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Private Pension Participation and the Utilization of Tax-Favored Programs: Evidence from Self-Employed Professionals in Japanⁱ

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Abstract

Using administrative tax return data for self-employed professionals in Japan, this study examines heterogeneity in private pension contribution behavior. We use participation in the Furusato Nozei system, a unique tax-favored donation program that allows taxpayers to redirect part of their tax payments to local governments of their choice, as an indicator of otherwise unobserved differences in the utilization of tax-favored programs. Propensity score-adjusted estimates show that active Furusato Nozei participants contribute substantially more to private pensions than non-participants. Estimates from an IPW two-part model indicate that approximately two-thirds of the adjusted difference is attributable to pension participation (the extensive margin), whereas only a relatively small share is attributable to contribution levels conditional on participation (the intensive margin).

Keywords: Private retirement saving; Furusato Nozei donation system; Tax-favored programs; Self-employed professionals; Administrative tax data

JEL Classification H24, D14, J26

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1. Introduction

In Western countries, individual participation and contribution behavior in private pension schemes have been extensively documented using microdata (e.g., Rey-Ares et al., 2018; Ayuso et al., 2019; Chan et al., 2022; Christensen et al., 2023) Gonzales et al., 2024). One of the most consistent findings in this literature is the existence of substantial heterogeneity in retirement saving behavior. In influential work, Chetty et al. (2014) distinguish between active savers, who respond to retirement saving incentives, and passive savers, who do not. Subsequent studies similarly show that individuals differ considerably in their utilization of tax-favored retirement saving opportunities (Andersen, 2018; Goda et al., 2019; Friedberg et al., 2024).

In Japan, by contrast, rapid population aging has increased the importance of private retirement saving, yet empirical evidence on individual contribution behavior remains scarce because suitable microdata have largely been unavailable. Existing studies rely primarily on survey data and cover only a limited range of topics (Maruyama, 2021; Nishida et al., 2024).

In 2022, the National Tax Agency of Japan launched a project to facilitate the use of administrative tax microdata for economic research. Using eight years of administrative tax return data (2014-2021; hereafter, the tax return data), we provide evidence consistent with substantial heterogeneity in the utilization of tax-favored retirement saving programs in Japan. We use participation in the Furusato Nozei system, a unique tax-favored donation program in Japan, as an indicator of otherwise unobserved differences in the utilization of tax-favored programs and show that Furusato Nozei participants are substantially more likely to participate in private pension schemes than non-participants.

A key feature of our approach is the use of variation in Furusato Nozei participation across individuals. As described later, the Furusato Nozei system is widely known in Japan and provides substantial tax benefits, making participation financially attractive for many taxpayers. Nevertheless, participation varies considerably across individuals. This variation may provide information about otherwise unobserved differences in individuals' willingness or ability to take advantage of tax-favored opportunities. We suggest that heterogeneity in the utilization of tax-favored programs extends beyond private pension saving and can be observed through participation in other tax-favored programs.

Our analysis is necessarily restricted to self-employed professionals, including tax accountants, certified public accountants, lawyers, and other licensed professionals¹. This restriction reflects two limitations of the tax return data.

¹ In the tax return data, these individuals are classified in the “legal and tax professional services” category.

First, most employees are largely absent from the tax return data because their tax liabilities are typically settled through withholding and year-end tax adjustment in Japan. By contrast, self-employed individuals are required to file income tax returns annually².

Second, the data do not contain characteristics such as family structure, educational attainment, and financial literacy. Focusing on licensed professionals allows us to study a relatively homogeneous occupational group and thereby reduce, although not eliminate, concerns about unobserved heterogeneity in these factors³. Our final sample consists of more than 40,000 individuals.

Self-employed individuals in Japan can contribute to two major tax-favored retirement saving schemes: the Small Business Mutual Aid System and the defined contribution pension system (iDeCo). Because contributions to these schemes are reported as a single aggregate amount in the tax return data, we analyze them jointly as private pension contributions.

This paper examines whether heterogeneity in the utilization of tax-favored retirement saving programs, widely documented in Western countries, is also present in Japan. To this end, we focus on participation in the Furusato Nozei system.

The Furusato Nozei system allows taxpayers to make donations to local governments that are largely offset by tax deductions and to receive return gifts worth approximately 30% of the donated amount from recipient local government, making participation financially attractive at little net cost. As discussed above, the broad accessibility and financial attractiveness of the system make participation potentially informative about otherwise unobserved differences in the utilization of tax-favored programs. We find that Furusato Nozei participants are

² In Japan, self-employed individuals often incorporate as their income increases. Once incorporated, they are treated as employees of their own firms for tax purposes, and their income is recorded as payroll income rather than self-employment income. As a result, such individuals may no longer appear in tax return data as self-employed individuals, and may not be fully captured due to the year-end adjustment system. This raises concerns about potential selection bias when analyzing contribution behavior using data with relatively few high-income individuals.

One advantage of focusing on professionals is that they are relatively more likely to remain self-employed even at higher income levels, partly due to professional norms and institutional features, thereby mitigating this concern.

³ Clark et al. (2017) suggest that even among professionals there may exist differences in financial knowledge; however, empirically examining such differences is difficult in our data. To partially account for potential heterogeneity, we control for differences between tax and accounting professionals and legal professionals using occupation dummy variables.

substantially more likely to participate in private pension schemes than non-participants. The estimated gap in annual private pension contributions between the two groups remains close to 300 thousand yen even after controlling for observable characteristics, including income. More importantly, the association is driven primarily by the extensive margin: roughly two-thirds of this difference is attributable to pension participation itself, whereas differences in contribution amounts among participants (the intensive margin) account for a much smaller share. These findings suggest that the key distinction lies in whether individuals enroll in private pension schemes in the first place.

This paper makes three contributions to the literature. First, using administrative tax return data covering more than 40,000 self-employed professionals, we provide the first large-scale evidence on heterogeneity in private pension participation in Japan. Second, we show that participation in the Furusato Nozei system is strongly associated with private pension participation even after conditioning on observable characteristics. Third, by decomposing the contribution gap into extensive and intensive margins, we demonstrate that the relationship is driven primarily by participation decisions rather than contribution levels among participants.

Two aspects of the empirical analysis merit particular attention. First, Furusato Nozei participants and non-participants differ not only in their donation behavior but also in observable characteristics such as income and age. In particular, Furusato Nozei participants are disproportionately concentrated in higher-income groups, even though the Furusato Nozei system is accessible across the income distribution with little net financial cost. We use propensity-score methods to mitigate observable differences between participants and non-participants and show that the association remains after conditioning on these characteristics (Imbens and Wooldridge, 2009; Wooldridge, 2007). In addition, because income is likely to be the primary observable confounder, we conduct supplementary analyses within income groups. These analyses yield qualitatively similar results.

Second, we distinguish between the extensive and intensive margins of pension saving behavior. This decomposition allows us to examine whether the observed association arises primarily through participation decisions or through contribution levels among participants.

The observed association suggests that Furusato Nozei participation contains information about otherwise unobserved differences in private pension participation. However, the tax return data do not allow us to directly identify the underlying mechanism. Although previous studies emphasize education, financial literacy, and liquidity constraints as determinants of private pension participation, these factors may play a smaller role in our setting because the analysis focuses on licensed professionals and participation in Furusato Nozei generally involves little net monetary cost. Our findings are consistent with, but do not establish, two

possible mechanisms.

First, the observed association may reflect differences in individuals' preferences for tax-advantaged schemes, which is related to the distinction between active and passive savers emphasized by Chetty et al. (2014). In particular, Chetty et al. (2014) show that active savers tend to be wealthier and more financially sophisticated. Furusato Nozei participants resemble active savers along at least some observable dimensions, most notably income.

Second, the observed association may capture differences in psychological or administrative barriers (hassle costs) associated with utilizing tax-favored programs (Bertrand et al., 2006; Bhargava and Manoli, 2015; Daminato, 2024). This interpretation is also consistent with our finding that the difference between Furusato Nozei participants and non-participants is concentrated primarily at the extensive margin, since individuals facing higher hassle costs may be less likely to participate in either Furusato Nozei or private pension schemes.

If these interpretations hold, they have significant implications for the design of private pension systems and related policies. We return to these implications after presenting the main empirical results.

In the remainder of this paper, Section 2 describes the private pension schemes available to self-employed individuals in Japan and their current utilization. Section 3 presents descriptive evidence showing that individuals who actively participate in Furusato Nozei donations also tend to contribute more to private pensions. Section 4 outlines the data and empirical methodology, and Section 5 reports the main results and discusses their policy implications. Section 6 concludes.

2. Private Retirement Saving Schemes Available to Self-Employed Individuals in Japan

This section describes the private retirement saving schemes available to self-employed professionals in Japan—the Mutual Aid System and iDeCo—and documents their contribution patterns. Section 3 then introduces the Furusato Nozei system and provides preliminary evidence on the relationship between Furusato Nozei participation and private pension contribution behavior.

2.1 The Mutual Aid System and iDeCo

We begin by outlining the two main retirement saving schemes available to self-employed individuals. Self-employed professionals may participate in either or both schemes.

The Mutual Aid System is designed to allow self-employed individuals and small business owners to accumulate funds for retirement. Contributions can be set between 1,000 and 70,000 yen per month (12 to 840 thousand yen annually). The retirement benefits received under the scheme depend on the total amount of contributions and the duration of

participation. Unlike iDeCo, contributions are not invested in financial products and therefore participants do not bear investment risk. The tax treatment follows the general principle of pension taxation in Japan— an EET regime⁴, with additional tax advantages at the benefit stage. Contributions are fully deductible from taxable income, while benefits are taxed upon receipt under favorable tax rules, including retirement income deductions (for lump-sum payments) and public pension deductions (for annuitized payments).

While participants can increase their contributions after enrollment, reducing contributions entails a penalty because the reduced portion no longer counts toward the contribution record, resulting in lower future benefits⁵. Moreover, although benefits can be claimed upon business closure regardless of age, early withdrawal for other reasons may lead to a loss of principal when the contribution period is shorter than 20 years. The scheme is therefore structured to promote long-term retirement saving among self-employed individuals.

In contrast, iDeCo is a defined contribution pension scheme in which individuals make contributions and manage their retirement assets through self-directed investment choices. For self-employed individuals, contributions range from 5,000 to 68,000 yen per month (60 to 816 thousand yen annually). The contribution cap is defined jointly with contributions to the National Pension Fund, a voluntary public pension scheme for the self-employed⁶, so that the combined total contributions cannot exceed 68,000 yen per month.

The tax treatment of iDeCo also follows the EET principle with preferential treatment at the benefit stage: contributions are fully deductible, investment returns are tax-deferred, and benefits are subject to favorable tax treatment upon receipt. Unlike the Mutual Aid System, contributions can be freely adjusted without penalty. However, funds in iDeCo generally cannot be withdrawn before the age of 60, implying low liquidity and a design focused on long-term asset accumulation.

⁴ EET (Exempt-Exempt-Taxed) refers to a tax regime under which contributions are deductible from taxable income, investment returns accrue tax-free, and benefits are taxed upon withdrawal. In the Japanese pension tax system, preferential treatment at the benefit stage refers to the application of the public pension deduction and the retirement income deduction.

⁵ This point is explained in Japanese on the following website.

https://sogyotecho.jp/syokibokyoasai_kaisei/

⁶ In the tax return data, contributions to the National Pension Fund are reported under a different income deduction category, the social insurance premium deduction, together with other social insurance contributions. As a result, they cannot be separately identified and are excluded from our measure of private pension contributions.

In the annual income tax return, contributions to the Mutual Aid System and iDeCo are reported under a single deduction category, “Deduction for small business mutual aid premiums.” Because the tax return data record only the combined contribution amount, contributions to the two schemes cannot be distinguished. The maximum combined annual contribution is 1,656 thousand yen (840 thousand yen for the Mutual Aid System and 816 thousand yen for iDeCo).

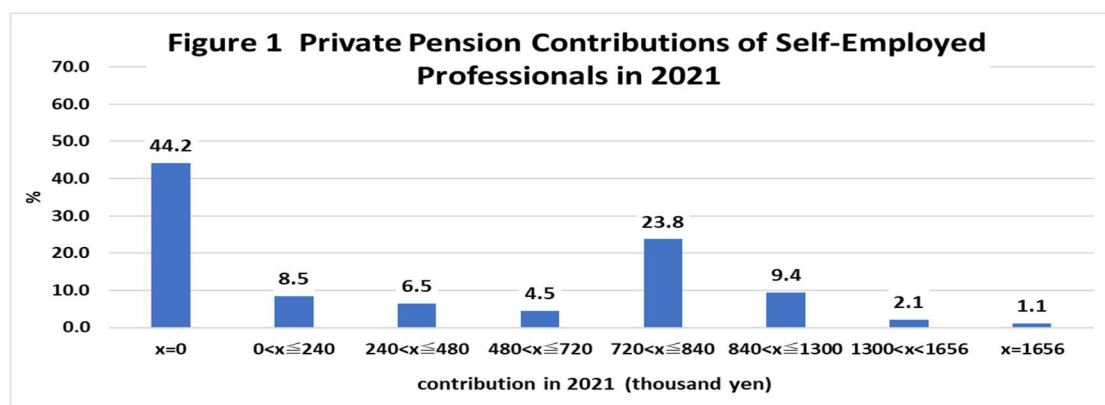
Given their similar tax treatment, this study does not differentiate between them and instead analyzes their combined contributions as “private pension” contributions.

2.2 Private Pension Contribution Behavior

We present descriptive evidence on private pension contribution behavior among self-employed professionals using tax return data for 2021.

The sample consists of self-employed professionals aged 40–59 in 2021. We further restrict the sample to individuals who continuously filed under the blue tax return⁷ for eight years from 2014 to 2021, thereby focusing on individuals with stable and sustained self-employment histories. The final sample comprises 42,729 individuals.

Figure 1 presents the distribution of private pension contributions in 2021 (in percent), where x denotes annual private contributions. The figure shows that approximately 44% of individuals are non-participants (i.e., those with zero contributions), while about 56% make positive contributions.



Among participants, 23.8% fall within the range of $720 < x \leq 840$ thousand yen. A closer examination reveals that a large proportion of this group (18.9% of the total sample)

⁷ The blue tax return (aioiro shinkoku) is a tax filing system that provides tax benefits to self-employed individuals who maintain proper accounting records. It is widely adopted by individuals who conduct their business on a continuous and stable basis.

contribute exactly 840 thousand yen, which is the maximum contribution limit for the Mutual Aid System. This suggests that many individuals contribute up to the cap of the Mutual Aid System. In contrast, only a small fraction of individuals (0.6% of the total sample) contribute the iDeCo maximum (816 thousand yen annually) ⁸.

One possible explanation for this is that the Mutual Aid System offers greater flexibility, as benefits can be withdrawn in circumstances such as business closure, whereas funds in iDeCo are generally inaccessible until age 60⁹. In addition, the iDeCo contribution cap (816 thousand yen) is defined jointly with contributions to the National Pension Fund, and some individuals may be unable to contribute to iDeCo because they are already enrolled in the National Pension Fund.

At the same time, Figure 1 also shows that 12.6% of individuals (9.4 + 2.1 + 1.1) contribute more than 840 thousand yen, indicating that they contribute to both the Mutual Aid System and iDeCo. Moreover, 1.1% of individuals contribute the maximum amount (1656 thousand yen) to both schemes.

Figure 2 presents the distribution of contribution amounts in 2021 for the same 42,729 individuals, expressed as percentages within four income groups. Income groups are constructed as follows. For each individual, we calculate average real income over the period 2014–2020 and classify individuals into four categories: 5 million yen or less, 5–10 million yen, 10–15 million yen, and more than 15 million yen (y in the Figure denotes average real income.). The method for calculating income is described in footnote 10¹⁰. The number of

⁸ A small fraction of individuals (0.2%) report deduction amounts exceeding the statutory annual cap of 1,656 thousand yen. This reflects a provision of the Mutual Aid System that allows advance payment of contributions for the following year, up to a combined maximum of 2,496 thousand yen.

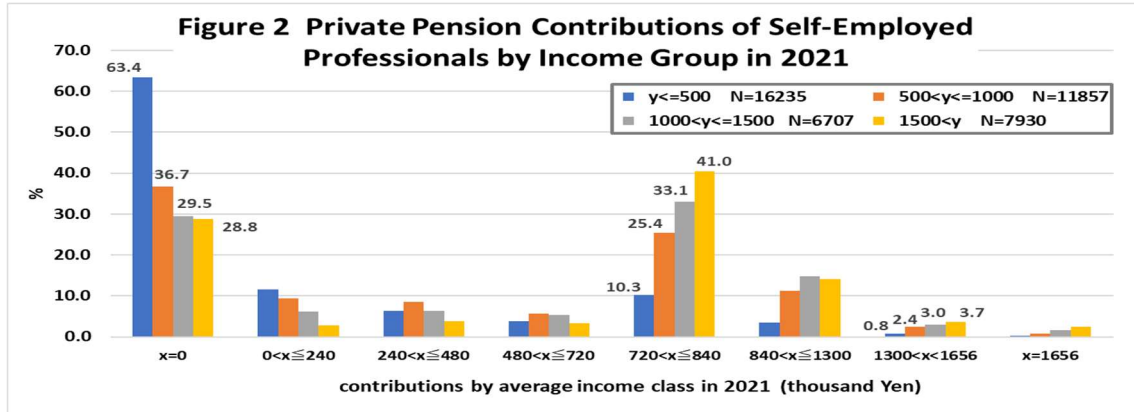
For observations with $1,656 < x \leq 2,496$ thousand yen, we divide the reported amount by two in the main analysis. The results are robust to using the reported amount instead. Observations exceeding 2,496 thousand yen are excluded, although they account for only a negligible share of the sample.

⁹ Financial planners often recommend prioritizing the Mutual Aid System over iDeCo for self-employed individuals because of its greater flexibility, including the possibility of withdrawal upon business closure.

See, for example, *MyBest* (<https://my-best.com/articles/335>, accessed June 4, 2026).

¹⁰ In constructing the income group classifications, we calculate, for each individual in the dataset, the seven-year average of real income based on the sum of wage income, public pension income, business income, agricultural income, real estate income, and wages paid to

individuals in each income group is reported in the legend of the figure.



Consistent with previous studies in Western countries (e.g., Huberman et al., 2007; Gonzales, 2024), the figure shows that private pension contribution behavior varies substantially across income groups. Among the lowest-income individuals ($y \leq 5$ million yen), 63.4% are non-participants, while only 10.3% fall within the $720 < x \leq 840$ thousand yen range, where contributions are most concentrated. In contrast, among the highest-income individuals ($y > 15$ million yen), the share of non-participants is only 28.8%, while 41% fall within the $720 < x \leq 840$ thousand yen range.

We conduct a similar analysis by age group, dividing individuals aged 40–59 into four five-year categories (results not reported). Although the share of non-participants is slightly higher among those aged 55–59, differences across age groups are modest compared with those across income groups shown in Figure 2. The absence of large differences in contribution behavior by age is also consistent with previous findings.

3. The Relationship between Private Pension Contributions and Furusato Nozei Donations

3.1 The Furusato Nozei System

In this paper, we focus on the Furusato Nozei (hometown tax donation) system, a donation-

family employees.

For wage and public pension income, tax provisions such as the employment income deduction and the public pension deduction are normally applied; however, these are not incorporated in our calculation, as our aim is to measure income as an indicator of economic capacity. Wages paid to family employees refer to compensation paid to family members working in the business.

Real income is calculated using 2015 as the base year and deflated by the GDP deflator. However, during this period Japan experienced low inflation, and the GDP deflator remained at only 101.7 even in 2021.

based tax scheme unique to Japan, as a revealed-behavior indicator of otherwise unobserved heterogeneity in the utilization of tax-favored programs, and examine whether this indicator is associated with private pension contribution behavior.

The Furusato Nozei system, introduced in 2008 to reduce fiscal disparities between urban and rural areas, allows taxpayers to effectively redirect a portion of their tax payments to local governments of their choice through tax-deductible donations. Donations are deductible from income tax and resident tax up to an income-dependent limit, with a fixed annual out-of-pocket cost of 2,000 yen.

The upper limit on deductible donations depends on the taxpayer's level of taxable income and increases with taxable income. For example, the upper limit is approximately 70,000 yen for taxpayers with taxable income of 3 million yen and approximately 330,000 yen for those with taxable income of 10 million yen¹¹.

The total amount of Furusato Nozei donations nationwide began to increase rapidly around 2015. This surge was largely driven by the growing practice of local governments offering return gifts to donors. As local governments sought to attract donations through increasingly attractive return gifts, competition among them intensified and attracted widespread public attention in Japan¹². Because return gifts play a key role in shaping individuals' incentives to participate in Furusato Nozei scheme, we describe them in more detail below.

Local governments offer menus of return gifts, including food products and regional specialties, from which donors can choose according to their preferences. The value of the return gift is capped at 30% of the donation amount¹³.

As noted above, participation in the Furusato Nozei system requires a fixed annual out-of-pocket cost of 2,000 yen; however, by donating 10,000 yen, donors receive a return gift worth 3,000 yen, implying a positive net return. Moreover, additional donations (including those to other local governments) yield return gifts equal to 30% of the donation amount at no additional net monetary cost. From this perspective, it would be reasonable to expect that

¹¹ A “one-stop” scheme allows eligible taxpayers to claim the deduction without filing a tax return, but self-employed individuals are generally ineligible.

¹² As a motivation for making donations under the Furusato Nozei system, altruistic motives—such as a desire to support one's hometown or municipalities affected by disasters—may also play a role. However, Yamamura et al. (2021) argues that self-interested motives, particularly those related to obtaining return gifts, are more important.

¹³ In response to the intensifying competition over return gifts, the Ministry of Internal Affairs and Communications issued guidelines in April 2017, setting the value of return gifts at no more than 30% of the donation amount.

many taxpayers donate close to the maximum deductible amount each year¹⁴.

Nevertheless, participation behavior varies substantially even among self-employed professionals, who are likely to be familiar with tax-related incentives. While some individuals repeatedly claim donation deductions close to the upper limit, many others do not make any donations at all during the sample period. These differences may reflect heterogeneity in individuals' propensity to utilize tax-favored programs. We exploit this heterogeneity and examine whether individuals who actively utilize the Furusato Nozei system are also more likely to participate in private pension saving.

3.2 Classification Based on Donation Behavior

We next classify individuals according to their Furusato Nozei donation behavior. The sample consists of 42,729 self-employed professionals, and the classification is based on donation behavior observed from 2014 to 2020 (Table 1).

We begin by identifying individuals who are effectively unable to participate in the Furusato Nozei system. Specifically, because participation in the system requires positive deductible capacity, we classify individuals whose deduction limit remained 20,000 yen or less throughout the seven-year period as "Ineligible (low income)," as their potential tax benefit from participating in the system is too limited. This group accounts for approximately 8% of the sample (4,189 individuals), with an average real income of only 0.56 million yen. Since their preferences regarding Furusato Nozei participation cannot be inferred from the data, they are excluded from the analysis.

The remaining 38,540 individuals are classified as "Eligible," meaning that they have positive taxable income and therefore face a positive donation deduction limit under the Furusato Nozei scheme. Because deductible donations are reported in income tax returns, donation behavior can be observed using the donation deduction variable in the data. Using this information together with the income-dependent deduction limit, which can be calculated from the tax return data, these individuals are classified into three groups: "Non-donors," "Moderate donors," and "Near-cap donors."

Non-donors are individuals who report zero donation deductions throughout 2014–2020, that is, those who made no donations during the entire period. Near-cap donors are individuals whose donation deductions fall between 50% and 105% of the deduction limit ($0.5L \leq z \leq 1.05L$, where z denotes the donation deduction and L the deduction limit) in at

¹⁴ The year-end rush by taxpayers to make donations up to the deduction limit is sometimes described in Japan as "Furusato Nozei matsuri" (literally, "Furusato Nozei festival").

least two years during the sample period¹⁵. The two-year requirement for classification as a Near-cap donor is intended to capture persistent near-cap behavior rather than one-time occurrences. We consider a two-year threshold appropriate, given that Furusato Nozei participation became widespread only in the late 2010s. Moderate donors comprise all remaining Eligible individuals who do not meet either of the above definitions.

Before proceeding, one data issue should be noted. The donation deduction variable (z) in the tax return data captures both Furusato Nozei donations and other deductible charitable donations. Consequently, some individuals classified as Moderate donors may in fact be charitable donors rather than Furusato Nozei participants, resulting in misclassification.

This concern is less important for Near-cap donors. Near-cap donors repeatedly report donation deductions close to the Furusato Nozei deduction limit, suggesting that they actively respond to the deduction cap and that classification error for this group is likely to be small, particularly because charitable giving remains relatively uncommon in Japan¹⁶. For this reason, the main empirical analysis focuses on Near-cap donors and Non-donors, for whom misclassification is limited. Moderate donors are nevertheless included in robustness checks.

Table 1 Income and Age Distribution by group of Furusato Nozei Donation

Donation group		N	Mean Average Real Income (Thousand Yen)	Mean Income in 2020 (Thousand Yen)	Mean Age in 2021
Ineligible(Low Income)		4,189	562	814	51.5
Eligible	Non-donors	12,673	6,654	7,606	50.9
	Moderate donors	14,606	12,582	14,516	50.2
	Near-cap donors	11,261	14,314	16,520	49.4
Total		42,729	10,102	11,651	50.3

This figure presents summary statistics on income and age by group of Furusato Nozei donation for 42,729 self-employed professionals.

Table 1 summarizes the key characteristics of the donation groups. The three groups are of broadly comparable size, each consisting of slightly more than 10,000 individuals, indicating

¹⁵ We allow the upper bound to exceed the estimated deduction limit by 5% to account for measurement error in the calculated limit and the fact that the tax return variable may include other deductible donations.

¹⁶ According to statistics from the National Tax Agency, the share of self-employed individuals claiming donation deductions remained low before the rise of Furusato Nozei (about 2%) but increased substantially by 2021 (about 13%). While the available statistics do not distinguish Furusato Nozei from other deductible donations, the timing of the increase is consistent with the rapid expansion of Furusato Nozei.

substantial heterogeneity in Furusato Nozei participation behavior.

The most notable difference across groups is income. The average real income over 2014–2020 is 14.31 million yen for Near-cap donors, compared with 6.65 million yen for Non-donors. This pattern is somewhat surprising, given that participation in the Furusato Nozei system entails little net monetary cost and is available across the income distribution. Moreover, the deductible limit increases with income. As a result, lower-income individuals can reach their deductible limit with relatively small donations, whereas higher-income individuals often need to make substantially larger cumulative donations and multiple donation transactions to reach their deductible limit¹⁷. Despite the larger amounts required to reach the deductible limit, Near-cap donors are disproportionately concentrated among higher-income individuals.

Finally, average age differs only modestly across groups. Near-cap donors are approximately 1.5 years younger than Non-donors, although the magnitude of the difference is small.

3.3 Correlation Between Private Pension Contributions and Furusato Nozei Donation Behavior

We next examine the relationship between private pension contributions and Furusato Nozei donation behavior, which is the main focus of this study. A simple tabulation already reveals a strong correlation between the two.

Table 2 reports private pension contribution behavior in 2021 by the three donation groups for the 38,540 Eligible individuals. For comparison, the right-hand side of the table reports the same statistics for these individuals classified into four income groups based on average real income over the seven-year period¹⁸.

First, the average amount of private pension contributions differs clearly across donation

¹⁷ According to statistics published by the Ministry of Internal Affairs and Communications, the average Furusato Nozei donation is approximately 18,000 yen per transaction. Under this assumption, taxpayers with taxable income of 3 million yen (deduction limit $\approx$ 70,000 yen) can reach the deductible cap with only about 3 to 4 donations, whereas those with taxable income of 10 million yen (deduction limit $\approx$ 330,000 yen) require approximately 18 donations. Thus, attaining near-cap donation behavior is not necessarily easier for higher-income taxpayers.

¹⁸ For the income groups shown in Table 2, the number of individuals and the average real income (in thousand yen), ordered from the lowest group (below 5 million yen), are as follows: 12,061, 11,845, 6,705, and 7,929 individuals, and 2,896, 7,302, 12,230, and 28,485 thousand yen, respectively.

groups, as shown on the left-hand side of the table. Specifically, Non-donors contribute an average of 243 thousand yen, whereas Near-cap donors contribute 650 thousand yen, implying a difference of about 407 thousand yen. This difference is substantial, as it is comparable to the gap between individuals with average income below 5 million yen and those above 15 million yen (391 thousand yen, or 631–240) on the right-hand side of the table.

The table also reports the share of contributors (i.e., individuals with positive contributions) and the average contribution amount among contributors. In economic terms, the former corresponds to the extensive margin and the latter to the intensive margin. Examining these two margins helps clarify whether differences in average contributions across groups arise primarily from differences in participation decisions or from differences in contribution levels among participants.

Table 2 Private Pension Contribution Status in 2021 among Eligible Individuals
(Mean Contributions, Participation Rates, and Conditional Mean Contributions)

Donation Group (Eligible only)	N	Mean Average Real Income (Thousand Yen)	Mean Contribution in 2021 (Thousand yen)	Share of Contributors in 2021	Mean Contribution by Contributors in 2021 (Thousand Yen)	Average Real Income Class (Eligible only)	Mean Contribution in 2021 (Thousand yen)	Share of Contributors in 2021	Mean Contribution by Contributors in 2021 (Thousand Yen)
Non-donors	12,673	6,654	243	0.403	604	y≤5000	240	0.425	566
Moderate donors	14,606	12,582	463	0.629	736	5000<y≤10000	458	0.633	724
Near-cap donors	11,261	14,314	650	0.773	841	10000<y≤15000	573	0.705	812
Total	38,540	11,139	445	0.597	747	15000<y	631	0.712	885
						Total	445	0.597	747

Notes: This figure shows private pension contribution behavior in 2021 for 38,540 eligible individuals, by group of Furusato Nozei donation and average real income group.

Comparing Non-donors and Near-cap donors, the participation rate differs markedly by 37.0 percentage points (40.3% vs. 77.3%), whereas the difference in conditional contribution amounts is 237 thousand yen (604 vs. 841).

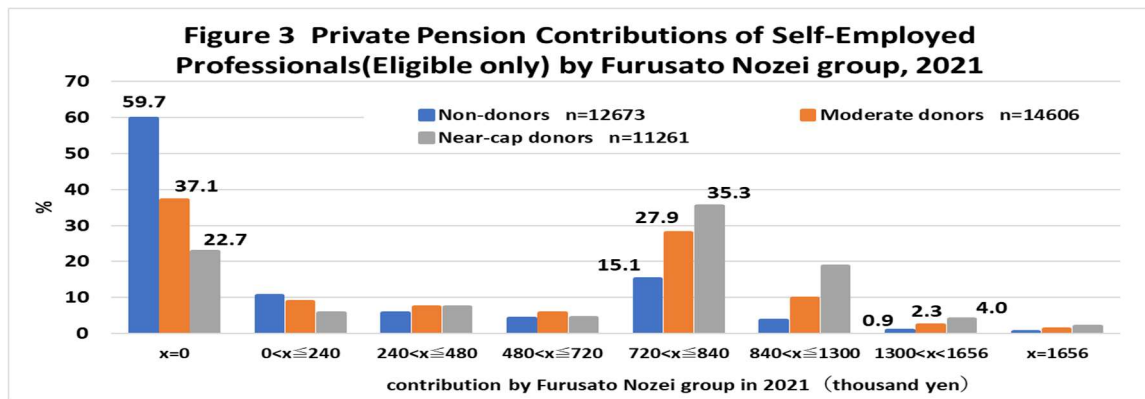
The significance of this pattern becomes clearer when compared with the income-group results shown on the right-hand side of the table. Among the income groups, the participation gap between the lowest and highest income groups is 29.2 percentage points (42.5% vs. 71.2%), smaller than the corresponding gap between Non-donors and Near-cap donors (37.0 percentage points). In contrast, the difference in contribution amounts among contributors is larger across the income groups (319 thousand yen; 566 vs. 885) than across the donation groups (237 thousand yen). These comparisons suggest that differences across donation groups are driven primarily by participation decisions (the extensive margin) rather than contribution levels among participants (the intensive margin).

Appendix Table A1 reports the same statistics separately for each income group. The same

broad pattern is observed within all income groups: differences between Near-cap donors and Non-donors appear to be associated more strongly with pension participation than with contribution amounts among contributors. We revisit this point in the subsequent analysis using a formal decomposition framework.

Figure 3 presents the distribution of private pension contributions in 2021 by donation group. The distributions differ substantially across groups and are consistent with the patterns reported in Table 2. We therefore do not discuss them further.

Overall, these simple tabulations indicate a clear association between donation groups and private pension contribution behavior. However, two considerations should be noted.



First, the observed association between Furusato Nozei participation and private pension contributions is likely to reflect underlying determinants of retirement saving behavior, although the specific mechanism remains unclear. Previous studies on the determinants of private pension saving have emphasized factors such as education, financial literacy, and liquidity constraints. However, these factors may play a smaller role in the present setting. Regarding education and financial literacy, the sample is restricted to self-employed professionals, who are likely to be more homogeneous with respect to education, financial sophistication, and tax-related knowledge than the broader self-employed population. Likewise, liquidity constraints are unlikely to fully explain the observed relationship, given the relatively small net monetary cost of participating in the Furusato Nozei program.

Second, the differences reported in Table 2 may partly reflect observable differences between donation groups rather than behavioral differences associated with donation behavior itself. In particular, Near-cap donors have substantially higher incomes than Non-donors, and higher-income individuals are more likely to contribute to private pension schemes. Consequently, part of the observed difference in average contributions may simply reflect differences in income and other observable characteristics rather than differences associated with donation behavior itself. To address this concern, the following section

employs a propensity score–based approach to balance observable characteristics between the groups before estimating treatment effects.

4. Empirical Method and Data

4.1 Empirical Method

We next describe the empirical approach employed in this study. Individuals are classified into groups based on their Furusato Nozei donation behavior, and differences in private pension contributions across these groups are examined using contribution data in 2021. A key challenge is to control for confounding factors that affect both donation behavior and private pension contributions.

The empirical approach used in this paper is based on propensity score methods (Rosenbaum and Rubin, 1983). By applying appropriate weighting, we balance observable characteristics such as income and age between Near-cap donors and Non-donors and estimate the counterfactual pension contributions that Near-cap donors would have made had they instead been Non-donors. Identification relies on the assumption that, conditional on the observed covariates, potential outcomes are independent of treatment assignment (the so-called selection-on-observables assumption). While this assumption cannot be directly tested, our tax return data contain seven years of pre-treatment income information, together with data on age, occupation, and place of residence, allowing us to construct a rich set of covariates that are expected to capture key confounding factors affecting both donation behavior and pension contributions. In addition, by restricting the sample to licensed professionals who have consistently filed blue tax returns over an extended period, we further increase the likelihood that the sample is relatively homogeneous with respect to education, financial literacy, and lifecycle stage.

While propensity score–based methods are typically used in policy evaluation settings, it is applied here to analyze behavioral differences across groups. For convenience, we refer to Near-cap donors as the treatment group and Non-donors as the control group.

The analysis estimates the average treatment effect on the treated (ATT), defined as the difference between the actual 2021 contribution of Near-cap donors and the counterfactual contribution they would have made had they instead been Non-donors. Moderate donors are also included in parts of the analysis for robustness checks.

We do not interpret the ATT estimates as causal effects of Furusato Nozei participation itself, since Furusato Nozei participation is used primarily as an observable marker of underlying heterogeneity. Rather, the ATT estimates should be interpreted as adjusted differences in private pension contribution behavior associated with different patterns of Furusato Nozei participation.

To estimate the ATT, we employ three estimation methods. The first method is inverse probability weighting with regression adjustment (IPWRA), a doubly robust estimator proposed by Wooldridge (2007), Imbens and Wooldridge (2009). The ATT is estimated using the following equation:

$$\widehat{ATT}_{IPWRA} = \frac{1}{N_1} \sum_{i=1}^N \left[D_i (Y_i - \hat{m}_0(X_i)) - (1 - D_i) \frac{\hat{p}(X_i)}{1 - \hat{p}(X_i)} (Y_i - \hat{m}_0(X_i)) \right] \quad (1)$$

Let N denote the total number of observations and N_1 the number of individuals in the treatment group. Let D_i be a dummy variable that takes the value 1 if individual i belongs to the treatment group and 0 otherwise. Let Y_i denote the amount of private pension contributions made by individual i in 2021, and X_i denote a vector of covariates (such as income and age).

Further, $\hat{m}_0(X_i)$ represents the predicted contribution amount obtained from an outcome model estimated using the control group; for individuals in the treatment group, this corresponds to the counterfactual contribution they would have made had they instead belonged to the control group, conditional on having the same covariates X_i . Let $\hat{p}(X_i)$ denote the propensity score, defined as the probability that an individual with characteristics X_i belongs to the treatment group; this is estimated using a logit model with D_i as the dependent variable and X_i as explanatory variables.

In the estimation of the ATT shown in equation (1), no weights are applied to the treatment group (the first term inside the brackets), whereas observations in the control group (the second term inside the brackets) are weighted by $\left(\frac{\hat{p}(X_i)}{1 - \hat{p}(X_i)}\right)$ to balance the distribution of observed covariates between the two groups. Because the estimator remains consistent if either $\hat{m}_0(X_i)$ or $\hat{p}(X_i)$ is correctly specified, it is referred to as a “doubly robust” estimator.

In the first approach, the IPWRA estimator is implemented directly using standard commands in Stata. In this implementation, $\hat{m}_0(X_i)$ is estimated using ordinary least squares (OLS). However, OLS may be less suitable given the non-negative and skewed nature of the outcome variable.

To address this issue, the second approach replaces OLS with a Poisson regression model with a log link to estimate $\hat{m}_0(X_i)$ (with equation (1) computed manually). Poisson models with a log link are commonly used for non-negative and skewed outcomes and remain consistent even under distributional misspecification (Motta, 2019). Although the doubly robust property of IPWRA mitigates concerns about possible misspecification of the OLS outcome model $\hat{m}_0(X_i)$, we conduct this alternative estimation as a robustness check.

The third approach uses a two-part model (Dow and Norton, 2003). This model decomposes private pension contribution behavior into an extensive-margin component

(participation in a private pension scheme) and an intensive-margin component (contribution amounts conditional on participation). This decomposition is particularly informative because the distinction between Near-cap donors and Non-donors itself reflects a difference in participation in a tax-favored program, and the descriptive evidence in Table 2 suggests that the observed heterogeneity in pension contributions may arise primarily through the extensive margin. The two-part model allows us to formally evaluate this possibility.

Specifically, using the same propensity score $\hat{p}(X_i)$ as in the IPWRA approach, we first estimate a weighted logit model for participation in private pensions in 2021. The explanatory variables include the covariates X_i and the treatment indicator D_i .

Next, restricting the sample to individuals with positive contributions in 2021, we estimate a weighted regression model with $Y_i (> 0)$ as the dependent variable, and X_i and D_i as explanatory variables. For this step, we use a generalized linear model with a gamma distribution and a log link, which is well suited for strictly positive and right-skewed outcomes such as contribution amounts (Manning and Mullahy, 2001).

Finally, the predicted contribution for each individual is obtained from equation (2) as the product of the predicted probability of participation, $\hat{P}_d(X_i)$, and the predicted contribution amount conditional on participation, $\hat{\mu}_d(X_i)$.

$$\hat{g}_d(X_i) = \hat{P}_d(X_i) \times \hat{\mu}_d(X_i) \quad (2)$$

The average treatment effect on the treated (ATT) for the treatment group is then calculated using equation (3).

$$\widehat{ATT}_{IPW-T} = \frac{1}{N_1} \sum_{i=1}^{N_1} D_i [\hat{g}_1(X_i) - \hat{g}_0(X_i)] \quad (3)$$

Although this third approach is not doubly robust, it has the advantage over IPWRA that it allows the ATT to be decomposed into extensive-margin, intensive-margin, and interaction components. As shown on the right-hand side of equation (4), these correspond to the first, second, and third terms, respectively.

$$\begin{aligned} \widehat{ATT}_{IPW-TPM} = \frac{1}{N_1} \sum_{i=1}^{N_1} D_i \Big[& \left(\hat{P}_1(X_i) - \hat{P}_0(X_i) \right) \hat{\mu}_0(X_i) + \hat{P}_0(X_i) \left(\hat{\mu}_1(X_i) - \hat{\mu}_0(X_i) \right) + \\ & \left(\hat{P}_1(X_i) - \hat{P}_0(X_i) \right) \left(\hat{\mu}_1(X_i) - \hat{\mu}_0(X_i) \right) \Big] \quad (4) \end{aligned}$$

This decomposition allows us to examine whether differences in pension contributions between Near-cap donors and Non-donors arise primarily through participation decisions or through contribution behavior conditional on participation. In addition, employing an alternative method to IPWRA allows us to assess the robustness of the ATT estimates

obtained from the previous approaches.

Finally, for all three estimation methods, standard errors are computed using nonparametric bootstrap procedures with 1,000 replications.

4.2 Data

We next describe the data used in the analysis. Summary statistics for the outcome and covariates by treatment and control groups are presented in Table 3.

The outcome variable is the amount of private pension contributions in the most recent year of the data, 2021. Outcomes are reported separately for the treatment group (“Near-cap donors”) and the control group (“Non-donors”), as well as for “Moderate donors,” which are included in the robustness analysis.

The classification into the three groups (i.e., treatment assignment) is based on individuals’ Furusato Nozei donation behavior over the period 2014–2020, ensuring that it is determined prior to the outcome. The classification method has already been described: Near-cap donors are defined as individuals who report a donation deduction z satisfying $0.5L \leq z \leq 1.05L$ in at least two of the seven years, where L denotes the deduction limit; Non-donors are individuals who report no donation deductions during the seven-year period; and Moderate donors are all other individuals.

Table 3 confirms the pattern observed in Table 2: Near-cap donors have substantially higher average private pension contributions than Non-donors. It also shows substantial differences in several observable characteristics between the two groups, particularly income-related variables.

Next, we describe the covariates used in estimating the propensity score and the outcome regressions. A key limitation of the tax return data is the absence of information on family structure, educational attainment, and financial literacy. However, the focus on licensed professionals helps mitigate, although not eliminate, concerns about unobserved heterogeneity arising from these factors. On the other hand, the panel structure of the data provides rich information on individuals’ income over time, allowing us to construct both cross-sectional and longer-term income measures based on seven years of tax return information. This is particularly important because income is likely to be a primary confounding factor affecting both Furusato Nozei participation and private pension contributions. The availability of seven years of income information therefore provides a significant advantage for propensity score estimation.

Specifically, we classify individuals into four income groups based on their average real income over 2014–2020, using 5-million-yen intervals, and construct dummy variables (with

those earning 5 million yen or less as the reference category)¹⁹. In Table 3, these variables are labeled as avg_inc_5-10, avg_inc_10-15, and avg_inc_15p.

Next, we include income in the previous year (2020) as a covariate. While average real income captures longer-term income conditions, this variable reflects the influence of short-term income fluctuation. However, the logarithmic transformation commonly used for income cannot be applied when income takes negative values. Therefore, instead of using the logarithm, we employ the inverse hyperbolic sine transformation, $\ln \left[inc_{it} + \sqrt{inc_{it}^2 + 1} \right]$ (Gelber, 2011), which behaves similarly to the logarithmic transformation for large values of income. In Table 3, this variable is denoted as asinh_prev_inc.

Table 3 Descriptive Statistics for Treatment Variables and Covariates by Type of Furusato Nozei Donations

Variable	Near-cap donors (Treated)		Moderate donors		Non-donors (Control)	
	Mean	SD	Mean	SD	Mean	SD
contrib(thousand yen)	650.1	46.68	463.3	45.83	243.2	37.88
avginc_5-10_d	0.323	0.468	0.317	0.465	0.282	0.450
avginc_10-15_d	0.238	0.426	0.183	0.387	0.107	0.309
avginc_15p_d	0.319	0.466	0.231	0.422	0.076	0.265
asinh_prev_inc	7.814	0.830	7.459	1.402	6.727	1.817
asinh_inc_chg	0.493	1.285	0.600	2.145	0.719	2.860
taxacc_d	0.532	0.499	0.408	0.492	0.343	0.475
agegrp_45-49_d	0.320	0.466	0.284	0.451	0.261	0.439
agegrp_50-54_d	0.273	0.446	0.282	0.450	0.300	0.458
agegrp_55-59_d	0.200	0.400	0.262	0.440	0.295	0.456
r_kanto_d	0.502	0.500	0.487	0.500	0.475	0.499
r_chubu_other_d	0.029	0.168	0.036	0.186	0.045	0.208
r_tokai_d	0.105	0.307	0.104	0.305	0.102	0.303
r_kansai_d	0.205	0.403	0.185	0.389	0.173	0.378
r_chushikoku_d	0.049	0.215	0.060	0.238	0.066	0.249
r_kyushu_d	0.065	0.246	0.072	0.258	0.078	0.268
N	11253		14606		12673	

Notes:

Near-cap donors are defined as those whose donation amounts fall between 50% and 105% of the estimated donation cap in at least two of seven years.

Non-donors are defined as those who have never claimed a donation deduction during the seven-year period.

Moderate donors are individuals who are neither near-cap donors nor non-donors.

In addition, to capture the possibility that individuals experiencing income growth over the

¹⁹ We experimented with including average real income as a continuous covariate; however, due to nonlinear relationships, propensity score adjustment did not perform well. By contrast, using dummy variables yielded satisfactory balance, as shown in Table 4. We therefore adopt dummy variables in the main analysis.

medium to long term are more likely to contribute to private pensions, we include the rate of income change over the period from 2014 to 2020 as a covariate. As with income levels, we apply the inverse hyperbolic sine transformation and define this variable as the difference between the transformed values in 2020 and 2014. In Table 3, this variable is denoted as `asinh_inc_chg`.

In this way, while the seven-year average income and its rate of change capture long-term income levels and dynamics, the previous year's income is intended to reflect short-term income fluctuations and potential liquidity constraints.

Next, we describe the remaining covariates. Age may influence private pension contribution behavior from a life-cycle perspective. In addition, the treatment and control groups differ somewhat in their age distributions, making age a relevant variable in deriving the propensity score. We divide individuals' age in 2021 into four groups at five-year intervals (40–44, 45–49, 50–54, and 55–59) and include dummy variables for each category, using the youngest group (40–44) as the reference. In Table 3, these variables are labeled as, for example, `agegrp45-49_d`.

We also control for place of residence by dividing the country into seven regions (Hokkaido–Tohoku, Kanto, Tokai, Chubu excluding Tokai, Kansai, Chugoku–Shikoku, and Kyushu) and including the corresponding dummy variables, with Hokkaido–Tohoku as the reference category. Finally, although the analysis focuses on self-employed professionals, there may be differences in knowledge and interest in private pensions and *Furusato Nozei* across professional fields. To account for this, we include a dummy variable equal to one for individuals in tax and accounting professions (`taxacc_d`).

As an additional robustness check, we repeat the analysis using data in 2019, the year prior to the COVID-19 pandemic. In this case, the sample is restricted to self-employed professionals aged 40–59 as of 2019, and the classification into treatment and control groups as well as the calculation of average real income are based on data from 2014 to 2018 (descriptive statistics are omitted).

5. Results

5.1 Preliminary Analysis

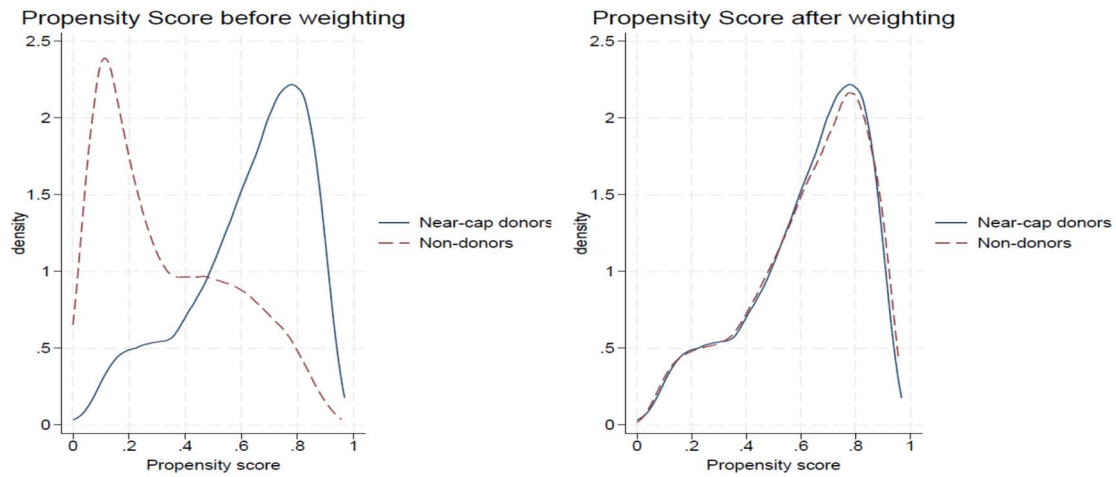
We now turn to the empirical results. In propensity score-based analyses, it is necessary to examine whether differences in covariates between the treatment and control groups in the original data are adequately balanced after weighting by the propensity score, as well as to assess the extent of common support between the two groups. Before presenting the ATT

estimates, we briefly discuss these points²⁰.

To summarize the main findings, our empirical setting allows propensity score weighting to perform well in achieving covariate balance. At the same time, it is important to note that the identification strategy relies on observable characteristics.

Figure 4 first compares the distribution of covariates between the treatment group (Near-cap donors) and the control group (Non-donors) before and after applying propensity score weighting. In the original, unweighted data, the distributions of covariates differ substantially between the two groups. However, after applying propensity score weighting, the covariate distributions become almost identical across the two groups, as is also visually apparent.

Figure 4 Propensity Score Distributions Before and After Weighting



To quantitatively assess the balance of individual covariates, we compute the standardized mean difference (SMD) for each covariate (Table 4). A value below 0.1 is generally interpreted as indicating adequate balance. Prior to weighting, several covariates exhibit SMDs well above 0.1 (in Table 4, these variables are marked with an indicator equal to one). In particular, substantial imbalances are observed in income-related covariates, which are key determinants of both treatment assignment and the outcome. Additional imbalances are also present in age and the dummy variable for tax and accounting professions. After weighting, however, all covariates have SMDs below 0.1, confirming that satisfactory balance has been achieved.

We next examine the extent of common support. While the number of observations in the

²⁰ For a clear exposition of the procedures for preliminary analysis in propensity score-based studies, see Hashimoto and Yasunaga (2022).

control group is 12,673, the effective sample size (ESS) after propensity score weighting is 3,739. This suggests that a sufficient effective sample size is retained and that the estimates do not rely excessively on a small number of observations. Furthermore, although the maximum weight assigned to control group observations is 22, the value declines to 13 at the 99.9th percentile and to 8 at the 99.5th percentile, indicating that only a small number of observations carry extremely large weights.

The favorable balancing properties reported above are not specific to the baseline specification. In the subsequent analysis, we conduct several robustness checks by varying the definitions of the treatment (Near-cap donors) and control groups (Non-donors)—for example, by tightening the definition of the treatment group and by including Moderate donors in alternative specifications (see below for details). In all such cases, the corresponding pre-analysis results indicate similarly good performance. Similar results are obtained when 2019 is used as the outcome year instead of 2021 (with covariates constructed from data for 2014–2018).

Based on these findings, we do not apply any trimming or truncation of extreme weights and report results based on the full sample.

Table 4 Covariate SMD Before and After Weighting

Variable	Unweighted		Weighted	
	Std. diff.	>0.1	Std. diff.	>0.1
avginc_5-10_d	0.088	0	0.013	0
avginc_10-15_d	0.352	1	0.014	0
avginc_15p_d	0.641	1	-0.029	0
asinh_prev_inc	0.769	1	-0.046	0
asinh_inc_chg	-0.102	1	0.016	0
taxacc_d	0.386	1	-0.010	0
agegrp_45-49_d	0.129	1	0.001	0
agegrp_50-54_d	-0.060	0	-0.015	0
agegrp_55-59_d	-0.224	1	-0.015	0
r_kanto_d	0.055	0	-0.003	0
r_chubu_other_d	-0.084	0	0.007	0
r_tokai_d	0.009	0	-0.008	0
r_kansai_d	0.082	0	-0.002	0
r_chushikoku_d	-0.077	0	0.004	0
r_kyushu_d	-0.050	0	0.007	0

Notes:

SMD denotes standardized mean differences in covariates; values greater than 0.1 indicate imbalance.

5.2 Estimation Results

We now present the main estimation results. As noted above, we estimate the ATTs using three methods: IPWRA implemented via Stata commands, IPWRA with a Poisson regression specification, and an IPW-based two-part model. The results are reported in Table 5²¹.

²¹ In some cases, a very small number of observations in the treatment group are excluded

We begin with Case 1, the baseline specification, in which Near-cap donors constitute the treatment group and Non-donors the control group. The estimated ATTs from the three methods are very similar, amounting to 295, 299, and 296 thousand yen, respectively, and all estimates are statistically significant at the 1% level. This indicates a clear difference in private pension contribution behavior between the two types. For comparison, the simple averages reported in Table 2 showed a difference of approximately 407 thousand yen. However, because the two groups also differ in observable characteristics such as income and age, the ATTs, which adjust for these differences, are about 110 thousand yen smaller. These results are consistent across specifications and confirm the robustness of the baseline finding.

Table 5 Estimated Average Treatment Effect on the Treated (ATT) (thousand yen)

Sample	Treated Control year	Case 1		Case 2		Case 3		Case 4		Case 5		Case 6	
		Near-cap donors Non-donors 2021		Near-cap donors (stricter definition) Non-donors 2021		Near-cap donors Non-donors 2019		Moderate donors Non-donors 2021		Near-cap donors Moderate donors 2021		y<=5000 15000<y 2021	
Method	Effect	Estimates	SE	Estimates	SE	Estimates	SE	Estimates	SE	Estimates	SE	Estimates	SE
IPWRA (OLS)	ATT	294.9	8.27	330.8	11.10	281.7	7.65	148.2	6.30	145.5	6.11	291.2	8.26
IPWRA (poisson)	ATT	299.3	8.92	339.9	12.11	283.8	8.07	144.7	6.55	146.1	5.95	296.1	8.94
IPW two-part model	Total ATT	296.4	8.05	331.9	10.71	283.0	7.75	152.1	6.05	145.2	5.94	293.6	8.65
	Extensive	195.0	6.60	214.9	8.49	183.0	5.81	106.8	4.74	86.7	4.45	102.5	5.81
	Intensive	65.3	4.21	74.1	5.37	64.8	3.60	33.8	3.09	50.0	3.62	146.6	5.49
	Interaction	36.0	2.55	42.9	3.45	35.2	2.27	11.5	1.18	8.6	0.74	44.5	2.97
N	Treated	11248		4325		7253		14606		11248		7925	
	Control	12673		12673		15953		12673		14606		12058	

Notes:

ATT is defined as the average treatment effect on the treated, computed by applying predicted values from the regression to the treated group only. IPWRA (OLS) estimates are obtained using the built-in Stata command, while IPWRA (Poisson) estimates are computed manually using a Poisson regression model with a log link.

In the IPW two-part model, the extensive margin is estimated using a weighted logit model on the full sample, while the intensive margin is analyzed using a GLM (Gamma distribution with a log link) applied to the subsample with positive contributions.

Near-cap donors are defined as those whose donation amounts fall between 50% and 105% of the estimated donation cap in at least two of seven years.

Case 2 applies a stricter definition, requiring at least three years with donation amounts between 66.7% and 105% of the cap.

y in Case 6 denotes the average real income over the seven-year period.

In some specifications, a small number of treated observations are excluded in the ATT estimation.

A potential concern is that Furusato Nozei participation may simply reflect differences in income levels. To address this possibility, we re-estimate the ATT separately within four average-income categories. The results are reported in Table 6. For conciseness, Table 6 reports only the OLS-IPWRA estimates. The corresponding estimates obtained from the Poisson-IPWRA and the IPW two-part model yield qualitatively similar results. The income-group-specific decomposition from the IPW two-part model is discussed later and reported in

during the estimation of the ATT, leading to slight differences from the sample sizes reported in the descriptive statistics in Table 5. However, the number of excluded observations is negligible and does not materially affect the results.

Appendix Table B2.

The estimated treatment effects remain positive and statistically significant across all income groups, ranging from approximately 236 thousand yen to 303 thousand yen. Moreover, the magnitude of the estimated effects is remarkably similar across income categories. These findings suggest that the positive association between Furusato Nozei participation and private pension contributions cannot be explained solely by differences in income levels.

Notably, the estimated treatment effect remains economically large even within the highest-income category. If the baseline results merely reflected differences in income between Near-cap donors and Non-donors, the estimated effect would be expected to diminish substantially once the analysis is restricted to relatively homogeneous income groups. Instead, the estimated ATT remains stable throughout the income distribution, indicating that the behavioral differences documented in this paper extend beyond income-related factors.

Table 6 Estimated ATT by average income class (thousand yen)

Sample	Treated Controll year	Case 1							
		Near-cap donors Non-donors 2021							
		Average income		y<=5000		5000<y<=10000		10000<y<=15000	
Method	Effect	Estimates	SE	Estimates	SE	Estimates	SE	Estimates	SE
IPWRA (OLS)	ATT	236.6	13.62	296.8	11.78	302.9	14.07	289.3	27.07
N	Treated	1357		3632		4254		2005	
	Controll	6781		3577		1875		440	

Notes:

ATT is defined as the average treatment effect on the treated, computed by applying predicted values from the regression to the treated group only.

IPWRA (OLS) estimates are obtained using the built-in Stata command.

Near-cap donors are defined as those whose donation amounts fall between 50% and 105% of the estimated donation cap in at least two of seven years.

y denotes the average real income over the seven-year period. Analyses are conducted by Average income class. In some specifications, a small number of treated observations are excluded in the ATT estimation.

Turning back to Cases 2–5 in Table 5, the results are broadly consistent with those in Case 1. In Case 2, we impose a stricter definition of Near-cap donors, defining them as individuals who report a donation deduction z satisfying $0.667L \leq z \leq 1.05L$ in at least three of the seven years. This effectively focuses on individuals with a stronger propensity to engage in Furusato Nozei donations. The estimated ATTs increase slightly to around 330–340 thousand yen, suggesting that individuals who are more actively engaged in Furusato Nozei donations tend to contribute more to private pensions.

In Case 3, we estimate the ATT using data in year 2019 instead of 2021. Although this case relies on a different set of outcome data, the results are very similar: the estimated ATTs across the three methods remain in the lower 280-thousand-yen range, indicating robust findings.

By contrast, Case 4 treats Moderate donors as the treatment group and Non-donors as the control group, while Case 5 treats Near-cap donors as the treatment group and Moderate

donors as the control group (the classification follows the same procedure as in Case 1, using data in 2021). As noted earlier, the group of Moderate donors includes individuals who did not make any Furusato Nozei donations, which introduces some misclassification; nevertheless, the analysis is conducted as a robustness check.

The ATTs are slightly below 150 thousand yen in both Case 4 and Case 5, and are statistically significant at the 1% level in each case. However, the estimated effects are roughly half the magnitude of those in Case 1. This pattern is consistent with Moderate donors representing an intermediate behavioral type between active and inactive participants.

Overall, these results suggest that individuals who are more actively engaged in Furusato Nozei donations are also more likely to contribute to private pension schemes.

Next, we present the results of the two-part model using inverse probability weighting (IPW). Here, contribution behavior to private pensions is decomposed into the extensive margin (participation in private pension schemes) and the intensive margin (increases in contribution amounts). This allows us to disentangle whether differences in contribution amounts between the groups arise from participation decisions or from differences in contribution levels among participants.

Revisiting Case 1, the estimated ATT is 296 thousand yen, of which the extensive margin accounts for approximately 195 thousand yen, or about two-thirds of the total, while the intensive margin amounts to 65 thousand yen, or roughly 22%. In other words, the difference in contribution amounts between the two groups is largely explained by whether individuals contribute at all, whereas the amount contributed plays a relatively minor role.

Cases 2 and 3 yield broadly similar results. While Table 2 in Section 3 provided suggestive evidence based on simple calculations that the extensive margin plays a dominant role, the two-part model provides further support for this finding.

Next, in Case 4—where Moderate donors are treated as the treatment group and Non-donors as the control group—the extensive margin again dominates (107 thousand yen), while the intensive margin is relatively small (approximately 22%, or 34 thousand yen). By contrast, in Case 5—where Near-cap donors are treated as the treatment group and Moderate donors as the control group—the intensive margin (50 thousand yen, about 34%) is somewhat larger relative to the extensive margin (87 thousand yen).

These results indicate that the extensive margin plays a larger role when Non-donors are used as the control group. This suggests that individuals who do not make Furusato Nozei donations are less likely to participate in private pensions.

To assess whether this pattern is specific to donation-based classification, we conduct an additional analysis in Case 6. Specifically, instead of defining the treatment and control groups based on Furusato Nozei donation behavior, we define them using average real income

categories. The treatment group consists of individuals with $y > 15$ million yen (where y denotes average real income), while the control group consists of individuals with $y \leq 5$ million yen²². The average real income for this classification is calculated from 2014–2020 data. In this specification, Furusato Nozei donation categories are included as dummy variables, with Non-donors as the reference group and indicators for Near-cap donors and Moderate donors.

The estimated ATTs are approximately 290 thousand yen, indicating a sizeable effect, and are comparable in magnitude to that between Near-cap donors and Non-donors. Interestingly, the intensive margin exceeds the extensive margin, yielding a pattern distinct from Cases 1–4. Similar results are obtained when alternative income brackets are used to define the treatment and control groups; in particular, the larger role of the intensive margin remains largely unchanged (results not reported).

These results imply that when differences in contributions are analyzed by income class, not only whether individuals contribute but also how much they contribute plays a larger role. This is consistent with the possibility that individuals in lower-income groups participate in private pension schemes but keep their contribution amounts relatively low, potentially reflecting liquidity constraints.

However, when Non-donors are used as the control group, such a pattern does not emerge; instead, the decision not to contribute at all appears to play a larger role. This contrast suggests that differences captured by income primarily operate through the intensive margin, whereas differences captured by donation behavior are more closely associated with the extensive margin. The underlying regression results from the two-part model (weighted logit models and weighted gamma GLM with a log link) are reported in Appendix B.

As an additional robustness check, we estimated the corresponding two-part decomposition separately within each income class. In all four income groups, approximately 60–70 percent of the ATT was attributable to the extensive margin. These results further suggest that the predominance of the extensive margin among Near-cap donors and Non-donors is not confined to any particular segment of the income distribution. Detailed results are reported in Appendix Table B2.

5.3 Discussion and Policy Implications

²² In this analysis, including both lagged income and the income growth rate as covariates causes the logit model to fail to converge; therefore, lagged income is excluded from the specification. In addition, although the standardized difference for the income growth rate remains relatively large (0.16) after weighting, the results are reported here for reference and comparative purposes.

The empirical results yield two central findings. First, individuals who are more actively engaged in Furusato Nozei donations are also more likely to contribute to private pension schemes. Second, the observed heterogeneity is driven primarily by the extensive margin rather than the intensive margin. In other words, the key difference between Near-cap donors and Non-donors lies in whether they participate in private pensions at all, rather than in how much they contribute once they participate.

This distinction has significant policy implications. When differences in pension contributions are analyzed by income group, the intensive margin plays a relatively large role, suggesting that liquidity constraints may influence contribution amounts among existing participants. In contrast, when Near-cap donors and Non-donors are compared, differences arise primarily through the extensive margin. This suggests that a substantial share of the observed heterogeneity may be associated with whether individuals participate in tax-favored programs in the first place.

One interpretation is that the observed association reflects differences in tax-saving preferences. Both Furusato Nozei and private pension schemes provide substantial tax advantages, and individuals who actively utilize one tax-favored program may also be more likely to utilize another. This interpretation is closely related to the active-saver framework of Chetty et al. (2014), who emphasize that some individuals respond much more strongly to tax incentives than others.

A second interpretation is that the observed association reflects differences in psychological or administrative costs (hassle costs). Individuals facing higher hassle costs may be less likely to participate in both Furusato Nozei and private pension schemes. The dominance of the extensive margin is particularly consistent with this explanation because hassle costs are expected to affect participation decisions more strongly than contribution levels among existing participants. Also, individuals facing higher psychological barriers are more likely to be low-income (Bertrand et al., 2006; Bhargava and Manoli, 2015), consistent with our findings.

Although the present analysis cannot fully distinguish between these two mechanisms, both imply that participation barriers deserve greater policy attention. Traditional pension policy often focuses on the generosity of tax incentives. However, if many individuals do not participate at all, increasing tax benefits may primarily affect those who are already inclined to utilize tax-favored programs. By contrast, reducing psychological and administrative barriers may have broader effects on participation.

Several policy options follow from this observation. Financial education may improve awareness of retirement saving opportunities (Sekita, 2011; Lusardi and Mitchell, 2014), but simplifying participation procedures may be equally important. More direct approaches

include reducing participation frictions through simplified enrollment procedures and digitalization (Daminato et al., 2024). While automatic enrollment has been shown to be effective in increasing retirement saving participation (Madrian and Shea, 2001; Chetty et al., 2014), implementing such mechanisms for self-employed individuals may be difficult. In this context, reducing administrative burdens may provide a practical alternative.

The results also have implications for pension taxation. If Near-cap donors represent individuals who are particularly responsive to tax incentives, the results are consistent with the possibility that the current pension tax framework (an EET regime, with additional tax advantages at the benefit stage) disproportionately benefits individuals who are already inclined to utilize tax-favored programs (Yashio, 2023). This raises the possibility that existing tax incentives are less effective at encouraging participation among lower-income individuals or among those facing higher hassle costs.

Concerns have been raised in the United States that tax-favored pension systems may disproportionately benefit higher-income households and generate substantial revenue costs (Weller and Ghilarducci, 2015). Similar concerns may apply in Japan. In this respect, proposals that rely less on income-based deductions and more on flat-rate matching contributions (Duflo et al., 2006; Gale et al., 2006; Antolin et al., 2012) may deserve further consideration. While our findings are consistent with this possibility, evaluating alternative subsidy designs is beyond the scope of the present paper.

More broadly, the findings suggest that participation in *Furusato Nozei* may serve as a useful revealed-behavior indicator of otherwise unobserved heterogeneity in the utilization of tax-favored programs. Understanding the origins of this propensity remains a key topic for future research and may help explain heterogeneity in the use of tax incentives more generally.

6. Conclusion

This paper examines private pension contribution behavior among self-employed professionals in Japan using administrative tax return data. A central finding is that individuals who actively participate in the *Furusato Nozei* system are substantially more likely to contribute to private pension schemes than those who do not. Even after accounting for differences in observable characteristics, the estimated gap in annual private pension contributions remains close to 300 thousand yen.

More importantly, the observed difference is driven primarily by the extensive margin rather than the intensive margin. Approximately two-thirds of the adjusted difference is attributable to pension participation itself, while differences in contribution amounts among participants account for a much smaller share. Moreover, this pattern remains visible throughout the income distribution. These findings suggest that heterogeneity in retirement

saving behavior is closely related to whether individuals participate in tax-favored programs in the first place.

More broadly, the results suggest that participation in the Furusato Nozei system may serve as a useful observable marker of otherwise unobserved heterogeneity in the utilization of tax-favored programs. While the underlying mechanism remains unclear, the observed patterns are consistent with the type of behavioral heterogeneity emphasized in the active/passive saver and hassle-cost literatures.

At the same time, the data contain no direct measure of financial literacy, and we cannot determine whether the observed association reflects financial sophistication, tax-saving preferences, lower hassle costs, or some combination of these factors. Understanding the origins of this heterogeneity remains a key topic for future research.

Finally, we highlight three limitations of this study. First, the analysis is restricted to self-employed professionals. The available tax return data do not cover the entire population, and the sample restriction was partly motivated by the need to control for unobserved factors such as financial literacy and education. As a result, it remains unclear whether the findings can be generalized to the broader population, and further research is needed.

Second, the analysis does not exploit tax reforms or pension policy changes. This is primarily due to the absence of major reforms during the sample period (2014–2021). In contrast, many empirical studies in other countries rely on policy changes for identification. An interesting question for future research is whether individuals identified as highly engaged in Furusato Nozei donations in this study, such as Near-cap donors, would also adjust their behavior in response to policy reforms.

Third, this study demonstrates the value of tax return microdata for empirical research. While such data remain relatively limited in Japan, our analysis reveals significant behavioral patterns that have not been previously documented. Expanding access to tax return microdata would greatly enhance our understanding of household behavior in Japan.

A more fundamental question remains whether increased participation in tax-advantaged schemes leads to higher overall savings, rather than simply a reallocation across financial instruments. Addressing this issue remains a challenge for future research.

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Appendix A: Private Pension Contribution 2021 among Eligible by average real income class

Table A1 reports private pension contribution behavior by Furusato Nozei donation group within each average real income class. Consistent with the results reported in Table 2, Near-cap donors exhibit substantially higher participation rates and contribution amounts than Non-donors in every income class. In particular, differences in pension participation (the extensive margin) remain pronounced throughout the income distribution. These patterns suggest that the relationship between Furusato Nozei participation and private pension contributions is not driven solely by income differences.

Table A1 Private Pension Contribution Status in 2021
among Eligible Individuals by average real income class

Average Real Income Class	Donation Group (Eligible only)	N	Mean Average Real Income (Thousand Yen)	Mean Contribution in 2021 (Thousand yen)	Share of Contributors in 2021	Mean Contribution by Contributors in 2021 (Thousand Yen)
y<=5000	Non-donors	6,781	2,636	156	0.314	496
	Moderate donors	3,920	3,082	316	0.534	592
	Near-cap donors	1,360	3,655	444	0.660	673
	Total	12,061	2,896	240	0.425	566
5000<y<=10000	Non-donors	3,577	7,087	302	0.484	624
	Moderate donors	4,633	7,314	461	0.641	719
	Near-cap donors	3,635	7,499	610	0.771	791
	Total	11,845	7,302	458	0.633	724
10000<y<=15000	Non-donors	1,354	12,162	391	0.538	727
	Moderate donors	2,675	12,220	540	0.691	782
	Near-cap donors	2,676	12,275	697	0.804	868
	Total	6,705	12,230	573	0.705	812
15000<y	Non-donors	961	25,634	431	0.535	807
	Moderate donors	3,378	31,116	577	0.675	855
	Near-cap donors	3,590	26,773	734	0.795	923
	Total	7,929	28,485	631	0.712	885

Notes: This figure shows private pension contribution behavior in 2021 for 38,540 eligible individuals, grouped into quartiles of average real income and further classified into three Furusato Nozei donation groups.

Appendix B: Regression Results from the Two-Part Model (Marginal Effects)

In Section 5 of the main text, we showed that when Non-donors are used as the control group, most of the difference in contribution amounts is explained by the extensive margin. This suggests that individuals who do not make Furusato Nozei donations are also unlikely to participate in private pension schemes in the first place.

The underlying regression results from the two-part model (marginal effects) are presented in Table B1. Due to space limitations, the results for Case 2 and Case 3 are not reported; however, they exhibit patterns similar to those observed in Case 1.

Table B1 Regression Results from the Two-Part Model (Marginal Effects)

Case	Case1		Case4		Case5		Case	Case6	
Treated Control year	Near-cap donors Non-donors 2021		Moderate donors Non-donors 2021		Near-cap donors Moderate donors 2021		Treated Control year	average income 15- average income -5 2021	
Model	Weighted logit	Weighted GLM (Gamma, log link)	Weighted logit	Weighted GLM (Gamma, log link)	Weighted logit	Weighted GLM (Gamma, log link)	Model	Weighted logit	Weighted GLM (Gamma, log link)
Type of margin	extensive	intensive	extensive	intensive	extensive	intensive	Type of margin	extensive	intensive
Treatment dummy	0.220 *** (0.0057)	14.3 *** (0.939)	0.155 *** (0.0061)	7.6 *** (0.728)	0.101 *** (0.0043)	7.9 *** (0.600)	Treatment dummy	0.150 *** (0.0071)	31.9 *** (1.285)
avginc_5-10_d	0.093 *** (0.0109)	11.8 *** (1.604)	0.087 *** (0.0083)	13.1 *** (1.120)	0.074 *** (0.0083)	12.9 *** (1.300)	Moderate_d	0.144 *** (0.0090)	8.0 *** (1.402)
avginc_10-15_d	0.133 *** (0.0157)	19.2 *** (2.007)	0.121 *** (0.0114)	20.4 *** (1.336)	0.107 *** (0.0103)	18.6 *** (1.472)	Near-cap_d	0.250 *** (0.0104)	15.6 *** (1.464)
avginc_15p_d	0.125 *** (0.0199)	22.7 *** (2.482)	0.094 *** (0.0136)	25.9 *** (1.531)	0.099 *** (0.0119)	23.0 *** (1.716)	asinh_inc_chg	0.013 *** (0.0032)	0.6 (0.583)
asinh_prev_inc	0.001 (0.0094)	5.0 *** (1.208)	0.036 *** (0.0041)	2.7 *** (0.584)	0.011 ** (0.0045)	3.7 *** (0.696)	taxacc_d	0.050 *** (0.0088)	0.1 (1.198)
asinh_inc_chg	0.006 ** (0.0027)	0.9 ** (0.334)	-0.004 ** (0.0015)	0.2 (0.229)	0.006 *** (0.0022)	0.9 *** (0.253)	agegrp_45-49_d	0.007 (0.0131)	2.3 (1.752)
taxacc_d	0.028 *** (0.0076)	1.2 (0.824)	0.024 *** (0.0069)	-0.3 (0.712)	0.045 *** (0.0053)	-1.2 ** (0.596)	agegrp_50-54_d	-0.005 (0.0129)	2.5 (1.790)
agegrp_45-49_d	0.014 (0.0113)	-0.1 (1.149)	0.024 ** (0.0103)	-1.2 (1.077)	0.012 (0.0075)	1.0 (0.860)	agegrp_55-59_d	-0.036 *** (0.0134)	-0.5 (1.929)
agegrp_50-54_d	-0.001 (0.0114)	-1.0 (1.185)	0.011 (0.0103)	-0.8 (1.061)	-0.005 (0.0077)	1.0 (0.893)	regional dummy	○	○
agegrp_55-59_d	-0.017 (0.0118)	-1.1 (1.197)	-0.010 (0.0105)	-1.1 (1.078)	-0.024 *** (0.0081)	-0.3 (0.931)	Number of observations	7925	5645
regional dummy	○	○	○	○	○	○			
Number of observations	11248	8691	14606	9191	11248	8691			

Notes:

Statistical significance is indicated as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

The figure reports marginal effects for treated individuals, calculated based on regression coefficients. The logit model is estimated using the full sample, while the GLM (Gamma distribution with log link) is estimated using only observations with positive private pension contributions.

Near-cap donors are defined as those whose donation amounts fall between 50% and 105% of the estimated donation cap in at least two of seven years.

In some specifications, a small number of treated observations are excluded in the estimation.

In what follows, we briefly summarize these results by focusing on the magnitude of the treatment dummy. In the baseline Case 1 (treatment group: Near-cap donors; control group: Non-donors), the marginal effect of the treatment dummy is 22% for the extensive margin and 143 thousand yen for the intensive margin. In contrast, in Case 6, where treatment is defined based on income categories (treatment group: y > 15 million yen ; control group: y ≤ 5 million yen), the effect on the extensive margin is limited to 15%, whereas the effect on the intensive margin is substantially larger at 319 thousand yen, reversing the relationship observed in Case 1.

These results highlight an important contrast. When treatment is defined by Furusato Nozei donation behavior (Case 1), differences in contributions are driven primarily by pension participation. In contrast, when treatment is defined by income (Case 6), differences in

contribution levels among participants play a larger role. This pattern is consistent with the interpretation that donation behavior and income capture different dimensions of heterogeneity in private pension saving.

Next, Appendix Table B2 reports the income-group-specific decomposition of the ATT obtained from the IPW two-part model. Across all income groups, approximately 60–70 percent of the ATT is attributable to the extensive margin, whereas the intensive margin accounts for about 20–30 percent. These results confirm that the dominance of the extensive margin is not driven by income differences.

Table B2 Estimated ATT calculated by two-part model by average income class (thousand yen)

		Case 1							
Sample	Treated	Near-cap donors							
	Controll	Non-donors							
	year	2021							
Average income		y<=5000		5000<y<=10000		10000<y<=15000		15000<y	
Method	Effect	Estimates	SE	Estimates	SE	Estimates	SE	Estimates	SE
IPW two-part model	Total ATT	234.5	12.68	296.2	10.87	303.2	14.15	292.0	27.72
	Extensive	150.5	8.49	181.2	8.38	209.3	12.34	196.9	24.96
	Intensive	48.6	6.08	72.8	6.48	62.2	7.53	65.6	13.89
	Interaction	35.3	4.71	42.2	3.99	31.8	4.09	29.5	6.88
N	Treated	1357		3632		4254		2005	
	Controll	6781		3577		1875		440	

Notes:

ATT is defined as the average treatment effect on the treated, computed by applying predicted values from the regression to the treated group only.

In the IPW two-part model, the extensive margin is estimated using a weighted logit model on the full sample, while the intensive margin is analyzed using a GLM (Gamma distribution with a log link) applied to the subsample with positive contributions.

Near-cap donors are defined as those whose donation amounts fall between 50% and 105% of the estimated donation cap in at least two of seven years.

y denotes the average real income over the seven-year period. Analyses are conducted by Average income class.

In some specifications, a small number of treated observations are excluded in the ATT estimation.