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Intergenerational Conflict Over Consumption Tax Hike: Evidence from Japan

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【Abstract】This paper analyzes the determinants of voter preferences on consumption tax hike using an opinion survey of Japanese citizens. We find robust evidence that the older voter is more likely to support consumption tax hike. We also find that the most of inter-generational difference toward consumption tax policy is explained by the gap between citizens under sixty and over sixty. We investigate how individual economic environment changes in 60 years old as a result of mandatory retirement system and pension system and find that the hours of work do not change but their degree of dependence on the pension in household income increases at the age of 60. Utilizing these facts, we conjecture that individuals may realize the importance of consumption tax in order to save the value of their assets.

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1 Introduction

Since the outbreak of financial crisis, many developed countries are suffering from enormous government debt. Figure 1 illustrates the recent amounts of general government liabilities per GDP in selected OECD countries. It shows that many countries have experienced government liabilities per GDP after financial crisis. Although fiscal consolidation is one of urgent macroeconomic issues for most developed countries, the processes of fiscal consolidation do not seem to continue well in many countries. Why is fiscal consolidation so difficult?

[Figure 1 here]

The political process is often considered as a cause of persistent government deficit. In the classical work, Buchanan and Wagner (1977) argue that fiscal consolidation policies, such as tax increases or cuts in government spending, tend to be postponed in democratic societies because they burden the current electorate although they are beneficial for future generations. Since future generations have no political influence on current policy decisions, fiscal policies in democratic countries often cause enormous accumulation of government debt.[1] Figure 2 shows that the median age of voters consistently increases in advanced countries in periods when government debt expansion is observed. Taking the changes in the age distribution of the electorate in recent years seriously, the recent government debt expansion might be explained by intergenerational conflict in policy preference. [2]

[Figure 2 here]

This paper analyzes the determinants of voter preferences for consumption tax hike, which is considered as one of the most important key instruments for fiscal consolidation plans in Japan, using an opinion survey conducted among Japanese citizens. To assess the role of the intergenerational conflict on delay of fiscal consolidation policy, we examine how age of voters influences preferences for consumption tax hike. As Figure 1 and 2 show, Japan experiences a rapid increase in the median age of voters as well as that in government debt per GDP. Moreover, several attempts to reduce fiscal deficits have been postponed mainly due to political unpopularity among Japanese citizens. There are some arguments that regard an increase in the political influence of older generations as a serious obstacle in the political situations. [3] From these facts, we believe that Japan is an ideal country for our research purpose.

[1] There is also substantial literature that analyzes the debt management policies of the government from a positive perspective (a excellent survey is provided by Alesina and Passalacqua 2016). Intergenerational conflict over fiscal policies is often noted in the literature (e.g. Cukierman and Meltzer 1989, Tabellini 1991, Song et al. 2012, Müller et al. 2016).

[2] Since aging populations typically place a financial burden on the government through an increase in medical spending or pension benefit payments, we cannot simply regard the observed co-movement of an aging population and the accumulation of government debt is caused by a surge in political power of elderly citizens. However, the standard political economic theory predicts that politicians in democratic countries would heed the interests of older voters as the median age of the voters increases.

[3] The political stance that gives substantial consideration to the opinions of the elderly is called "silver democracy" and is often noted as the reason why the government fails to achieve reduction in its large budget deficit. (e.g. Ihori 2016 and Kato and Kobayashi 2017). Ihori (2016) argues that "As the difference

Contrary to the prevailing view that older voters oppose an increase in consumption tax to escape from the current fiscal burden, we first provide robust evidence that the older voter is *more* likely to support consumption tax hike. This result does not change even if we control differences in education, income, and family structure. Interestingly, we also find that the relationship between support for consumption tax hike and age are non-linear and the most of inter-generational difference of policy preference can be explained by the gap between citizens under sixty and over sixty. This indicates that there might have some mechanisms that make senior people to support consumption tax hike after 60s.

In order to uncover the reason why the old citizens tend to support consumption tax hike, we closely investigate this gap in the latter part of the paper. Knowing that many people face mandatory retirement and start to obtain the part of pension at the age of 60, we examine whether there is a discontinuous change in the political opinion about consumption tax hike at the age of 60 by adopting a regression discontinuity design. We find that the supporters of the consumption tax hike discontinuously jump up at the age of 60. The share of supporters for consumption tax hike among citizens who just turned 60 is about 4-7% higher than that among slightly younger citizens. Given that the total share of support for consumption tax is less than 40%, the estimated magnitude is large and not negligible. This indicates that changes in economic environments that individuals encounter at the age of 60 can be the main candidate mechanism that make senior people to change their political attitude.

Investigating institutional regularities in Japan, we identify main changes in economic environments which many Japanese might encounter at the age of 60s as a result of Japanese mandatory retirement system and pension system: changes in employment status and changes in the amount and the component of household income. We investigate the economic significance of these changes by adopting a regression discontinuity design.

We show that while there is a discontinuous reduction of the share of regular worker at the age of 60, because many firms reemploy or extend the period of employment, the hours of work and the share of employment do not show any large changes in 60 years old. As a result, we also find that the time allocation to leisure or home production does not show any drastic changes in 60 years old. Moreover, we find that a large drop in household income at the age of 60 probably due to changes in employment status. The share of pensioner household also jumps up at the age of 60 because many Japanese are eligible to receive a part of their pension at the age of 60. This indicates not only that people reduce total household income, but also that their degree of dependence on the pension increase at the age of 60.

Although we cannot derive definite conclusion about mechanism from these findings, we propose a promising hypothesis on the reason why senior people changes their political attitude to support consumption tax hike in 60 years old. The elderly citizens would turn to support consumption tax hike after they reach age of 60 because they come to realize the

in preference by age increases, the current beneficiary tends to hope for an increase in benefit payments but is reluctant to bear their costs, and the reforms tend to be postponed. As a result, the fiscal burden is imposed on the future beneficiary. If the policy is determined by "silver democracy," it causes the accumulation of fiscal deficits and an increase in social security benefits. (pp. 246)".

importance of fiscal sustainability to preserve the value of property that they have gained. The hypothesis that motives of the old voters to preserve the value of their assets cause support of fiscal consolidation policy is consistent with the prediction of previous theoretical research and we believe that our evidence can be considered as a valuable first step to refine a possible candidate mechanism to understand why senior people support fiscal consolidation policy.

Related Literature The intergenerational conflict in the politics of government debt is pointed out in the previous studies that theoretically analyze the political economy of government debt. They show that the old voters generally are more likely to prefer the accumulation of the government debt to tax increase than the young voters. For instance, by building a overlapping generation model with taxes and private intergenerational transfers from parent to child, Cukierman and Meltzer (1989) show that low tax policy financed by accumulation of debt is supported by the majority as long as there are citizens who want to leave negative bequests to their offsprings but negative bequests are forbidden. Song et al (2012) develop a dynamic model where voters choose level of public good provison, taxes, and debt in each period. Under the assumption that there is no risk of default, their model predicts that old agents support high spending, high taxes, and large debt but the young wants to avoide debt accumulation since it reduces public good provision in the near future. On the other hand, Tabellini (1991) considers a situation where the government cannot commit to repayment of the debt. Since the debt repudiation cause redistribution from creditors to debtors, issuing debt itself creates a coaliton of voters who support of repaying it. In particular, debt reputation reduces welfare of the old, hence the old voters support debt repayment.

This study is also related to several studies that analyze the determinants of fiscal policy preference using survey data. Many studies analyze the determinants of preference on redistributive policy (e.g., Corneo and Gruner 2002, Alesina and La Ferrara 2005, Alesina and Fuchs-Schündeln 2007, Alesina and Giliano 2011, Giuliano and Spilimbergo 2013).[4] However, only a few studies analyze preferences for fiscal consolidation policies (e.g., Blinder and Krueger 2004, Heinemann and Hennighausen 2012, Stix 2013, Hayo and Neumeier 2017). Among them, some research reports the tendency that the old is more likely to support fiscal consolidation, which suggests that Japan would not be the only country that old support fiscal consolidation more (Blinder and Krueger 2004, Heinemann and Hennighausen 2012, Hayo and Neumeier 2017, Walter et al. 2018). [5]

[4]While several studies analyze fiscal policy preferences (e.g., Ohtake and Tomioka 2004, Hayo and Ono 2010, Yamamura 2012, 2014) using survey data from Japanese citizens, there is no empirical research that analyzes Japanese citizens' preferences for fiscal consolidation.

[5]Blinder and Krueger (2004) investigate the process of public opinion formation using a telephone survey of a sample of the US population. Although they do not address fiscal consolidation policies directly, the authors show that older respondents are more likely to consider the fiscal deficit a serious problem while they are less likely to consider raising tax an appropriate way to reduce the deficit. Heinemann and Hennighausen (2012) and Hayo and Neumeier (2017) also find that older citizens are more likely to demand public debt reduction using German Survey data. Walter et al. (2018) also find that older voters tend to agree with austerity programs rather than young people using the original survey data in Greece.

Although these authors find evidence that the old is more likely to support fiscal consolidation, intergeneratinal conflict is not main concern of these research. Hence they neither analyze the reason why the old supports consolidation policy nor provide persuasive explanations. [6] This paper contributes the literature by going further ahead. We also find that the supporters of the consumption tax hike discontinuously jump up at the age of 60, the timing that many people face mandatory retirement and start to obtain pension benefit. Moreover, we provide evidence which allows us to infer a plausible candidate mechanism behind the age effect: the preserving the value of asset hypothesis. To the best of our knowledge, there is no previous study that discuss the mechanism behind the age effect. [7]

Given that the arguments that the aging electorate causes political bias toward the interests of the older electorate are commonly observed in many advanced countries, our finding would be informative for thinking about politics of fiscal consolidation policies generally. Like Japan, loose financial administration is also attributed to political rule by the older generation in countries where the accumulation of sovereign debt is outstanding, such as Italy and Greece. For instance, in an article in the Financial Times, the common view of the young Italian toward "gerontocracy", politics ruled by the old, is described as follows

> "(young people) feel stifled by Silvio Berlusconi's older generation of political leaders who drove Italian public debt to crippling levels and kept the top jobs to themselves for decades."[8]

On the contrary to such the view, our findings suggest that the political influence of old citizens would not necessarily be obstacle for fiscal consolidation even if they only care about their self interests.

The remainder of the paper is organized as follows. In Section 2, we explain the back-

[6] The intergenerational conflict over policy preference is studied more substantially in research that analyzes demand for government spending. Much research examines the differences in opinion between generations over public education spending. The empirical research using survey data typically confirms that the older voter is less likely to support spending on public education, which is consistent with the standard economic theory since government spending on public education is considered redistribution from older to younger generations (e.g., Bruner and Baldson 2004, Cattaneo and Wolter 2009, Rattsøand Sørensen 2010, Sørensen 2013, Bruner and Johnson 2016).

[7] Our research is also related with studies analyze how pension eligibility affects household decision using regression discontinuity approach. Edmonds et al. (2005) investigate how an increase in household income changes their living arrangement by exploiting the institutional feature that pension eligibility discontinuously changes at age 60 in South Africa. They estimate the impact of turning age of 60 on household size and interpret it as causal effect of pension eligibility. By adopting a similar approach, Edmonds (2006) estimate the impact of presence of a pension eligible person in household on schooling and labor supply of children in South Africa. Although we also estimate the impact of turning the pension eligible age, we should be careful to interpret the estimated change as causal effect of receipt of pension since the pension eligibility could not be the only difference between over and below age of 60 among Japanese citizens. Hence we take a more deliberate approach. After estimating impact of turning age of 60 on support for consumption tax hike simply, we provide additional evidence and discuss about the reason why citizens changes their attitude toward tax policy at age of 60.

[8] "Italy's Generation X hopes to loosen grip of gerontocracy" *Financial Times*, December 2, 2016. Accessed at `https://www.ft.com/content/e1075190-b7d6-11e6-961e-a1acd97f622d?mhq5j=e5` (March 5, 2018)

ground of the recent fiscal consolidation policies in Japan. In Section 3, we explain our data and the definitions of the variables in our estimate. Section 4 provides the basic empirical results. In Section 5, we provide the results from our RDD and show that there is a discrete jump in support consumption tax hike at the age of 60. In Section 6, we discuss how Japanese mandatory retirement system and pension system can change economic environment of senior people at the age of 60 and provide evidence from which we can potentially infer a candidate mechanism that that make senior people to change their political attitude to support consumption tax hike. In section 7, we provide additional evidence exploiting the difference by subgroup. In section 8, we discuss possible candidate mechanism that is inferred from our evidence and propose the preserving the value of asset hypothesis. In final section we conclude.

2 Background

In this section, we provide the background history of fiscal policy in Japan. It demonstrates that consumption tax hike is always considered as one of the most important instruments for fiscal consolidation policy in Japan.

It is well-known that the amount of government debt of has been sharply increased during the recent decades in Japan. The gross liability of the general government exceeds 220% of GDP in 2016, which is highest number among advanced countries.

In response to accumulation of the public debt and the severe fiscal situation, the government has attempted to implement fiscal consolidation since the mid 1990s. In 2001, the government developed the basic plan for fiscal policy (Basic Policies for Economic and Fiscal Policy Management and Structural Reform), also called "Big-Boned Policy" (*honebuto no ho-shin*), and established the two targets of fiscal policy to restore the sustainability: (i) The government restricts the issue of new government bonds to a maximum of 30 trillion yen. (ii) The government will transform the primary balance of the budget into a surplus.[9]

Although the fiscal balance gradually improved in the mid-2000s, the primary balance again deteriorated due to the financial crisis in 2008. After the change in the government on September 9 in 2009, the administration of the Democratic Party of Japan formulated the fiscal plan (Basic Frame for Fiscal Consolidation: Medium-term Fiscal Plan) in 2010 and emphasized the aim of improving the primary balance and persistently reducing the amount of government debt to GDP ratio. In the plan, the government aimed to reduce the primary deficit of national and local governments to GDP ratio by half from 2010 to 2015 and bring the primary balance of the budget into surplus by 2020. [10]

The comprehensive reform of tax systems have played a key role in the fiscal consolidation plans of the government since 2011. The comprehensive reform of tax systems have

[9] "Basic policies for economic and fiscal policy management and structural reform 2001" approved by the cabinet. Accessed at `https://www.kantei.go.jp/jp/kakugikettei/2001/honebuto/0626keizaizaisei-ho.html` (Febrary 21, 2019)

[10] "The strategy of fiscal policy management" approved by the cabinet. Accessed at `https://www.kantei.go.jp/jp/kakugikettei/2010/100622_zaiseiunei-kakugikettei.pdf`(Febrary 21, 2019)

played a key role in the fiscal consolidation plans of the government since 2011. For instance, the IMF report also indicates that it was necessarily to raise the government revenue given that an aging population made difficult to reduce government expenditure, and raising consumption tax rate should be the key measure for that purpose (Keen et al. 2011). The numerical studies also indicate that the government must adjust its fiscal policy to maintain the fiscal sustainability (e.g., Imrohoroglu and Sudo, 2011; Arai and Ueda, 2013; Hansen and Imrohoroglu, 2016; Imrohoroglu et al; 2016).

The reform proposal in 2011 planed that the consumption tax rate would be raised gradually to 10% by the middle of 2010.[11] On the other hand, the government limited the usage of the revenue from consumption tax to the expenditure related with social security, health care, and countermeasure against decline in birth rate to win public support for tax increase. In 2012, the government revised the Consumption Tax Act and stipulated the use of the consumption tax revenue.

The consideration of economic conditions, however, have allowed discretion and made the implementation of fiscal consolidation politically difficult. In 2014, the consumption tax rate was raised from 5% to 8% as planned. However, in 2014, a further increase in the consumption tax rate from 8% to 10%, which was scheduled in October 2015, was postponed to April 2017 by the political decision of the prime minister Shinzo Abe. Moreover, it was postponed again to October 2019 in June 2016 because of economic stagnation and sluggish domestic demand. Political consideration underlies delays in fiscal consolidation. The consumption tax is unpopular with voters and, hence, it is necessary to avoid tax increases to win the election. The opposition to tax increases remains strong at present, and there are concerns of a further delay in fiscal reform.

In sum, consumption tax hike was considered as one of the most important instruments for fiscal consolidation policy in Japan. While the government has tried to increase consumption tax to make public finance sustainable, the implementation of consolidation policy was always postponed because it is unpopular policy among Japanese people.

3 Data

In this section, we describe our data and the measurement of preferences for the consumption tax rate and variables to investigate intergenerational differences in attitude toward consumption tax hike.

We use survey data from the Japanese General Social Survey (JGSS) and opinion poll data from the University of Tokyo/Asahi Shimbum Survey (UTAS). The JGSS is a Japanese version of the General Social Survey and nationallly representative data including demographic characteristics such as age, sex, family structure, education, and income. [12] The

[11]The consumption tax was introduced in Japan in 1988. Then, the tax rate was 3%. In 1998, the consumption tax rate was raised from 3% to 5%.

[12]The Japanese General Social Surveys (JGSS) are designed and carried out by the JGSS Research Center at Osaka University of Commerce (Joint Usage / Research Center for Japanese General Social Surveys accredited by Minister of Education, Culture, Sports, Science and Technology), in collaboration with the

JGSS also collects opinions, preferences, and data on the sense of values of a wide range of respondents. While the survey has been conducted periodically since 2001, we use the data from 2010 (JGSS2010) and 2012 (JGSS2012) because these surveys investigate opinions on the desirable consumption tax rate because public discussions on the consumption tax increase attracts much attention at the time when the two surveys were conducted. Our data contain citizens' opinions on the desirable level of consumption tax at the time before the government eventually decided on the consumption tax increase.

While the JGSS contains cross-sectional data, and respondents are not the same in the 2010 and 2012 surveys, these two surveys use the same method and contain many overlapping question items. We pool the data from the two surveys and analyze preferences for fiscal consolidation using the pooled data.

As secondary data source, we use data from the University of Tokyo/Asahi Shimbum Survey (UTAS), which has jointly conducted public opinion polls since the 46th Lower House general election in 2012.[13] The survey was conducted nationwide and questionnaires were sent to 3,000 voters; responses were received from 1,900 voters, and data on the attitudes toward various policy dimensions including diplomatic issues, political reform, trade policies, and fiscal policies were obtained. We use the UTAS to back up our findings obtained in the JGSS.

Preferences for the Consumption Tax Rate Let us first discuss how to measure the preferences for consumption tax hike using the JGSS survey data. We measure preferences for consumption tax hike using the following question on the consumption tax rate: "At what level do you think the consumption tax rate should be?" This question was posed to 2,507 respondents in the JGSS 2010, approximately half of the respondents in the JGSS 2010, and 4,667 in the JGSS 2012. The respondents were asked to choose their answers from six alternatives, which are composed of two categories with the tax rate less than 5 %, one with a tax rate of exactly 5%, and three with tax rates higher than 5%. [14] We focus on whether the respondents choose a tax rate higher than 5%, which is the actual consumption tax rate when each survey is conducted and construct a binary variable that takes a value of 1 if the respondents choose alternatives that indicate tax rates higher than 5% and 0 otherwise. In the following analysis, we regard those who choose tax rates higher than 5% as supporters of the consumption tax increase and empirically analyze the determinants.

Institute of Social Science at the University of Tokyo. The project is financially assisted by the Japanese Ministry of Education, Culture, Sports, Science and Technology and Osaka University of Commerce. The JGSS adopts both interview and detention methods using a questionnaire to collect survey data. The questions on subjects that would relate to social justice or morals are posed using the detention method. The survey population is composed of men and women from 20 years old to 89 years old. The survey subjects are selected using a stratified two-stage sampling method.

[13] The UTAS is conducted by Masaki Taniguchi at the University of Tokyo and the Asahi Shimbun.

[14] Although the questions were the same for the JGSS 2010 and 2012, there was a slight difference in their alternatives. While the six alternatives were (1) 0%, (2) 1 to 4%, (3) 5%, (4) 6 to 7%, (5) 8 to 9%, and (6) more than 10% in the JGSS 2010, The alternatives in 2012 were (1) 0%, (2) 1 to 4%, (3) 5%, (4) 6 to 9%, (5) 10 to 14%, and (6) more than 15%. To control any possible influence caused by the differences in the answer categories between the JGSS 2010 and 2012, we include a survey year dummy in the following analysis.

In the UTAS, the respondents are also asked to provide their opinion of the consumption tax increase using the following statement: "In the long run, it is inevitable that the consumption tax rate will be higher than 10%." The respondents are required to choose their answers from five alternatives: agree, somewhat agree, cannot say (between agree and disagree), somewhat disagree, and disagree. We use each respondent's response to these questions as their preference for the consumption tax increase.

Control Variables Following the literature, we control demographic variables such as sex, marital status, number of children, education, employment status, and annual household income in our analysis. According to their terminal education record we classify respondents into the following four categories elementary and junior high school, high school, some college, and university. Employment status is classified into four categories in the JGSS data: regular employment (*seiki-koyo*), part-time employment (*hiseiki-koyo*), self-employment, and not working. In the UTAS data, we created two different categories, public servant and student, in addition to the four categories. These variables are designed to control for demographic characteristics among citizens that might influence their preference for fiscal consolidation. However, there is no information on household income, marital status, family structure in the UTAS data.[15]

We also use the following indicators as additional controls in some specifications. (1) living in a large city, (2) bad health, (3) house ownership,[16] (4) trust in politicians.[17] (5) experience of charity, and (6) will to volunteer. The last two variables are included only in JGSS 2012, which was conducted in the year following the Great East Japan Earthquake. We use these two variables as a proxy for respondent altruism.

Policy Preference JGSS contains several questions about policy preference of respondents. In order to confirm whether a similar tendency is observed in preference on other kinds of policies, we use the opinion toward government's responsibility to provide life security, health care for the elderly and redistribution policy and investigate how the age of respondents is related with their preferences on these policies.

Receipt of pension We identify the respondent who receives pension benefit by exploiting a question about the source of household income in JGSS. We define receipt of pension as an indicator for whether household of respondent reveives a pension benefit. Note that the respondents not eligible to pension can be included the category of pension recipients if their spouse or family in the household receive a pension.

Time Use As working time, we use the average hours worked per week which is asked to respondents in JGSS. We also use information about lifestyle of respondents. The re-

[15] We provide rigorous definition of variables in Appendix.

[16] Stadelmann and Eichenberger (2012, 2014) show that public debts capitalize into prices of property. House ownership might affect policy preference through the capitalization effect of public debt.

[17] Stix (2013) shows that the credibility of fiscal consolidation matters with regard to attitudes toward fiscal consolidation policies.

spondents are asked the frequency of shopping, cooking dinner, cleaning, and washing in a typical week. From these questionaries, we define indicators for whether respondents do these activities almost everyday. Although we have only limited information on leisure of respondents, we also use average daily hours of watching TV as proxy of leisure time.

Summary Statistics We drop observations if the data of demographic variables is missing. Table 1 and 2 provide the summary statistics for our sample. Table 1 shows that 39% of respondents of the JGSS support a consumption tax hike.

[Table 1, 2 here]

Table 3 shows how opinions of respondents of JGSS toward desirable consumption tax rates vary among different demographic groups. It shows that approximately half of all respondents prefer the status quo. There is a tendency that the elderly citizens are more likely prefer tax increase than younger citizens. While 46% of those aged in their 60s support a consumption tax increase, only 29% of those aged in their 20s support a consumption tax increase. Probably due to general perception about serious fiscal situation in Japan, few people hope for a reduction in consumption tax rate though a certain fraction of young respondents hopes for a reduction in consumption taxes. Panels B and C in Table 3 compare the gender differences. The results show that female respondents are less likely to support a consumption tax increase. The tendency that the fraction of tax hike supporters increases with age is observed both in the male and female sample, although it is less obvious in the latter. These findings contradict the standard argument that the older generation would postpone the implementation of consolidation policies and impose greater fiscal burden on future generations.

[Table 3 here]

4 Basic Facts

Firstly, we provide robust evidence that the older voter is more likely to support consumption tax increase.

4.1 Japanese General Social Survey

Following the literature on fiscal policy preferences, we control several demographic variables to isolate the impact of age on support for a consumption tax increase, which cannot be explained by the correlation between age and other demographic variables. We use the following regression model to clarify how tax policy preferences are related to age and other variables,

$$Y_{it} = \beta_0 + \beta_1 Age_{it} + \beta_2 X_{it} + \delta_t + \epsilon_{it} \tag{1}$$

where Y_{it} refers to whether the respondent i supports the consumption tax increase. The subscript t refers to the survey year. The control variables X_{it} include the demographics

of the respondent i such as sex, marital status, number of children, education, employment status, and annual household income. Moreover, we always include the survey year fixed effect δ_t, which captures any differences between the survey years. [18] Our main concern is whether the coefficient of age, β_1, is positive or negative.

Table 4 provides the estimation results from our basic specification. The important finding is that older individuals are significantly more likely to support a consumption tax increase even if we control the demographic variables. In all specifications, the impact of age is significantly positive, and the estimated coefficient is approximately 0.5 to 6%. Therefore, aging 10 years increases the probability that the respondent will support a consumption tax increase by approximately 5%, indicating that the intergenerational difference in preference for the consumption tax should not be negligible.[19]

[Table 4 here]

The positive relationship between age and support for a consumption tax increase is robust even when we include the additional control variables. Column (2) in Table 4 shows that estimation result when we control residential area, house ownership, and health status. Whether the respondent lives in a large city, house ownership and the subjective health status are not related to support for a consumption tax increase. More importantly, the estimated impact of age barely changes even if we control these variables. Column (3) shows that support for a tax increase is also not significantly related to trust in politicians, and the intergenerational difference in preferences for a consumption tax increase do not disappear even if we control trust in politicians. Column (4) reports the results when we include the proxies of altruism as additional control variables. There is a tendency for individuals who have experience with donating or volunteering to be more likely to approve of a consumption tax increase, which would be beneficial for future generations. However, the estimated effect of age barely changes even if we control proxies of altruism.

While the estimation in Table 4 assumes a linear relationship between age and preference for a tax increase, we also estimate a model that includes dummies of age group of respondents instead of their age to allow a non-monotone relationship between age and policy

[18] Even if we measure preferences for a tax increase more precisely by dividing the respondents into (i) those who choose a tax rate less than 5%, (ii) those who choose a tax rate equal to 5%, and (iii) those who choose more than 5%, our qualitative result does not change. In this case, Y_{it} is the ordered variable that refers to the degree of preference for the consumption tax increase, and we estimate (1) using an ordered probit. The result is available upon request.

[19] Table 4 also shows that family structure has an impact on preferences for a consumption tax increase. Compared with single individuals, those who are married are more likely to support a consumption tax increase although the estimated impacts are not significant in all specifications. The existence of children, however, has no significant impact on preferences for a consumption tax increase, which is contrary to the results in the previous literature. This result is robust when we allow the nonmonotone relationship between number of children and policy preference as Table 5 shows. The relationship between education and preference for the consumption tax increase is roughly consistent with that of previous research. There is a tendency that more educated individuals are more favorable toward a consumption tax increase. Additionally, household income is a key determinant of preference for a consumption tax increase; rich individuals are significantly more likely to support a consumption tax increase, which might be because of the regressivity of the consumption tax.

preference, Figure 3 shows that the number of supporters of the consumption tax increases consistently with age although individuals 65-69 years old are more likely to support the tax increase than individuals over 70.

[Figure 3 here]

The finding that older individuals tend to prefer a consumption tax increase seems to be robust but not consistent with the standard view that older individuals would place fiscal burden on future generations. More importantly, the impacts seem to be much larger after they reach 60s.

4.2 Opinion Poll by the University of Tokyo and Asahi Shimbum Survey

To confirm the robustness of our findings, we reexamine the relationship between age and consumption tax increases using the UTAS data. As the dependent variable is ordered variables, and a higher number corresponds to stronger support for fiscal consolidation or the consumption tax increase, we estimate using ordered probit models.

[Table 5 here]

Table 5 shows that older individuals are significantly likely to approve of the consumption tax increase in the long run compared to younger individuals. Strikingly, only the coefficients after 60s are significant. That is, it suggests that the major part of age effects comes from after 60s dummies. Overall, the estimation results in Table 5 are consistent with the findings using the JGSS.

In sum, we find robust evidence that, on the contrary to the standard view about intergenerational conflict with fiscal consolidation policy, older voters tend to support a consumption tax hike. We also find that the most of age effects is explained by the 60-year-old later dummy. These results can be supported in different data set.

5 Changes in Political attitude at Age 60

In the previous section, we find not only that older voters tend to support a consumption tax increase, but also the major part of inter-generational difference in the support for consumption tax hike is explained by whether respondents are over sixty or not. As we will discuss later, the most of Japanese citizens faces large changes in their economic situation and life style at the timing when they turn 60 because of the age requirement for national pension system and common practices concerning elderly employment in many firms. In order to clarify the cause of inter-generational conflict about consumption tax policy, we pay special attention to change in political preference around age of 60 and examine whether policy opinion of citizens toward consumption tax policy largely changes when they turn 60.

5.1 Regression Discontinuity Design

We examine change in support for consumption tax hike around age 60 by using the regression discontinuity design (RDD). Our concern here is whether being sixty sharply changes opinions of citizens toward consumption tax policy. In terminology of RDD, the treatment is whether the respondents is over sixty or not. By definition, assignment of the treatment is perfectly determined by the age of respondents, which is the running variable in our design. Therefore, our approach can be regarded as sharp regression design.

Under assumption that the probability that the respondent support consumption tax hike is function of age of respondent and continuous at age of 60, the treatment effect can be defined by

$$TE = \lim_{a \downarrow 60} \mathbb{E}(Y_{it}|Age_{it} = a) - \lim_{a \uparrow 60} \mathbb{E}(Y_{it}|Age_{it} = a). \tag{2}$$

The age of respondent is only recorded in years in JGSS, hence our running variable is discrete. Following the procedure of Lee and Card (2008) for RD design where running variable is discrete, we adopt a global polynomial method to estimate the treatment effect. Specifically, we assume the following regression function:

$$Y_{it} = \alpha + \gamma D_{it} + f(Age_{it}) + \epsilon_{it} \tag{3}$$

where D_{it} is a dummy variable which takes 1 if and only if the age of respondent is 60 or over and the function $f(Age_{it})$ is continuous at $Age_{it} = 60$. We approximate function f by high order polynomials and allow the parameter of polynomial to vary on either side of the cutoff age. Moreover, we assume that the specification error is random and orthogonal to age of respondents. Under assumption of random specification error, the least squares estimate of the parameter γ will be consistent estimator of the average treatment effect at the age of 60. Following the suggestion of Lee and Card (2008), we use standard errors that are clustered by the running variable. [20]

5.2 Results

Our main result is presented in Figure 4, which plots the share of supporters for consumption tax hike by age and the solid lines denote quartic fit on each side of age cutoff. We can see a discontinuous break in support for tax hike at the age cutoff. This evidence suggests that the probability that respondents prefer tax increase is larger for citizens just has turned 60 compared with the slightly younger citizens. Table 6 reports the corresponding coefficients estimates. Taking column (4) as our preferred specification, the estimated coefficient implies that citizens just has turned 60 are 7.4 percentage points more likely than the slightly younger citizens to support consumption tax hike. Given that the total share of support for consumption tax is less than 40%, the estimated magnitude is large and not negligible. The sign and magnitude of estimated effec are not so sensitive to variations in the degree

[20] We also report conventional heteroskedasticity robust standard errors since clustered standard errors by the running variable have poor coverage properties (Kolesár and Rothe 2018).

of polynomial of the regression function. The estimation results are also robust to including predetermined covariates, which confirms the validity of the design.

[Figure 4 here]

[Table 6 here]

We also apply a local polynomial method by using restricting sample to respondents around age of 60 to confirm the robustness of our baseline estimates. Specifically, we estimate the equation (2) using sample of respondents who satisfy $Age_{it} \in [60-h, 60+h]$ and adopt low-order polynomial approximation. [21] Figure 5 shows that estimated coefficient when we use only restricted sample of respondents whose age are closely to 60. Panel A and B depict the coefficients obtained using local linear and quadratic regressions for several bandwidth from 5 to 20, respectively, and the associated confidence intervals are also reported.[22] They show that the magnitudes of coefficients are similar to those in Table 7 and relatively stable as bandwidth changes.

Overall, these results indicate that there is a sharp change in attitude toward consumption tax hike at age of 60 among Japanese citizens. [23]

[Figure 5 here]

5.3 Validity Check

The validity of RD design depend on the comparability of respondents who recently has turned age of 60 and those who are going to be sixty. We provide two types of tests to examine the validity of our research design.

First, we investigate the distribution of age of respondents around the age cutoff. Although the respondents are not able to manipulate their age, running variable in our design, the distribution of respondents' age can be distorted if response rate to survey discontinuously changes at age of 60. Figure 6 shows that there is no such the break around age of 60. The more rigorous manipulation test statistically confirms that there is no significant difference in size of respondents by age around the cutoff. [24]

[Figure 6 here]

Second, we examine whether there are discontinuities of predetermined covariates around the age cutoff. Figure 7 plots the fraction of female respondents (panel A), fraction of married respondents (panel B), mean number of children (panel C), and average years of schooling by

[21] Table A.1 reports the estimator of γ for local linear and quadratic regressions.

[22] We use robust standard errors to calculate these confidence intervals.

[23] We can find the discontinuity at age of 60 both in sample using only respondents of JGSS2010 and JGSS 2012 though significance of coefficients are reduced (See Table A.3). While we cannot distinguish between the effect of age of respondents and cohort effect precisely, there is no evidence that supports the claims that the observed difference in policy preference is caused by the difference in birth year.

[24] The p-value of the manipulation test of the discrete running variable proposed by Frandsen (forthcoming) is 0.922 for $k = 0$, which does not reject the smoothness condition.

age (panel D). These figures show that there are no remarkable difference in marital status, number of children, years of education between the respondents who recently has turned age of 60 and those who has not yet. [25]

[Figure 7 here]

The fraction of female respondent discontinuously decreases at age of 60, which could cast doubt on the validity of our research design. However, we think that it would not be a serious problem by the following reasons. First, the change in sex ratio in our sample at age 60 is not caused by discontinity of age distribution of either male or female respondents. Panel A and Panel B in Figure A.1 show the age distribution of male and female respondents, respectively. They show that there is no break in sample size around age of 60 both for male and female sample and the manipulation tests do not reject the smoothness of distribution at cutoff age. Second, the magnitude of change in sex ratio at age of 60 is too small to explain magnitude of our estimated effect. In fact, the magnitude of estimated effect almost unchanged even if we control predetermined covariates (Table 6).

In summary, we cannot find strong evidence that suggests the possibility of manipulation from these tests.

5.4 Other policy preference

The results in Table 6 indicate that Japanese citizen suddenly come to support for the consumption tax hike when they reach 60-years-old. One concern is whether such changes in support for the consumption tax hike reflect changes in more general political preferences. In order to examine whether there is a discontinuity at age of 60 in general policy preference, we conduct the same regression discontinuity design for political attitudes to other kinds of policies.

We test whether there is also changes in the attitudes about the role of government for social security and health care for the elderly around age of 60. We also examine the general attitude toward redistribution policies and trust in politicians.

[Figure 8 here]

Panel A , Panel B, and Panel C in Figure 8 plot the preference for health care policy, life security for the old, and redistributive policy, by age, respectively. We can see that there are no clear discontinuities in the measure of preference on these variables. [26] Panel D in Figure 8 shows that there is also no discontinuity in trust in politicians at age of 60. These results indicate that it is less likely that the change in attitude toward tax policy is caused by a shift in policy preference on the role of government and trust in politicians. A discontinuous change in political attitude is observed only about attitude toward consumption tax policy.

[25] Table A.2 reports regression results which examines discontinuities in predetermined covariates. We estimate the similar model to equation (3) with predetermined covariate as the dependent variable. Table A.2 shows that all coefficients except for female dummy are insignificant and not robust to the choice of order of polynomial and bandwidth.

[26] Table A.4 confirms that change in policy preference around the age of 60 is small and not statistically significant.

6 Why Do Citizens Suddenly Change Their Attitudes toward Tax Policy?

In the previous section, we find that there is a discontinuous increase in the support for consumption tax hike at the age of 60. Importantly, the major part of our puzzling finding that the old citizens are more likely to accept fiscal consolidation through tax increase can be explained by a change in policy preference at the age of 60. In the following sections, we attempt to understand the reason why the support for consumption tax hike jumps at the age of 60. As we mentioned above, Japanese pension system and retirement practice cause several changes in life style after people turn 60 in Japan. The natural conjecture is that these institutional arrangements would influence changes in political attitude. We first discuss institutional arrangements of pension system and retirement in Japan.

6.1 Institutional Arrangements

The national pension system The Japanese public pension system consists of the National Pension System (*Kokumin Nenkin*) and the Employees' Pension Insurance (EPI) System (*Kosei Nenkin*). [27] All Japanese citizens must be covered by the National Pension System and can receive the Old-age Basic Pension (*rorei kiso nenkin*) when they reach age of 65 if they have paid required contribution. The monthly full amount of Old-age Basic Pension benefit is about 65,000 yen. Even before the eligible age for the Old-age Basic Pension, the qualified recipients can receive reduced amount of pension whenever they reach age of 60. [28]

The workers in a firm with more than 5 employees are also covered by EPI. The eligibility age for the employees' pension has been 60 until 2001, though it started to be raised gradually since 2001. While the old citizens who have a coverage period under EPI ststem can receive the Old-age Employees' Pension (*rorei kousei nenkin*) from the age of 65, qualified recipients for EPI in their early sixties can receive the specially-provided (*tokubetsu shikyu*) Old-age Employees' Pension during the transition period from 2001 to 2025. The specially provided employees' pension consists of the constant part (*teigaku bubun*) and the proportional part (*hosyu-hirei bubun*), and eligibility ages for each part are different. The eligibility age for the specially provided is currently rising in stages. The eligibility age of men for the constant part started to rise by one year for every three years since 2001 until it reaches 65 years in 2013. That for the proportional part started to rise since 2013 by one year for every three years and it is planned that eligibility age for all part of pension benefit reach age 65 in 2025. The eligibility age for women also started to rise in five years later from that for men. For the constant part, the eligibility age started to rise since 2006 by one year for every three

[27] There was Mutual Aid pension for public servants (*Kyosai Nenkin*) prior to 2015, which was integrated into Employees' Pension Insurance.

[28] The amount of receivable benefit at the age of 60 is 70 % of that for age 65. On the contrary, by delaying the timing when they start to receive benefit, the qualified recipients can also receive increased amount of pension. If they choose to start to receive basic pension from the age of 70 or older, the amount of receivable benefit gets 142 % of that for age 65.

years until 2018 and that for the proportional part is planned to rise since 2018 by one year for every three years.

Table 7 summarizes the eligibility age for each part of pension benefit from 1986 to 2014. In 2010 and 2012, when the survey which we analyze has been conducted, both of male and female qualified recipients can receive proportional part of specially-provided Employees' Pension from age of 60 though they cannot receive the constant-part. They also can receive neither of basic pension benefit and employees' benefit until they reach age of 65.

[Table 7 here]

The amount of benefit from proportional part depends on both of number of months covered by EPI and the past earnings of recipients. [29] Hence there is a large difference in amount of pension between men and women at age of 60. According to Ministry of Health, Labor and Welfare (2013a), the average monthly amount of pension benefits at age of 60 are 97,681 yen for men and 47,733 yen for women in 2010. The corresponding numbers in 2012 and are 96,584 yen and 48,864 yen, respectively. [30]

It is important for our research that the most of Japanese citizens start to receive pension benfit when they reach 60. The average monthly amount of pension beneifts that persons of sixty can receive is smaller than the average of benefits for those above 65, but they are not neligible. [31]

The retirement of old workers in Japan Most of Japanese firms set retirement age of workers in advance and can terminate an employment contract when workers reach the retirement age (*teinen* system). Typically, the retirement age has been set at 60 because it had been prohibited to set retirement age to under 60 years of age by the law (the Elderly Employment Stabilization Law, EESL)

While the retirement at age 60 has been common practice of Japanese old workers, the government revised the EESL in 2006 and mandated firms to provide opportunities for employees to work until 65 in response to rise in the eligibility age for the full pension benefit. If the mandatory retirement age is set to below 65, the firm must take any one of the following ways to secure employment of old workers until they reach age of 65; (i) raising the mandatory retirement age, (ii) introducing a continuous employment system (*keizoku koyoseido*), and (iii) abolition of the mandatory retirement age. When the firms introduce the continuous employment system, they can make old workers retire at once and reemploy them on new employment contract, or they can extend their employment contract until age of 65. According to Ministry of Health, Labor and Welfare (2006), about 84% of firms takes

[29] The amount of benefit from constant part is determined by the date of birth and number of months covered by EPI of recipients. Although the working recipient can receive specially provided employees' pension, the amount of benefit is reduced or suspended if the total of monthly pension benefit and monthly remuneration from work exceeds 280,000 yen.

[30] The gender gap becomes relatively small for citizens who are 65 years old and more because they can receive both of Old-age Basic Pension and Old-age Employees' Pension.

[31] The average monthly amount of benefits of Old-age Employees' Pension are about 190,000 yen for men and 110,000 yen for women.

one of the above measures and more than 85% of them introduces the continuous employment system. [32] There are very few firms that abolish the mandatory retirement age.

After the revision of EESL in 2006, the employment rate for individuals in their sixties has risen. Kondo (2014) compares the employment rate by age between the cohort born in 1943-1945, which was not influenced by revision of EESL, with those born in 1946-1948, which was influenced by revision. She finds that employment rate decreases by about 10% after age 60 in the former cohort whereas it decreases by 6-7% after age 60 in the later cohort. Kondo and Shigeoka (2017) show that EESL revision significantly increases the male employment share in their early 60s but the effect is only observed for workers in large-sized firms. [33]

Although the revision of EESL has increased employment of early 60s, the average wages of 60-64 year old are lower than those of 50s probably because EESL does not prohibit firms to offer substantially lower wages for workers who reach mandatory retirement age. Ministry of Health, Labour and Welfare (2009) reports that about 35% of firms that introduces continuously employment system set wages of reemployed old workers roughly 60-70% of those at their retirement age. The decrease in wage of workers whose employment contracts are extended at retirement age is relatively small. However, about 30% firms reduce wage of these workers by more than 10%.

The large amount of retirement allowance is the other prominent feature of retirement system in Japan. It is usual that workers receive retirement allowance when they reach their mandatory retirement age. According to Ministry of Halth, Labor, and Welfare (2013b), about 75% of Japanese firms have retirement allowance plans in 2012. The fraction is positively correlated with size of firm, 93.6% of large firms with more than 1,000 employees have retirement allowance plan whereas only 72.0% of firms with 30-99 employees have plan. The amounts of retirement pay depends on several factors such as the size of firm and tenure of workers. For typical worker with 35 or longer years of tenure, it is roughly 10-15 million yen. When workers are reemployed or continuously employed after they reach the mandatory retirement age, their timing of receiving retirement allowances depends on the case.[34] While it is said that workers generally receive retirement allowances at the timing when they reach the mandatory retirement age, that is 60, some workers receive them at the timing when they actually retire after reemployment.

In sum, we expect that many Japanese encounter the following changes in employment status, the source of income and the amount of total asset at the age of 60. (i) As many Japanese workers encounter mandatory retirement while they are reemployed, there may

[32] Among large firms with more than 300 employees, 94.4% of them adopt a way to secure employment of old workers.

[33] Stephens and Unayama (2012) also find a similar pattern using data from the 1986-2005 survey. This is probably because the reemployment after age 60 has been already common in small firms and the employment share of male workers in small firms does not sharply decrease at age of 60 both before and after the EESL revision. In fact, a certain share of small firms does not set mandatory retirement age at 60 in the first place. According to Ministry of Health, Labour and Welfare (2009), about 30% of plants with 5 to 29 employees did not have the mandatory retirement age and about 20% of them set it above age of 60 in 2008.

[34] If workers choose to take early retirement, they can receive retirement allowance even if they do not reach mandatory retirement age.

be changes in working hour, employment status and the use of time. (ii) Because many Japanese experience a decrease in wage payment as a result of reemployment and receive the part of pension after they turn 60, both the amount and the component of household income drastically changes. (iii) Because many Japanese receive the large amount of retirement allowance at the age of 60, the total amount of asset increases.

We investigate the possibility of each changes in data and provide evidence from which we can infer the mechanism of a discontinuous increase in the support for consumption tax hike at the age of 60.

6.2 Changes in Outcome Variables at Age of 60

In this subsection we provide evidence on changes in outcome variables such as working hour, employment status, time-use, household income, and pension reciption at the age of 60 by using the same method as above.

Employment Status First, we look at the changes in employment status of old citizens. Panel A in Figure 9 plots the share of respondents who does not work by age. It shows that there is no clear discontinuity in working population around age of 60 though the share of not working citizens is clearly increasing in age. Panel B shows that the similar pattern is also observed in transition of hours worked per week around age 60. While average hours worked declines with age, there is no sharp reduction around age of 60.

Panel A in Table 8 confirms that there are no significant changes in the share of working population and work hours around the age of 60. [35] Regardless of the fact that mandatory retirement age is set at 60 in the most of firms, there is no strong evidence that many old workers do not stop working immediately after they turn 60. Even if the old workers continue to work after they reach the mandatory retirement age, it necessarily does not imply that there are no changes in their economic situations. While the EESL demands firm to provide employment opportunities for old workers who have turned 60, it does not force them to treat these workers in the same way as before. Therefore, there could be change in employment contracts of workers who reach mandatory retirement age. Panel C in Figure 9 shows that the share of regular employed workers slightly decreases at age 60. The corresponding point estimate in Table 8, however, is small and not statistically significant.

[Figure 9 here]

[Table 8 here]

In summary, these evidence indicates that the most of citizens in our sample continue to work after the age of 60. In addition, there is not large change in employment status, such as decrease in regular employment at age 60.

[35] We provide results for several specification in Table A. 5 in Appendix. While the coefficients are significant in some specifications, the magnitude is small and the sign of coefficient is not robust to order of polynomial.

Time Use Second, we examine whether the workers change their time-use after they reach the mandatory retirement age. The literature on consumption of households over life cycle suggests that the substitution from market activities to home production occurs after the retirement. One possible explanation for the support of old citizens for consumption tax increase is that the burden of consumption tax becomes relatively light for the elder generation since they substitute away from market consumption by increasing home production. [36] Although we cannot directly test this hypothesis because our dataset does not contain any consumption data, we provide evidence about changes in time-use at the age of 60.

Panel A - D in Figure 10 plot the fraction of respondents who answer that they conduct shopping, cooking dinner, cleaning, and washing every day. While it seems that the frequency of cooking dinner slightly decreases at age of 60, there are no clear discontinuities of time uses at age of 60. The point estimates in Panel B in Table 8 confirm that there are no significant increases of frequency of home works at age of 60.[37]

[Figure 10 here]

Panel E in Figure 10 provides change in time of watching TV, which we regard one proxy of leisure time. Although it shows that there is a tendency that the old citizen spends more time to watching TV, there is no discontinuity of time spending to watch TV at age of 60. Panel F in Figure 10 shows that there is also no drastic change in size of household, which would affect incentive of shopping and home production, at age of 60.

Overall, we cannot find any evidence that people immediately increase their time spending for home production and leisure at the age of 60. This would be consistent with the finding that the hours of worked does not change at the age of 60.

Changes in the Amount and Component of Income As we discuss before, because many Japanese experience a decrease in wage payment as a result of reemployment and receive the part of pension after they turn 60, we expect that both the amount and the component of household income largely changes. In order to investigate this possibility, we also provide evidence on changes in the amount and the component of household income at the age of 60.

[Figure 11 here]

[36] There are many studies that find people reduce their consumption after the retirement (e.g., Hurst 2008). The previous studies show that the reduction in consumption expenditure are limited to two kinds of categories, work related goods and food expenditure (Hurst 2008). Moreover, the substitution of households from market activities to home production is often pointed out as the reason why food expenditure decline with age. Aguiar and Hurst (2005) show that time spending for shopping and preparing meal increases at the timing of reduction of food expenditure, which makes the quality and the quantity of food intake roughly unchanged. Aguiar and Hurst (2007) find that the price paid for a particular good decreases after middle age and it is mainly because that old people reduces food expenditure by the frequent shopping.

[37] The impact on the frequency of cooking dinner is *negative* and statistically significant in some specifications.

Panel A in Figure 11 indicates that there is a sharp reduction in household income around the cutoff age. Panel C in Table 8 shows that the reduction is statistically significant and implies a decrease of more than one million yen.

Panel B in Figure 11 shows that the fraction of pension recipients discontinuity increases at age 60. The estimated coefficient in Panel C in Table 8 is statistically significant and implies that the fraction of pension recipients increases by more than 20% at age of 60. As we have argued, citizens who have work experience in firms with more than 5 employees can receive proportional part of specially-provided Employees' Pension after they turn 60. However, they can receive neither of the constant-part of specially-provided Employees' Pension nor Old-age Basic Pension until they reach age of 65. Hence, the most part of estimated increase of pension recipients at age of 60 would be caused by the respondents' reception of proportional part of specially-provided Employees' Pension.

In sum, these results suggest not only that people reduce total household income, but also that their degree of dependence on the pension increase at the age of 60.

7 Heterogeneity of Effect

In the previous section, we argue that many Japanese encounter changes in the employment status and the source of income and find that while there are no significant discontinuities in the employment status, hours worked, and time use, the amount and component of household income largely changes after citizens reach the age of 60. In particular, we find that the average household income sharply decreases but the probability of receipt of pension benefit significantly increases at the age of 60. While we also discuss that many Japanese are likely to increase the amount of total asset due to retirement allowance at the age of 60, as we have no information about the amount of asset of respondents in our data, we cannot provide any evidence that the asset discontinuously changes at the age of 60. [38]

In this section, we conduct subsample analyses to provide further evidence that can assist us to discuss plausible mechanisms. We exploit two dimensions of heterogeneity in our sample. First, we compare the policy preference between male and female respondents. Second, we investigate difference in change of policy preference of respondents by size of firms in which that have been employed.

Let us first explain several important gender differences of working condition and economic situation in old age in Japan. Given that majority of Japanese working women does not take regular jobs, the influence of mandatory retirement system would be relatively small among women. Moreover, since the amount of pension benefit at the age of 60 strongly depends on the past work experience of recipients, many female citizens can receive only small amount of pension benefit at the age of 60. For instance, housewives with little work experience can only receive negligible amount of pension benefit even when they reach the age

[38] About half of respondents in JGSS2012 are asked whether they hold financial assets such as bond or stock. From the analysis of the limited sample, we cannot find evidence that indicates there is upward jump on the share of bond or stock holders at the age of 60.

of 60 and get eligible for employee's pension. Therefore, if the change in policy preference at the age of 60 is caused by the change in either their life style, income or asset, we expect that change in attitude toward consumption tax policy among females would be weaker than that among males.

Column (1) and (2) in Table 9 shows differences in change of economic situations at the age of 60 between male and female respondents. The decrease in household income of male respondents at age of 60 is much larger than that of female respondents and statistically significant. The share of regular employment of male respondent also significantly decreases at the age of 60 while that of female respondent does not. On the other hand, the proportions of pension recipients are significantly decreased at the age 60 for both of male and female respondents. Hence, while our data supports our arguments that men and women encounter different changes in employment status and, therefore, the amount of income at the age of 60, it does not support the argument that there are gender differences in the share of the pension receipts. We consider that gender differences are more likely to occur at the amount of pension, which our data does not include the information about.

[Table 9 here]

The size of firms in which that have been employed might also influence the retirement practices and the recipients of pension. As we have argued, the retirement practices of old workers significantly differ between large and small firms. The mandatory retirement at age 60 is relatively uncommon in small firms both of before and after the revision of EESL in 2006. Therefore, if the change in policy preference at the age of 60 is caused by the distinctive retirement practice, changes in attitude toward consumption tax policy should be stronger among respondents who have been employed in large firms.

Unfortunately, we cannot identify the size of firm that respondent has been employed at age 60 precisely since respondents of JGSS are asked about only the current employment status. Hence, we use the size of the firm in which respondents are employed for the first time as proxy of the size of a firm in which they have been employed at the age of 60. As the frequency of job turnovers is low in Japan compared with other advanced countries, the firm size of initial jobs could predict the employment status of workers in their old age fairly well.

[Table 10 here]

According to their initial jobs, we categorize respondents into two groups: those who has not employed at all or worked at a firm with less than 99 employees as the first job and those who has worked at a firm with more than 100 employees or public authorities as the first job. Table 10 shows the relationship between the firm size of initial jobs and current employment status among respondents aged 50 to 59. It indicates that only 23.1 percent of individuals who have initially worked at a small firm work at a large firm or public sector in their fifties. Hence, we expect that the sample of citizens the initial job is in a small firm or not working is a good proxy of the sample in a small firm or not working at the age of 60.

Column (3) in Table 9 shows that reduction in income at the age of 60 is less common and the fraction of working population does not decrease among respondents who have started their career with small firms.[39] These results are consistent with the argument that the retirement at the age of 60 is less common in small firms. On the other hand, the significant increase in proportions of pension recipients can be observed among both of respondents who have started their career with small firms and those who with large firms.

[Figure 12 here]

[Table 11 here]

Let us first investigate the policy preference between male and female respondents. Panel A and B in Figure 12 show the relationship between attitude toward consumption tax policy and age of respondent for male and female sample, respectively. In line with our prediction, they show that the drastic change in policy preference at age of 60 can be observed only among male respondents. Table 11 indicates that the estimated effect of reaching age of 60 for males is about 10% and statistically significant. For female respondents, the sign of effect of being sixty on the support for consumption tax hike is neither robust to specification nor statistically significant in specification with higher order polynomial. These results are consistent with the prediction that male change of political preference at the age of 60 would be larger than that of females.

On the other hand, there is little support the claim that change in preference for tax policy is larger among respondents who have been employed in large firms. The panel C and D show that discontinuities of attitude toward consumption tax policy at age of 60 can be observed regardless of size of initial job of respondents. [40] While the reduction of sample size makes our estimation less precise, Table 10 indicates there is not large difference of estimated coefficients of reaching age of 60 between respondents who have been employed in large firms and small firms.

8 Discussion

From a series of observed facts, we would like to make some speculative arguments on the mechanism on why many elderly people suddenly support consumption tax hike at the age of 60.

First, it seems hard to explain the observed change in political preference at age of 60 by changes in life styles, home production, and leisure time of elderly citizens. The literature of the retirement consumption puzzle (e.g., Hurst 2008) argues that the retirement increases the intensity of home production, which makes people to reduce the purchase of consumption goods. If this argument is correct, the reduction can lower the cost of an increase

[39] The fraction of not working respondent is significantly *increases* at the age of 60 among them. However, the sign of coefficient is not robust to specification (Table A.11).

[40] Table 10 reports that coefficients in large firm sample is larger than that in small firm size, though Table A.8 shows that this result does not robust to specification.

in consumption tax for retired senior persons. However, our evidence indicates no distinct changes in working hours, the intensity of home production, and time use of respondents at the age of 60. Moreover, Stephens and Unayama (2011) found that there is no immediate reduction in consumption at retirement, on average, in Japan. Taken together, these findings do not support the hypothesis that reduction in consumption due to substitution from market consumption into home production causes support for consumption in elderly citizens.

Second, we think that explanation that reduction in income at the age of 60 causes changes in support for consumption tax hike also would not be promising. While household income and the share of regular workers drops at the age of 60, these changes should be *negatively* related with support for consumption tax hike since poor respondents or non-regular employed workers tend to oppose to tax hike. In fact, household income is positively correlated with support for consumption tax hike although coefficient of regular employment is not significant (Table 4). Moreover, we can still observe a discontinuous increase in support for consumption tax hike even if we restrict sample to the workers not initially employed in a large firm, who do not experience large change in household income and employment status at the age of 60. Hence, we think that it is less likely to find a plausible mechanism from this line of argument.

As a plausible explanation, we propose the hypothesis that elderly people change their political attitude to consumption tax policy by receiving pension benefit. As shown in Table 8, many Japanese start to receive pension at the age of 60 and rely on it to maintain their lives. If the state financial risk is expected to undermine sustainability of the social security system, the recipients of pension would support consumption tax hike in order to protect their vested interests. Our evidence suggests that while a reduction in income at age of 60 is less common and the fraction of working population does not decrease among respondents who have started their career with small firms, the significant increase in both the support for consumption tax hike and the proportions of pension recipients can be observed among both of respondents who have started their career with small firms. This indicates that the motive to preserve the value of pension is more promising than other explanations.

To be fair, we also find the evidence that appears not to be consistent with this hypothesis. While we find that the proportions of pension recipients are significantly increased at age 60 for female respondents, the support for consumption tax hike does not change at the age of 60 for female respondents. We consider that this is probably because females are likely to have substantially lower pension in Japanese employment system. Because our dataset does not include the information about the amount of pension, the validity of this argument is left for the future research.

The similar and somewhat different explanation is that the severance payment would sharply change political opinion of elderly people through by increasing their amount of financial assets. If the risk of debt crisis would involve devaluation of financial assets, the elderly citizens would turn to support fiscal consolidation in order to preserve value of their assets when they receive retirement pay. In fact, the previous research finds evidence that net financial asset is larger in 60s than in 50s. Ichimura et al. (2009) shows that, from 50s to 60s,

the average share of deposits holders increases 2.7 percent, the average share of bonds holders increases 2.1 percent, the average share of stock holder increases 1.6 percent and the average share of non-mortgage liabilities holder decline 7.6 percent. It shows the large decline in non-mortgage liabilities holder and increases in financial asset holder, in particular, deposit holders and bond holders. However, Ichimura et al. (2009) do not provide any information whether this difference discontinuously occurs at the age of 60. Hence, it is difficult to judge the validity of this explanation without further information. We leave it as a possible hypothesis to be tested. [41]

Although we are not able to separate preserving the value of pension from preserving the value of financial asset, our argument suggests that the motive of elderly citizens to preserve their value of assets, stepping back from the issue that these assets are public or private, can be the promising explanation to cause their support for consumption tax hike. The possibility that the old voters support fiscal consolidation policies to preserve the value of their assets is pointed out in the theoretical literature on the political economy of social security and government debt (e.g. Tabellini 2000, Persson and Tabellini 2002). Since pension can be regarded as redistribution from the young to the old, the old generally accpet increase in tax to maintain generous pension benefits. Similary, the debt holder also has incentive to raise tax rate if the government cannot commit to repayment of the government debt (Tabellini 1991, Dixit and Londregan 2000, Gruembel and Sussman 2009) Our hypothesis about observed fact is that the older citizen could be more likely to support fiscal consolidation policy if such the motive of elderly citizens to preserve value of their assets is strong enough. While this is on the contrary to the prevailing view, we think it shuold be worth pursuing.

9 Conclusion

This paper analyzes the determinants of voter preferences on consumption tax hike using an opinion survey of Japanese citizens. We find robust evidence that the older voter is *more* likely to support consumption tax hike. We also find that the most of inter-generational difference toward consumption tax policy is explained by the gap between citizens under sixty and over sixty. We discuss a possible mechanism about the discontinuous jump based on the following additional findings: the hours of work do not change but their degree of dependence on the pension in household income increases at the age of 60. We argue that the motive of the elderly citizens to preserve the value of their asset would lie behind their support for consumption tax hike.

Our hypothesis that the old citizens are more likely to support consolidation policy from worry about the serious impact on their asset value could be applied in different situations. In the Greek crisis, some citizens voted for austerity because they feared that their assets

[41] If we take the tendency that practices of retirement payment at age of 60 are enforced more often in large firms seriously, the observed shift of political opinion at age of 60 among respondents employed in small firms would be less consistent with this argument, while the lack of shift of political opinion at the age of 60 among female can be consistent.

would be devalued. Vicky Pryce, the chief economic adviser at the Centre for Economics and Business Research, explains the reason why she supported the yes vote as follows:[42]

> "It [no vote] would almost certainly mean banks becoming insolvent, an exit from the euro and a much faster decline in economic activity with hyperinflation following as the drachma that is introduced instantly devalues."

If there is considerable risk of devaluation of domestic assets when standard consolidation policy fails, the prevailing view of intergenerational conflict over fiscal policy might not hold.

Finally, we briefly discuss the direction of future research. On the mechanism that yields correlation between age and support for a consumption tax, furthur investigation is required. In particular, we need richer data to provide definitive evidence concerning the relationship between financial asset holdings and preferences on fiscal policy. The empirical research that identifies the causal effect of financial asset holdings on fiscal policy preference is left for future study.[43]

[42] "Greek referendum: how would top economists vote?" *The Guardian*, July 3, 2015. Accessed at `https://www.theguardian.com/world/2015/jul/03/greek-referendum-what-the-experts-say` (March 18, 2018)

[43] Tere are some reserch that analyzes impact of asset holding on political preference (e.g. Jha 2015, Kaustia et al. 2016). To the best of our knowledge, however, there is no previous research that analyzes effect on preference for fiscal consolidatioin policy.

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Table 1: Summary statistics (JGSS)

Variable	Mean	Std. Dev.	Number of obs.
Dependent variable			
Support for consumption tax hike	0.399	0.49	5140
Demographic variables			
Age	53.642	15.879	5140
Female	0.513	0.5	5140
Married	0.759	0.428	5140
Number of children	1.712	1.074	5140
Household income (million yen)	5.59	3.793	5140
Education			
High school	0.478	0.5	5140
Some college	0.149	0.356	5140
University	0.23	0.421	5140
Employment status			
Regular employment	0.349	0.477	5140
Part-time employment	0.183	0.387	5140
Self-employed	0.1	0.3	5140
Control variables			
Living in a large city	0.488	0.5	5140
House ownership	0.775	0.418	5125
Bad health status	0.142	0.349	5135
Trust in politicians	0.342	0.474	2856
Experience of charity	0.866	0.341	3297
Will to volunteer	0.671	0.47	3363
Policy preference			
Life security for old (five grade)	3.637	1.15	5091
Health care for old (five grade)	3.931	1.014	5091
Redistribution (five grade)	3.714	1.032	5129
Pension benefit			
Receipt of pension	0.405	0.491	5137
Time use			
Average hours worked per week	23.021	20.783	4995
Cooking dinner everyday	0.486	0.5	5110
Washing everyday	0.399	0.49	5105
Shopping everyday	0.204	0.403	5122
Cleaning everyday	0.24	0.427	5117
Hours of watching TV per day	3.6	2.335	5114

Notes: The table presents summary statistics for JGSS sample (Source: JGSS 2010 and JGSS 2012). The number of observation in JGSS 2010 is 1,732 and that in JGSS 2012 is 3,408. Detailed definition of each variable is presented in Appendix. Experience of charity and will to volunteer is only asked to the respondents in JGSS 2012. Trust in politicians is only asked to about half of repondents in JGSS 2010 and 2012.

Table 2: Summary statistics (UTAS)

Variable	Mean	Std. Dev.	Number of obs.
Dependent variable			
Support for consumption tax hike (five grade)	2.681	1.266	1821
Demographic variables			
Age 30s	0.137	0.344	1821
Age 40s	0.169	0.375	1821
Age 50s	0.199	0.399	1821
Age 60s	0.194	0.396	1821
Age 70 over	0.212	0.409	1821
Female	0.501	0.5	1821
Education			
High school	0.407	0.491	1821
Some college	0.205	0.403	1821
University	0.242	0.428	1821
Employment status			
Regular employment	0.283	0.45	1821
Part-time employment	0.136	0.343	1821
Self-employed	0.13	0.337	1821
Public servant	0.049	0.217	1821
Student	0.016	0.125	1821

Notes: The table presents summary statistics for UTAS sample. In UTAS, respondents report their age by choosing a category from six alternatives, 20s, 30s, 40s, 50s, 60s, and 70 over. There is no question about household income and family structure in UTAS.

Table 3: Preferece on consumption tax by age group (JGSS)

	Tax cut		Status quo		Tax increase		Total
Age group	Obs.	Fraction	Obs.	Fraction	Obs.	Fraction	Obs.
Panel A. All sample							
20-29	49	14.41	191	56.18	100	29.41	340
30-39	98	11.69	441	52.63	299	35.68	838
40-49	104	10.84	513	53.49	342	35.66	959
50-59	82	8.84	481	51.83	365	39.33	928
60-69	91	8.05	515	45.53	525	46.42	1131
70-	78	8.26	448	47.46	418	44.28	944
Total	502	9.77	2589	50.37	2049	39.86	5140
Panel B. Male only							
20-29	26	16.88	74	48.05	54	35.06	154
30-39	53	13.25	182	45.50	165	41.25	400
40-49	45	9.98	200	44.35	206	45.68	451
50-59	36	8.07	202	45.29	208	46.64	446
60-69	49	8.73	214	38.15	298	53.12	561
70-	36	7.36	189	38.65	264	53.99	489
Total	245	9.80	1061	42.42	1195	47.78	2501
Panel C. Female only							
20-29	23	12.37	117	62.90	46	24.73	186
30-39	45	10.27	259	59.13	134	30.59	438
40-49	59	11.61	313	61.61	136	26.77	508
50-59	46	9.54	279	57.88	157	32.57	482
60-69	42	7.37	301	52.81	227	39.82	570
70-	42	9.23	259	56.92	154	33.85	455
Total	257	9.74	1528	57.90	854	32.36	2639

Notes: The table presents frequency distribution of opinion toward consumption tax policy by age group. According to answers to desirable consumption tax rate, we classify the respondents in JGSS into three categories, tax cut, status quo, and tax increase. The category of tax cut includes respondents who prefer tax rates less than 5 %, that of status quo includes respondents who prefer tax rate of exactly 5%, and that of tax increase includes respondents who prefer tax rates higher than 5%.

Table 4: Estimation results of benchmark model (JGSS)

	(1)	(2)	(3)	(4)
Age	0.0051***	0.0052***	0.0054***	0.0058***
	(0.0005)	(0.0005)	(0.0007)	(0.0011)
Female	-0.1140***	-0.1142***	-0.1055***	-0.0794***
	(0.0151)	(0.0151)	(0.0202)	(0.0302)
Married	0.0370**	0.0404**	0.0368	0.0104
	(0.0182)	(0.0183)	(0.0252)	(0.0367)
Have children	-0.0097	-0.0099	-0.0023	-0.0121
	(0.0207)	(0.0208)	(0.0282)	(0.0420)
High school	0.1178***	0.1175***	0.1014***	0.1105**
	(0.0204)	(0.0206)	(0.0290)	(0.0440)
Some college	0.1468***	0.1458***	0.1342***	0.1440***
	(0.0259)	(0.0261)	(0.0362)	(0.0541)
University	0.2804***	0.2779***	0.2694***	0.2471***
	(0.0247)	(0.0249)	(0.0341)	(0.0517)
Household income	0.0109***	0.0112***	0.0092***	0.0124***
	(0.0020)	(0.0020)	(0.0027)	(0.0040)
Regular employed	-0.0134	-0.0138	-0.0130	-0.0094
	(0.0195)	(0.0197)	(0.0259)	(0.0393)
Part-time empployed	-0.0370*	-0.0361*	-0.0330	-0.0136
	(0.0195)	(0.0197)	(0.0275)	(0.0410)
Self-employed	-0.0755***	-0.0772***	-0.0994***	-0.0726
	(0.0239)	(0.0240)	(0.0321)	(0.0467)
Living in a large city		0.0111	-0.0046	0.0035
		(0.0134)	(0.0182)	(0.0273)
House ownership		-0.0160	-0.0264	-0.0199
		(0.0170)	(0.0231)	(0.0344)
Bad health status		-0.0213	-0.0366	-0.0004
		(0.0191)	(0.0253)	(0.0382)
Trust in politician			0.0377*	0.0344
			(0.0192)	(0.0302)
Experience of charity				0.0701*
				(0.0417)
Will to volunteer				0.0895***
				(0.0308)
R^2	0.080	0.081	0.079	0.075
N	5140	5120	2847	1297

Notes: The table shows estimate for a linear probability model. The dependent variable is a binary variable that equals one when the respondent supports consumption tax hike. Survey year dummy is included in estimation model. Robust standard errors in parentheses.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table 5: Estimation results of benchmark model: UTAS

	(1)	(2)
	Ordered probit	OLS
Age 30s	0.0392	0.0637
	(0.1202)	(0.1379)
Age 40s	0.0226	0.0417
	(0.1189)	(0.1361)
Age 50s	0.0226	0.0377
	(0.1155)	(0.1325)
Age 60s	0.3601***	0.4240***
	(0.1195)	(0.1370)
Age 70 over	0.3118***	0.3600***
	(0.1264)	(0.1445)
Female	-0.1445**	-0.1757***
	(0.0551)	(0.0650)
High school	0.1137	0.1266
	(0.0815)	(0.0942)
Some college	0.1630*	0.1827*
	(0.0961)	(0.1109)
University	0.5024***	0.5859***
	(0.0959)	(0.1109)
Regular employment	0.1554**	0.1815**
	(0.0779)	(0.0903)
Part-time employment	0.0008	0.0007
	(0.0831)	(0.0953)
Self-employed	0.1120	0.1242
	(0.0820)	(0.0970)
Public servant	0.2169*	0.2525*
	(0.1263)	(0.1514)
Student	0.5530**	0.6465**
	(0.2387)	(0.2752)
Cutoff 1	-0.3997***	
	(0.1430)	
Cutoff 2	0.2599*	
	(0.1428)	
Cutoff 3	0.9125***	
	(0.1442)	
Cutoff 4	1.7897***	
	(0.1503)	
N	1821	1821
R^2		0.055

Notes: The table shows estimation result for ordered probit model and that for OLS. The dependent variable is a binary variable that equals one when the respondent supports consumption tax hike. Survey year dummy is included in estimation model. Robust standard errors in parentheses.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table 6: Regression discontinuity estimates (JGSS)

	Covariates	(1)	(2)	(3)	(4)
Age 60 over	No	0.0557**	0.0602*	0.0422	0.0737*
		(0.0243)	(0.0349)	(0.0424)	(0.0387)
		[0.0253]	[0.0357]	[0.0463]	[0.0573]
Age 60 over	Yes	0.0769***	0.0696*	0.0461	0.0662*
		(0.0245)	(0.0353)	(0.0417)	(0.0389)
		[0.0249]	[0.0349]	[0.0453]	[0.0565]
Order of Polynomial		1	2	3	4
Observation		5140	5140	5140	5140

Notes: The table reports coefficient of the age-above-60 indicator controlling for a polynomial of age. We allow the parameter of polynomial to vary on either side of the cutoff. The covariates is demographic variables such as gender, marital status, education, household income, and employment status. Standard errors are clustered at age in parentheses. Robust standard errors are also reported in brackets.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table 7: The eligibility age of pension benefit

Fiscal Year	Specially-provided Employees' Pension		Basic Pension and
	Constant-part	*Proportional-part*	Employees' Pension
1986 - 2000	60	60	65
2001 - 2003	61 for men, 60 for women	60	65
2004 - 2005	62 for men, 60 for women	60	65
2006	62 for men, 61 for women	60	65
2007 - 2008	63 for men, 61 for women	60	65
2009	63 for men, 62 for women	60	65
2010 - 2011	64 for men, 62 for women	60	65
2012	64 for men, 63 for women	60	65
2013 - 2014	63 for women	61 for men, 60 for women	65

Table 8: Jumps of outcome variables at age of 60 (JGSS)

Dependent Variables	Jump at Age of 60	Number of Obs.
Panel A: Work related variables		
Not working	-0.0446	5140
	(0.0296)	
	[0.0519]	
Regular employment	-0.0339	5140
	(0.0593)	
	[0.0549]	
Weekly hours worked	2.8136	4995
	(2.1102)	
	[2.4414]	
Panel B: Home production and leisure		
Shopping everyday	0.0442	5122
	(0.0269)	
	[0.0470]	
Cooking dinner everyday	-0.0758	5110
	(0.0492)	
	[0.0581]	
Washing everyday	0.0007	5105
	(0.0287)	
	[0.0574]	
Cleaningg everyday	-0.0491	5117
	(0.0348)	
	[0.0479]	
Time of watiching TV	-0.0931	5114
	(0.1435)	
	[0.2632]	
Size of household	-0.1065	5139
	(0.1170)	
	[0.1472]	
Panel C: Amount and content of household income		
Household income	-1.2165**	5140
	(0.5000)	
	[0.4898]	
Receipt of pension	0.2248***	5137
	(0.0240)	
	[0.0509]	

Notes: The table reports coefficient of the age-above-60 indicator on each dependent variables controlling for 4th order polynomial of age with no covariates. We allow the parameter of polynomial to vary on either side of the cutoff. Standard errors are clustered at age in parentheses. Robust standard errors are also reported in brackets.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table 9: Jump of outcome variables: By Subgroup

	By gender		By firm size at the initial job	
	Male	Female	Small firm	Large firm
Dependent variables	(1)	(2)	(3)	(4)
Not working	0.0061	-0.0586	-0.1248*	0.0425
	(0.0455)	(0.0548)	(0.0686)	(0.0501)
	[0.0599]	[0.0780]	[0.0772]	[0.0705]
Number of Obs.	2501	2639	2471	2669
Weekly hours worked	2.4768	0.8621	2.4768	-1.6310
	(2.7740)	(3.0992)	(2.7740)	(2.7839)
	[3.1767]	[3.0326]	[3.1767]	[3.1543]
Numboer of Obs.	2423	2572	2423	2605
Regular employment	-0.1369**	0.0125	0.0412	-0.0990
	(0.0543)	(0.0609)	(0.0685)	(0.4945)
	[0.0797]	[0.0638]	[0.0808]	[0.6899]
Number of Obs.	2501	2639	2501	2669
Household income	-1.7296***	-0.8346	-0.3966	-1.7048***
	(0.5336)	(0.7715)	(0.6387)	(0.7715)
	[0.7403]	[0.6517]	[0.6401]	[0.6517]
Number of Obs.	2501	2639	2471	2669
Receipt of pension	0.2210***	0.2458***	0.1650***	0.2744***
	(0.0524)	(0.0288)	(0.0530)	(0.0375)
	[0.0550]	[0.0709]	[0.0766]	[0.0684]
Number of Obs.	2498	2639	2469	2668

Notes: The table reports coefficient of the age-above-60 indicator on each dependent variables controlling for 4th order polynomial of age with no covariates. We allow the parameter of polynomial to vary on either side of the cutoff. Standard errors are clustered at age in parentheses. Robust standard errors are also reported in brackets.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table 10: The relationship between firm size at the initial job and current employment among respondents from 50 to 59 years old (JGSS)

	Current employment				
Firm size at the initial job	Small firm	Large firm	Public	Not working	Total
Small firm	175	62	12	71	320
	(54.69)	(19.38)	(3.75)	(22.19)	(100)
Large firm	136	189	24	84	433
	(31.41)	(43.65)	(5.54)	(19.4)	(100)
Public	15	19	44	14	92
	(16.3)	(20.65)	(47.83)	(15.22)	(100)
Total	331	275	80	172	858
	(38.58)	(32.05)	(9.32)	(20.05)	(100)

Notes: The table presents frequency distribution of current emplotment status among respondents from 50 to 59 years old by firm size at their initial job. The definition of each categories are presented in Appendix. The numbers in parentheses mean fraction of each cell.

Table 11: Regression discontinuity estimates by subgroups (JGSS)

	By gender		By firm size at the initial job	
	Male	Female	Small firm	Large firm
	(1)	(2)	(3)	(4)
Age 60 over	0.1313**	0.0090	0.0513	0.1183
	(0.0514)	(0.0412)	(0.0528)	(0.0755)
	[0.0841]	[0.0776]	[0.0844]	[0.0779]
Number of Obs.	2501	2639	2471	2669

Notes: The table reports coefficient of the age-above-60 indicator controlling for a polynomial of age without covariates. We allow the parameter of polynomial to vary on either side of the cutoff. Standard errors are clustered at age in parentheses. We arso report robust standard errors in blacket.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

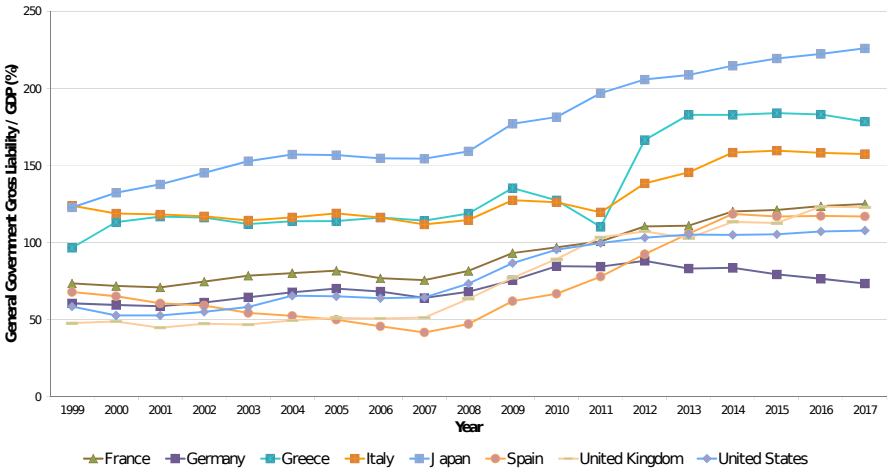


Figure 1: Gross financial liabilities in advanced countries

Notes: The graphs show transitions of gross financial liabilities across advanced countries. Data comes from OECD Economic Outlook.

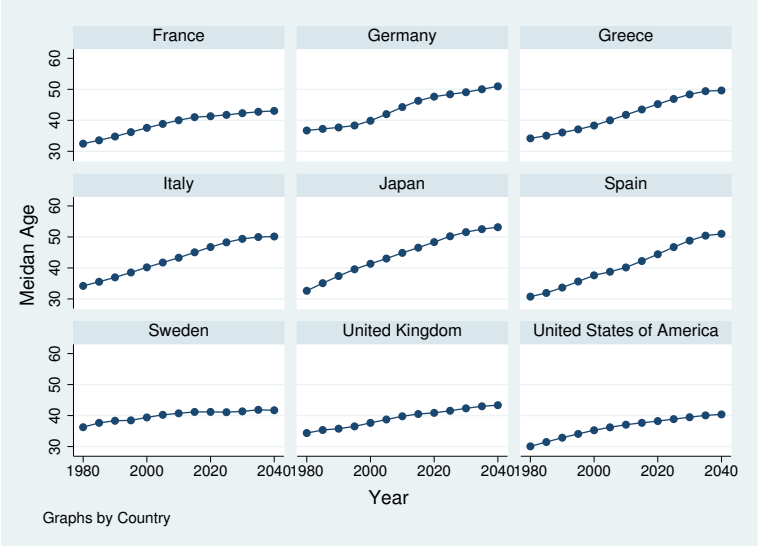


Figure 2: Median age of the total population in advanced countries

Notes: The graphs show transitions of median age across advanced countries. Data comes from World Population Prospects 2017 of United Nation.

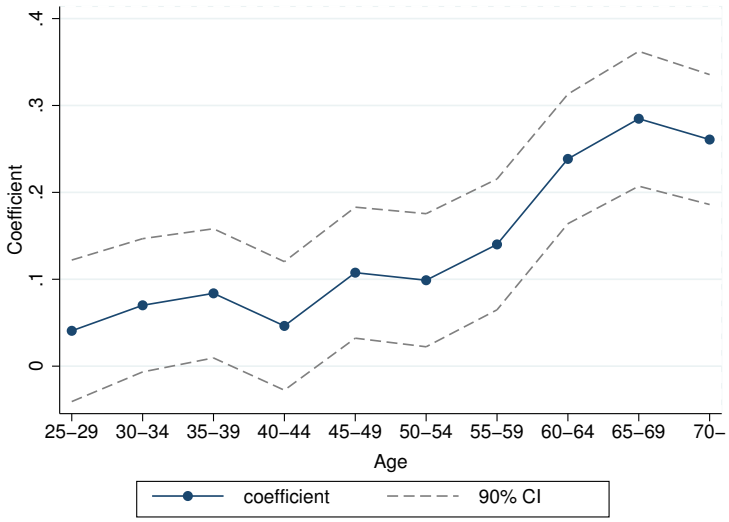


Figure 3: The coefficients of dummies of each group for non linear specification (JGSS)

Notes: The figure plots coefficients of dummies of age groups, age 25-29, age 30-34, age 35-39, age 40-44, age 45-49, age 50-54, age 55-59, age 60-64, age 65-69, and age 70 over when we regress support fot consumption tax hike on sex, marital status, education, household income, employment status, and a series of age dummies using JGSS sample. The excluding category is age 20-24. We also report confidence intervals of coefficients using robust standard errors.

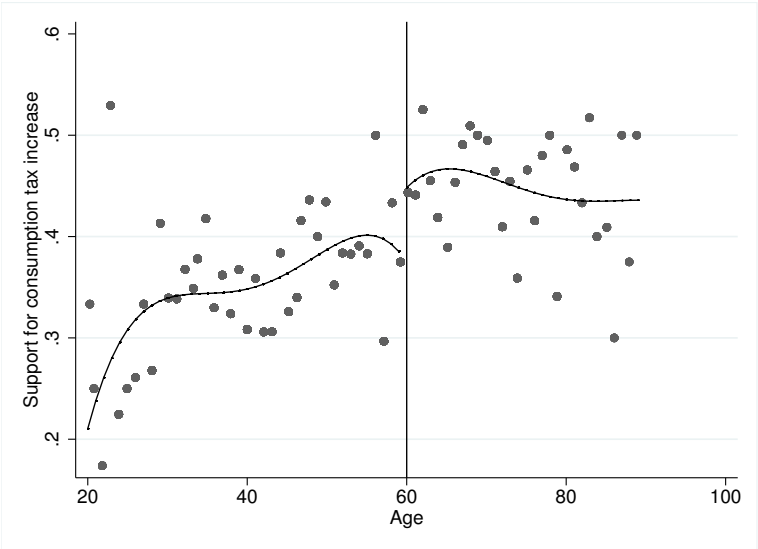


Figure 4: The fraction of supporters for consumption tax hike by age (JGSS)

Notes: The figure plots fraction of supporters for consumption tax hike for each age in JGSS sample. The solid line is quartic fits on each side of age of 60. The vertical line represents age of 60.

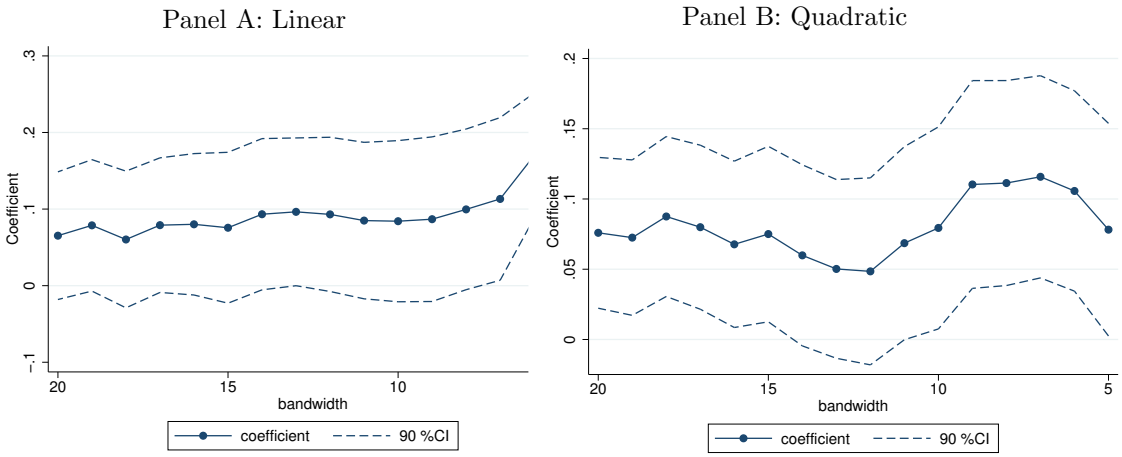


Figure 5: The local estimator by bandwidth (JGSS)

Notes: The graphs show the coefficients of the age-above-60 indicator and associated confidence intervals for each bandwidth. Panel A uses the local linear method and Panel B uses the local quadratic method to estimate coefficients. The confidence intervals are calculated by using robust standard errors.

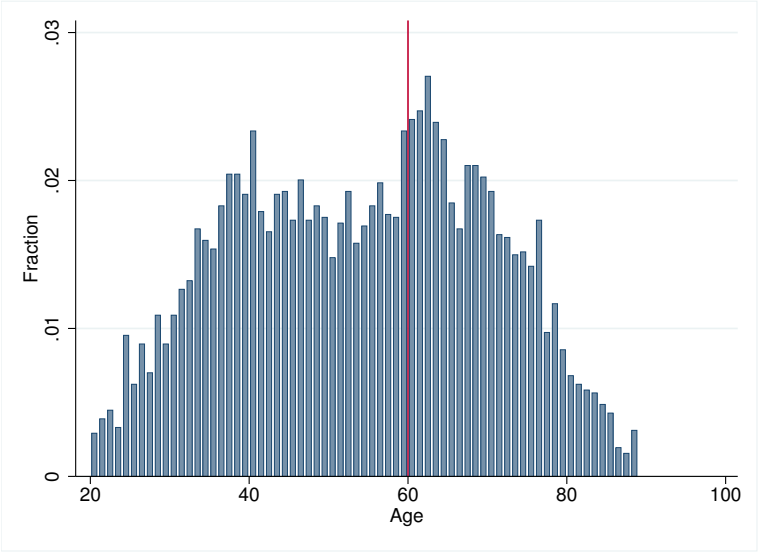


Figure 6: The distribution of age of respondents (JGSS)

Notes: The graph shows the fraction of respondents for each age in JGSS sample. The vertical line represents age of 60.

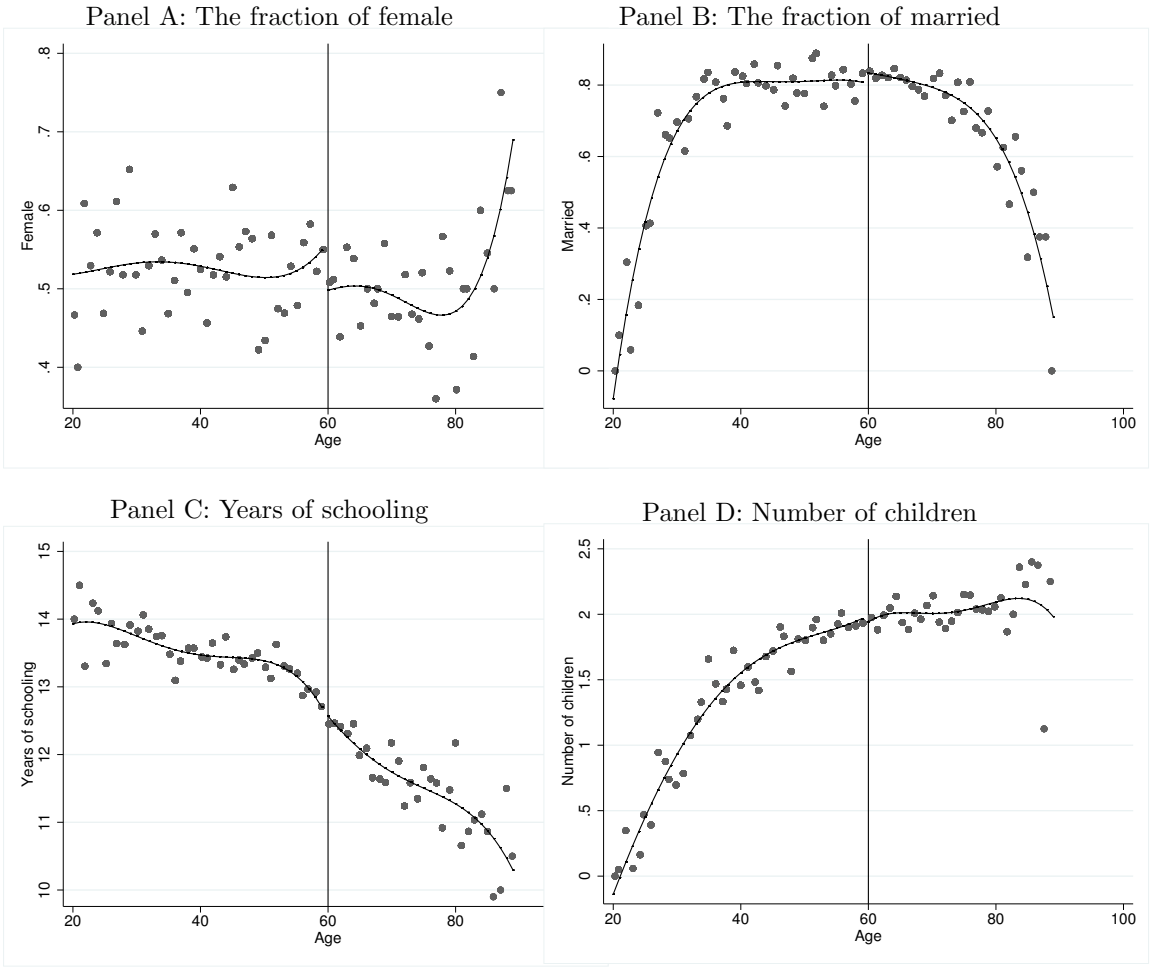


Figure 7: The mean of demographic variables by age (JGSS)

Notes: The figure plots average of predetermined variables such as sex, marital status, years of schooling, and number of children for each age in JGSS sample. The solid line is quartic fits on each side of age of 60. The vertical line represents age of 60.

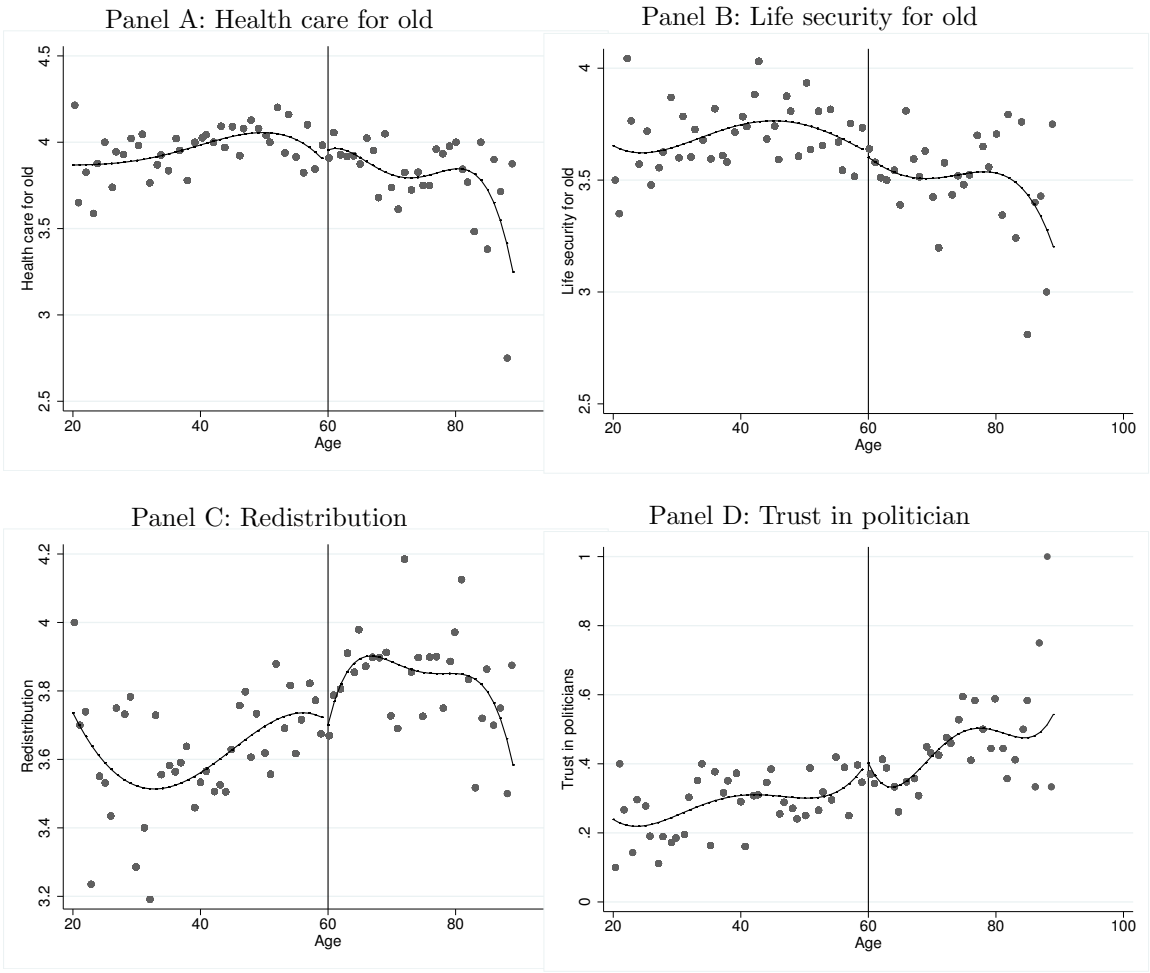
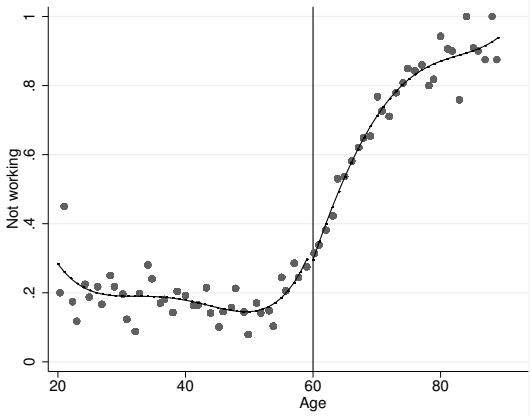


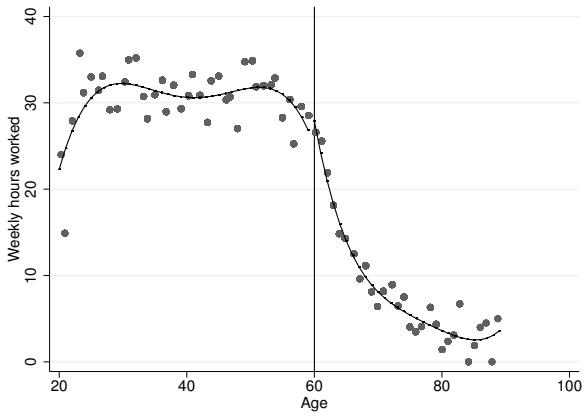
Figure 8: The policy preference by age (JGSS)

Notes: The figure plots the average of policy preference related variables such as demand for health care for old, demand for life security for old, support for redistributive policy, and trust in politician for each age in JGSS sample. The solid line is quartic fits on each side of age of 60. The vertical line represents age of 60.

Panel A: The share of not working citizens



Panel B: Average hours worked per week



Panel C: The share of regular employed workers

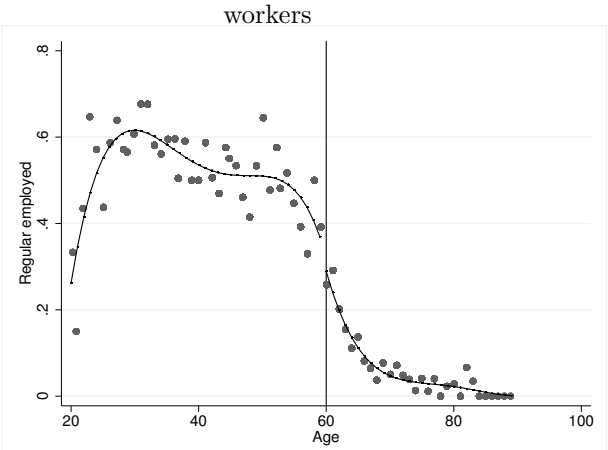


Figure 9: The work related variables by age (JGSS)

Notes: The figure plots average of work related variables such as fraction of not working, average hours worlked per week, and share of regular employment for each age in JGSS sample. The solid line is quartic fits on each side of age of 60. The vertical line represents age of 60.

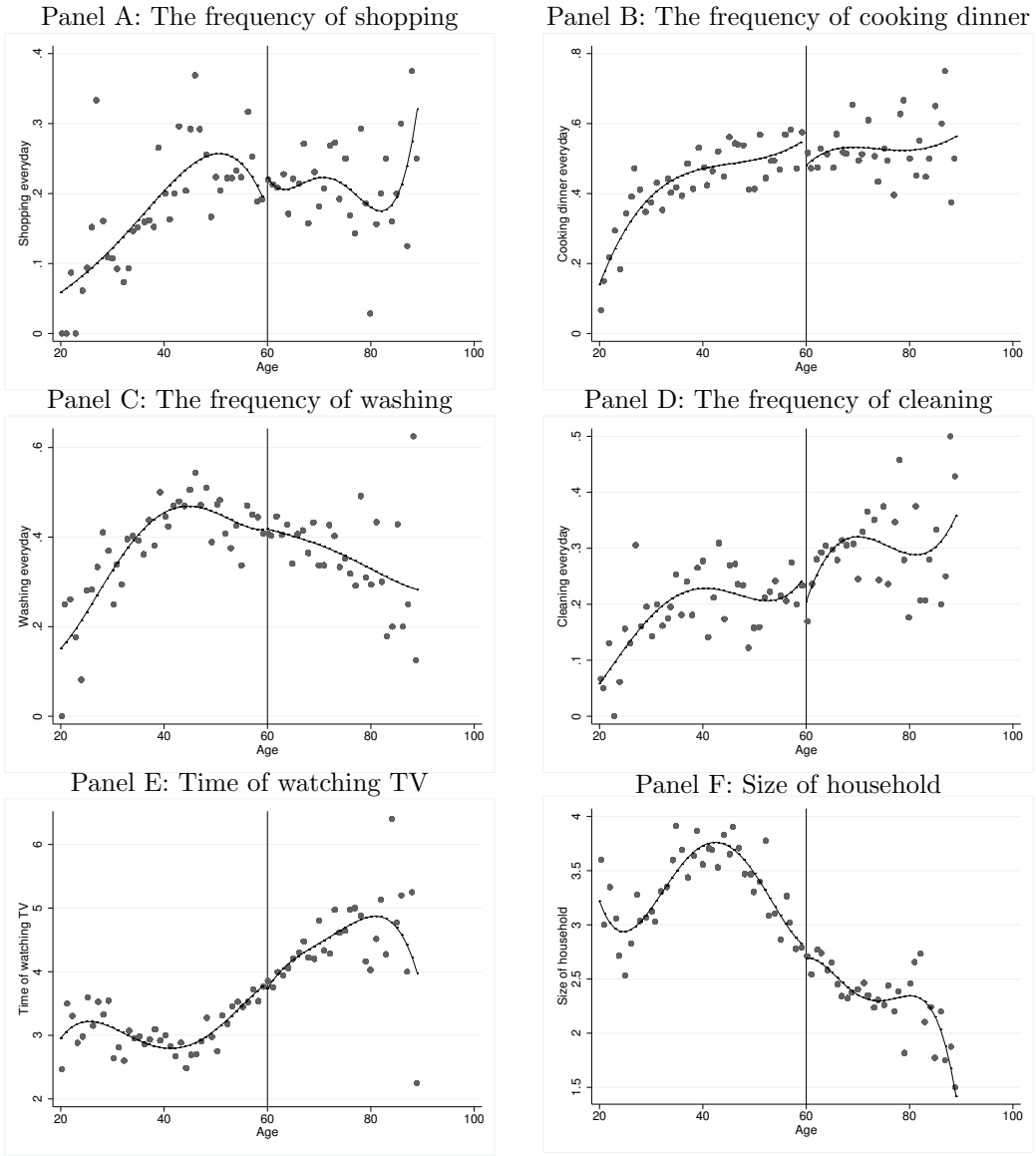


Figure 10: Home production and leisure related variables by age(JGSS)

Notes: The figure plots average of home production and leisure related variables such as frequency of shopping, cooking, washing, cleaning, time of watching TV, and size of household for each age in JGSS sample. The solid line is quartic fits on each side of age of 60. The vertical line represents age of 60.

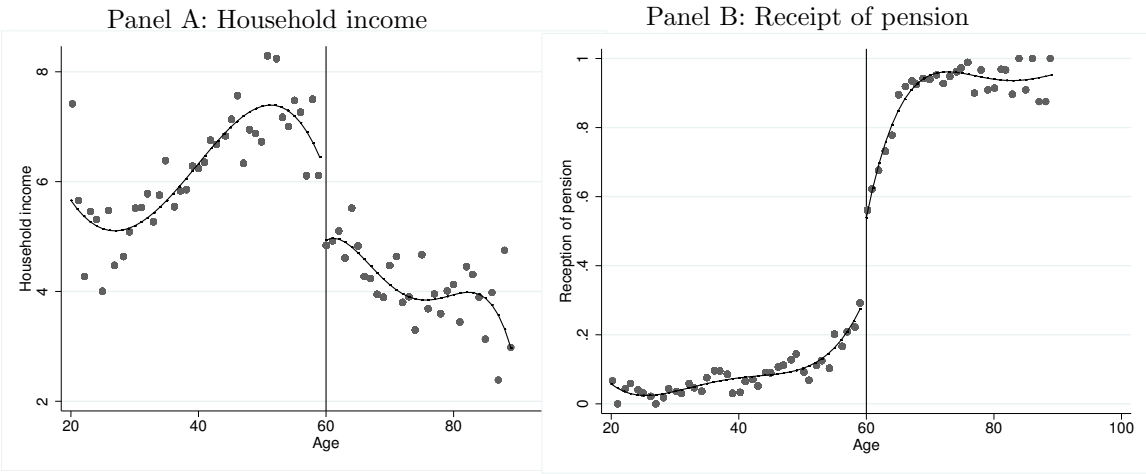


Figure 11: Household income and receipt of pension benefit by age (JGSS)

Notes: The figure plots average of household income and receipt of pension for each age in JGSS sample. The solid line is quartic fits on each side of age of 60. The vertical line represents age of 60.

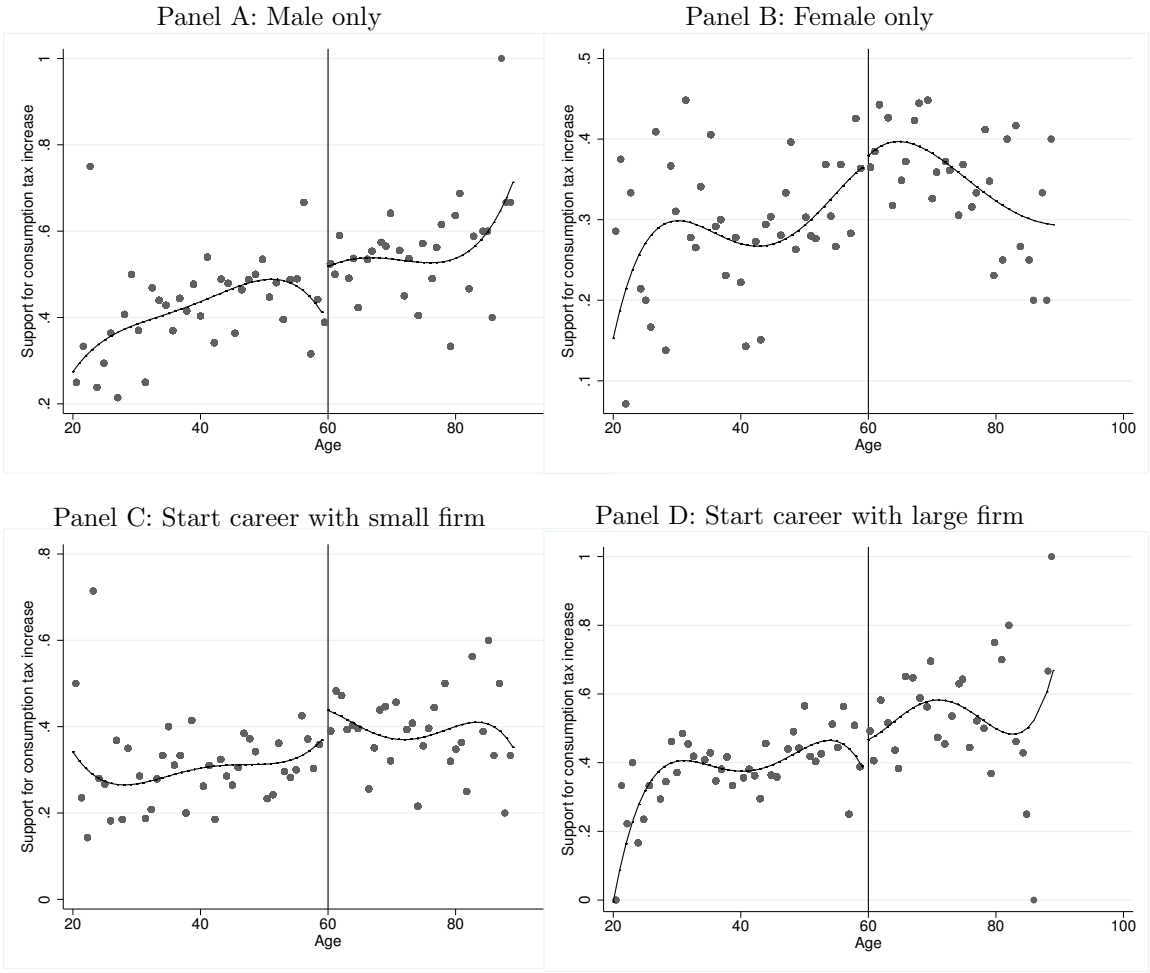


Figure 12: The fraction of supporters for consumption tax hike by subgroup (JGSS)

Notes: The figure plots fraction of supporters for consumption tax hike for each age in JGSS sample by subgroup. The solid line is quartic fits on each side of age of 60. The vertical line represents age of 60.

Appendix

A.1 Definition of Variables

Demographic Varibles

Education. We classify respondents into the following four categories according to their terminal education record: elementary and junior high school, high school, some college, and university. Both the JGSS and UTAS ask respondents for their terminal education record. The category of some college includes colleges of technology and junior colleges. Graduate school is included in the category of university.

Household Income. Only JGSS asks responrents about pre-tax household income that includes wages and pension benefits, yields on shares, and income from real estate. The respondents are asked to choose their answers from among several income categories. We record the median value of the category that the respondent chooses as household income. We assign 350 thousand yen for the respondent who chooses the lowest category, less than 700 thousand yen for the next lowest category, and 25 million yen for the respondent who chooses the highest category of more than 23 million yen.

Employment Status. Employment status is classified into four categories in the JGSS data, regular employment (*seiki-koyo*), part-time employment (*hiseiki-koyo*), self-employment, and not working. Managers and directors are included in category of regular employment while part-time and temporary workers are included in category of non-regular employment. In the UTAS data, we add two different categories, public servant and student, to the above four categories.

Control Variables (only JGSS)

Living in a large city. An indicator variable that shows whether a respondent lives in a city with a population over 200,000.

Bad health. JGSS asks respondents about subjective evaluation of their health status in five grades. Bad health is a dummy variable that indicates whether subjective evaluation is worse than the third in the five stage evaluation

House ownership. An indicator variable that shows whether the respondent has their own house.

Trust in politicians: In JGSS, there are questions concerning trust in members of Congress as follows: "How much do you trust members of Congress?" We regard those who respond with "trust a lot" or "trust a little" as having trust in politicians. Since half of the respondents in the JGSS 2012 are not asked about trust toward members of Congress, the sample size substantially decreases when we include trust in politicians in our analysis.

Experience of charity: Whether the respondent donated during the past year.

Will to volunteer: JGSS 2012 asked respondents, "Would you like to participate in volunteer activities if there is an opportunity to from now on?" We regard those who respond with "I'd like to participate" or "I'd like to participate if I could" as having the will to participate

in volunteer activity.

Policy Preference (only JGSS)

Health care for the old. In JGSS, there is a following question on life security of the elderly, "Is the life security of the elderly the responsibility of individuals or families? Or is it the responsibility of the state or local government?" The respondents provided responses from 1 to 5, where "5" corresponds to "responsibility of the state or local government" and "1" corresponds to "responsibility of individuals or families." We use this five grade variable as degree of demand for health care for the old.
Life security for the old. In JGSS, there is a following question on health care, "Is health care for the elderly the responsibility of individuals or families? Or is it the responsibility of the state or local government?" The respondents provided responses from 1 to 5, where "5" corresponds to "responsibility of the state or local government" and "1" corresponds to "responsibility of individuals or families." We use this five grade variable as degree of demand for health care for the old.
Redistribution. JGSS asks for opinions on redistributive policies in the following statement, "Are you in favor of the statement that the government should adopt policies to reduce the income gap between the rich and the poor?" The respondents must choose their answer from five alternatives, from 1 to 5, and the larger number means more positive attitude toward the government intervention.

Receipt of pension (only JGSS)

Receipt of pension. In JGSS, there is a question about the source of financial support as follows: "What are your sources of financial support? Choose all items that apply". We define the respondent who answer "pension" is included in the source of financial support to this question as pension recipients.

Time Use (only JGSS)

Average hours worked per week. We use question about normal hours worked per week. The hours worked for respondent who does not work is recorded as zero.
Home production related variables (Cooking dinner everyday, Washing everyday, Shopping everyday, and Cleaning everyday). In JGSS, there is quesions about time use as follows: "How often do you do the following activities ?" The respondents are asked about the frequency of activity such as preparation of dinner, cleaning, washing, and shopping. They choose answer from six categories, "almost everyday", "several times in a week", "about once in a week", "about once in a month", "several times in a year", and "about once in a year". We define respondents who answer to do these activities almost everyday as one do these activities everyday.
Hours of watching TV per day. We use question about time of wathing TV "How many hours do you watch TV in a day on average?"

Firm size of the initial job (only JGSS)

JGSS asks respondents about the content of first job in detail, including the number of employees in the firm. According to the firm size of their initial jobs, we categorize respondents into two groups: those who has not employed at all or worked at a firm with less than 99 employee as the first job and those who has worked at a firm with more than 100 employees or public authorities as the first job.

A.2 Additional Graphs and Tables

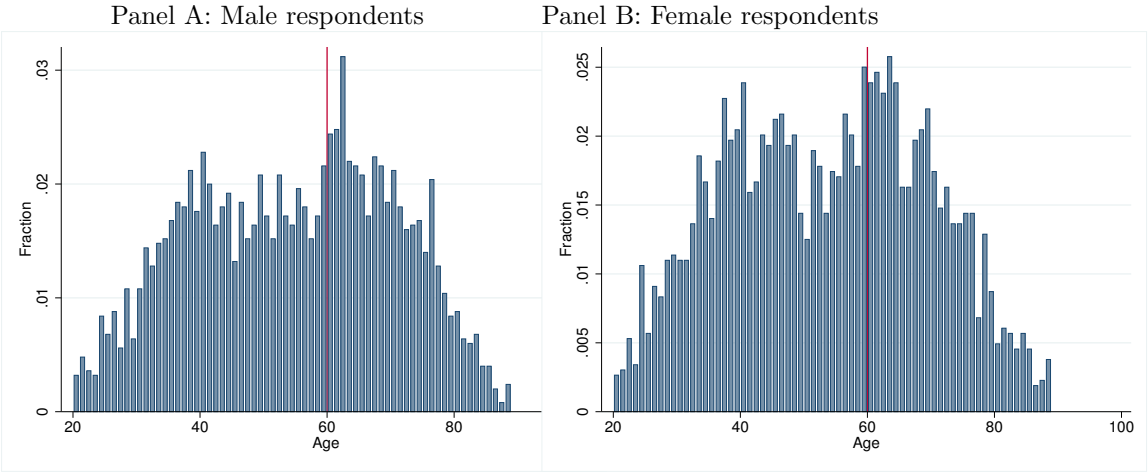


Figure A.1: The distribution of age of respondents by sex (JGSS)

Notes: The graph shows the fraction of respondents for each age by sex in JGSS sample. The vertical line represents age of 60.

Table A.1: Regression discontinuity estimates (JGSS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Age 60 over	0.0557**	0.0602*	0.0422	0.0737*	0.0476	0.0759*	0.0526	0.0794**	0.1043**
	(0.0243)	(0.0349)	(0.0424)	(0.0387)	(0.0319)	(0.0408)	(0.0417)	(0.0373)	(0.0417)
	[0.0253]	[0.0357]	[0.0463]	[0.0573]	[0.0304]	[0.0450]	[0.0419]	[0.0654]	[0.0589]
Covariates	No	No	No	No	No	No	No	No	No
Age 60 over	0.0769***	0.0696*	0.0461	0.0662*	0.0625*	0.0759*	0.0584	0.0738*	0.0986**
	(0.0245)	(0.0353)	(0.0417)	(0.0389)	(0.0323)	(0.0409)	(0.0422)	(0.0361)	(0.0399)
	[0.0249]	[0.0349]	[0.0453]	[0.0565]	[0.0297]	[0.0440]	[0.0411]	[0.0647]	[0.0583]
Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Order of Polynomial	1	2	3	4	1	2	1	2	1
Bandwidth	∞	∞	∞	∞	20	20	10	10	5
Observation	5140	5140	5140	5140	3790	3790	2158	2158	1222

Notes: The table reports coefficient of the age-above-60 indicator controlling for a polynomial of age. We allow the parameter of polynomial to vary on either side of the cutoff. The covariates is demographic variables such as gender, marital status, education, household income, and employment status. Standard errors are clustered at age in parentheses. Robust standard errors are also reported in brackets.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table A.2: Jumps of predetermined variables at age of 60 (JGSS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female	-0.0281	-0.0118	-0.0586*	-0.0611**	-0.0199	-0.0418	-0.0639**	-0.0597**	-0.0657*
	(0.0223)	(0.0277)	(0.0304)	(0.0302)	(0.0250)	(0.0312)	(0.0293)	(0.0271)	(0.0295)
	[0.0258]	[0.0363]	[0.0470]	[0.0584]	[0.0309]	[0.0457]	[0.0425]	[0.0666]	[0.0600]
Married	-0.0320	0.0865**	-0.0153	0.0306	0.0406**	0.0102	0.0363	0.0309	0.0215
	(0.0362)	(0.0363)	(0.0266)	(0.0377)	(0.0193)	(0.0260)	(0.0263)	(0.0438)	(0.0340)
	[0.0209]	[0.0280.0365]	[0.0451]	[0.0241]	[0.0357]	[0.0330]	[0.0515]	[0.0463]	
Years of schooling	-0.5430***	-0.4180***	-0.1269	0.0375	-0.5068***	-0.0776	-0.2021*	0.0792	-0.1319
	(0.0978)	(0.1166)	(0.1190)	(0.1151)	(0.1167)	(0.1057)	(0.1076)	(0.1204)	(0.0796)
	[0.1082]	[0.1527]	[0.1974]	[0.2437]	[0.1302]	[0.1921]	[0.1780]	[0.2767]	[0.2503]
Number of children	-0.2529***	0.0953*	0.0066	-0.0512	-0.0646	0.0449	0.0014	0.0481	0.0314
	(0.0699)	(0.0537)	(0.0600)	(0.0710)	(0.0466)	(0.0530)	(0.0434)	(0.0499)	(0.0482)
	[0.0506]	[0.0712]	[0.0929]	[0.1157]	[0.0612]	[0.0915]	[0.0850]	[0.1348]	[0.1217]
Order of Polynomial	1	2	3	4	1	2	1	2	1
Bandwidth	∞	∞	∞	∞	20	20	10	10	5
Observation	5140	5140	5140	5140	3790	3790	2158	2158	1222

Notes: The table reports coefficient of the age-above-60 indicator on each predetermineed variables controlling for a polynomial of age. We allow the parameter of polynomial to vary on either side of the cutoff. Standard errors are clustered at age in parentheses. Robust standard errors are also reported in brackets.
* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table A.3: Regression discontinuity estimates by survey year (JGSS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A. JGSS2012 only									
Age 60 over	0.0505*	0.0652*	0.0416	0.1021**	0.0323	0.0947**	0.0554	0.0998**	0.1264***
	(0.0257)	(0.0359)	(0.0473)	(0.0443)	(0.0350)	(0.0418)	(0.0427)	(0.0416)	(0.0357)
	[0.0314]	[0.0444]	[0.0583]	[0.0730]	[0.0378]	[0.0566]	[0.0527]	[0.0839]	[0.0755]
Observation	3408	3408	3408	3408	2506	2506	1418	1418	802
Panel B. JGSS2010 only									
Age 60 over	0.0628	0.0491	0.0348	0.0262	0.0752	0.0396	0.0439	0.0318	0.0612
	(0.0404)	(0.0572)	(0.0551)	(0.0506)	(0.0477)	(0.0586)	(0.0569)	(0.0594)	(0.0650)
	[0.0429]	[0.0600]	[0.0758]	[0.0920]	[0.0512]	[0.0740]	[0.0690]	[0.1043]	[0.0940]
Observation	1732	1732	1732	1732	1284	1284	740	740	420
Covariates	No	No	No	No	No	No	No	No	No
Order of Polynomial	1	2	3	4	1	2	1	2	1
Bandwidth	∞	∞	∞	∞	20	20	10	10	5

Notes: The table reports coefficient of the age-above-60 indicator controlling for a polynomial of age without covariates. We allow the parameter of polynomial to vary on either side of the cutoff. Standard errors are clustered at age in parentheses. Robust standard errors are also reported in brackets.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table A.4: Jumps of policy preference at age of 60 (JGSS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Health care for the old	-0.0890	-0.0089	0.1246	0.0895	-0.0351	0.1166	0.0670	0.0320	-0.0091
	(0.0543)	(0.0686)	(0.0936)	(0.1014)	(0.0603)	(0.0843)	(0.0773)	(0.1010)	(0.0784)
	[0.0533]	[0.0757]	[0.0979]	[0.1198]	[0.0635]	[0.0947]	[0.0882]	[0.1349]	[0.1233]
Observation	5091	5091	5091	5091	3753	3753	2137	2137	1210
Life security for the old	-0.1666***	-0.0844	0.0130	-0.0212	-0.0982	-0.0221	-0.0351	-0.1314	-0.0674
	(0.0555)	(0.0676)	(0.0899)	(0.1098)	(0.0595)	(0.0838)	(0.0877)	(0.1065)	(0.0886)
	[0.0607]	[0.0853]	[0.1097]	[0.1345]	[0.0723]	[0.1068]	[0.0994]	[0.1520]	[0.1390]
Observation	5091	5091	5091	5091	3749	3749	2136	2136	1211
Redistribution	0.1048**	-0.0391	0.0225	-0.0104	0.0304	0.0515	0.0354	0.0221	-0.0526
	(0.0515)	(0.0635)	(0.0671)	(0.0675)	(0.0548)	(0.0654)	(0.0712)	(0.0552)	(0.0766)
	[0.0523]	[0.0743]	[0.0973]	[0.1216]	[0.0628]	[0.0942]	[0.0873]	[0.1374]	[0.1240]
Observation	5129	5129	5129	5129	3781	3781	2153	2153	1219
Trust in politician	-0.0100	-0.0082	0.0033	-0.0092	-0.0320	-0.0112	-0.0183	0.0533	0.0678
	(0.0272)	(0.0372)	(0.0391)	(0.0523)	(0.0339)	(0.0385)	(0.0391)	(0.0390)	(0.0392)
	[0.0326]	[0.0459]	[0.0588]	[0.0721]	[0.0390]	[0.0571]	[0.0529]	[0.0819]	[0.0740]
Observation	2856	2856	2856	2856	2091	2091	1219	1219	703
Order of Polynomial	1	2	3	4	1	2	1	2	1
Bandwidth	∞	∞	∞	∞	20	20	10	10	5

Notes: The table reports coefficient of the age-above-60 indicator on policy preference controlling for a polynomial of age without covariates. We allow the parameter of polynomial to vary on either side of the cutoff. Standard errors are clustered at age in parentheses. Robust standard errors are also reported in brackets.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table A.5: Jumps of work related variables at age of 60 (JGSS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Not working	0.2055***	0.0612**	0.0019	-0.0446	0.1367***	-0.0079	0.0091	-0.0034	0.0145
	(0.0340)	(0.0261)	(0.0260)	(0.0296)	(0.0319)	(0.0219)	(0.0191)	(0.0270)	(0.0166)
	[0.0227]	[0.0322]	[0.0420]	[0.0519]	[0.0273]	[0.0406]	[0.0377]	[0.0583]	[0.0542]
Observation	5140	5140	5140	5140	3790	3790	2158	2158	1222
Regular employment	-0.2602***	-0.1324***	-0.1460***	-0.0339	-0.2153***	-0.1061**	-0.1011**	-0.1222**	-0.1274**
	(0.0354)	(0.0370)	(0.0478)	(0.0593)	(0.0379)	(0.0461)	(0.0476)	(0.0541)	(0.0517)
	[0.0224]	[0.0327]	[0.0435]	[0.0549]	[0.0278]	[0.0426]	[0.0395]	[0.0635]	[0.0572]
Observation	5140	5140	5140	5140	3790	3790	2158	2158	1222
Weekly hours worked	-9.5755***	-3.1614**	-1.5490	2.8136	-7.1660***	-1.1245	-1.2564	-0.6048	-1.1338
	(1.8477)	(1.3532)	(1.4738)	(2.1102)	(1.7597)	(1.4501)	(1.4027)	(1.3045)	(1.0031)
	[1.0241]	[1.4873]	[1.9614]	[2.4414]	[1.2488]	[1.8989]	[1.7545]	[2.7499]	[2.5285]
Observation	4995	4995	4995	4995	3681	3681	2093	2093	1184
Order of Polynomial	1	2	3	4	1	2	1	2	1
Bandwidth	∞	∞	∞	∞	20	20	10	10	5

Notes: The table reports coefficient of the age-above-60 indicator on work related variables controlling for a polynomial of age without covariates. We allow the parameter of polynomial to vary on either side of the cutoff. Standard errors are clustered at age in parentheses. Robust standard errors are also reported in brackets.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table A.6: Jumps of home production and leisure related variables at age of 60 (JGSS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Shopping everyday	-0.0593**	-0.0091	0.0167	0.0442	-0.0131	0.0127	-0.0101	0.0397*	0.0414
	(0.0226)	(0.0234)	(0.0282)	(0.0269)	(0.0240)	(0.0293)	(0.0292)	(0.0212)	(0.0245)
	[0.0211]	[0.0296]	[0.0383]	[0.0470]	[0.0255]	[0.0376]	[0.0349]	[0.0538]	[0.0484]
Observation	5122	5122	5122	5122	3775	3775	2152	2152	1220
Cooking dinner everyday	-0.0613**	-0.0158	-0.0784**	-0.0758	-0.0331	-0.0542	-0.0815**	-0.0787	-0.0757
	(0.0239)	(0.0328)	(0.0391)	(0.0492)	(0.0272)	(0.0397)	(0.0374)	(0.0458)	(0.0430)
	[0.0257]	[0.0361]	[0.0468]	[0.0581]	[0.0309]	[0.0458]	[0.0425]	[0.0665]	[0.0599]
Observation	5110	5110	5110	5110	3766	3766	2153	2153	1221
Washing everyday	-0.0686**	0.0340	0.0255	0.0007	0.0052	0.0253	0.0072	-0.0478	-0.0237
	(0.0272)	(0.0260)	(0.0280)	(0.0287)	(0.0223)	(0.0268)	(0.0243)	(0.0408)	(0.0432)
	[0.0253]	[0.0356]	[0.0463]	[0.0574]	[0.0306]	[0.0454]	[0.0422]	[0.0659]	[0.0592]
Observation	5105	5105	5105	5105	3759	3759	2140	2140	1213
Cleaning everyday	0.0217	0.0335	-0.0304	-0.0491	0.0411	-0.0215	-0.0104	-0.0231	-0.0341
	(0.0237)	(0.0296)	(0.0287)	(0.0348)	(0.0273)	(0.0319)	(0.0319)	(0.0230)	(0.0255)
	[0.0219]	[0.0305]	[0.0390]	[0.0479]	[0.0264]	[0.0385]	[0.0356]	[0.0551]	[0.0499]
Observation	5117	5117	5117	5117	3771	3771	2150	2150	1218
Time of watiching TV	0.5894***	-0.0871	-0.2042	-0.0931	0.1660*	-0.2425*	-0.0850	0.1390	-0.0183
	(0.1325)	(0.0961)	(0.1353)	(0.1435)	(0.0952)	(0.1262)	(0.0998)	(0.1361)	(0.0888)
	[0.1170]	[0.1622]	[0.2096]	[0.2632]	[0.1361]	[0.2019]	[0.1871]	[0.2961]	[0.2649]
Observation	5114	5114	5114	5114	3771	3771	2149	2149	1216
Size of household	-0.6531***	-0.0110	0.2650**	-0.1065	-0.2037*	0.1309	0.0206	0.0521	-0.0681
	(0.1420)	(0.1009)	(0.1272)	(0.1170)	(0.1051)	(0.1016)	(0.1011)	(0.1315)	(0.1178)
	[0.0683]	[0.0929]	[0.1203]	[0.1472]	[0.0800]	[0.1168]	[0.1083]	[0.1658]	[0.1489]
Observation	5139	5139	5139	5139	3789	3789	2158	2158	1222
Order of Polynomial	1	2	3	4	1	2	1	2	1
Bandwidth	∞	∞	∞	∞	20	20	10	10	5

Notes: The table reports coefficient of the age-above-60 indicator on home production and leisure related variables controlling for a polynomial of age without covariates. We allow the parameter of polynomial to vary on either side of the cutoff. Standard errors are clustered at age in parentheses. Robust standard errors are also reported in brackets.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table A.7: Jumps of work related variables at age of 60 (JGSS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Household income	-2.6531***	-2.0432***	-1.0974**	-1.2165**	-2.2000***	-1.2033**	-1.2823**	-0.8768	-1.2036**
	(0.3184)	(0.4383)	(0.4170)	(0.5000)	(0.3837)	(0.4469)	(0.4638)	(0.5121)	(0.4681)
	[0.2071]	[0.3005]	[0.3923]	[0.4898]	[0.2590]	[0.3864]	[0.3670]	[0.5723]	[0.5261]
Observation	5140	5140	5140	5140	3790	3790	2158	2158	1222
Receipt of pension	0.5358***	0.3727***	0.2757***	0.2248***	0.4655***	0.3049***	0.3191***	0.2211***	0.2609***
	(0.0456)	(0.0313)	(0.0241)	(0.0240)	(0.0445)	(0.0273)	(0.0264)	(0.0237)	(0.0271)
	[0.0203]	[0.0305]	[0.0407]	[0.0509]	[0.0252]	[0.0394]	[0.0366]	[0.0586]	[0.0542]
Observation	5137	5137	5137	5137	3787	3787			
Order of Polynomial	1	2	3	4	1	2	1	2	1
Bandwidth	∞	∞	∞	∞	20	20	10	10	5

Notes: The table reports coefficient of the age-above-60 indicator on household income and receipt of pension controlling for a polynomial of age without covariates. We allow the parameter of polynomial to vary on either side of the cutoff. Standard errors are clustered at age in parentheses. Robust standard errors are also reported in brackets.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table A.8: Regression discontinuity estimates by subsample (JGSS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A. Male only									
Age 60 over	0.0258	0.0886*	0.0971	0.1313**	0.0653	0.1105*	0.0842	0.1749***	0.2093***
	(0.0374)	(0.0527)	(0.0606)	(0.0514)	(0.0495)	(0.0605)	(0.0610)	(0.0469)	(0.0485)
	[0.0369]	[0.0521]	[0.0679]	[0.0841]	[0.0444]	[0.0662]	[0.0613]	[0.0957]	[0.0864]
Observation	2501	2501	2501	2501	1866	1866	1060	1060	591
Panel B. Female only									
Age 60 over	0.0751***	0.0357	-0.0217	0.0090	0.0280	0.0375	0.0087	-0.0191	-0.0057
	(0.0260)	(0.0323)	(0.0380)	(0.0412)	(0.0285)	(0.0394)	(0.0354)	(0.0400)	(0.0445)
	[0.0342]	[0.0482]	[0.0625]	[0.0776]	[0.0410]	[0.0607]	[0.0566]	[0.0889]	[0.0799]
Observation	2639	2639	2639	2639	1924	1924	1098	1098	631
Panel C. Start career with small firm									
Age 60 over	0.0689**	0.0758**	0.0979**	0.0513	0.0579*	0.0907**	0.0524	0.1079*	0.0910*
	(0.0289)	(0.0375)	(0.0468)	(0.0528)	(0.0315)	(0.0412)	(0.0395)	(0.0530)	(0.0479)
	[0.0360]	[0.0515]	[0.0678]	[0.0844]	[0.0441]	[0.0663]	[0.0618]	[0.0962]	[0.0873]
Observation	2471	2471	2471	2471	1825	1825	1017	1017	568
Panel D. Start career with large firm									
Age 60 over	0.0555	0.0391	-0.0108	0.1183	0.0413	0.0557	0.0479	0.0693	0.1218
	(0.0462)	(0.0611)	(0.0791)	(0.0755)	(0.0565)	(0.0736)	(0.0731)	(0.0739)	(0.0731)
	[0.0357]	[0.0496]	[0.0634]	[0.0779]	[0.0420]	[0.0613]	[0.0566]	[0.0885]	[0.0797]
Observation	2669	2669	2669	2669	1965	1965	1141	1141	654
Covariates	No	No	No	No	No	No	No	No	No
Order of Polynomial	1	2	3	4	1	2	1	2	1
Bandwidth	∞	∞	∞	∞	20	20	10	10	5

Notes: The table reports coefficient of the age-above-60 indicator controlling for a polynomial of age without covariates. We allow the parameter of polynomial to vary on either side of the cutoff. Standard errors are clustered at age in parentheses. Robust standard errors are also reported in brackets.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table A.9: Jump of outcome variables at age of 60 (JGSS): Male sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Not working	0.2284***	0.0289	0.0584	0.0061	0.1538***	0.0449	0.0546	-0.0114	-0.0090
	(0.0478)	(0.0344)	(0.0444)	(0.0455)	(0.0416)	(0.0385)	(0.0346)	(0.0494)	(0.0405)
	[0.0283]	[0.0378]	[0.0489]	[0.0599]	[0.0317]	[0.0464]	[0.0433]	[0.0663]	[0.0610]
Observation	2501	2501	2501	2501	1866	1866	1060	1060	591
Regular employment	-0.4608***	-0.1808***	-0.2409***	-0.1369**	-0.3409***	-0.1973***	-0.1989***	-0.2128***	-0.2309***
	(0.0521)	(0.0411)	(0.0444)	(0.0543)	(0.0425)	(0.0402)	(0.0443)	(0.0568)	(0.0493)
	[0.0328]	[0.0478]	[0.0638]	[0.0797]	[0.0397]	[0.0619]	[0.0573]	[0.0910]	[0.0841]
Observation	2501	2501	2501	2501	1866	1866	1060	1060	591
Weekly hours worked	-12.8064***	-1.0025	-2.3347	2.4768	-8.7069***	-2.1559	-2.3188	1.1068	0.7656
	(2.9111)	(1.9804)	(2.0902)	(2.7740)	(2.6224)	(1.9224)	(1.8613)	(2.4338)	(2.0330)
	[1.4043]	[1.9463]	[2.5626]	[3.1767]	[1.6162]	[2.4468]	[2.2561]	[3.5465]	[3.2382]
Observation	2423	2423	2423	2423	1805	1805	1024	1024	574
Household income	-2.7050***	-2.2182***	-1.2461**	-1.7296***	-2.4030***	-1.4711**	-1.3899**	-0.8613	-1.1627*
	(0.3820)	(0.5479)	(0.5916)	(0.5336)	(0.4734)	(0.5912)	(0.5855)	(0.6425)	(0.5351)
	[0.3060]	[0.4493]	[0.5913]	[0.7403]	[0.3857]	[0.5902]	[0.5555]	[0.8936]	[0.8326]
Observation	2501	2501	2501	2501	1866	1866	1060	1060	591
Receipt of pension	0.4972***	0.3557***	0.2613***	0.2210***	0.4635***	0.2969***	0.3255***	0.1925***	0.2237***
	(0.0558)	(0.0388)	(0.0444)	(0.0524)	(0.0571)	(0.0416)	(0.0404)	(0.0459)	(0.0370)
	[0.0291]	[0.0427]	[0.0567]	[0.0711]	[0.0354]	[0.0550]	[0.0508]	[0.0814]	[0.0746]
Observation	2498	2498	2498	2498	1863	1863	1058	1058	590
Order of Polynomial	1	2	3	4	1	2	1	2	1
Bandwidth	∞	∞	∞	∞	20	20	10	10	5

Notes: The table reports coefficient of the age-above-60 indicator on main outcome variables controlling for a polynomial of age without covariates. We allow the parameter of polynomial to vary on either side of the cutoff. Standard errors are clustered at age in parentheses. Robust standard errors are also reported in brackets.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table A.10: Jump of outcome variables at age of 60 (JGSS): Female sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Not working	0.1938***	0.0989*	-0.0212	-0.0586	0.1325***	-0.0325	-0.0027	0.0398	0.0735
	(0.0422)	(0.0514)	(0.0473)	(0.0548)	(0.0476)	(0.0456)	(0.0429)	(0.0616)	(0.0417)
	[0.0334]	[0.0482]	[0.0626]	[0.0780]	[0.0411]	[0.0608]	[0.0566]	[0.0884]	[0.0817]
Observation	2639	2639	2639	2639	1924	1924	1098	1098	631
Regular employment	-0.0865***	-0.0987**	-0.0852	0.0125	-0.1136***	-0.0454	-0.0576	-0.0761	-0.0808
	(0.0295)	(0.0386)	(0.0522)	(0.0609)	(0.0344)	(0.0510)	(0.0456)	(0.0509)	(0.0521)
	[0.0258]	[0.0377]	[0.0502]	[0.0638]	[0.0318]	[0.0486]	[0.0453]	[0.0745]	[0.0665]
Observation	2639	2639	2639	2639	1924	1924	1098	1098	631
Weekly hours worked	-7.4031***	-5.9886**	-2.5323	0.8621	-6.7567***	-1.5950	-2.4920	-4.6700	-5.3424*
	(1.6697)	(2.2634)	(2.5493)	(3.0992)	(2.0090)	(2.5681)	(2.4605)	(2.7686)	(2.4219)
	[1.2543]	[1.8297]	[2.4162]	[3.0326]	[1.5560]	[2.3486]	[2.1794]	[3.4430]	[3.1515]
Observation	2572	2572	2572	2572	1876	1876	1069	1069	610
Household income	-2.6356***	-1.8941***	-1.0686*	-0.8346	-2.0445***	-1.0450	-1.2705*	-0.9751	-1.3212
	(0.3686)	(0.5201)	(0.5937)	(0.7715)	(0.4625)	(0.6278)	(0.6574)	(0.9667)	(0.9650)
	[0.2793]	[0.4020]	[0.5237]	[0.6517]	[0.3468]	[0.5086]	[0.4873]	[0.7331]	[0.6629]
Observation	2639	2639	2639	2639	1924	1924	1098	1098	631
Receipt of pension	0.5756***	0.3966***	0.3041***	0.2458***	0.4739***	0.3298***	0.3265***	0.2688***	0.3142***
	(0.0446)	(0.0373)	(0.0304)	(0.0288)	(0.0420)	(0.0343)	(0.0314)	(0.0360)	(0.0399)
	[0.0278]	[0.0422]	[0.0565]	[0.0709]	[0.0349]	[0.0546]	[0.0510]	[0.0824]	[0.0766]
Observation	2639	2639	2639	2639	1924	1924	1098	1098	631
Order of Polynomial	1	2	3	4	1	2	1	2	1
Bandwidth	∞	∞	∞	∞	20	20	10	10	5

Notes: The table reports coefficient of the age-above-60 indicator on main outcome variables controlling for a polynomial of age without covariates. We allow the parameter of polynomial to vary on either side of the cutoff. Standard errors are clustered at age in parentheses. Robust standard errors are also reported in brackets.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table A.11: Jump of outcome variables at age of 60 (JGSS): Start career with small firm

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Not working	0.1582***	-0.0216	-0.0595	-0.1248*	0.0697	-0.0766	-0.0759	-0.0774	-0.0927
	(0.0445)	(0.0435)	(0.0530)	(0.0686)	(0.0460)	(0.0549)	(0.0533)	(0.0711)	(0.0578)
	[0.0333]	[0.0474]	[0.0624]	[0.0772]	[0.0409]	[0.0615]	[0.0572]	[0.0870]	[0.0810]
Observation	2471	2471	2471	2471	1825	1825	1017	1017	568
Regular employment	-0.1603***	-0.0112	-0.0517	0.0412	-0.1072**	-0.0064	-0.0019	-0.0749	-0.0535
	(0.0391)	(0.0473)	(0.0541)	(0.0685)	(0.0434)	(0.0584)	(0.0603)	(0.0559)	(0.0574)
	[0.0320]	[0.0470]	[0.0632]	[0.0808]	[0.0403]	[0.0623]	[0.0583]	[0.0938]	[0.0844]
Observation	2471	2471	2471	2471	1825	1825	1017	1017	568
Weekly hours worked	-7.6048***	0.7658	1.0314	6.9167*	-4.5120*	2.4954	2.0874	1.4148	2.6029
	(2.4556)	(2.6219)	(2.7957)	(3.9512)	(2.5738)	(3.3096)	(3.2758)	(2.8508)	(3.0836)
	[1.5524]	[2.2634]	[3.0294]	[3.8017]	[1.9274]	[2.9787]	[2.7608]	[4.3087]	[3.9662]
Observation	2390	2390	2390	2390	1765	1765	981	981	544
Household income	-1.7529***	-1.3915***	-0.2996	-0.3966	-1.4100***	-0.4661	-0.4273	0.0791	-0.2765
	(0.3422)	(0.5058)	(0.4726)	(0.6387)	(0.4154)	(0.5377)	(0.5153)	(0.5797)	(0.5224)
	[0.2908]	[0.4166]	[0.5336]	[0.6401]	[0.3598]	[0.5174]	[0.5027]	[0.7025]	[0.6508]
Observation	2471	2471	2471	2471	1825	1825	1017	1017	568
Receipt of pension	0.4747***	0.3051***	0.1956***	0.1650***	0.3979***	0.2388***	0.2390***	0.1355**	0.1829***
	(0.0523)	(0.0419)	(0.0421)	(0.0530)	(0.0522)	(0.0392)	(0.0313)	(0.0633)	(0.0413)
	[0.0300]	[0.0450]	[0.0610]	[0.0766]	[0.0378]	[0.0597]	[0.0559]	[0.0882]	[0.0820]
Observation	2469	2469	2469	2469	1823	1823	1016	1016	568
Order of Polynomial	1	2	3	4	1	2	1	2	1
Bandwidth	∞	∞	∞	∞	20	20	10	10	5

Notes: The table reports coefficient of the age-above-60 indicator on main outcome variables controlling for a polynomial of age without covariates. We allow the parameter of polynomial to vary on either side of the cutoff. Standard errors are clustered at age in parentheses. Robust standard errors are also reported in brackets.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent

Table A.12: Jump of outcome variables at age of 60 (JGSS): Start career with small firm

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Not working	0.2432***	0.1335***	0.0374	0.0425	0.1941***	0.0451	0.0763*	0.0585	0.1029
	(0.0385)	(0.0462)	(0.0583)	(0.0501)	(0.0395)	(0.0496)	(0.0427)	(0.0592)	(0.0604)
	[0.0313]	[0.0443]	[0.0572]	[0.0705]	[0.0371]	[0.0547]	[0.0507]	[0.0789]	[0.0734]
Observation	2669	2669	2669	2669	1965	1965	1141	1141	654
Regular employment	-0.3194***	-0.2372***	-0.2023***	-0.0990	-0.2965***	-0.1837***	-0.1772***	-0.1427**	-0.1759***
	(0.0391)	(0.0411)	(0.0498)	(0.0630)	(0.0433)	(0.0451)	(0.0500)	(0.0664)	(0.0509)
	[0.0307]	[0.0450]	[0.0591]	[0.0740]	[0.0376]	[0.0574]	[0.0530]	[0.0846]	[0.0766]
Observation	2669	2669	2669	2669	1965	1965	1141	1141	654
Weekly hours worked	-11.0092***	-6.7103***	-3.0872	-1.6310	-9.4627***	-4.0323*	-4.0931**	-2.3784	-4.3218
	(1.9062)	(2.0156)	(2.6057)	(2.7839)	(1.9687)	(2.2568)	(1.8674)	(2.8609)	(2.7843)
	[1.3555]	[1.9679]	[2.5583]	[3.1543]	[1.6387]	[2.4629]	[2.2699]	[3.5419]	[3.2709]
Observation	2605	2605	2605	2605	1916	1916	1112	1112	640
Household income	-3.1815***	-2.4774***	-1.6810***	-1.7048***	-2.7201***	-1.7174***	-1.8452***	-1.4320**	-1.7754***
	(0.3782)	(0.4644)	(0.4805)	(0.4945)	(0.4345)	(0.4804)	(0.5029)	(0.5404)	(0.4797)
	[0.2883]	[0.4182]	[0.5464]	[0.6899]	[0.3595]	[0.5411]	[0.5092]	[0.8274]	[0.7587]
Observation	2669	2669	2669	2669	1965	1965	1141	1141	654
Receipt of pension	0.5944***	0.4358***	0.3501***	0.2744***	0.5317***	0.3694***	0.3947***	0.2982***	0.3325***
	(0.0474)	(0.0422)	(0.0416)	(0.0375)	(0.0489)	(0.0429)	(0.0438)	(0.0515)	(0.0563)
	[0.0273]	[0.0413]	[0.0546]	[0.0684]	[0.0334]	[0.0521]	[0.0481]	[0.0783]	[0.0721]
Observation	2668	2668	2668	2668	1964	1964	1140	1140	653
Order of Polynomial	1	2	3	4	1	2	1	2	1
Bandwidth	∞	∞	∞	∞	20	20	10	10	5

Notes: The table reports coefficient of the age-above-60 indicator on main outcome variables controlling for a polynomial of age without covariates. We allow the parameter of polynomial to vary on either side of the cutoff. Standard errors are clustered at age in parentheses. Robust standard errors are also reported in brackets.

* significant at 10 percent, ** significant at 5 percent, *** significant at 1 percent