

Grandchildren and Views about Consumption Tax

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ABSTRACT

In Japan, an increase in the consumption tax rate, a measure of balanced public finance, reduces the inequality of the fiscal burden between present and future generations. This study estimates the effect of grandchildren on an older person's view of consumption tax by using independently collected data. The results show that having grandchildren is positively associated with supporting an increase in the consumption tax. This implies that people of the older generation are likely to accept the tax burden to reduce the burden on their grandchildren. In other words, grandparents show intergenerational altruism.

Keywords: Consumption tax, grandparents, grandchild

JEL Codes: H23, J11, J13, J14

1 Introduction

Many researchers argue that a consumption-based tax system is preferable to an income-based one (Aaron and Gale, 1996; Gravelle, 1991; Hall and Rabushka, 1995; Summers, 1981). In an aging society, consumption tax is regarded as financing government expenditures to alleviate intergenerational inequality because the ratio of older people to the total population has rapidly increased (Watanabe *et al.*, 2015). In most developed countries where demographic and

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fiscal problems are critical, consumption-based taxes play a significant role in realizing sustainable economies.

For instance, in a rapidly aging society like Japan, public debt and fiscal burden have remarkably increased to finance social security expenditures (Kitao and Mikoshiba, 2020). The fiscal balance of the Japanese government has deteriorated rapidly, and a growing fiscal deficit could become a burden on future generations. Accordingly, it is necessary to set a consumption tax rate of approximately 30–45% to achieve fiscal sustainability (Braun and Joines, 2015). In 2030, the government of Japan could reduce the budget deficit by approximately half of the consumption tax rate increases from 10% to 15% (İmrohoroğlu *et al.*, 2019). According to Kitao (2011), an increase in consumption tax transfers wealth from old to young consumers. Consequently, future generations will experience welfare gains, and present generations, particularly older consumers, will experience welfare losses.¹ An increase in consumption tax rates can be considered an intergenerational redistribution policy.

We confront the conflict of interest between present and future generations, analogous to the conflict between high-income and low-income groups. There is a tradeoff between increasing the consumption taxes of grandparents and their grandchildren if they have selfish motives. Young grandchildren cannot display their intentions and views due to their immaturity. Inevitably, grandchildren would encounter more difficult situations with larger fiscal burdens than their grandparents. There is a possibility of strategic behavior in parent–child relations (Horioka *et al.*, 2018). For instance, parents behave according to their expectations of their children’s future caregiving. Such strategic decision-making is unlikely in the grandparent–grandchild relationship. Therefore, grandparents’ views on consumption taxes are unlikely to be selfish concerning the influence of their grandchildren.

In an aging society, older people are expected to play a significant role in the workplace.² The role played by grandparents within a family has also increased (e.g., He *et al.*, 2018; Mutchler *et al.*, 2007; Zeng and Xie, 2014), such as caregiving for grandchildren (e.g., Boca *et al.*, 2018; Feng and Zhang, 2018; Greenfield, 2011).³ Inevitably, grandparents and grandchildren spend time

¹Future generations will be better off with pension reform, and delaying reforms will reduce the welfare of the future generations in Japan (Kitao, 2017).

²In the situation of a rapid decline in the labor force caused by the unprecedented speed of demographic aging, older persons are required in the labor supply (Kitao and Mikoshiba, 2020).

³Families anticipate grandmothers to care for their grandchildren to promote the labor participation of mothers. To examine this, many studies analyzed the relationship between grandmothers’ childcare and the labor supply of mothers (e.g., Aparicio-Fenoll and Vidal-Fernandez, 2015; Garcia-Moran and Kuehn, 2017; Ho, 2015; Posadas and Vidal-Fernández, 2012; Rupert and Zanella, 2018). Moreover, grandmothers’ caregiving has influenced grandparents’ health status (Di Gessa *et al.*, 2016a; 2016; Ku *et al.*, 2012; Reinkowski, 2013), mortality (Christiansen, 2014), participation in social activities (Arpino and Bordone, 2017), and cognitive functioning (Ahn and Choi, 2019).

together to form intimate relationships. Hence, grandchild-to-grandparent behavioral influence is also critical in achieving a sustainable society that benefits grandchildren and future generations. It is valuable to analyze whether the grandchild-to-grandparent relationship promotes intergenerational redistribution policies, such as increased consumption tax in the long term. Hence, this study examines the effect of grandchildren on their grandparents' views of increasing consumption tax in Japan.

Grandparents may have selfish, altruistic, or dynastic motivations for bequest behaviors (Horioka *et al.*, 2000, Horioka, 2000, 2014, 2019). Further research is needed to uncover which of these dominate and how they differ when viewing the consumption tax rate to increase the benefits to their grandchildren. Therefore, we conducted an analysis to differentiate selfish and altruistic motivations for consumption tax. Based on independently collected individual-level data, in addition to basic demographic and economic information, a subjective view of the consumption tax policy and family structure was collected. The key findings indicate that older persons with grandchildren are more likely to support an increase in consumption tax than those without grandchildren. This implies that altruistic grandparents are motivated to redistribute their wealth to future generations. Many empirical studies have explored how and why people prefer income redistribution (e.g., Corneo and Grüner, 2002; Luttmer and Singhal, 2011; Ravallian and Lokshin, 2000; Yamamura, 2012). Thus far, the preference for intergenerational redistribution has not been sufficiently explored in an empirical analysis. This study's contribution is to identify the reasons for the preference for intergenerational redistribution and altruism stemming from having grandchildren.

The remainder of this paper is organized as follows. Section 2 proposes our hypotheses. Section 3 describes the study's data and presents the empirical methodology. Section 4 presents the estimation results and interpretation. The final section offers reflections and conclusions.

2 Testable Hypotheses

Due to the unprecedented speed of aging in society, grandparents are expected to care for their grandchildren (Boca *et al.*, 2018; Feng and Zhang, 2018; Greenfield, 2011). Consequently, grandparents have opportunities to participate in physical exercise and mental activity, thereby improving their subjective well-being (Coall and Hertwig, 2011; Dunifon *et al.*, 2020; Powdthavee, 2011; Silverstein *et al.*, 2003; Wang *et al.*, 2019).⁴ Therefore, through caregiving, grandparents develop intimate relationships with their grandchildren.

⁴Brunello and Rocco (2019) found that the informal care of grandchildren reduced grandparents' subjective well-being.

Piketty (1995) theoretically indicated that expectations of upward and downward mobility determine individual attitudes toward redistribution. Bénabou and Ok (2001) proposed the “prospect of upward mobility (POUM)” hypothesis that people who expect to move up the income scale will not favor a distributive policy, even if they are currently poor. Ravallion and Lokshin (2000) find that people expecting their welfare to fall in the future tend to support redistribution, even if they are currently wealthy. Recent studies by Alesina *et al.* (2018) have bridged intergenerational social mobility and redistribution preferences. They used an experimental method to provide evidence that respondents supported more redistribution after seeing pessimistic information about their mobility. This tendency was observed only for left-wing respondents and not for right-wing ones.

Consumption is relatively constant throughout the life cycle, whereas income is not. People earn high incomes, save for retirement during their prime working years, and then live off of savings (and public or private pensions) in old age. Thus, income taxes impose a relative burden on young workers, and moving to consumption tax would shift some of this burden to older taxpayers. Hence, the cost of consumption tax is considered to be larger for older people than for younger people. Accordingly, older people are likely to be opposed to consumption tax if other factors are equal. In Japan, public debt and fiscal imbalances have rapidly increased, leading to an increased fiscal burden for future generations. Consumption tax is a widely acknowledged method and an effective measure to redistribute from the present generation to future generations, thus reducing intergenerational inequality (Kitao, 2011; Kitao and Mikoshihira, 2020; Watanabe *et al.*, 2015). Similar to bequest behaviors (Horioka, 2000, Horioka, 2002, 2014, 2019), grandparents prefer redistribution to their grandchildren.

Therefore, we propose the following *Hypothesis*.

Hypothesis. *Having a grandchild leads older persons to agree with an increase in the consumption tax rate.*

3 Data

3.1 Data Collection

The data were originally collected, at an individual level, by the project we planned through an Internet survey in July 2016. Due to its reputation among Japanese researchers and experience with academic surveys, the Nikkei Research Company was commissioned to survey a representative sample of

Japanese people ages 18–68 years old.⁵ The survey was kept open to collect at least 10,000 observations. Finally, 12,176 observations were obtained. In the original survey, the sample's demographic composition was 18–67 years of age. However, this study explores how grandparents' views on consumption tax differ from those of older persons who were not grandparents. Therefore, we used subsamples of older people who may have grandchildren.

Consumption tax is a major issue in economic policy. In 2012, as part of the joint reform of social security and taxation, the government and opposition parties reached an agreement on the increase in consumption tax to establish the sustainability of public finances and social security (Nakamura 2012). The consumption tax rate was raised from 5% to 8% in 2014 and from 8% to 10% in 2019. However, this agreement was abrogated within a few years. In 2016, when the House of Councilors election was held, under the coalition government of the Liberal Democratic Party (LDP) and the New Komeito Party (NKP), the governing party intended to promote an increase in the consumption tax rate, while opposition parties were against it.

The original survey was conducted immediately after the House of Councilors election in 2016. Hence, we can investigate the voting behavior. In the House of Councilors election in Japan, the proportional representation and electoral district systems are jointly used. In total, there were 242 seats, and an election took place for half of the seats every three years. Hence, in 2016, there was an election in 121 seats. In the 2016 House of Councilors election, 73 seats were allocated to the electoral district system, and 48 to the proportional representation system. Each voter had two votes, one for each system.

This study deals with voting behaviors only in the proportional representation system because persons vote for a party, not for candidates in a proportional representation system,⁶ such as the Liberal Democratic Party (LDP) and New Komei party that composed the coalition government. We asked respondents which governing party (LDP or NK) they voted for.

⁵A 2015 government survey on the use information technology indicates that over 90% of working-age Japanese were internet users. Accordingly, the bias due to the exclusion of non-users is unlikely to be large. See the Statistics Bureau, Ministry of Internal Affairs and Communications <http://www.soumu.go.jp/johotsusintokei/statistics/statistics05.html> (access on April 5, 2018).

⁶In a proportional representation system, candidates within a party list are elected based on the order in which they are listed. The list has been made open to the public before voting. It is possible to vote for a party list without specifying a candidate. That is, seat parties that put forward female candidates are decided based on the candidates order in the list. Therefore, in the case that a party would not put forward any female candidate, voting for the party would mean not being able to vote for a female candidate. However, a person who would like to vote for a female candidate would avoid voting for the party because he/she can consult the list before voting. In a questionnaire of this study, voting behavior in a proportional representation system has not been asked, and, therefore, there is no data about the party for which respondents voted.

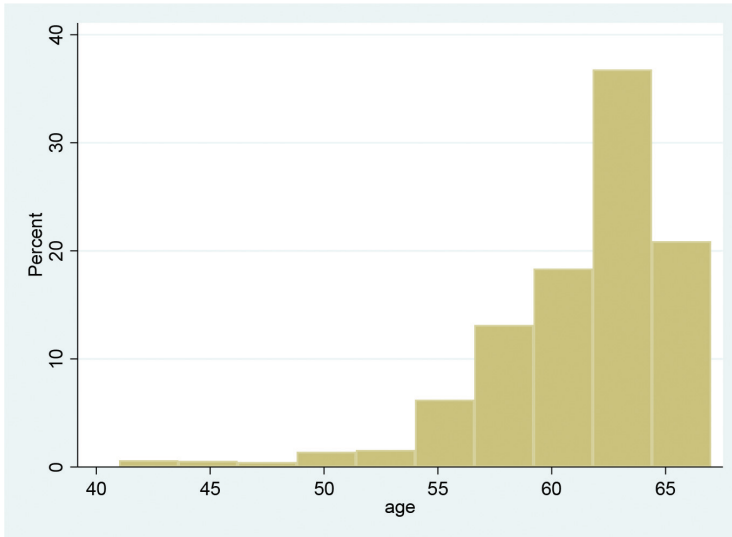


Figure 1A: Distribution of ages when respondents had at least one grandchild. (Respondents over 40 years old).

Figure 1A illustrates the age distribution using a sample of children and grandchildren. Individuals over 60 years of age occupy approximately 70% of the sample. Furthermore, 95% of respondents who have grandchildren are over 50 years of age. None of the respondents equal to or below 40 years of age had grandchildren. Therefore, we limit the sample to those over 40 years old when we conduct the estimations. Figure 1B illustrates the rates of the age of respondents who have children but do not have any grandchildren and indicates a declining rate as respondents age. Younger respondents and those without children were unlikely to have grandchildren. In this study, the sample was limited to parents who were over 60 years of age because their child was possibly a parent. In other words, there is a possibility that the respondents had grandchildren. Furthermore, we limited the sub-sample to those who answered questions related to this study.

Observations were reduced to 4,125 and 1,102 if the respondents had children and were over 40 and 60 years of age, respectively. Unfortunately, we did not have data on the ages of the grandchildren. However, we can predict the ages of respondents' grandchildren based on official data (Ministry of Health, Labour and Welfare, 1980, 2017). Figures 1A and 1B indicate that the age of respondents who have grandchildren is approximately 63 years old. They were approximately 25 years of age in 1980. In 1980, the average age of women when they had their first child was approximately 26 years old. Therefore, when the surveys were conducted, their first child was 38 years old. In 2016, the average

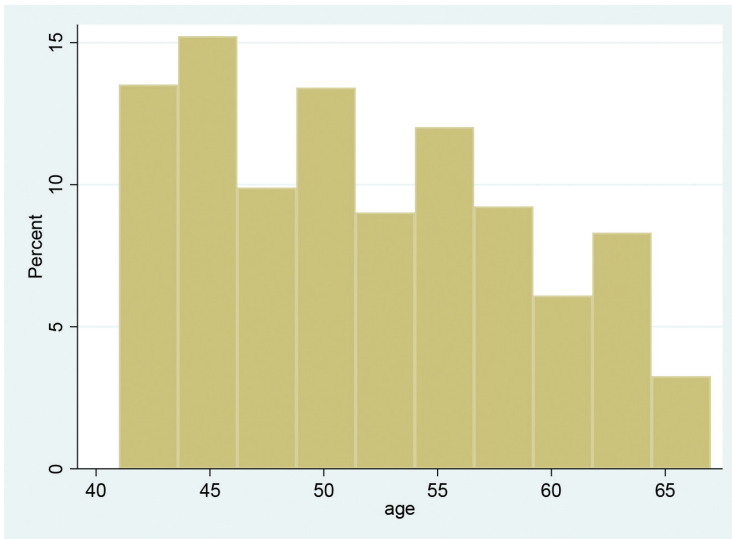


Figure 1B: Distribution of ages when respondents have children but do not have grandchildren. (Respondents over 40 years old)

age of women when they had their first child was approximately 30 years old. Based on this subsample, Figure 2 shows the distribution of the number of grandchildren. Approximately two-thirds of respondents had grandchildren. The sample was further limited to respondents who were over 60 years of age with children over 30 years old, ensuring that respondents were grandparents and making them comparable to others. Observations were condensed to 623. Additionally, various subsamples were used for more detailed examination.

3.2 Data Definition and Descriptive Statistics

Descriptions of the variables and their basic statistics are provided in Appendix Table A1. The questionnaire included various questions to collect basic variables, such as respondents' ages, genders, job status, marital status, educational background, household income, and residential prefectures. Additionally, information about family members, such as the number of children and grandchildren, their gender, and the age of the youngest child were collected.

It is widely acknowledged that an increase in consumption tax would necessitate fiscal sustainability (Braun and Joines, 2015; İmrohoroğlu *et al.*, 2016; İmrohoroğlu *et al.*, 2019). This study examines the subjective view of the Consumption Tax Argument. Hence, the key variable is:

“To what degree do you agree with the statement that an increase in consumption tax cannot be avoidable?”

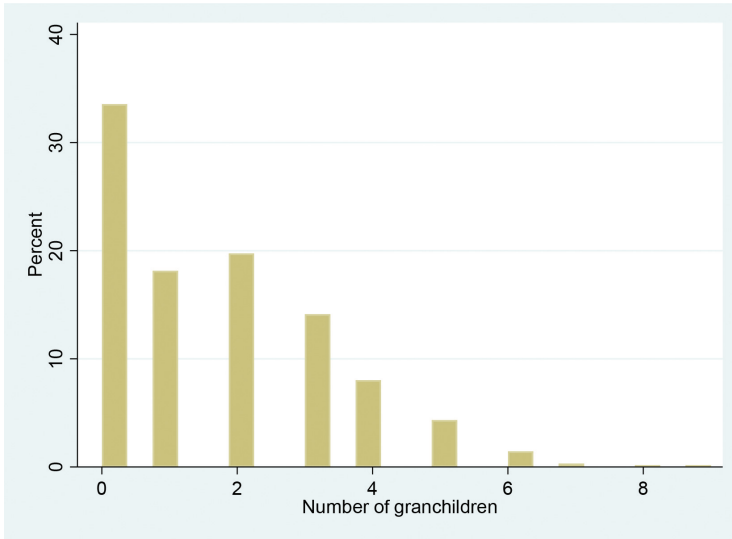


Figure 2: Distribution of number of grandchildren.

Note: The sample is limited to respondents who are over 60 years old and have children over 30 years old.

Preferences for consumption tax (VIEW CON TAX) were measured by the degree of support, ranging from one (strongly disagree) to five (strongly agree).

The question is whether the respondent feels that an increase in consumption tax is avoidable not whether the respondent supports an increase in consumption tax. Hence, VIEW CON TAX does not currently directly reflect respondents' attitudes toward consumption tax. However, people come to only consider the current situation when they answer questions such as, "Do you agree with an increase in consumption tax? Focusing on the current situation, an increase in consumption tax leads to an increase in the cost of living but no benefit at all. Instead, the nuance of the question is more related to future issues, rather than the present one. This induces respondents to consider an increase in consumption tax as a future issue and then show their current attitudes toward future generations. There is ambiguity in the question because it does not specify the timing of the increase in consumption tax. Hence, the answer to the question should be carefully interpreted. Nevertheless, we can distinguish the effect of having a child on future issues and the present issue by conducting placebo tests, where views about policy on the present issue are explained later.

The survey was conducted two years later, in 2018, and involved sending questionnaires to identical respondents via the Internet. Therefore, we can match the information on individual characteristics with the replies to the

questionnaire in the 2018 survey. The measure of preferences for consumption tax is ambiguous because the respondents are asked whether an increase is “unavoidable.” In the 2018 survey, we added another question to directly measure support for consumption tax hikes by specifying different timeframes:

“Assume that, if the status quo remains unchanged, the consumption tax rate will increase to 40% in 30 years’ time. Suppose that if current consumption tax payments increase by 1%, the consumption tax rate for future generations will decrease by 1%. What rate of tax would you accept? Choose from 0% to 50%”

The answer to the question is that PAY CON TAX measures support for consumption tax hikes more directly than VIEW CON TAX. However, as usually occurs in panel surveys, the sample size inevitably decreased in the 2018 survey because some respondents in the 2016 survey did not participate. The PAY CON TAX sample size was too small to replicate various estimations using VIEW CON TAX. Therefore, we report the results using PAY CON TAX to test the robustness of the main results of VIEW CON TAX.

Based on a subsample of respondents who were over 60 years of age and had children, Figure 3 shows a comparison of the distribution of “Preferences for consumption tax” between those who had grandchildren and others. In the same way, Figure 4 compares the distribution of “accepted percentage for consumption tax” between two groups. As shown in Figures 3 and 4, respondents with grandchildren are more likely to choose larger values than their counterparts. This finding is consistent with the *Hypothesis*. However, for a closer examination, we control for various variables using the regression estimations in Section 4.

The characteristics of respondents may differ according to the number of grandchildren. Using the same subsample used in Figures 2 and 3, Table 1 indicates the balance check, suggesting no difference in respondents’ ages, the youngest child’s age, household income, and schooling years.

3.3 Empirical Specifications

Our baseline model assesses how the presence of grandchildren is related to grandparents’ preference for consumption tax, testing the *Hypothesis*. The estimated function takes the following form:

$$\begin{aligned} \text{VIEW CON TAX (or PAY CON TAX)}_i &= \alpha_0 + \alpha_1 \text{ GRAND CHILDREN}_i \\ &+ \alpha_2 \text{ GOV PARTY DUMMY}_i \\ &+ X_i B + u_i. \end{aligned}$$

The dependent variable VIEW CON TAX is a proxy for consumption tax preferences. In the alternative specification, VIEW CON TAX is replaced

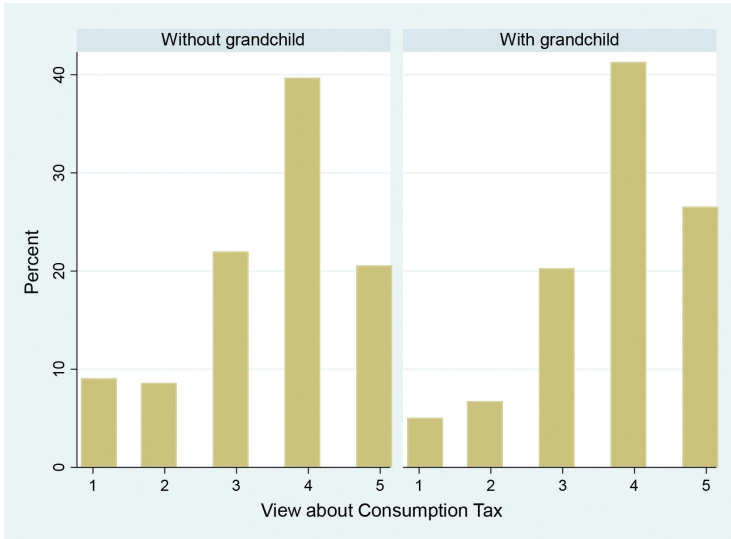


Figure 3: Distribution of views on consumption tax. Comparison between those with grandchildren and those without.

Note: The sample is limited to respondents who are over 60 years old and have children over 30 years old.

Table 1: Balance check.

Number of grandchildren	Ages	Th Youngest Child’s ages	Income	Schooling years
0	63.4	35.1	4.66	14.3
1	63.5	34.9	4.65	14.2
2	63.6	36.0	4.09	13.9
3	63.5	35.9	4.17	14.0
4	63.2	34.9	4.22	14.0
5	63.7	36.2	3.90	13.4
6	63.8	34.6	4.22	13.6
7	64.0	36.0	3.50	13.0
8	63.0	35.0	3.00	12.0
9	66.0	32.0	6.00	16.0
<i>P</i> -value (<i>F</i> -test)	0.66 (0.73)	0.68 (0.75)	0.36(1.1)	0.18 (1.40)

with PAY CON TAX. The suffix i denotes individuals. X_i denotes the control variable, and B denotes the vector of the estimated coefficients.

The key independent variables were GRAND CHILDREN and the number of grandchildren. Based on the *Hypothesis*, the sign of the coefficient

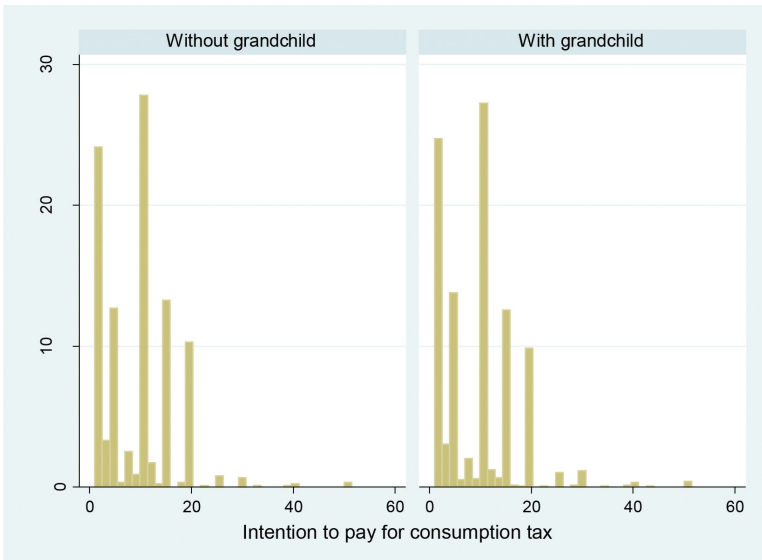


Figure 4: Distribution of intention to pay consumption tax. Comparison between those with and without grandchildren.

Note: The sample was limited to respondents who were over 60 years old and had children.

is predicted to be positive. However, it is plausible that VIEW CON TAX does not increase linearly as the number of grandchildren increases. In the alternative specification, the linear variable GRAND CHILDREN is replaced with a dummy for having a grandchild (GRAND CHILDREN DUMMY). Having children depends on the parents’ decisions and not on their grandparents. Therefore, these are considered exogenous variables. As explained in the previous section, the governing party was more positive in increasing the consumption tax rate than other parties. Hence, the survey question “To what degree do you agree with the statement that an increase in consumption tax cannot be avoidable?” may not necessarily elicit a preference for a consumption tax increase. Rather, this question can capture one’s support for the governing party and cabinet under the command of Prime Minister Shinzo Abe.⁷ As another key independent variable, we incorporate GOV PARTY DUMMY, which captures respondents’ voting for governing parties in the 2016 election. The anticipated sign of the coefficient of GOV PARTY was positive. In the speculation that GRAND CHILDREN DUMMY is used, the effect of having a child can be compared to that of GOV PARTY DUMMY because both are dummy variables.

⁷The Abe Cabinet was the Cabinet inaugurated by Shinzo Abe, who was appointed as Japan’s Prime Minister. The Abe Cabinet was a coalition Cabinet where the Liberal Democratic Party and New Komei Party form the government. The Abe cabinet persisted from 2012 to 2020.

The control variables are individuals' age (AGE) and their square (AGESQR), respondents' gender dummy (MALE), schooling years (EDU), 12 job status dummies, 17 household income dummies, and marital status dummies. In addition, 47 residential prefecture dummies were included to control for the characteristics of residential places.

To make the empirical strategy more convincing, we conducted placebo tests. In the placebo tests, we examine whether the research design explains other outcomes that are not supposed to be affected by the key independent variables. For this purpose, as an independent variable, we used two policy variables that should not be affected by having a grandchild. First, the government is expected to reduce income inequality between high-income and low-income earners in the present generation. Consumption tax is related to redistribution between present and future generations, whereas the redistribution policy is to redistribute with the present generation. Therefore, we also use VIEW REDIST (view of the government's role in reducing income inequality). The determinants of this variable have been examined in previous studies (Alesina *et al.*, 2018; Corneo and Grüner, 2002; Yamamura 2012; 2014), and therefore, this analysis is generally established to consider redistribution preference. Second, natural disasters frequently occurred in Japan, such as the Great East Japan earthquake in 2011 and the Kumamoto earthquake in 2016, which occurred just before the election. Japanese people are thought to draw their attention to disaster prevention; therefore, we used VIEW DISAS (view about the government's role in preparing for natural disasters). VIEW REDIST and VIEW DISAS are present and urgent issues and less likely to be related to future generations, such as grandchildren.

4 Estimation Results

The baseline specification results using a subsample of those over 40 and 60 years of age are presented in Tables 2, 3 and 4. Table 2 shows the key variables related to the number of grandchildren and basic control variables. Tables 2, 3, 4 and 5 indicate only the results of the key variables and grandchildren dummy. Table 2 shows that the GRAND CHILDREN coefficient yields a positive sign and is statistically significant at the 1% level in Columns (1)–(4). Therefore, the number of grandchildren is positively associated with an increase in consumption tax. The absolute value of the coefficient is equivalent regardless of the inclusion of the GOV PARTY DUMMY. The coefficient of GOV PARTY DUMMY shows a positive sign and is statistically significant at the 1% level in Columns (1) and (2). Hence, in line with our argument, respondents who voted for the governing party are more likely to support an increase in consumption tax. Apart from this, INCOM shows a significant positive sign, implying that low-income people are against an increase in

income tax. This reflects “the fact that consumption taxes are more regressive than progressive income taxes. In particular, fundamental tax reform may have unfavorable effects on low-income households, who spend more of their resources on consumption (Kitao, 2011, p. 63).

The results of placebo tests are presented in Table 3. The coefficients of GRAND CHILDREN do not show statistical significance in Panels A and B. This implies that the existence of grandchildren is unrelated to the view of the government’s role regarding the present issue, such as reducing income inequality and preventing natural disasters. In Panel A, GOV PARTY DUMMY and INCOME indicate significant negative signs for all columns. This implies that those who did not vote for the governing party and low-income people were more likely to support income redistribution. Compared to opposition parties, the LDP, the governing party, generally places more importance on economic growth than redistribution. Therefore, the results of Panel A are convincing, and in Panel B, none of the variables show statistical significance except GOV PARTY DUMMY in Column (1). Overall, placebo tests made the main estimation of consumption tax compelling.

To thoroughly test the *Hypotheses*, Table 4 shows the results when GRAND CHILDREN DUMMY was used instead of GRND CHILD. These results are similar to those presented in Table 2. However, the absolute coefficient of GRAND CHILDREN DUMMY in Columns (1) and (3) are 0.09 and 0.10, which are far smaller than 0.23 and 0.24 in Columns (2) and (4), respectively. Furthermore, the statistical significance in Columns (1) and (3) is only 10 % level, whereas those in Columns (2) and (4) are 1 % level. The effect of having a grandchild is clearly larger for those who were over 60 years old than for those over 40 years old. According to our interpretation, as people age, they are more likely to focus on the benefits for future generations when they have grandchildren, even though they are less likely to enjoy their own benefits. Moreover, grandparents were more likely to have children when young. This may be because they were myopic to have unintended children. Hence, they are less likely to possess a long-term view of their grandchildren’s benefits. Considering Tables 2 and 4, the coefficients of GRAND CHILDREN DUMMY were significantly larger than those of the linear variable in GRAND CHILDREN. In our interpretation, the presence of grandchildren is more important than their number. That is, first-born grandchildren have a far greater effect than second- and third-born grandchildren. In fact, the marginal effect of grandchildren was observed to be extremely small.

Both independent variables shown in Table 4 are dummy variables, and thus, their impacts can be compared. In Column (1), the absolute values of coefficient of GRAND PARTY DUMMY are 0.33 and 0.37, while being statistically significant at the 1% level. These values are larger than the coefficients of the GRAND CHILDREN DUMMY. The test for the difference between the coefficients of GRAND CHILDREN DUMMY and GRAND PARTY DUMMY shows a statistical difference in Column (1) but not in Column (2).

Table 2: Results of baseline specification. Subsample of respondents with children. Test for Altruistic Motivation (OLS Model).

Dependent variable: VIEW CON TAX				
	(1)	(2)	(3)	(4)
	AGE \geq 40	AGE \geq 60	AGE \geq 40	AGE \geq 60
GRAND CHILDREN	0.05*** (2.91)	0.08*** (3.73)	0.05*** (3.11)	0.08*** (3.77)
GOV PARTY DUMMY	0.33*** (9.52)	0.36*** (7.48)		
AGE	-0.03 (-0.52)	-1.28 (-0.78)	-0.03 (-0.56)	-1.07 (-0.64)
AGE SQR	0.0003 (0.66)	0.01 (0.78)	0.0003 (0.70)	0.008 (0.64)
INCOM	0.07*** (6.39)	0.06** (2.08)	0.08*** (7.02)	0.06** (2.35)
EDU	0.02** (2.03)	0.01 (0.58)	0.02** (2.18)	0.01 (0.43)
MALE	0.01 (1.02)	0.22** (2.00)	0.02 (0.25)	0.22* (1.93)
Observations	4,125	1,102	4,125	1,102
R-square	0.07	0.11	0.06	0.09

Note: Numbers in parentheses are t-values calculated using robust standard errors clustered by residential prefecture. *, **, and *** indicate significance at the 10%, 5 %, and 1 % levels, respectively. Various control variables were included, such as the respondent's residential prefecture, marital status, and job status dummies. However, these results have not been reported.

Table 3: Placebo Test for Baseline Specifications. Subsample of respondents with children. (OLS model).

Panel A. Dependent variable: VIEW REDIST				
	(1)	(2)	(3)	(4)
	AGE \geq 40	AGE \geq 60	AGE \geq 40	AGE \geq 60
GRAND CHILDREN	0.01 (0.54)	0.02 (0.79)	0.004 (0.28)	0.01 (0.60)
GOV PARTY DUMMY	-0.23*** (-6.33)	-0.37*** (-7.33)		
AGE	-0.01 (-0.27)	-2.54 (-1.41)	-0.01 (-0.22)	-2.75 (-1.51)
AGE SQR	0.0002 (0.81)	0.02 (1.41)	0.0002 (0.74)	0.02 (1.52)
INCOM	-0.04*** (-4.53)	-0.03** (-2.02)	-0.05*** (-4.97)	-0.03** (-2.43)
EDU	-0.01 (-0.68)	0.01 (0.35)	-0.01 (-0.70)	0.01 (0.49)
MALE	-0.03 (-0.74)	-0.10 (-0.84)	0.04 (0.90)	-0.10 (-0.86)
Observations	4,125	1,102	4,125	1,102
R-square	0.08	0.13	0.07	0.09

Note: Numbers in parentheses are t-values calculated using robust standard errors clustered by residential prefecture. **, and *** indicate significance at the 5 %, and 1 % levels, respectively. The set of independent variables is equivalent to that in Table 2. However, these results have not been reported.

Table 3: Continued.

Panel B. Dependent variable: VIEW DISAS

	(1) AGE \geq 40	(2) AGE \geq 60	(3) AGE \geq 40	(4) AGE \geq 60
GRAND CHILDREN	-0.01 (-0.42)	0.01 (0.31)	-0.01 (-0.35)	0.01 (0.29)
GOV PARTY DUMMY	0.06** (2.17)	-0.02 -0.02		
AGE	0.03 (0.75)	1.54 (1.18)	0.03 (0.74)	1.53 (1.18)
AGE SQR	-0.0002 (-0.46)	-0.01 (-1.18)	-0.0002 (-0.45)	-0.01 (-1.18)
INCOM	0.01 (1.26)	0.004 (0.49)	0.01 (1.47)	0.004 (0.40)
EDU	-0.001 (-0.10)	-0.003 (-0.21)	-0.001 (-0.08)	-0.003 (-0.20)
MALE	0.01 (0.15)	-0.04 (-0.06)	0.01 (0.18)	-0.004 (-0.06)
Observations	4,125	1,102	4,125	1,102
R-square	0.03	0.06	0.03	0.06

Note: Numbers in parentheses are t-values calculated using robust standard errors clustered by residential prefecture. ** indicates significance at the 5% level. The set of independent variables is equivalent to that in Table 2. However, these results have not been reported.

Table 4: Results using a dummy variable for grandchildren instead of the number of grandchildren. Subsample of respondents with children.

Test for Altruistic Motivation (OLS Model)				
	(1)	(2)	(3)	(4)
	AGE \geq 40	AGE \geq 60	AGE \geq 40	AGE \geq 60
GRAND CHILDREN DUMMY	0.09*	0.23***	0.10*	0.24***
	(1.88)	(3.25)	(1.92)	(3.22)
GOV PARTY DUMMY	0.33***	0.37***		
	(9.52)	(7.58)		
Test				
GRAND CHILDREN DUMMY –	F-stat = 13.6	F-stat = 2.44		
GOV PARTY DUMMY = 0	Prob = 0.0006	Prob = 0.13		
Observations	4,125	1,102	4,125	1,102
R-square	0.07	0.11	0.06	0.09

Note: Numbers in parentheses are t-values calculated using robust standard errors clustered by residential prefecture. *, and *** indicate significance at the 10% and 1% levels, respectively. The set of independent variables is equivalent to that in Table 2. However, these results have not been reported.

Table 5: Results of grandchild dummies using a sub-sample of respondents who were over 60 years old. Furthermore, they had children who were over 20 or 30 years old. Test for altruistic motivation. (Ordered Logit model).

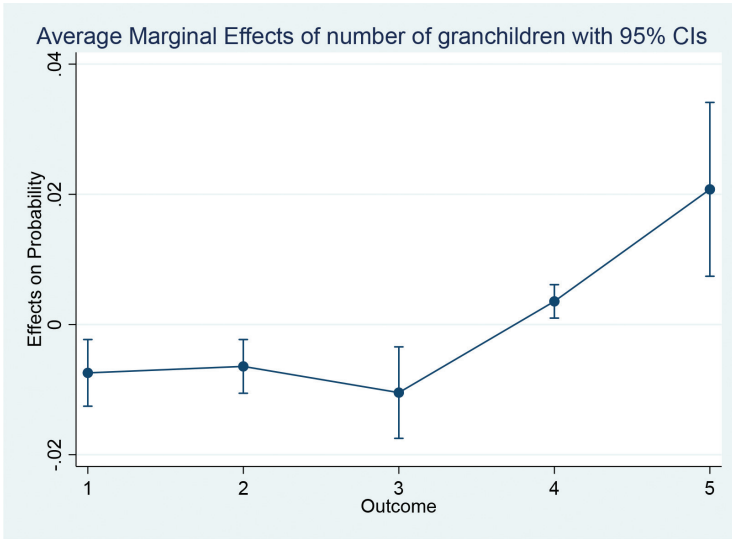
	(1) Children over 20 ages	(2) Children over 30 ages	(3) Children over 20 ages	(4) Children over 30 ages	(5) Children over 20 ages AGE >= 60 GRND CHILDREN = 1 or 0	(6) Children over 30 ages AGE >= 60 GRND CHILDREN = 1 or 0
GRAND CHIL- DREN	0.12*** (2.93)	0.11** (2.29)				
GRAND CHIL- DREN DUMMY			0.38*** (2.87)	0.41*** (2.72)	0.45*** (2.89)	0.45** (2.18)
GOV PARTY DUMMY	0.54*** (5.67)	0.44*** (2.52)	0.55*** (5.75)	0.43** (2.44)	0.53*** (4.03)	0.53** (2.09)
Test GRAND CHIL- DREN DUMMY - GOV PARTY DUMMY = 0			F-stat = 1.01 Prob = 0.31	F-stat = 0.01 Prob = 0.94	F-stat = 0.19 Prob = 0.66	F-stat = 0.04 Prob = 0.85
Observations	623	1,051	623	1654	322	
Pseudo <i>R</i> -square	0.04	0.07	0.05	0.07	0.06	0.13

Note: Numbers in parentheses are t-values calculated using robust standard errors clustered by residential prefecture. **, and *** indicate significance at the 5% and 1% levels, respectively. The set of independent variables is equivalent to that in Table 2. However, these results have not been reported.

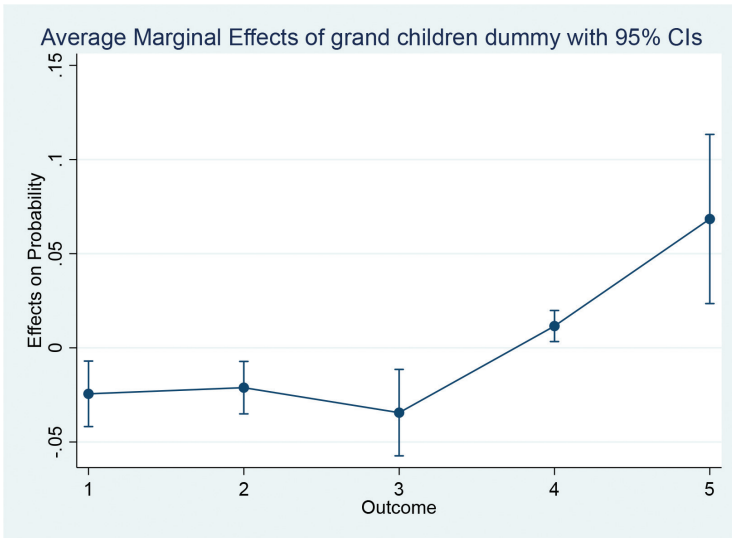
Closer estimations were conducted, and the results are listed in Table 5. The probability that elderly people have a grandchild in part depends on the age of their child because a young child is less likely to have his/her own child. Hence, the sub-sample of respondents over 60 years of age was further limited to those with children over 20 or 30 years old by using information on the youngest child's age. Furthermore, elderly people are more likely to have grandchildren if there are a large number of children. Elderly people with only one child have the same possibility of having one child. It is critical to examine the effects of having a child by comparing elderly people under the same conditions. Hence, we limited the sample to respondents with only one child. In other words, respondents with multiple children in the subsample were removed. CON TAX is a discrete and ordered variable. In this case, the ordered logit model was more appropriate than the OLS model. Using the same specification and subsamples, ordered logit estimations were conducted for the robustness check. The results in Table 5 exhibit a significantly positive sign for all variables in all columns. Interestingly, the absolute values of the coefficient of GRAND CHILDREN DUMMY are 0.38 to 0.45 in Columns (3)–(6), which are far larger than those in Table 4. Differences in the absolute values of the coefficients between the GRAND CHILDREN DUMMY and GRAND PARTY DUMMY are remarkably smaller than those in Table 4. Furthermore, there was no statistical difference between the two groups. Hence, the effect of having a grandchild on those who are over 60 years old is almost similar to their political preference for the governing party.

In ordered logit estimation, the results cannot be interpreted meaningfully. To scrutinize the results in Table 5, we checked the marginal effect on the probability that respondents chose each category in the question. Figures 5 A, B, and C are illustrated based on the results of Columns (1), (3), and (5), respectively. Figure 5 plots the effect of having a grandchild on probability in each category. Figures 5 A, B, C show similar results. As shown in Figure 5 C, having a child leads people to be less likely to choose one, two, or three categories, which are negative or neutral views about consumption tax. The effect on probability was not statistically different between the categories. Meanwhile, it increases the probability that they chose 4 or 5, which are positive views, by about 1% and 8%. Between 4 and 5, there was statistically a 5% difference.

Table 6 shows OLS results of alternative specifications where PAY CON TAX is used as dependent variable. The results of PANEL A and PANEL B correspond to those of Tables 2 and 4, respectively. Using sub-sample of those who are over the age of 60, both GRAND CHILDREN and GRAND CHILDREN DUMMY show the positive sign while being statistically significant in all columns. However, results of these variables do not show any statistical significance when we used the sub-sample of those over the age of 40. Younger grandparents do not accept increase of consumption tax, which influenced the results. This is consistent with results of Tables 2 and



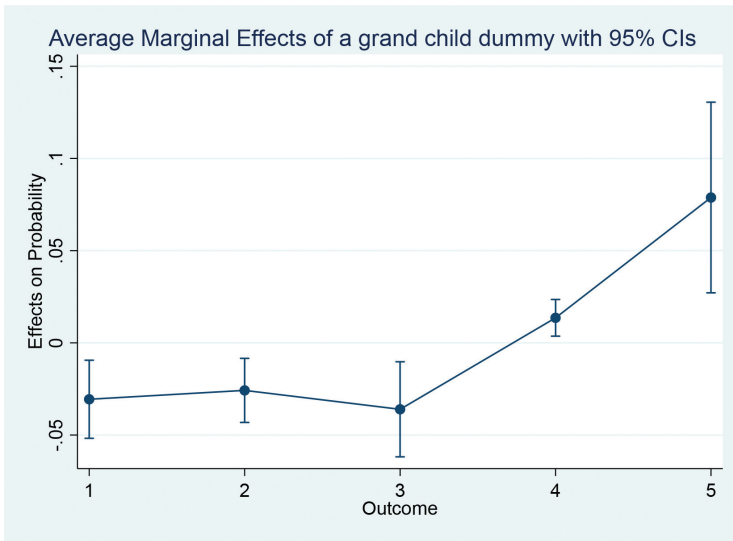
A. Figure based on the results of Column (1) of Table 5



B. Figure based on the results of Column (3) of Table 5

Figure 5: Marginal effect of grandchildren on the view of consumption tax.

Note: This figure is illustrated based on the results in Table 5. The sample was limited to respondents who were over 60 years old and had children over 20 or 30 years old.



C. Figure based on the results of Column (5) of Table 5

Figure 5: Continued.

4 showing that degree of coefficient of key variables using old grandparents' sample are larger than those including young grandparents, all results of key variables being statistically significant. As for political preference, a significant positive sign of GOV PARTY DUMMY is observed for sub-sample including young grandparents aged 40–60. Hence, the younger generation's acceptance of higher tax rate reflects political preference, rather than the presence of grandchildren.

Overall, this finding is consistent with the results presented in Table 5. However, as shown in Appendix Table A1, the dependent variables ranged from 1 to 50.⁸ The coefficient value can be interpreted as follows: For columns (1) and (3), accepted consumption tax rate increases by 0.34% if number of their grandchildren increased by one. Concerning the results of the grandchildren dummy, columns (2) and (4) imply that accepted consumption tax rate for those who had grandchildren is larger by approximately 1.1 % than those who had not grandchild.

Overall, having a grandchild influences the probability of choosing a view about consumption tax. The *hypotheses* are strongly supported by the results in Tables 2, 3, 4, 5 and 6.

⁸ Respondents are allowed to choose from 0 to 50 % and so values are censored at 0 and 50. To mitigate the bias of censored sample, Tobit model is preferred. However, only 2 observations were censored at 50. So, results of Tobit are almost equivalent to those of OLS.

Table 6: Results of the specification where PAY CON TAX is a dependent variable using a sample of respondents who had children and were over 60 years old. Test for altruistic motivation. (OLS).

PANEL A.

	(1) AGE>= 40	(2) AGE>= 60	(3) AGE>= 40	(4) AGE>= 60
GRAND CHIL- DREN	0.13	0.34*	0.14	0.34*
	(0.96)	(1.68)	(1.05)	(1.71)
GOV PARTY DUMMY	1.18***	1.22		
	(3.22)	(1.40)		
Observations	1,960	674	1,960	674
R-square	0.03	0.04	0.04	0.04

PANEL B.

	(1) AGE>= 40	(2) AGE>= 60	(3) AGE>= 40	(4) AGE>= 60
GRAND CHIL- DREN DUMMY	0.03	1.09**	0.08	1.13**
	(0.12)	(2.55)	(0.26)	(2.60)
GOV PARTY DUMMY	1.19***	1.20		
	(3.28)	(1.38)		
Test				
GRAND CHIL- DREN DUMMY	F-stat = 5.89	F-stat = 0.01		
—				
GOV PARTY DUMMY = 0	Prob = 0.02	Prob = 0.90		
Observations	1,960	674	1,960	674
R-square	0.03	0.03	0.04	0.04

Note: The numbers in parentheses are t-values calculated using robust standard errors clustered by residential prefecture. *, ** and *** indicate significance at the 10%, 5%, and 1% levels, respectively. The set of independent variables is equivalent to those in Tables 2 and 4. However, these results have not been reported yet.

5 Discussion

These findings have several policy implications. In a society with fewer children, the rate of older persons having grandchildren decreases, whereas the

population of older persons increases. Therefore, older people are less likely to support the policy to realize a sustainable society because they are less likely to have altruistic motivations toward their grandchildren. The existence of grandchildren leads grandparents to imagine the future where their descendants live and, thus, behave altruistically. In this regard, increasing the birth rate is critical for sustaining society and creating a bright future. However, to put it more precisely, behind the findings of this study, there may be various motivations, such as selfish, altruistic, or dynastic motivations (Horioka, 2002).

Previous studies on saving behavior are closely related to this study. Horioka (2019) analyzes the rationality of Japanese people by considering their savings and bequest behavior. He found that the savings rate in Japan was volatile from around 1960 until the mid-1980s. Horioka (2000) provided evidence that the ratio of the aged to the working-age population has a negative and significant impact on the household saving rate. This is consistent with the life-cycle model. Therefore, the Japanese people were rational, and their saving behavior was less likely to be based on cultural peculiarities, such as a greater prevalence of intergenerational transfers. The domestic savings rates in Asian countries are significantly determined by the population's age structure (Horioka and Terada-Hagiwara, 2012). Not only in Japan, but also in other developing countries in Asia, population aging has a negative impact on the domestic saving rate. If an aged society decreases savings and thus increases consumption, an increase in consumption tax leads to greater intergenerational transfers in Japan. Therefore, it is valuable to scrutinize how the elderly's consumption behavior response to increases in consumption tax rates.

Bequest behavior is a form of intergenerational transfer of wealth. People's attitudes toward bequests can be classified into four types (Horioka, 2019).

- (1) Parents do not leave bequests for their children because they want to enjoy their own lives.
- (2) Parents do not endeavor to leave a bequest for their children, but leave whatever is left over.
- (3) Parents leave bequests for their children to increase their motivation to provide care and attention during old age. This is "strategic bequest behavior" (Bernheim *et al.*, 1985).
- (4) Parents leave a bequest for their children even if they get nothing in return because they love and care about their children (Becker, 1991).

Types (1)–(3) presuppose selfish individuals, whereas Type (4) assumes that individuals are altruistic. In types (1) and (2), people do not accept an increase in consumption tax rates. However, the findings of this study are inconsistent with types (1) and (2). If strategic behavior also holds for the view of an increase in consumption tax, younger grandparents are more likely to accept

an increase in consumption tax than older grandparents, because they are more able to enjoy the return from their grandchild in the future. However, this study finds that the presence of grandchildren has a greater positive effect on views about an increase in consumption tax, using samples limited to those who were over 60 years old than those who were 40 years old. Further, Table 6 shows a significant positive sign for the variables of grandchildren only when the subsample is limited to the older sample of those who are over 60 years old when accepted consumption tax is the dependent variable. Therefore, these findings do not support the strategic behavior of type (3). Accordingly, type (4) is supported by our findings.

According to previous studies (e.g., Horioka 2002; 2014; 2019; Horioka *et al.*, 2000), the bequest behavior of the Japanese suggests that they are less altruistic toward their children and less reliant on them than other people. For the Japanese, dynastic motivation was not strong enough to increase bequests. The argument for bequest behavior cannot be applied to a subjective view of the consumption tax. We should consider the difference between the view of consumption tax and that of bequest behavior. Parents directly transfer their bequests to their children or grandchildren. That is, bequest behavior is limited to a family. However, generational redistribution occurs from the old generation to the next generation. Therefore, the presence of grandchildren leads grandparents to imagine the future world, thereby increasing their motivation to sustain human society.

Unobserved factors (e.g., individual cultural views) can simultaneously influence the presence of consumption tax views and children, resulting in omitted variable biases. The following conjecture raises concerns about reverse causality: Families who support consumption tax and prioritize thriftiness at both the individual and societal levels might exhibit a tendency toward more prudent behavior and longer time-horizon planning. This may lead to a higher preference for having more children among members of such families. To mitigate these biases, estimations using fixed effects should be conducted. Over time, some respondents may have become grandparents. The unobservable time-invariant characteristics of the respondents can be controlled for if changes in the view of consumption tax before and after becoming grandparents are examined. Therefore, long-term panel data should be constructed using repeated surveys to identify identical individuals.

Regarding the control variables, it would be advantageous to incorporate factors such as “frequency of visits” and “proximity of residence” because these variables have the potential to influence the attitude of grandparents towards their grandchildren. For instance, interaction and exchange with grandchildren leads grandparents to increase their attachment to their grandchildren. However, we did not ask about these variables in the survey, and these remaining issues need to be addressed in future studies.

6 Conclusions

In an aging society with increasing public debt and fiscal burden, an increase in consumption tax rates is required to reduce the intergenerational gap and maintain economies in Japan. However, older people in the present generation would not support an increase in consumption tax if they were rational and selfish, hampering long-term sustainable economies. How can we address this problem?

Consumption tax is considered a measure for achieving intergenerational redistribution from present to future generations. It seems plausible that people of the current generation are motivated to support the consumption tax-based system depending on the probability of the existence of their descendants. Contrary to parent-child relations, grandparent-grandchild relations are unlikely to be related to strategic decision-making based on, for instance, parents' expectations about their child's caregiving in the future. Therefore, the influence of having grandchildren on grandparents' views about consumption taxes is based on altruism rather than selfish motivation. The influence of grandchildren on grandparents' preferences for consumption taxes was examined using independently collected data.

The major findings are as follows: Overall, having a grandchild is positively associated with grandparents' support for increased consumption taxes. This finding implies that grandparents exhibit intergenerational altruism. The effects of experimental or quasi-experimental analyses must be scrutinized. The proxy variable used to capture the preference for consumption tax is somewhat ambiguous. It is valuable to use alternative variables based on the question "Do you support increase in consumption tax?" Furthermore, this study does not specify the timing of the increase in consumption tax. In the experimental way, we should investigate how and the extent to which the results changed when we put different timings into the questionnaire. Furthermore, an extended analysis should be conducted that covers cultural and social norms from the viewpoint of a comparative analysis. In particular, people with children may have selfish, altruistic, or dynastic motivations to care for their descendants (Horioka, 2002). It is valuable to investigate which motivation is more vital and how motivation depends on cultures of the community. These issues need to be addressed in future studies.

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Appendix

Table 1A: Description and basic statistics of variables.

	Description	Mean	Standard deviation	Max	Min
VIEW TAX	CON To what degree do you agree with the statement that an increase in consumption tax cannot be avoidable? 1 (strongly disagree) – 5 (strongly agree)	3.57	1.15	5	1
VIEW DISAS	To what degree do you agree that the government should play a critical role in preparing for natural disaster? 1 (strongly disagree) – 5 (strongly agree)	3.98	0.89	5	1
VIEW REDIST	To what degree do you agree that the government should reduce income inequality between people? 1 (strongly disagree) – 5 (strongly agree)	3.73	9.39	5	1

Note: The sample is limited to those who have children and are over 40 years old. There were 4,125 observations for all variables.

Table 1A: Continued.

	Description	Mean	Standard deviation	Max	Min
PAY CON TAX	Assume that, if the status quo remains unchanged, the consumption tax rate will increase to 40% in 30 years' time. Suppose that if current consumption tax payments increase by 1%, the consumption tax rate for future generations will decrease by 1%. What rate of tax would you accept? Choose percentage from 0% to 50%.	9.25	7.40	50	1
GRAND CHIL-DREN	Number of grand children	0.48	1.10	9	0
GRAND CHIL-DREN DUMMY	It takes 1 if respondent has a grand child, otherwise 0.	0.21	0.40	1	0
GOV PARTY DUMMY	It takes 1 if respondent voted for the government party in the House of Councilors election in Japan, otherwise 0.	0.25	0.44	1	0
AGE	Ages	54.3	7.32	41	66
AGE SQR	Square of ages	2998	788	1681	4356
INCOM	Household income (million yen)	6.97	4.29	0.5	23
EDU	Schooling years	14.6	1.86	6	18
MALE	It takes 1 if respondent is male, otherwise 0.	0.50	0.50	1	0

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