable source of income, and are therefore focusing on how to attract donors. In this sense, donation amounts for each municipality are likely to fluctuate in the near future as governments refine their marketing strategies year to year by releasing new thank-you gifts or novel programs to be funded. Such factors are not captured in my current model. Finally, it will be important to evaluate the possibility of a first mover advantage within the program by measuring the stickiness of donors to the municipalities they donate to.

Another concern is how politics may influence the conclusions drawn from my statistical analyses. Prime Minister Shinzo Abe proposed the furusato nouzei program while serving as prime minister between 2006 - 2007 before stepping down due to health reasons. He currently holds office again after being re-elected in 2012. Regional revitalization and decentralization of wealth and power from Tokyo are a key part of his platform. While his administration has been struggling to meet its goals of stemming the tide of migration to Tokyo by 2020, this specific program has been very successful in garnering mainstream attention and high participation rates. For this reason, it is likely to continue to expand under Abe's administration. Once a new Prime Minister or administration comes to power, support for this program may also change.

Furthermore, as mentioned in the Literature Review, the fact that the data are collected after a financial crisis may be an issue. While this usually is not an issue for a difference-in-differences regression, it can be if the treatment and control groups may be different. Flanagan and Kim found that high-income prefectures were more adversely affected than

low-income prefectures during the period of economic decline between 1970-1973. They attribute this to three reasons. First, local taxes in high-income prefectures decreased in a much more dramatic manner. Second, given that low-income prefectures are more financially dependent on national revenue, they were less affected by the reduction in internally generated revenue. Third, as lower-income prefectures receive a higher proportion of unrestricted block grants, relative to higher-income prefectures, they are still able to carry out a larger proportion of the policies that existed in a time of economic growth. In general, Flanagan and Kim found that local governments' level of autonomy increases in periods of economic growth, especially for high-income prefectures, during which they played an innovative and progressive role that is at odds with the conservative national administration. However, at times of economic decline, they tend to turn to incrementalist policies as they lose their autonomy.

VII. Conclusion:

From the results for Research Question 1, the direction of the coefficients for the explanatory variables were largely consistent with what I hypothesized in my literature review. Specifically, donation amount and: income per capita is positively correlated, population change is inversely related, population size is inversely related, percentage of the economy in primary industry is positively correlated. The relationship between donation amount and and percentage in tertiary industry was statistically insignificant. Finally, belonging to certain regions of Japan explains variance in annual donation per capita amounts and the significance and size of the coefficients changed as the incentives of the hometown tax expanded to include donors who wanted desirable gifts in return for their contributions.

From the results for Research Question 2, there appears to be no statistically significant interaction effect between the time (t2014) and treatment variables. This suggests that additional revenue from the donations simply offsets other sources of revenue. Such a finding is backed by the evidence that money is fungible, then there is little or no specific impact. Data from 1970-1990 suggests that foreign aid is fully fungible in certain sectors (Feyzioglu, 1998). If we liken the Furusato nouzei program to foreign aid, the recipient municipality may simply reduce its spending on the specified project or sector from its own resources by substituting Furusato nouzei revenue. Collier (2006) comments that fungibility is not an issue when the foreign aid is large, relative to the government budget. In the case of Furusato

nouzei, we see that this is not the case and so fungibility may indeed be an issue. Although this result questions the efficacy of the tax in its aim to redistribute wealth, further investigation is needed to see if the parallel trends assumption has been satisfied, if municipal expenditure is an appropriate proxy, and if the variables included are appropriate.

VII: Acknowledgements

I would like to thank Professor Charles Becker for encouraging me to turn my term paper into this thesis and for offering countless hours of his time to advise me and answer my many questions. I would not have completed this rewarding task and learned so much about my own country without your guidance. I would also like to thank Victor Ye for taking the time to help me with STATA and for offering his advice on regressions. Lastly, I would like to thank all of the individuals at the Data Visualization Lab who have helped me with my technical analysis.

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furusato nouzei donation data by municipality

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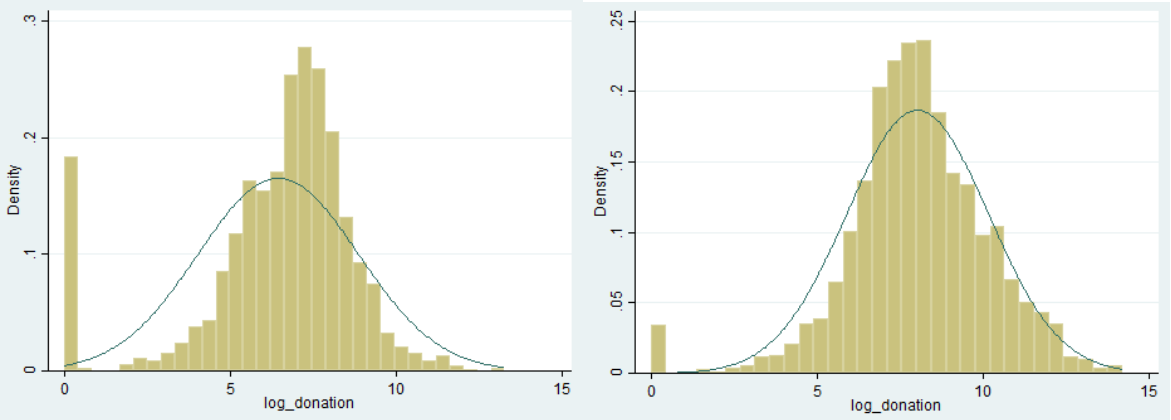
IX. APPENDICES

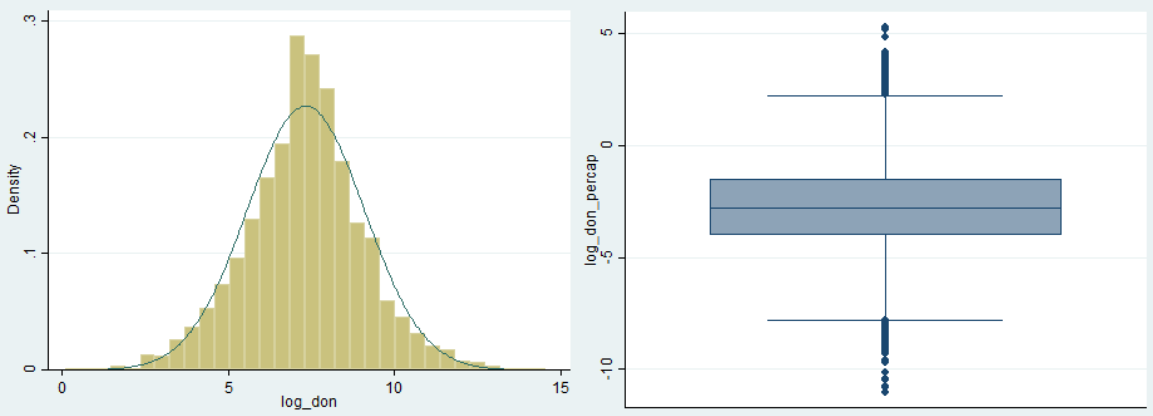
<u>APPENDIX A</u>: Graphs and summary descriptives relevant for RQ1

- **Graphs for the logarithm of donation per capita (log_don_percap)**

<u>2009 (left) and 2014 (right)</u>



<u>2009-2014 data combined and observations of 0 donations removed</u>



- **Summary statistics for donation per capita**

log_don_percap

Percentiles		Smallest		
1%	-7.846236	-11.05311		
5%	-6.181211	-10.84277		
10%	-5.354656	-10.82399	Obs	9,811
25%	-4.023149	-10.74664	Sum of Wgt.	9,811
50%	-2.777643		Mean	-2.819283
		Largest	Std. Dev.	1.974425
75%	-1.511022	4.188553		
90%	-.4135623	4.809133	Variance	3.898353
95%	.3491533	5.157435	Skewness	-.1212203
99%	1.837425	5.269656	Kurtosis	3.462545

- **Correlation of variables**

```
. correlate log_don_percap log_inc_percap pop_change primary tertiary year
(obs=9,811)
```

	log_do~p	log_in~p	pop_ch~e	primary	tertiary	year
log_don_pe~p	1.0000					
log_inc_pe~p	0.5599	1.0000				
pop_change	-0.4519	-0.5837	1.0000			
primary	0.4089	0.6133	-0.4768	1.0000		
tertiary	-0.2667	-0.3956	0.4041	-0.6938	1.0000	
year	0.1904	0.0682	-0.0511	-0.0383	0.1148	1.0000

```
. correlate log_don_percap log_inc_percap pop_change primary tertiary region_str
(obs=9,811)
```

	log_do~p	log_in~p	pop_ch~e	primary	tertiary	region~r
log_don_pe~p	1.0000					
log_inc_pe~p	0.5599	1.0000				
pop_change	-0.4519	-0.5837	1.0000			
primary	0.4089	0.6133	-0.4768	1.0000		
tertiary	-0.2667	-0.3956	0.4041	-0.6938	1.0000	
region_str	0.0133	0.0569	-0.0639	0.1294	-0.0403	1.0000

Overall, there seem to be no two variables that are so highly correlated as to pose an issue to the validity of the regressions. The primary and tertiary industry variables are most highly correlated at roughly 0.70. This makes sense, as the proportion of the local workforce that are employed in the primary, secondary or tertiary industries must equal 1.

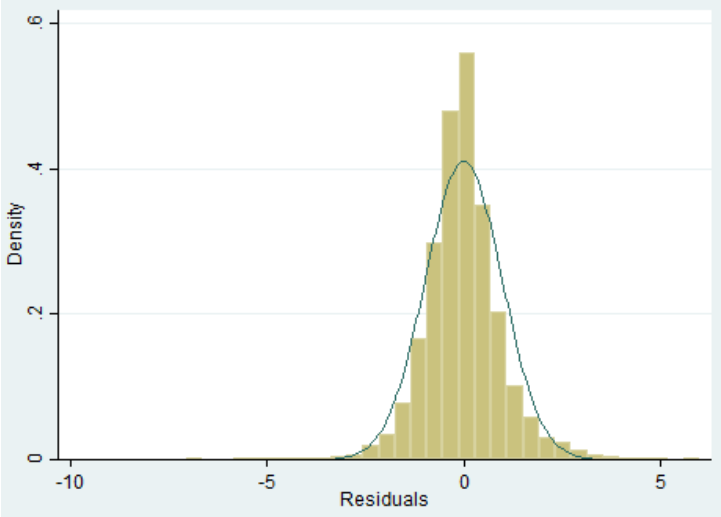
- **Summary statistics for the independent variables**

```
. summarize pop_change primary secondary tertiary income outcome log_pop region log_inc_percap
>  log_don_percap
```

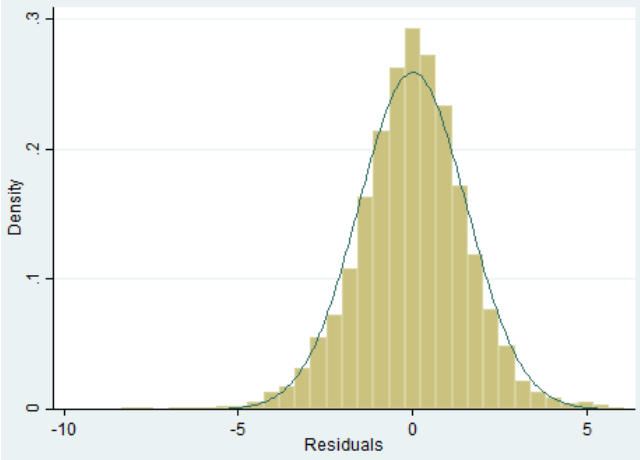
Variable	Obs	Mean	Std. Dev.	Min	Max
pop_change	9,811	-3.305157	5.338535	-32.8	100
primary	9,811	12.04308	10.60847	0	77.9
secondary	9,811	26.63635	8.228461	1.3	51.8
tertiary	9,811	61.06558	10.46457	20.5	93.4
income	9,811	3.26e+07	8.57e+07	983089	1.70e+09
outcome	9,811	3.16e+07	8.44e+07	962254	1.70e+09
log_pop	9,811	10.14969	1.464592	5.697093	15.12984
region	0				
log_inc_pe~p	9,811	6.333567	.5239536	5.486835	9.509636
log_don_pe~p	9,811	-2.819283	1.974425	-11.05311	5.269656

- **Distribution of residuals**

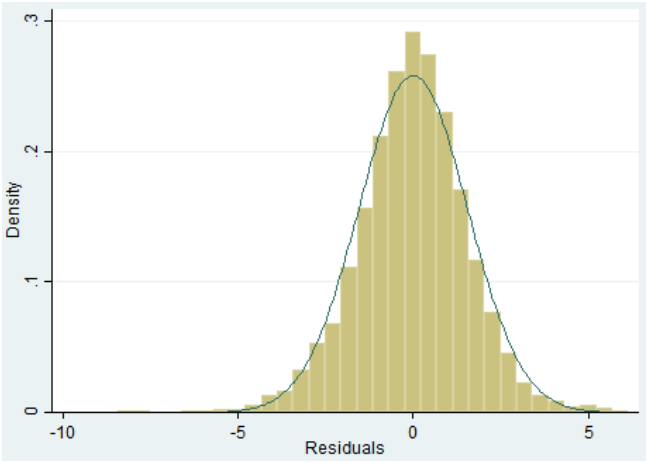
Model 1:



Model 2:



Model 3:



- **Additional interaction regression outputs for models 1-3:**

VARIABLES	(1) With city-level fixed effects	(2) Without city-level fixed effects	(3) Without region X year interaction
2010 X log_inc_percap	-0.222*	-0.406**	-0.435***
	(0.119)	(0.165)	(0.158)
2011 X log_inc_percap	-0.0801	-0.152	-0.114
	(0.118)	(0.161)	(0.154)
2012 X log_inc_percap	-0.291***	-0.348**	-0.319**
	(0.112)	(0.151)	(0.145)
2013 X log_inc_percap	-0.389***	-0.384**	-0.383***
	(0.114)	(0.155)	(0.148)
2014 X log_inc_percap	-0.691***	-0.728***	-0.697***
	(0.113)	(0.152)	(0.145)
2010 X pop_change	-0.00181	-0.0295**	-0.0247*
	(0.0103)	(0.0133)	(0.0129)
2011 X pop_change	0.00109	-0.0237*	-0.0224*
	(0.0101)	(0.0130)	(0.0126)
2012 X pop_change	-0.00933	-0.0323**	-0.0289**
	(0.00996)	(0.0128)	(0.0125)
2013 X pop_change	-0.0184*	-0.0426***	-0.0432***
	(0.0100)	(0.0128)	(0.0125)
2014 X pop_change	-0.0308***	-0.0545***	-0.0553***
	(0.00999)	(0.0128)	(0.0124)
2010 X primary	0.00468	0.00117	-0.000843
	(0.00678)	(0.00969)	(0.00866)
2011 X primary	-0.00360	-0.0100	-0.0113
	(0.00672)	(0.00957)	(0.00848)
2012 X primary	0.0152**	0.0108	0.00574
	(0.00672)	(0.00956)	(0.00843)
2013 X primary	0.00525	-0.00198	-0.00299
	(0.00669)	(0.00951)	(0.00842)
2014 X primary	0.0178***	0.0122	0.0112
	(0.00663)	(0.00940)	(0.00834)
2010 X tertiary	0.00332	0.00417	0.00448
	(0.00604)	(0.00864)	(0.00765)
2011 X tertiary	-0.00492	-0.00361	-0.00651
	(0.00595)	(0.00846)	(0.00749)
2012 X tertiary	0.0119**	0.0111	0.00851
	(0.00595)	(0.00846)	(0.00747)
2013 X tertiary	0.000373	-0.000772	-0.00101
	(0.00591)	(0.00839)	(0.00742)
2014 X tertiary	-0.00357	-0.00322	-0.00630
	(0.00588)	(0.00832)	(0.00737)
2010 X chubu	-0.175	-0.226	

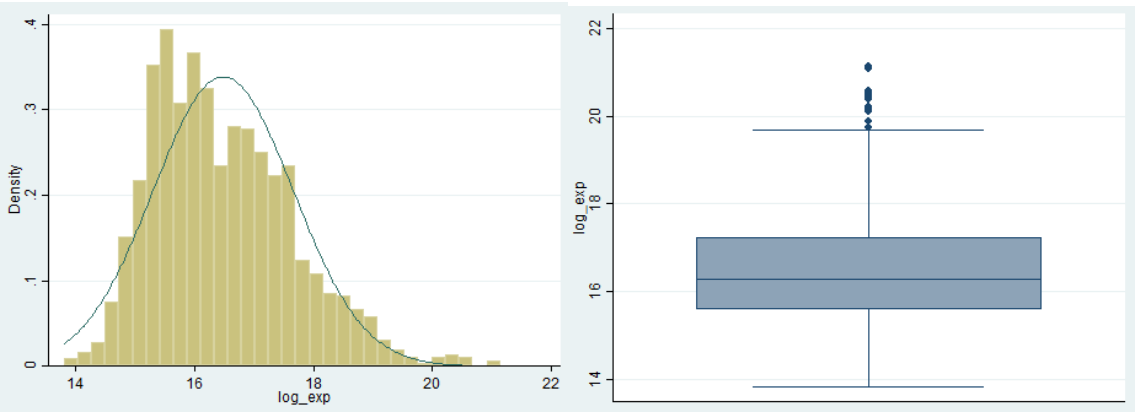
	(0.141)	(0.201)
2010 X chugoku	-0.214	-0.283
	(0.181)	(0.260)
2010 X hokkaido	-0.314*	-0.432*
	(0.172)	(0.247)
2010 X kansai	-0.249*	-0.356*
	(0.141)	(0.202)
2010 X kyushu	-0.228	-0.307
	(0.145)	(0.207)
2010 X okinawa	-0.0476	-0.114
	(0.279)	(0.399)
2010 X shikoku	-0.226	-0.316
	(0.193)	(0.277)
2010 X tohoku	-0.203	-0.365*
	(0.151)	(0.216)
2011 X chubu	0.0442	0.0804
	(0.141)	(0.201)
2011 X chugoku	0.152	0.161
	(0.181)	(0.259)
2011 X hokkaido	0.0550	-0.0284
	(0.174)	(0.246)
2011 X kansai	-0.0161	-0.0526
	(0.141)	(0.201)
2011 X kyushu	0.0375	0.0352
	(0.144)	(0.206)
2011 X okinawa	0.431	0.345
	(0.277)	(0.396)
2011 X shikoku	0.113	0.0790
	(0.192)	(0.275)
2011 X tohoku	0.473***	0.277
	(0.153)	(0.216)
2012 X chubu	0.0393	0.0229
	(0.140)	(0.200)
2012 X chugoku	0.122	0.104
	(0.180)	(0.258)
2012 X hokkaido	-0.132	-0.245
	(0.175)	(0.247)
2012 X kansai	-0.0227	-0.0677
	(0.140)	(0.200)
2012 X kyushu	-0.199	-0.222
	(0.144)	(0.206)
2012 X okinawa	0.374	0.308
	(0.279)	(0.398)
2012 X shikoku	-0.148	-0.163
	(0.193)	(0.276)
2012 X tohoku	0.227	-0.0460

	(0.154)	(0.217)	
2013 X chubu	0.0662	0.00134	
	(0.139)	(0.198)	
2013 X chugoku	0.494***	0.442*	
	(0.180)	(0.258)	
2013 X hokkaido	0.125	-0.0828	
	(0.173)	(0.245)	
2013 X kansai	-0.000599	-0.119	
	(0.139)	(0.199)	
2013 X kyushu	-0.135	-0.183	
	(0.144)	(0.205)	
2013 X okinawa	0.154	0.0352	
	(0.280)	(0.399)	
2013 X shikoku	0.176	0.135	
	(0.193)	(0.275)	
2013 X tohoku	0.145	-0.135	
	(0.154)	(0.216)	
2014 X chubu	0.280**	0.266	
	(0.138)	(0.196)	
2014 X chugoku	0.780***	0.800***	
	(0.180)	(0.257)	
2014 X hokkaido	0.280	0.136	
	(0.173)	(0.244)	
2014 X kansai	0.00564	-0.0411	
	(0.139)	(0.198)	
2014 X kyushu	0.172	0.185	
	(0.143)	(0.204)	
2014 X okinawa	0.257	0.127	
	(0.278)	(0.396)	
2014 X shikoku	0.107	0.0768	
	(0.192)	(0.273)	
2014 X tohoku	0.384**	0.139	
	(0.154)	(0.215)	
	(0.739)	(0.196)	(0.0792)
Constant	-12.27***	-14.88***	-14.89***
	(1.318)	(0.768)	(0.712)
Observations	9,811	9,811	9,811
R-squared	0.757	0.389	0.386
Adjusted R-squared	0.704	0.384	0.384

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

APPENDIX B: Graphs and summary descriptives relevant for Research Question 2

- **Histograms and boxplots for expenditure per capita (log_exp)**



- **Additional statistically insignificant interaction outputs for regression sets 1-3:**

Regression set 1:

VARIABLES	(1) Predicted donation per capita	(2) Predicted donation w/o interactions	(3) Actual donation per capita	(4) W/o any donation variable
t2014 X log_inc_percap	0.0144		0.00538	0.00589
	(0.0198)		(0.00452)	(0.00446)
t2014 X tertiary	-0.000183		-0.000234	-0.000227
	(0.000263)		(0.000228)	(0.000227)
t2014 X chubu	0.00643		0.00506	0.00516
	(0.00540)		(0.00587)	(0.00586)
t2014 X chugoku	-0.00579		-0.000818	-0.000932
	(0.0151)		(0.00707)	(0.00706)
t2014 X hokkaido	0.00108		-0.000357	-0.000183
	(0.00629)		(0.00694)	(0.00693)
t2014 X kansai	-0.00118		-0.00623	-0.00582
	(0.00967)		(0.00616)	(0.00613)
t2014 X kanto	0.00192		-0.00320	-0.00279
	(0.00969)		(0.00600)	(0.00597)
t2014 X kyushu	0.0119*		0.00920	0.00931
	(0.00638)		(0.00610)	(0.00609)
t2014 X shikoku	0		-0.00366	-0.00340
	(0)		(0.00772)	(0.00770)
t2014 X tohoku	0		0	0
	(0)		(0)	(0)

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Regression set 2:

VARIABLES	(1) Predicted donation per capita	(2) Predicted donation w/o interactions	(3) Actual donation per capita	(4) W/o any donation variable
t2014 X log_inc_percap	0.00516		-0.00590	-0.00558
	(0.00373)		(0.00360)	(0.00358)
t2014 X primary	-0.000236		4.37e-05	3.85e-05
	(0.000242)		(0.000245)	(0.000245)
t2014 X chubu	-0.00318		0.00897*	0.00882*
	(0.00513)		(0.00503)	(0.00503)
	(0.0102)		(0.0103)	(0.0103)
t2014 X shikoku	0.00376		0.0134*	0.0135*
	(0.00728)		(0.00734)	(0.00734)
t2014 X tohoku	0		0	0
	(0)		(0)	(0)

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Regression set 3:

VARIABLES	(1) Predicted donation per capita	(2) Predicted donation w/o interactions	(3) Actual donation per capita	(4) W/o any donation variable
t2014 X log_inc_percap	0.00447		-0.00530	-0.00515
	(0.00369)		(0.00358)	(0.00356)
t2014 X primary	0.000121		0.000381*	0.000379*
	(0.000223)		(0.000226)	(0.000225)
t2014 X tertiary	-0.000131		-8.98e-05	-8.77e-05
	(0.000182)		(0.000186)	(0.000186)

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1