一橋大学機関リポジトリ
HERMES-IR

| | |
|---|---|
| Title | Does Japan have a Gray Democracy? An empirical analysis of prefectural data |
| Author(s) | Shimasawa, Manabu; Oguro, Kazumasa; Toyoda, Nao |
| Citation | |
| Issue Date | 2014-02 |
| Type | Technical Report |
| Text Version | publisher |
| URL | http://hdl.handle.net/10086/26138 |
| Right | |

Hitotsubashi University Repository

# Does Japan have a Gray Democracy? An empirical analysis of prefectural data

Manabu Shimasawa*
Senior Researcher
National Institute for Research Advancement

Kazumasa Oguro
Associate Professor
Faculty of Economics, Hosei University

Nao Toyoda
Senior Researcher
National Institute for Research Advancement

**Abstract**

This study examines whether or not aging is increasing the political influence wielded by Japan's elderly and promoting a so-called "gray democracy." Using a median voter model based on data from Japan's 47 prefectures during the period from 2000 to 2010, we examined the relationship between aging and geriatric expenditures. As a result, controlling income, expenditures, economic conditions, and political factors, we found that geriatric welfare expenditures increase along with median age. The findings utilizing this median voter model imply that the aging median voter may be able to gain substantial benefit through voting. If this prefectural-level relationship between aging and increasing geriatric expenses is reflected on a national level, one may conclude that Japan's continued aging will likely strengthen the political influence of the elderly with respect to increased social security benefits.

**Key words**: aging; political aging; panel data; political economy; median voter model.
**JEL Classification**: C23; H55; J18

* Corresponding author: E-mail: mshimasawa@nira.or.jp

The authors hereby gratefully acknowledge invaluable contributions to this manuscript from XX and YY and others, and declare that any errors are solely our own.

## 1. Introduction

Many developed nations are currently experiencing a declining birthrate and aging population, a trend intensified in Japan. Following World War II, many countries constructed their social security system around the typical demographic pyramid of a broad youthful population narrowing into a much smaller number of elderly. It was, in other words, a system in which a relatively large number of young payers supported a small number of geriatric beneficiaries. Japan was no exception in creating such a system. However, a reverse pyramid is manifesting itself as the birthrate declines and the geriatric population grows, largely crumbling the premise of yesteryear. Despite this, many countries have continued providing their retirees with the same or more generous payments, maintaining the original system. This raises the possibility of a heavier load on the working generation, explained in part by the expanded political influence wielded by the burgeoning older generation.

The major global democracies are based on the principle of majority rule, which allocates political power to the entity winning a relative majority of support in an election. As a result, winning in excess of a numerical (or relative) majority of support becomes the major objective of a political party or alliance thereof. Therefore, in a political economy context, a political party or candidate has the incentive to propose policies approximating preferences of the median voter.[1] As birthrates continue declining and populations continue aging, the elderly and elderly-to-be increasingly represent the median voter. According to 2004 IMF estimates, older voters (aged 50+) will represent the majority of all voters (50.1%) in many developed nations by 2020.[2]

Browning (1975) was one of the first to make the important contribution of factoring in the median voter's age, reaching the following conclusion. He set a three-period overlapping generations model to examine social security burden and benefit, and analyzed it from a political economy standpoint. Assuming a lifetime maximized utility solely for the younger generation based on the acceptance of the middle-aged and elderly generations, the burden will not be fully internalized,[3] and the middle-aged and older generations will collude to gain more benefit than the younger generation. As a result, the older the median voter becomes, the greater the social security expenditure. He thus clarified that social security benefits inherently demand an unreasonably large expenditure from democratic governments.

If the elderly are selfish and use their increased political power to their own ends as the median age rises in an aging society, there is a considerable likelihood that they will put a larger burden on the younger generation to fund the excessive geriatric benefits. In fact, there

[1] See Black (1948) and Congleton (2003).
[2] Preliminary calculations reflect actual voter turnout by generation.
[3] In other words, burdens incurred by the middle-aged and elderly generations in the past are considered sunk costs.

are currently indications of that within the intergenerational disparities we see. Auerbach, Kotlikoff and Leibfritz (1999) conducted an international comparison of the measured intergenerational disparities in 17 world nations, based on the concept of generational accounting developed by Auerbach, Gokhale and Kotlikoff (1991). Their findings clearly revealed that the excessive burden of the younger generation is increasing in many nations (Table 1).

Table 1: International comparison of intergenerational disparity (in 1995 - %)

| Japan* | U.S. | Germany | Italy | Canada | Thailand |
|---|---|---|---|---|---|
| 208.9 | 51.1 | 92.0 | 131.8 | 0.0 | -88.0 |
| Australia | New Zealand | Netherlands | France | Norway | Portugal |
| 32.2 | -3.4 | 76.0 | 47.1 | 63.2 | 59.7 |
| Sweden | Argentina | Belgium | Brazil | Denmark | |
| -22.2 | 58.6 | 58.0 | 88.8 | 46.9 | |

Note: Preliminary calculations for Japan reflect 2010 values provided by Shimasawa (2013).
Source: Auerbach, Kotlikoff and Leibfritz (1999)

In particular, as indicated by Masujima, Shimasawa, and Murakami (2009), Masujima, Shimasawa, and Tanaka (2010), and Shimasawa (2013), Japan's intergenerational disparity is categorized as "severe" in the world, reaching 208.9%, according to Shimasawa (2013). As measurements were taken in differing years, a direct comparison to assess whether or not other nations are "passing the buck" onto future generations to the extent seen in Japan is difficult; however, the above table offers some clarification.

Shimasawa (2013) points out that the primary causes of this intergenerational disparity in Japan are problems such as the public pension and other aspects of the social security system, and the chronic budget deficit. Whether we see further exacerbation or correction of Japan's huge intergenerational disparity, which dooms future generations' livelihoods from the outset, depends on reform of the social security and financial systems largely comprising it. This in turn depends on the current generation's intent, which is to say, on the political process.[4]

This is because the degree of benefit the government confers upon a given group is closely related to its political process (its "democracy") as well as to the majority's preferences.

In the past, special interest groups have often revolved around vocation, as exemplified by agricultural associations, the construction industry, physicians' associations, management federations, and labor unions in Japan. Now, as the population of seniors grows

[4] According to Kotlikoff and Burns (2004), similar circumstances in the U.S. are referred to as "fiscal child abuse."

and the population of the working generation declines, "age" and "generation" may emerge as keywords, even though they do not reflect formalized groups. One reason "age" rates individual classification is that the relationship between the government and the individual generally presumes geriatric benefits, with the working generation shouldering the burden. Another reason is most likely that the elderly shortsightedly prefer immediate benefits over a far-reaching policy, as their remaining lifespan is limited.[5]

To reiterate, Japan's democracy is based upon the principle of majority rule, which allocates political power to the relative majority. Therefore, the major objective of political parties or alliances is to win in excess of a majority of seats in the Diet. From a political economy perspective, a political party has the incentive to adopt policies approximating median voter preferences, particularly in a two-party system. In other words, declining birthrates and a progressively aging population yield increasingly "gray" median voters with enhanced political presence, and thus political policies favorable to retirees—a hypothesized "gray democracy.[6]

Our study utilizes data from Japan's 47 prefectures spanning the decade from 2000 to 2010 to examine the hypothesis that Japan is home to a gray democracy. The remainder of this paper is structured as follows. The second section examines the generation-based participation of Japanese in the political process. The third section reviews surveys of the elderly's preferences vis-à-vis Japan's social security system. The fourth section includes an explanation both of data used in an empirical analysis and the model employed, as well as the verified outcome, while the fifth section presents the conclusion to this paper.

## 2. Aging and the age-based voter turnout

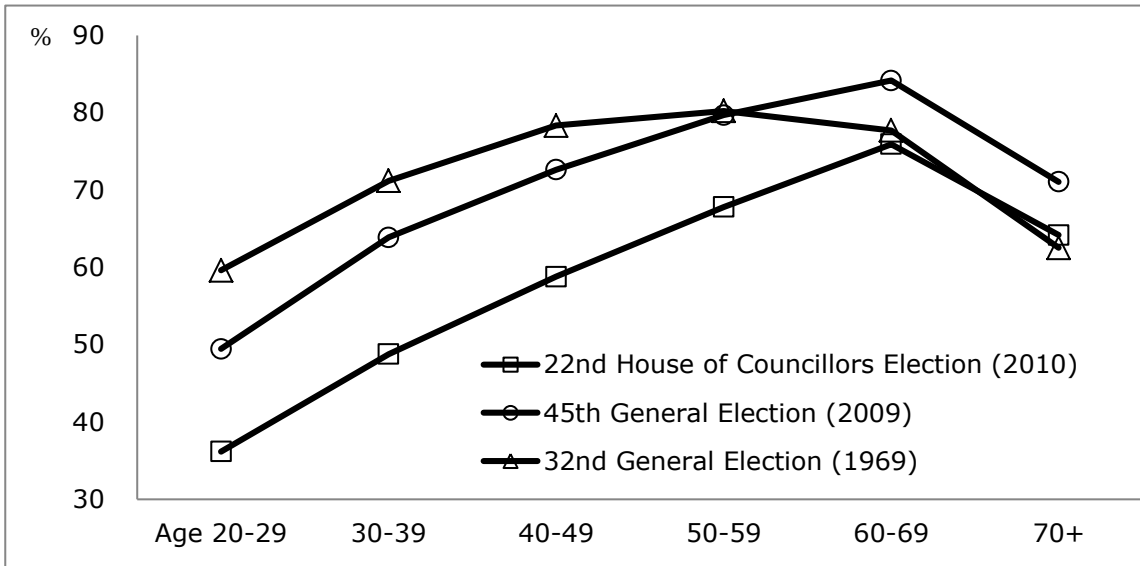
In this section, we examine one source of influence upon policymaking: age-based voting behavior. Figure 1 shows that Japan's voter turnout generally rises with age, remaining consistent without regard to election purpose or time.[7]

**Figure 1** Age-based voter turnout

[5] Prior studies on the relationship between time preference rate and age yield inconsistent conclusions. Samwick (1998) and Donkers and Soest (1999) find that the time preference rate falls as age increases, for example. Trostel and Taylor (2001), on the other hand, find that the time preference rate rises along with age. Harrison, Lau and Williams (2002), meanwhile, join Hiruma and Ikeda (2006) in describing the relationship between time preference rate and age as a U-shaped curve. These studies demonstrate the likelihood of selfish measures from a national perspective as the aged population continues its relative expansion.

[6] To the best of the authors' knowledge, Uchida and Iwabuchi (1999) were the first in Japan to identify the increasing political influence of retirees in relation to the declining birthrate and continued aging of society.

[7] Due to health factors, however, voter turnout peaks during voters' sixties.




Source: The Association for Promoting Fair Elections

One can interpret this to mean that a large percentage of older citizens feel it is their duty to vote,[8] and that such citizens (especially retirees) have spare time to dedicate to voting, judging the opportunity cost to be lower. Moreover, with Japan's declining birthrate and aging population, the number of youths is decreasing and the number of elderly rising. Current aged-based voter turnout suggests that older voters will overwhelm their more youthful counterparts, ultimately becoming the only "voice" heard in the political arena.

About three decades ago—in 1980—when the baby boom generation (born in 1947-1949) was rearing its children, those aged 60 and up accounted for less than 20% of the population. Now they represent some 38% of voters, and are expected to comprise 52% in 2050, becoming the voting majority (Table 2). If one considers voter turnout as well as mere population, the trend will be even more pronounced. For example, Figure 2 additionally shows that, according to projections based on aged-based voter turnout in the 22nd House of Councillors election held in 2010, voters aged 60 or older account for some 47% of the total at this time, jumping to a projected 57% in 2050.

Table 2: The aging of eligible and actual voters

(%)

| | Eligible voters | | | | Actual voters | | | |
|---|---|---|---|---|---|---|---|---|
| | 1980 | 2010 | 2050 | 2110 | 1980 | 2010 | 2050 | 2110 |
| Age 20-29 | 20.8 | 12.9 | 9.4 | 9.0 | 17.2 | 7.8 | 5.6 | 5.4 |
| Age 30-39 | 24.6 | 17.3 | 11.4 | 10.7 | 24.5 | 14.1 | 9.2 | 8.7 |

[8] The Association for Promoting Fair Elections (2010)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Age 40-49 | 20.3 | 16.0 | 13.1 | 12.2 | 21.7 | 15.8 | 12.8 | 12.0 |
| Age 50-59 | 15.7 | 15.7 | 14.1 | 13.5 | 17.5 | 17.8 | 15.7 | 15.2 |
| Age 60-69 | 10.4 | 17.7 | 15.1 | 15.3 | 11.6 | 22.4 | 19.1 | 19.4 |
| Age 70 and above | 8.3 | 20.4 | 36.9 | 39.3 | 7.5 | 22.1 | 37.6 | 39.4 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Examining both average and median ages of total, eligible, and actual voters, we find that these two indices point to accelerated aging, as Table 3 demonstrates. As of 2010, we find aging occurring in the total population, among eligible voters, and among actual voters, respectively. The median age of actual voters reaches a noteworthy 57, hitting 60 in the year 2030, and 63 in 2040, indicating that aging will increasingly impact political decision making.

Table 3: Average age and median age projections for Japan

| | Average age | | | Median age | | |
|---|---|---|---|---|---|---|
| | Total population | Eligible voters | Actual voters | Total population | Eligible voters | Actual voters |
| 2010 | 45 | 53 | 56 | 45 | 53 | 57 |
| 2020 | 48 | 55 | 58 | 49 | 54 | 59 |
| 2030 | 50 | 57 | 60 | 53 | 57 | 60 |
| 2040 | 52 | 59 | 62 | 54 | 60 | 63 |
| 2050 | 53 | 60 | 62 | 55 | 61 | 64 |
| 2060 | 55 | 61 | 63 | 58 | 62 | 65 |

This demonstrates that the older voters produced by Japan's current and future aging will wield majority influence in policymaking. In other words, we will become a society in which the benefits of the relative many are shouldered by the relative few, entering us into historically uncharted and unforeseen waters for democracy vis-à-vis the principle of majority rule.

For politicians, winning the upcoming election is generally of primary importance, and toward that end, garnering more votes than the opponent is key. Accordingly, rather than courting unborn future—or ineligible—voters, politicians are likely to favor generations of voting age, particularly older individuals among whom voter turnout is high. Politicians and individual political parties are strongly incentivized to propose policies favoring the older generation, even at the expense of other generations, in order to expand voter support for

themselves. In other words, the sheer magnitude of the potential political presence of seniors, and the excessive favor political parties show them, explain the concern generated by the emergence of Japan's gray democracy.

### 3. Social security preferences of Japan's seniors

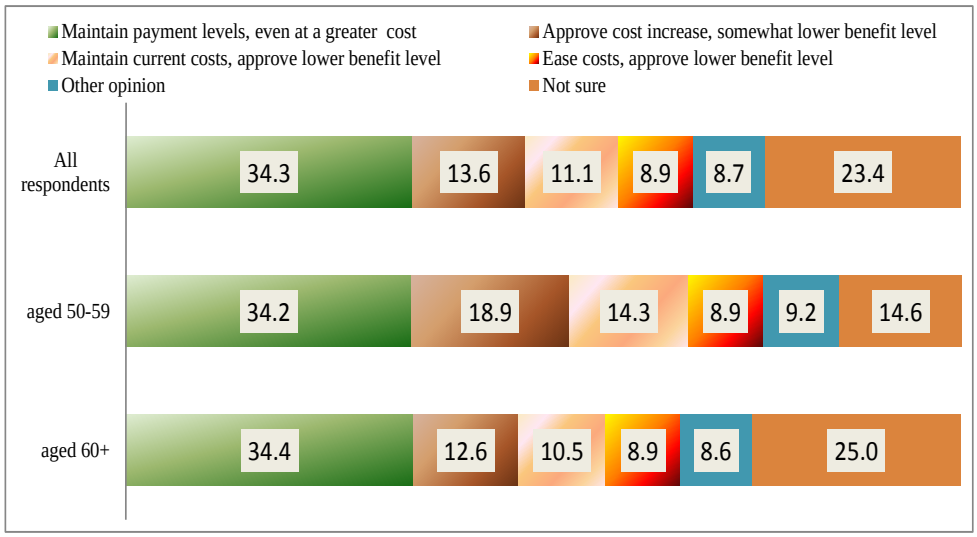
With the voter turnout of Japan's seniors generally in greater transition than that of other generations, how seniors will influence policymaking (and social security in particular) through elections will largely depend on their preferences concerning social security benefits, based on the current election system.

Three salient opinion polls tap senior preferences vis-à-vis the social security system and the policies sustaining it.

The first is "Elderly Persons' Attitude about Life Finances FY2011" released by the Cabinet Office, Government of Japan. The survey contained a question asking, "How should Japan coordinate future pension payment levels and their corresponding cost?" Some 34.3% of respondents replied that, "Current payment levels should continue, even if it means an inevitable increased burden," with 34.2% of respondents falling into the 55-59 age bracket, and 34.4% into the 60+ bracket. Meanwhile, a mere 8.9% of respondents declared that, "The burden should be lightened, even if it means inevitable lower payment levels."

This survey found no great difference in responses between differing generations (Figure 2).

**Figure 2** Social security benefits and costs



The second poll, "2009 awareness survey of public and private social security service," was conducted by the Ministry of Health, Labour and Welfare, which oversees the social security system. Respondents were asked their opinion regarding this statement: "The public pension level should remain sufficient enough to support recipients during retirement, even if it means raising the public pension tax and fees to cover social security costs." Results showed that the lower the respondent's age, the greater the disagreement with the survey statement, while the higher the age, the greater the agreement. Respondents were also asked about the importance of social security roles. The older the respondent, the greater the tendency to rank "old-age income (public pension)" and "medical/nursing care" as important. Meanwhile, the younger the respondent, the greater the tendency to rank "childcare support" as important, demonstrating that different generations prioritize differing aspects of social security services.

The third survey was conducted on the occasion of the 22nd House of Councillors election held in 2010, and asked respondents to rank issues affecting their vote. As shown in Table 3, the working generation prioritized the economic situation and employment, whereas the retired generation of those aged 60 and over named medical/nursing care and the public pension. Those in their 20s and 30s ranked countermeasures to the declining birthrate 5th and education 9th, whereas the oldest generation ranked birthrate countermeasures 9th and did not include education among its top ten priorities.

Table 4: Issues impacting voters (the 22nd House of Councillors election)

| Rank | Age 20-30 | Age 40-50 | 60 and above |
|---|---|---|---|
| 1 | economic situation/employment | economic situation/employment | medical/nursing care |
| 2 | taxes | public pension | public pension |
| 3 | medical/nursing care | taxes | economic situation/employment |
| 4 | the political system | medical/nursing care | taxes |
| 5 | falling birthrate countermeasures | fiscal reform | fiscal reform |
| 6 | public pension | the political system | cost of living |
| 7 | political funding | political funding | political funding |
| 8 | fiscal reform | falling birthrate countermeasures | the political system |
| 9 | education | education | falling birthrate |
| 10 | income disparity | income disparity | administrative reform |

*Source The Association for Promoting Fair Elections*

As these poll results indicate, there is general consensus among the generations regarding the overall concept of social security benefits and funding; however, when it comes to specifics, the already- and soon-to-be-retired generations are willing to shift the burden of funding to the younger generation to guarantee ongoing benefits supporting their post-retirement life. The selfish individual finds this rational; from the perspective of society *in toto*, however, it seems quite contradictory.

As the population of older, relatively high-turnout voters increases in an aging Japan, even in light of social security system preferences, the gray democracy of retirees whose political influence reflects their wish to maximize benefits from the social security system may cast a shadow over the "graying" Japan.

By passing the buck on to the younger generation, Japan's emerging gray democracy is jeopardizing the foundation of Japan's social security and public finance systems.

## 4. Does Japan have a gray democracy?

As discussed above, we can make the following three hypotheses concerning the possible impact of aging upon social security expenditures:

(H1) First, as the recipients of social security benefits increase along with an ever-graying Japan, so will the percentage of GDP stemming from social security expenditures. (economy of scale)

(H2) Next, social security expenditure as a percentage of GDP will increase, but as per capita benefits will decrease, the two will somewhat counterbalance, limiting the net increase. In other words, Japan's continued aging will yield less generosity in the social security system. (fiscal erosion)

(H3) Finally, per capita benefits will increase. Ultimately, Japan's majority generation of retirees will pressure politicians for increased social security "generosity." This will not only increase the GDP ratio, it will actually increase per capita geriatric benefits. (gray democracy)

Let us review empirical analyses from previous publications. Researchers have often conducted panel data studies of OECD countries, as it is relatively easily obtained.

Prior research, including that by Breyer and Craig (1997), Tabellini (2000), Tepe and Vanhuysse (2010), for example, used the ratio of GDP (GNP) in terms of social security expenditures (public pension expenditures) as a dependent variable, to verify that the GDP ratio will increase along with Japan's aging.[9] However, if per capita social security benefits to the elderly or pension benefits are used as dependent variables, we find contradictory results in

[9] Razin, Sadka, and Swagel (2002) used the labor tax income to GDP ratio as a dependent variable and the dependent population ratio as an independent variable, verifying a negative correlation.

prior research.

Mulligan and Sala-i-Martin (1999) and Hollandar and Koster (2010) find no positive correlation between progressive aging and per capita social security benefits to the elderly. On the other hand, Bryant (2003) and Disney (2007) do find a positive correlation. However, discussion of the scale and correlation between aging and social security expenditures in prior studies usually utilizes the aging rate (as a substitute for median age) as an explanatory variable.[10]

In Japan, empirical analysis of the median voter theorem chiefly relies on political influence on regional public works as a median voter characteristic.[11] Ohtake and Sano (2010), on the other hand, investigated the political influence of Japan's aging on compulsory education expenditures, and demonstrated a negative correlation between the two. However, their own study does not explicitly utilize median age as an explanatory variable.

We remain unaware of any other research specifically examining the gray democracy vis-à-vis expenditures, such as social security, related to the older generation.

This study utilized data from Japan's 47 prefectures spanning 2000 to 2010 for an empirical test of the hypothesis that a gray democracy, as it has recently been identified, actually exists in Japan. Often, previous studies making international comparisons utilized pension and social security benefit expenditures as dependent variables. Our research, however, used data from Japan's prefectures (regional governments), relying on geriatric welfare, on which the local government has sole discretion and from which retirees' wishes are easily detected, as a dependent variable. We found merit in using prefectural, as opposed to national, data. The structure of the public pension system at the national level is not often revised; on the other hand, as the regional political system remains uniform, fluctuation in geriatric welfare costs politically reflects the wishes of the elderly. Specifically, geriatric welfare costs represent one part of overall public welfare, mostly going into nursing insurance special accounts. Excluding subsidiary aid relating to institutional medical care for the elderly, nursing home maintenance fees, free passes for the elderly and other annual budget compilations at the prefectural level involve discretionary factors as expenditures change according to voter wishes. Therefore, it is easy to infer the intent of the elderly in the political process at the prefectural level.

Data utilized in this study were as follows.

First, as previously stated, we utilized welfare costs for the aged as the dependent variable. However, as also mentioned, as funds drawn for nursing insurance special accounts, geriatric medical expenses, or other non-discretionary expenses are included, we adjusted

[10] Breyer and Craig (1997) and Hollandar and Koster (2010) utilize median age.
[11] See Kondo (2006).

transfers to nursing insurance accounts, which are deducted from geriatric welfare and deflated by the consumer price index. As some data, such as geriatric medical expenses, are not publicized, we utilized real senior citizen health insurance program benefits as the control. In order to examine the three hypotheses (economy of scale, fiscal erosion, and the gray democracy), our study utilized the dual variables of prefectural gross production ratio and the per capita rate for the older (65+) population for the dependent variable of real geriatric welfare costs.

We utilized median age as an independent variable. In terms of median age, many previous studies used the ratio of those aged 65 and over against the total population as a substitute variable for the median aged voter. In our study, we utilized the median age of eligible voters. However, due to restrictions on available data, the figure does not match the exact median age of actual voters.

Next, we employed the five factors of age, income, public finance, economy, and political considerations as control variables.

First of all, in order to utilize discrepancies in age composition among the prefectures as a control, we employed the ratio of elderly within the entire population. As the ratio of elderly increases, so does geriatric welfare, which is an elderly-related expenditure; therefore, we expect this to be a positive figure.

Next, in terms of income, we utilized the consumer price index to adjust the scheduled cash earnings to real wages per laborer. Increased wages brings increased taxes, so increased costs in geriatric welfare are anticipated, as is dependency on private, not public, expenditures, in regions having higher income levels. It is transcendentally unclear as to whether this figure will be positive or negative.

In terms of public finance, in order to use the administrative scale of each prefecture as a control, we divided the annual expenditure by the total population, creating a real figure for annual per capita expenditure in the prefecture, deflated by the consumer price index. As annual welfare costs for the aged are expected to rise along with any rise in annual expenditures, public finance is expected to reflect a positive sign. Expenditures for medical benefits for the elderly were used as a substitute variable for older senior citizen health insurance program expenses, which must be deducted from total geriatric welfare costs. Such expenditures will of course rise as geriatric medical costs rise, so that factor was considered to reflect a positive number.

Moreover, we also utilized the unemployment rate, which is an index of each prefecture's economic condition, and the labor union worker-employee ratio, an index of political preferences as evidenced by small versus big government. We considered the impact of a prefecture's economic health on its welfare costs for the aged to be indefinite. We further considered that the labor union membership ratio reflects political preference, which reflects the

strength of left-wing preferences. In other words, as labor unions, and political parties which receive their support, have a general tendency to prefer big government, the labor union member ratio is expected to have a positive correlation with welfare costs for the aged.[12] Our analysis covered the 11 measured periods from 2000 to 2010.

Our descriptive statistics are as noted in Table 5.

Table 5: Descriptive statistics

| | Median | Standard deviation | Min | Max | Number of observations |
|---|---|---|---|---|---|
| Per capita cost of geriatric welfare (yen) | 50130.66 | 13046.18 | 25999.76 | 107387.4 | 517 |
| Geriatric welfare costs to gross prefectural production rate (%) | 0.310196 | 0.124299 | 0.116434 | 0.887418 | 517 |
| Median age (years) | 44.63901 | 2.860386 | 35.60000 | 52.40525 | 517 |
| Per capita wages (yen) | 236958.5 | 18926.86 | 199546.1 | 319080.9 | 517 |
| Per capita annual local government expenditures (yen) | 384637.7 | 104488.6 | 166544.7 | 742630.4 | 517 |
| Ratio of elderly (%) | 21.49327 | 3.192527 | 12.43959 | 29.01961 | 517 |
| Per capita geriatric medical costs (yen) | 797362.2 | 104752.5 | 592277.1 | 1146623. | 517 |
| Unemployment rate (%) | 4.414894 | 1.056262 | 2.2 | 8.4 | 517 |
| Labor union membership ratio (%) | 23.04342 | 3.711608 | 13.36932 | 34.68500 | 517 |

The model employed in our study was according to Razin et al. (2002), Bryant (2003), Disney (2008), and Hollanders and Koster (2011), formularized as follows:

$$Rojin_t^i = const^i + \alpha Medianage_t^i + \beta Income_t^i + \gamma Cg_t^i + \delta Old_t^i + \varepsilon Medexp_t^i + \epsilon UR_t^i + \theta UNION_t^i + u_t^i$$

where i = Hokkaido, Aomori, and the remaining prefectures, ending with Kagoshima and

[12] Interpretation of the labor union member ratio is per Hollanders and Koster (2011).

Okinawa, and totaling 47 in all, t = 2000, 2001, etc., ending with 2010.

Variables - Rojin: real costs for geriatric welfare, Median age: median age, Income: real per capita income, Cg: real per capita annual local government expenditures, Old: ratio of elderly, Medexp: real per capita geriatric medical expenses, UR: unemployment rate, UNION: labor union worker-employee ratio

Additionally, the dependent variable "Rojin" represents both GDP ratio and per capita elderly. Tables 6-1 and 6-2 results reflect a significant positive value for the median age whether we look at gross prefectural production or per capita elderly, implying the existence of a gray democracy at the prefectural level. Similarly, reduction in per capita benefits as a means of curtailing overall expenditures is rejected as a valid hypothesis. Moreover, excluding the labor union membership rate, signs for the other variables are statistically significant, and conform to the theory.[13]

Tables 6-3 and 6-4 reflect results of calculations excluding the labor union membership rate, using both formulas for indexes of big versus small government. These tables verify that excluding the above rate has no impact on the result. In a country such as Japan with centralized authoritarian rule, there is little margin to choose between small and big government at the prefectural level; the reason is that, unlike the central government, there is little factional sparring in elections or over policy at the prefectural level when governors or Diet representatives are being elected. From the above calculations, we can see that at the regional level, the gray democracy's influence is evident, and if the relationship between aging and budget increases for the elderly, which is seen regionally, is reflected on the national level, we can conclude that the progressive aging of Japan will likely result in Japan's elderly having a stronger political voice.

Table 6-1: The gray democracy influence - Model 1

Explanatory variable: geriatric welfare outlay vis-à-vis prefectural gross production rate

| | | | |
|---|---|---|---|
| Measurement period | 2000-2010 | | |
| Number of observations | 517 | | |
| Adjusted R-square | 0.780256 | | |
| F value | 35.569568 | | |
| Variable | Coefficient | S.E. | t-value |
| Constant | -1.936885 | 0.278969 | -6.943009*** |
| Median age | 0.028875 | 0.007419 | 3.891773*** |
| Per capita wage | -5.54E-07 | 1.45E-07 | -3.815785*** |

[13] We used Hausman's test results for our estimates, with a selection of fixed estimated formulas for each prefecture. The results allow for consideration of each prefecture's own characteristics.

| | | | |
|---|---|---|---|
| Per capita annual expenditure | 1.02E-06 | 1.13E-07 | 9.031481** |
| Per capita geriatric medical expense | 2.02E-07 | 8.61E-08 | 2.347965*** |
| Unemployment rate | 0.087025 | 0.005119 | 17.00119*** |
| Aging rate | 0.011372 | 0.005579 | 2.038563** |
| Labor union membership rate | -0.004031 | 0.002681 | -1.503255 |
| Exogeneity test Hausman test | F-statistic 127.770534<br>p-value 0.0000 | | |

Note: ***and ** measure significance at 1% and 5%, respectively.

Table 6-2: The gray democracy influence - Model 2

Explanatory variable: per capita geriatric welfare expense

| | | | |
|---|---|---|---|
| Measurement period | 2000-2010 | | |
| Number of observations | 517 | | |
| Adjusted R-square | 0.625581 | | |
| F value | 17.26668 | | |
| Variable | Coefficient | S.E. | t-value |
| Constant | -157833.7 | 38220.08 | -4.129602*** |
| Median age | 2432.602 | 1016.490 | 2.393138** |
| Per capita wage | -0.084701 | 0.019893 | -4.257824*** |
| Per capita annual expenditure | 0.133429 | 0.015481 | 8.618703** |
| Per capita geriatric medical expense | 0.028811 | 0.011792 | 2.443207*** |
| Unemployment rate | 12192.01 | 701.2977 | 17.38492*** |
| Aging rate | 218.3358 | 764.2831 | 0.285674 |
| Labor union membership rate | -580.1236 | 367.3505 | -1.579210 |
| Exogeneity test Hausman test | F-statistic 250.286117<br>p-value 0.0000 | | |

Note: *** denotes a 1% level of significance, while ** denotes a 5% level of significance.

Table 6-3: The gray democracy influence - Model 3

Explanatory variable: geriatric welfare expense vis-à-vis prefectural gross production rate

| | | | |
|---|---|---|---|
| Measurement period | 2000 – 2010 | | |
| Number of observations | 517 | | |
| Adjusted R-square | 0.779659 | | |
| F value | 36.11210 | | |
| Variable | Coefficient | S.E. | t-value |
| Constant | -2.121362 | 0.250867 | -8.456111*** |
| Median age | 0.030080 | 0.007386 | 4.072609*** |
| Per capita wage | -5.51E-07 | 1.45E-07 | -3.787588*** |
| Per capita annual expenditure | 9.90E-07 | 1.11E-07 | 8.894505*** |
| Per capita geriatric medical expense | 2.40E-07 | 8.24E-08 | 2.914488*** |
| Unemployment rate | 0.085397 | 0.005010 | 17.04664*** |
| Aging rate | 0.012569 | 0.005529 | 2.273236** |
| Exogeneity test Hausman test | F-statistic 105.799615 | | |
| | p-value 0.0000 | | |

Note: *** denotes a 1% level of significance, while ** denotes a 5% level of significance.

Table 6-4: The gray democracy influence - Model 4

Explanatory variable: per capita geriatric welfare expense

| | | | |
|---|---|---|---|
| Measurement period | 2000-2010 | | |
| Number of observations | 517 | | |
| Adjusted R-square | 0.624375 | | |
| F value | 17.49444 | | |
| Variable | Coefficient | S.E. | t-value |
| Constant | -184384.9 | 34378.65 | -5.363356*** |
| Median age | 2606.097 | 1012.161 | 2.574785*** |
| Per capita wage | -0.084209 | 0.019923 | -4.226832*** |
| Per capita annual expenditure | 0.128991 | 0.015249 | 8.459194*** |
| Per capita geriatric medical expense | 0.034283 | 0.011290 | 3.036544*** |
| Unemployment rate | 11957.59 | 686.5099 | 17.41794*** |
| Aging rate | 390.5341 | 757.6814 | 0.515433 |
| Exogeneity test Hausman test | F-statistic 253.537788 | | |
| | p-value 0.0000 | | |

Note: *** denotes a 1% level of significance, while ** denotes a 5% level of significance.

## 5. Conclusion: Transcending the gray democracy

As we have seen, despite Japan's profound intergenerational disparity, no radical measures have been pursued to balance the benefits and burdens of the social security system, which has been identified as one of its major causes. To the contrary, Japan's declining birthrate and progressive aging are worsening the disparity. We have also noted the increased political presence of the elderly, whose preferences are reflected in a postponement of any social security reform imposing an increased burden on their generation. In order to bring clarity to the debate, we conducted an empirical analysis of prefectural panel data and verified the existence of Japan's gray democracy. This study therefore highlights the possibility that Japan's elderly influence the administration of public finance at the regional level.

For Japan and other advanced nations, debt accumulation and a declining economic growth rate necessitate curtailing burgeoning governmental expenditures. However, further aging in societies in which seniors prefer expanded governmental benefits leads to the concern that such funding shouldered by younger generations becomes the politically accepted response. Reformation of the electoral system represents one idea for overcoming the gray democracy of conflicting intergenerational interests while preserving the social security system. Reforming the electoral system would help balance intergenerational political influence. Demeny (1986) proposed "Demeny voting," or children's suffrage—with parents actually voting on their children's behalf. Ihori and Doi (1998) proposed an aged-based voting system with Diet seats allocated according to age, and each generation represented in elections. Many expansions on Ihori and Doi (1998) have been offered, including one by Takeuchi (2011), who presents a voting system based on constituency by life expectancy, allowing generation-based representative elections according to average life expectancy.[14] Weakening elderly political power, where the gray democracy's presence is most evident, requires the consent of the elderly themselves, and efforts to that end are regrettably unlikely to be made.

The foundation of Japan's social security/public finance system is jeopardized by the younger generation's unwillingness to fund them, as Boldrin and Rustichini (2000) indicate, making it impossible to consider social security benefits in the short-term, of course, but also in the medium- and long-term. In such a case, one must assume that the bill for these benefits would ultimately return to the elderly. The pursuit of excessive benefits for the elderly may lead to wide-scale curtailment of benefits, rather than invite the bankruptcy of the social security system. On the other hand, responding quickly now to reduce benefits would, from an overall perspective, result in less drastic curtailment in the long run. Instead of a self-serving or unilateral approach to pursuing individual benefit disregarding the finances of the younger

[14] Oguro and Ishida (2012) present a theoretical analysis of a potential transition to a voting system based on constituency by life expectancy, emphasizing the potential for improving the utility for working and future generations.

generations funding it, seniors should prioritize continuity of the social security system and shoulder their part of its ongoing cost.

The elderly's increasing political influence accompanying the declining birthrate and aging population is a problem shared by advanced nations, and connotes fundamental challenges within a democracy. Each nation will need to channel its wisdom and resources to cope with the situation.

References


Auerbach, Alan J., Jagadeesh Gokhale and Laurence J. Kotlikoff, (1991), "Generational Accounts: A Meaningful Alternative to Deficit Accounting," in Bradford, David. eds., *Tax Policy and the Economy*, Vol. 5, pp.55-110.

Black, Duncan (1948). "On the rationale of group decision-making." *Journal of Political Economy* Vol. 56 pp. 23-34.

Boldrin, M. and A. Rustichini [2000], "Political Equilibria with Social Security," *Review of Economic Dynamics*, Vol. 3, pp. 41-78.

Breyer, F. and B. Craig (1997), "Voting on social security: Evidence from OECD countries," *European Journal of Political Economy*, Vol. 13, pp. 705-724.

Breyer, F. and K. Stolte (2001), "Demographic Change, Endogenous Labor Supply and the Political Feasibility of Pension Reform," *Journal of Population Economics*, Vol.14: pp.409-424.

Browning, E. K. (1975), "Why the Social Insurance Budget is Too Large in a Democracy," *Economic Inquiry*, Vol. 13(3), pp. 373-388.

Bryant, J. (2003), "Modelling the Effect of Population Ageing on Government Social Expenditures." Working Paper 03/15. New Zealand Treasury, Wellington.

Congleton, Roger D., (2003), "The Median Voter Model," The Encyclopedia of Public Choice, pp. 707-712, Splinger.

Demeny, Paul. (1986), "Pronatalist Policies in Low-Fertility Countries: Patterns, Performance, and Prospects," *Population and Development Review*, Vol. 12 pp.335-358.

Disney, Richard, (2007), "Population Ageing and the Size of the Welfare State: Is There a Puzzle to Explain?" *European Journal of Political Economy*, Vol. 23, pp. 542–553.

Galasso, V., and Profeta, P., (2002), "The political economy of social security: A survey." *European Journal of Political Economy* Vol. 18, pp. 1-29.

Hollanders, D., A. and F. Koster, (2011), "The Graying of the Median Voter Aging and the Politics of the Welfare State in OECD Countries" Netspar Discussion Paper No. 01/2011-003.

KOTLIKOFF, L. and BURNS, S. *The Coming Generational Storm: What you need to know about America's Economic Future*. 2004 Cambridge, MA: MIT Press.

Oguro, K. and R. Ishida, (2012) "The Viability of a Voting System that Allocates Parliamentary Seats According to Life Expectancy: An analysis using OLG models," Center for Intergenerational Studies, Institute of Economic Research, Hitotsubashi University, Discussion Paper Series No. 571.

Ohtake, F., and S. Sano (2010) “The Effects of Demographic Change on Public Education in Japan,” The Economic Consequences of Demographic Change in East Asia, NBER-EASE Vol. 19, pp. 193-223.Takatoshi Ito and Andrew Rose, editors.

Razin, A., Sadka, and E., Swagel, P., (2002), “The aging population and the size of the welfare state.” *Journal of Political Economy* Vol. 110, pp. 900-918.

Shelton, Cameron A. (2008), “Addendum: The aging population and the size of the welfare state: Is there a puzzle?” *Journal of Public Economics*, Vol. 92, pp. 647-651.

Tabellini, G. (2000), “A positive theory of Social Security,” Scandinavian *Journal of Economics* Vol. 102 (3), pp. 523-545.

Uchida, M., and Iwabuchi, K. (1999), “The Political Science Perspectives on Aging” (in Japanese), Waseda University Press.

Masujima, M., Shimasawa, S., and Murakami, T. (2009), “Study on Generational Accounting Model with the Social Security System” (in Japanese), Cabinet Office, Government of Japan, Economic and Social Research Institute, ESRI Discussion Paper Series No. 217, June 2009.

Masujima, M., Shimasawa, S., and Tanaka, G. (2010), “Inter- and Intra-generational Inequality” (in Japanese), Cabinet Office, Government of Japan, Economic and Social Research Institute, ESRI Discussion Paper Series No. 248, June 2009.