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## Demographic Impacts on Economic Growth in Japan

~A Comparison with G7 countries~

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This study discusses demographic impacts on economic growth in Japan and other major economies in OECD. The deceleration in the per capita GDP growth since the 1990s has been prominent in Japan, but other countries have suffered similar experiences. There is a possibility that the post-war baby boom generation is retiring, resulting in negative impacts on labor markets and social security burdens. However, these adverse effects are partly offset by appropriate policy measures encouraging the older population to stay employed and taxpayers. Also, more flexible social security and health care schemes help to maintain the fixed productive-age population ratio, resulting in an active aging society.

本研究は日本をはじめとする OECD 主要国における少子高齢化の経済成長に及ぼす効果を考察したものである。1990年代以降の日本経済の長期停滞の要因については諸説があるものの、他の先進国でも一人当たり GDP でみれば類似の成長停滞が見られている。これは戦後のベビーブーム世代の高齢化により、労働力の制約や社会保障負担等増の影響が大きい可能性がある。しかし、人口の高齢化による悪影響は、高齢者の就労率を高め、納税者を増やすことで、ある程度まで相殺できる。そのための社会保障制度の改革が重要となる。

**Key words:** Aging of the population, Japanese economy, dependency ratio, economic stagnation

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## Introduction

Declining growth in GDP per capita<sup>2</sup> since the 1990s has been prominent in Japan. Still, it has not been a phenomenon particular to Japan, and the same decline can be observed in other major economies. There are several explanations, such as the impact of the Lehman shock, the associated accumulation in non-performing loans, or the failure of macroeconomic policies. However, this paper focuses on the impacts of demographic shifting on economic growth as the common factor for major OECD countries.

The demographic factor here means that the share of the old-age cohort in the total population increases or the average age rises over time because of increased life expectancy and a decline in fertility. Of these two forces, the significant decrease in the total fertility rate over the last half-century is primarily responsible for the population aging in most developed countries<sup>3</sup>.

Second, how much does the effect depend on variation in people's functional capacities? Even though the aging population is proceeding, the quality of the current older people has improved, and they are more educated and healthier than before.

Third, to what extent do the policies offset the negative impacts? The discrimination against older workers in the labor markets or increasing social security costs by population aging could be partly offset by appropriate policies.

At the same time, it eventually raises old-age dependency as a "Demographic Drag." Both stimulate or decelerate economic growth through the impacts on the labor markets, household savings, and social security budgets.

The shrinking and aging of the population directly impacts economic growth, mainly in the labor markets. Still, the most crucial part of the aging process is the distortion from the existing tax, social security contributions,

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<sup>2</sup> The denominator of the GDP per capita here is the per hour worked, accounting for the differences in the dependency ratios across the country.

<sup>3</sup> Weil (1997).

and various regulations established in the past periods of the abundant young labor force. They have become rapidly obsolete in an aging society, requiring various economic reforms. Still, in many countries, actual processes are often too slow and too late, preventing efficient allocation of human resources.

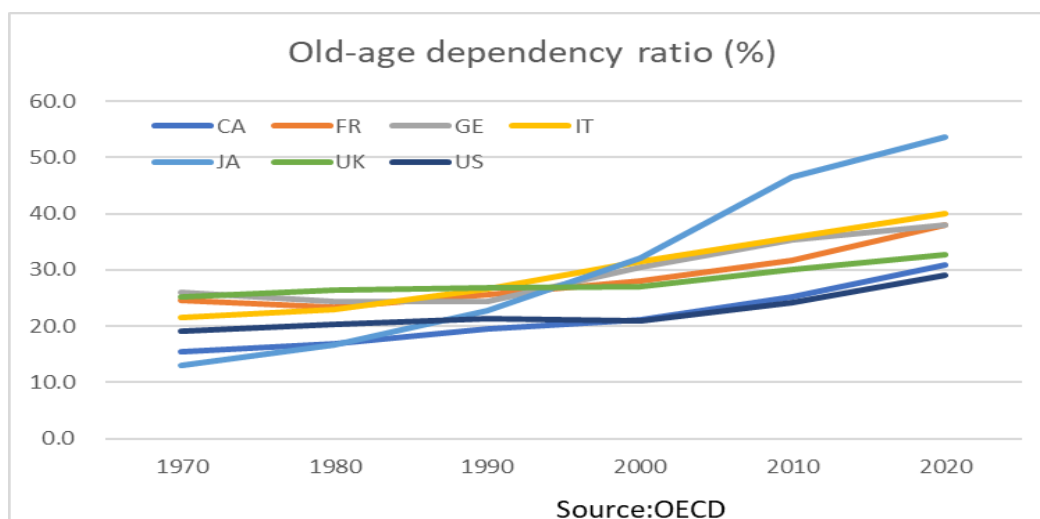
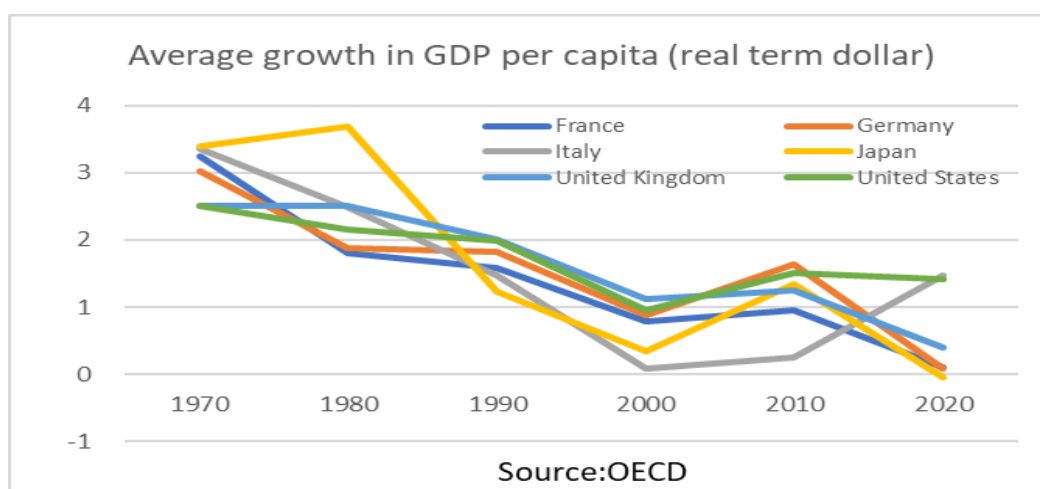
Among the G7 countries, demographic impacts on economic growth can be better observed in Japan, where demographic changes are proceeding more rapidly, and its GDP growth has declined most significantly. On the contrary, the demographic effects are minor in the United States, where immigration may offset the negative impacts.

People may wonder why aging, which is essentially a long-run, continuous process, is indicated as a significant cause for the decline in economic growth in the specific periods since around the 1990s. It is because of the aging of a large cohort of the baby boom generation with quite a high fertility right after the Second World War. More than 70 years after World War II, most baby boomers are now in retirement age, burdening the working-age population in major developed countries.

The first section indicates a simple relationship between the decline in per capita GDP and increasing old-age dependency rates in the major countries. The second section is mainly on Japan, reviewing the significant characteristics of demographic development. The third section is on the labor markets' better utilization of female and older workers to offset the declining population partially. Finally, the public policy options against the negative impacts of aging, mainly preventing automatically expanding social security expenditures, are examined.

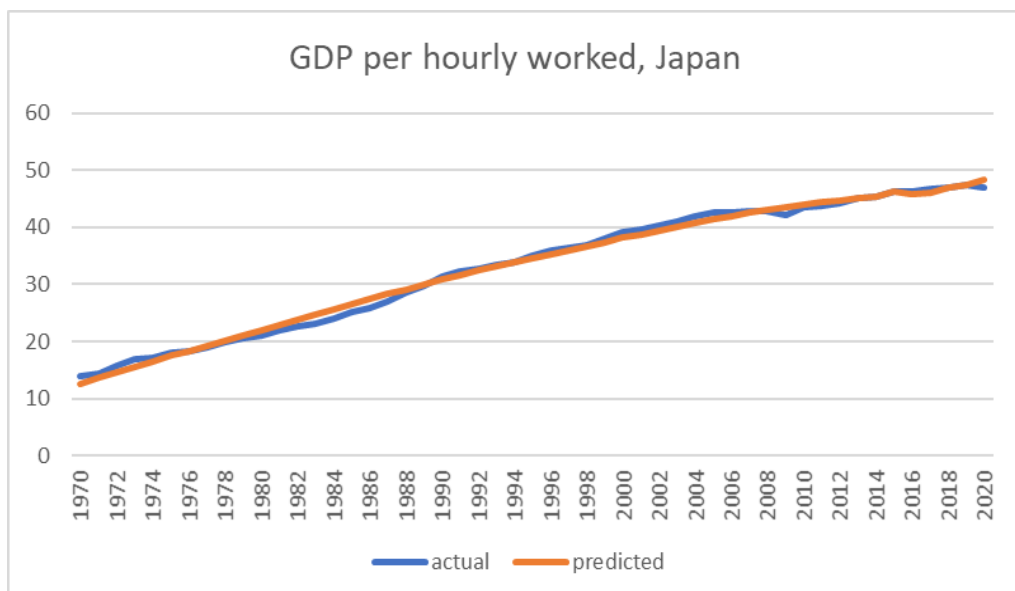
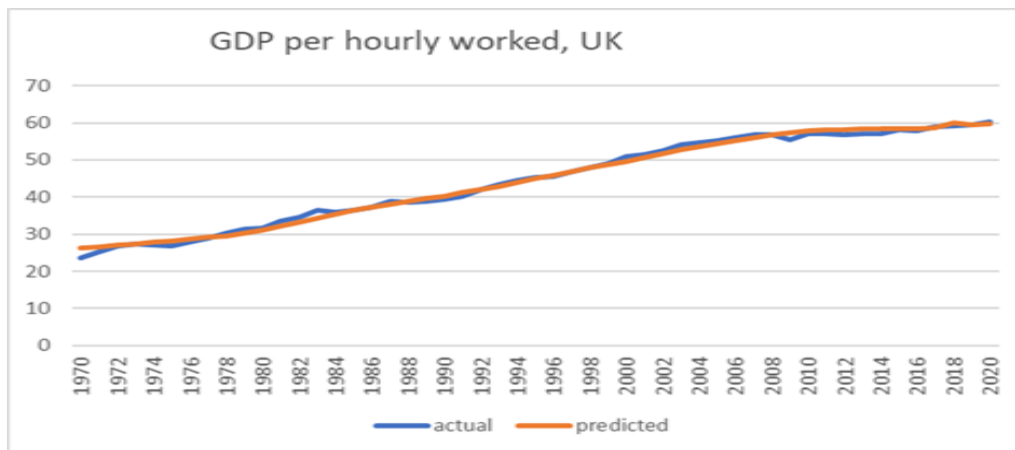
## 1. The productivity puzzle

The average growth in GDP per capita in the major seven countries in the OECD has fallen over time, particularly since the 1990s. The decline is most significant in Japan (Figure 1). This declining GDP per capita pattern corresponds to increasing old-age dependency rates. Japan's dependency rate increased from the lowest to the highest level in the G7 economies within five decades, which has significant economic implications. (Figure 2).



To confirm the relationship between demographic shifting and economic growth, we take the cases of Japan and the United Kingdom and run the OLS regression explaining both countries' GDP per capita by time trend and old-age dependency rates. The regression results are significant, and an

increase in the old-age dependency rates explains the decline in productivity since the 2000s in both countries (Figures 3 and 4 and Table 1).



(Table 1) Regression results				
	UK	T-value	Japan	T-value
intercept	54.8264	20.10955	16.5064	55.728
time trend	0.931844	56.04537	1.06952	34.86739
old age dependency ratio	-1.26802	-11.27	-0.4213	-11.981
R2	0.993114		0.993756	
Sample	51		51	
Source: OECD database				
<a href="https://data.oecd.org/lprdtty/gdp-per-hour-worked.htm">https://data.oecd.org/lprdtty/gdp-per-hour-worked.htm</a>				
<a href="https://data.oecd.org/pop/old-age-dependency-ratio.htm">https://data.oecd.org/pop/old-age-dependency-ratio.htm</a>				

## 2. Demographic development

There is much research on the economic effects of aging. According to the most recent empirical analysis by Kotschy and Bloom (2023)<sup>4</sup>, comparing retrospective and prospective views of aging is essential. The conventional view of aging results in retrospective predictions of economic stagnation due to shrinking populations. The alternative perspective of aging focuses on expanding the economic activity of old people with longevity.

They constructed a macroeconomic model using 145 country panel data from 1950 to 2015 and estimated economic growth from 2020 to 2050 based on projected aging shifts. According to their estimates, with the baseline population projection of 2.5 percent growth, the effects vary based on the alternative assumption of people's behavior. In the traditional approach, a contractive share of the working-age population adversely affects economic growth. However, an increasing life expectancy means older people become more active, partly offsetting the above negative impacts.

The average economic growth is projected to slow by 0.8 percentage points if working ages are measured retrospectively but only by 0.4 percentage points if measured prospectively. Substantial gains for policies enabling older people to remain economically active and adjust pensions and health costs with aging populations.

Of course, it depends on whether the social institutions or practices will activate the senior citizen. Thus, discussing the demographic impacts on economic growth is complex. It mostly depends on policy decision-making on managing the demographic dividends and drags well.

Another OECD review<sup>5</sup> found that aging directly impacts productivity growth, with the effect being concentrated in urban areas. One possible explanation is that cities specialize in sectors, such as tradable services, where the content of tasks makes it difficult to automate stages of the

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<sup>4</sup> Kotschy and Bloom, (2023).

<sup>5</sup> Daniele, Honiden and Lembcke (2019).

production process and where business dynamism, negatively affected by demographic change, is a more solid driver of productivity growth.

Declining and aging populations are common phenomena in virtually all OECD countries. Initially, infant mortality declines faster than fertility, producing many young dependents that tend to depress economic growth. However, economic growth can take off once the fertility decline accelerates and these young people move to the working-age population. The growing labor supply with higher education promotes the productivity of manufacturing or service industries.

A striking feature in the case of Japan is the high speed of demographic changes with the aging of the baby-boom generation. It is closely related to the rapid economic development in the postwar period. The high economic growth resulted in a substantial decline in fertility rates<sup>6</sup> and a rapid rise in the life expectancy of the elderly. In Japan, 2.7 million babies were born in 1947, continuously declining to 0.8 million in 2022. Also, the average life expectancy significantly increased from 50.1 to 81.6 for males and 54.0 to 87.7 for females between 1947 and 2020.

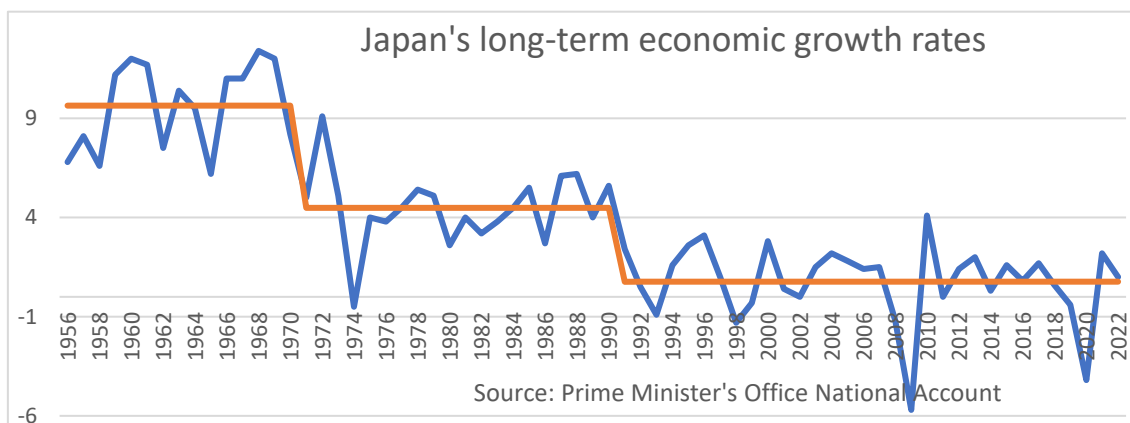
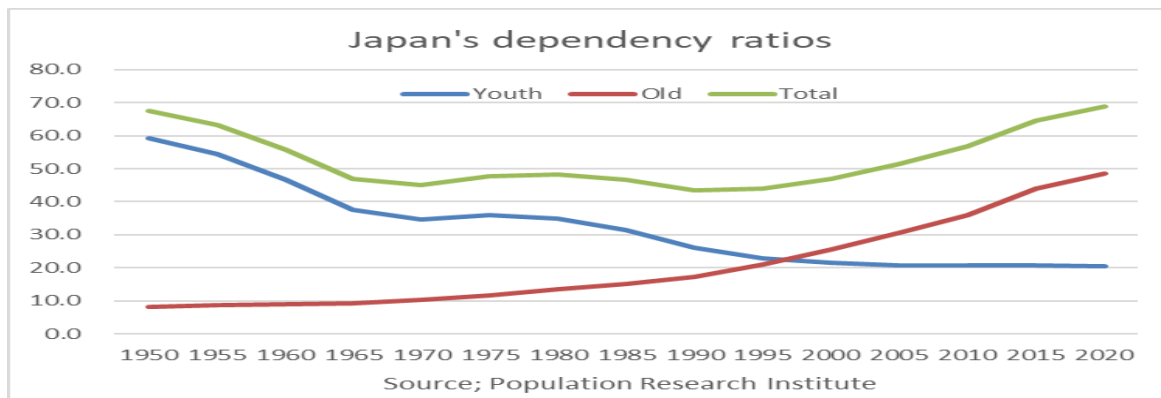
As a result, the population transits from high to low mortality and fertility. Initially, mortality rates decline faster than fertility, and the increasing number of youth dependents depress the economy. However, this bulge of the young population moves into working age, and reduces the total dependency rate and stimulated economic growth, resulting in a “demographic dividend.” Eventually, they move to the older age cohort, increasing the total dependency, and the demographic dividend becomes a “demographic drag.”

Japan’s total dependency rates fell up to the 1970s, stabilizing for a decade, and have continually increased since the 1990s. These three phases roughly

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<sup>6</sup> Gary Becker (1986) explained this decline in fertility rates as the substitution between the quantity and quality of children. *An Economic Analysis of the Family*, Economic and Social Research Institute, 1986.

correspond with the periods of the average real GDP growth of 10 percent, 4 percent, and 1 percent, respectively (Figures 5 and 6)<sup>7</sup>.



An extension of average life expectancy is a significant factor in increasing old-age dependency. Japan belongs to the highest life expectancy country group, and it is still expected to increase further. The high life expectancy reflects the high level of nutrition, better income disparity, and health and safety social conditions.

Then, why do these favorable social factors adversely affect per capita GDP? This is mainly because several fiscal and regulatory frameworks were established in the past periods with abundant labor force and need to be revised accordingly in the aging society. We will discuss them in the policy section below.

<sup>7</sup> Yashiro(2013)



### 3. Demographic impact on the economy

The implications of rapid changes in demographic factors on economic growth are profound for the labor market, government finances, healthcare, and welfare systems.

#### 3.1 Labor market impact

In most OECD countries, the total fertility rates<sup>8</sup> are below the replacement rate in 2021. Among them, Japan's fertility rate is 1.26 in 2023, compared with 1.58 for the UK and 1.64 for the US. An obvious consequence of the fall in fertility rates below 2.1 is an eventual decline in the population<sup>9</sup>. The Japanese working-age population peaked in 1995 and continuously declined by 14 million in 2020 or 0.7 percent annually. In addition, the labor force reserves in the primary industry, the exploitation of which had facilitated employment growth in other sectors in the past decades, are almost exhausted in Japan.

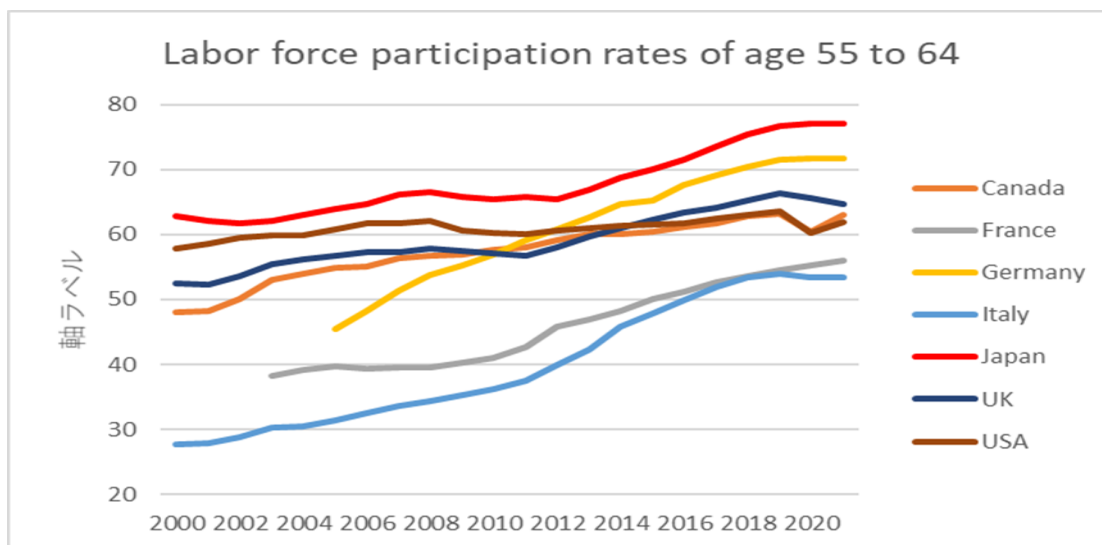
However, increased labor force participation can partly offset the negative impacts of the declining population growth. There is a significant gap in the labor force participation rates of older people in the Group of seven countries in the 2000s. It is mainly because of the earlier retirement policy in the 1990s in France or Italy, intending to reduce youth unemployment. The policy failed as it needed to account for the increasing costs of retirement benefits, discouraging the firm's labor demand.

A particular feature of the Japanese labor markets is older people's high labor force participation. Those aged 55 to 64 are 77 percent in Japan, compared with 65 percent and 62 percent in the United Kingdom and the United States, respectively, in 2021 (Figure 7). The high level of Japan's labor participation is a result of better health conditions and the need for savings for a longer retirement life, reflecting the higher life expectancy rate.

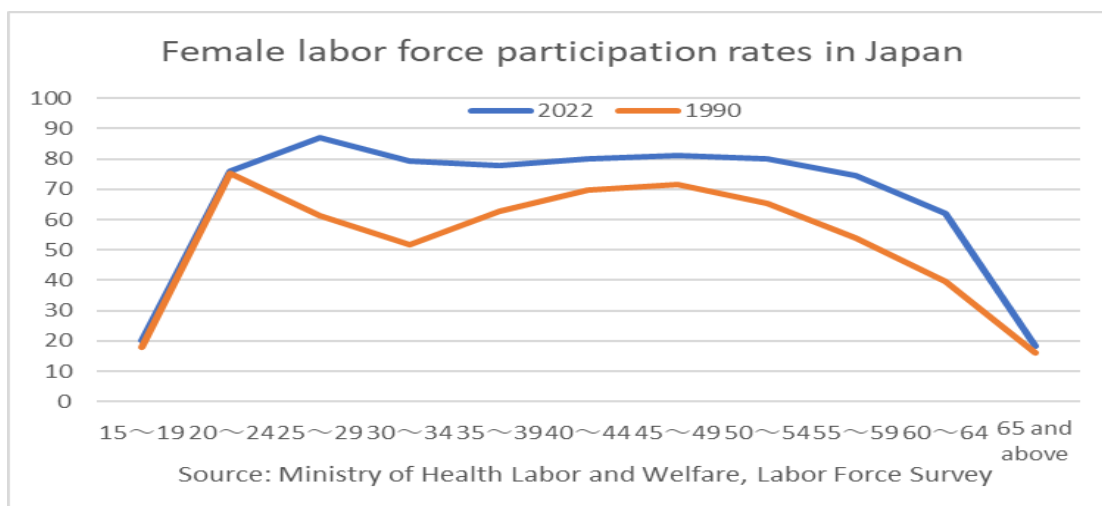
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<sup>8</sup> A total fertility rate of 2.1 children per woman ensures a broadly stable population if she lives to the end of her childbearing years.

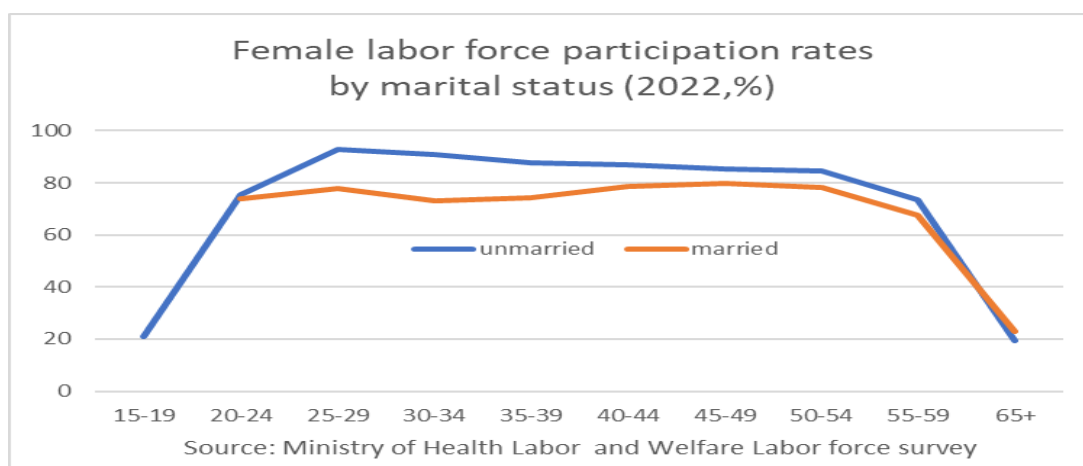
<sup>9</sup> The total fertility rate of 2.1 is necessary to stabilize the population.



Female labor force participation rates are generally lower than males, but there is a possibility for an increase. In particular, the participation rates at ages 25 to 40 were relatively low due to child-raising. They have gradually risen recently and are almost flat at 80 percent level in 2022, and there seems to be no more room for further increase (Figure 8).



However, the female labor force participation pattern differs between the single and the married. An increasing share of single women whose labor force participation rates are as high as the males' has pushed up the average female participation rates. At the same time, the participation rates of married women have risen but are still low at 70 percent (Figure 9).



This indicates a trade-off between the policy targets of preventing declining fertility rates by encouraging the married women labor force to stay employed and reducing single women. This is because 98 percent of babies are still born to married couples in Japan. Thus, the government encourages married women to have more babies while staying in the labor markets by providing better maternity leaves and nursery schools (see policy section below).

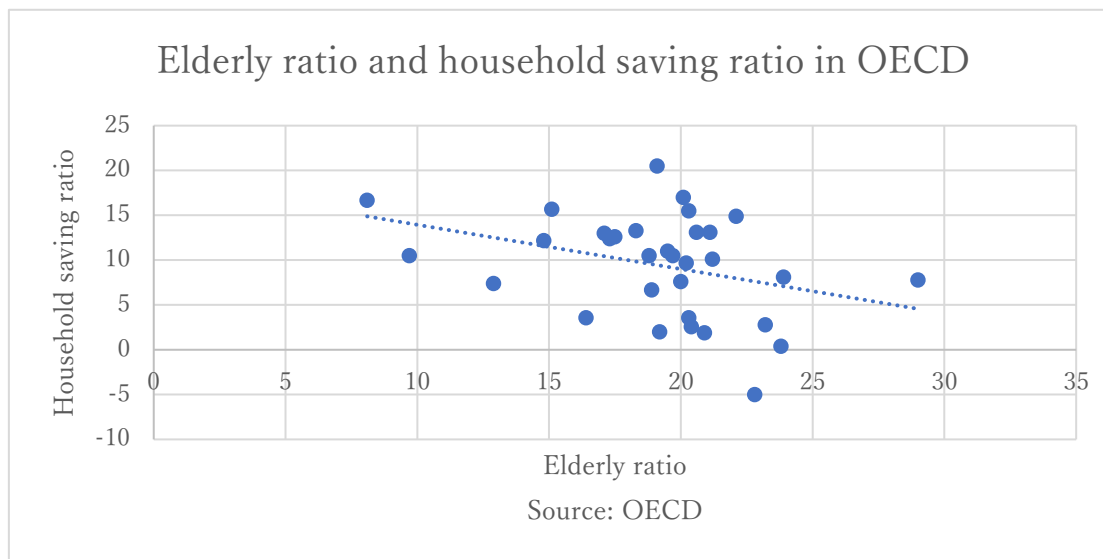
### 3.2 Capital market impact

It is well expected that a country undergoing population aging should “save for its old age,” that is, accumulate extra capital during the period of low dependency to maintain a smooth path of consumption into the period of high dependency.

This is to the extent that individuals have a lifecycle savings pattern of accumulating while employed and withdrawing after retirement.<sup>10</sup> Based on the average relationship observed in OECD countries, aging generally hurts the household saving ratio (Figure 10). However, household saving behavior is influenced by various non-economic factors and is difficult to predict for

<sup>10</sup> The household saving ratio of the elderly in Japan used to be relatively high, but has declined recently. This is well explained by the life-cycle theory of household savings, but partly due to the declining rates of co-habitants of older persons with their children who are not shown in household saving statistics. See Hurd and Yashiro (1997).

the future.



The extent to which population aging affects household savings depends on people's expectations as longevity rises<sup>11</sup>. The estimated demographic drag in OECD countries is smaller under the prospective-aging scenario, which incorporates expected increases in remaining life expectancy, than under the retrospective aging scenario, which abstracts from them.

The projected decline in labor force growth will likely impact investment demand. On the one hand, it stimulates factor substitution, entailing a trend increase in the equilibrium capital-to-labor ratio, for example, replacing a worker with labor-saving machines. Conversely, fewer contributions to the labor force need to be equipped with capital, reducing the investment-to-GDP ratio. Thus, the decline and aging of the population growth on the overall saving-investment balance is highly uncertain.

The above discussion is based on the case of a closed economy, and many developed countries can easily finance the capital from abroad. However, in practice, net financial flows among countries tend to be far smaller than a model of perfectly open capital markets would imply<sup>12</sup>.

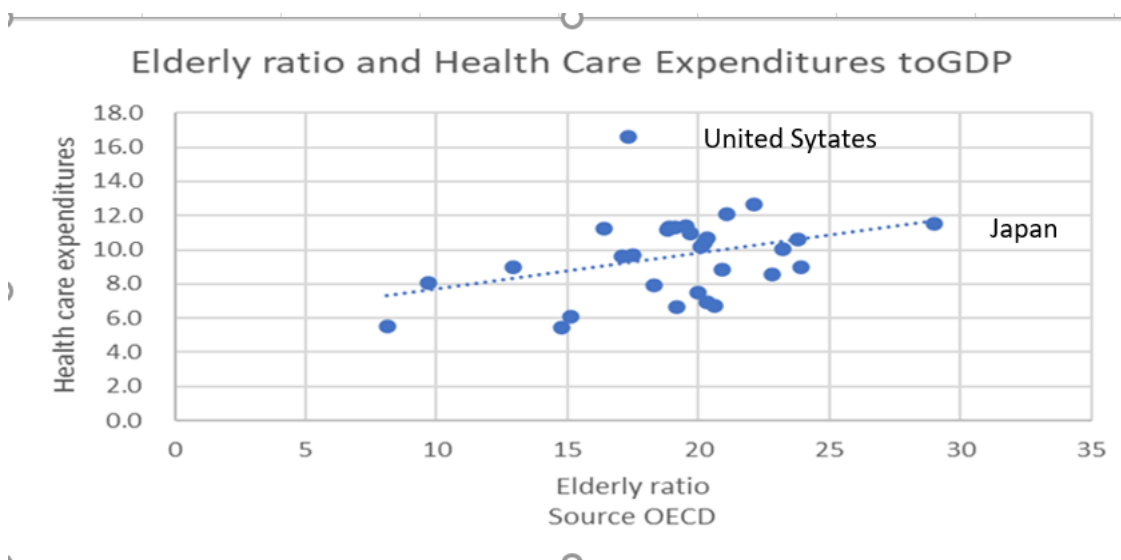
<sup>11</sup> Kotschy and Bloom (2023).

<sup>12</sup> Brooks, (2003).

### 3.3 Fiscal Impact

In developed countries that are aging rapidly, government transfer programs are a significant source of support for dependent elderly. Population aging also reduces government revenue. Putting these tax and spending effects together, the impact of population aging would raise the tax rate required for government transfers on a pay-as-you-go scheme in the United States from 16% in 2000 to 21% in 2030<sup>13</sup>.

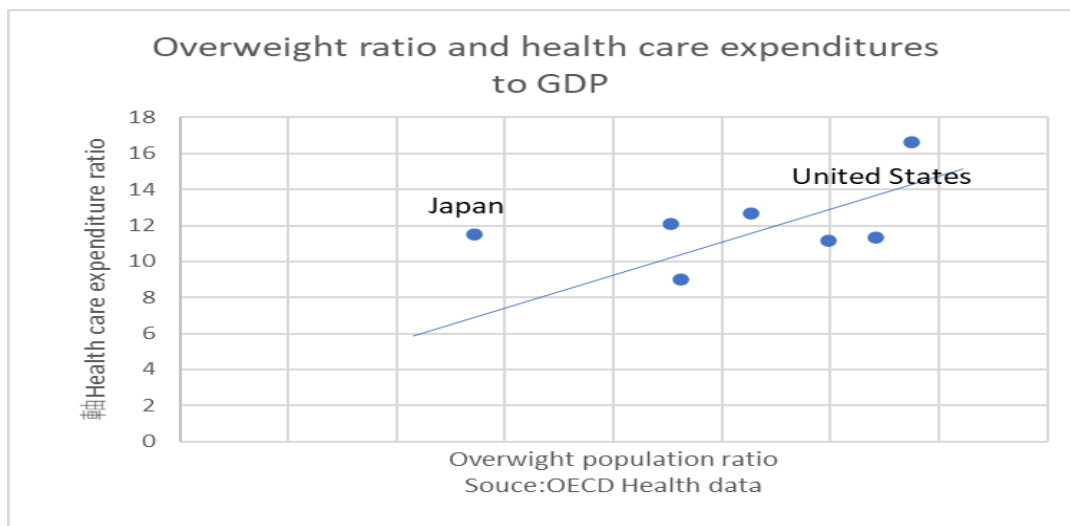
The expansion of the public sector in the past decades has been a general phenomenon in OECD countries, associated with the aging of the population. Countries with a relatively higher share of elderly people have a more significant government sector. There are various reasons for this. First, an increasing ratio of pension beneficiaries to contributors results in a higher ratio of pension expenditures to GDP. Second, as the incidence of sickness or being frail elderly tends to rise sharply with increasing age, medical and nursing expenditures will expand rapidly with the aging process (Figure 11).



However, the people's health conditions affect intra-country differences in healthcare expenditures. In this respect, the overweight and obese population ratios in the OECD Health Date are good indicators of potential

<sup>13</sup> Burtless (2006).

illness across the country. These ratios in G7 countries indicate that an extremely high level of the US health expenditures to GDP could partly be explained by its large share of overweight people in the total population. On the contrary, Japan's modest healthcare expenses could be even higher by accounting for its relatively small share of the overweight population and could be lowered further (Figure 12).



Third, as older workers have a higher probability of being unemployed, and their duration of unemployment is usually longer than average, expenditure for unemployment compensation is higher, too. In Japan, the firms must employ older workers in fixed-term contracts after the mandatory retirement up to age 64.

#### 4. Policy options

The observed decline and aging of the population are usually considered negative phenomena. However, they are essentially the results of individual rational decisions. Declining fertility is based on the family's logical choice to invest in higher education for fewer children, which is typically observed behavior in many developed countries. Also, an increasing life expectancy is undoubtedly desirable for individuals and families. A policy failure causes these rational people's behavior to become social problems.

Many of the undesirable repercussions of population aging can be cushioned or offset by appropriate policy measures. An increasing old-age dependency ratio due to the longer life expectancy requires an economically active population to support a more significant number of non-active populations. A key concept here is an “age-free” principle. The conventional definition of “the elderly” as those aged 65 and above does not account for the vast differences in life expectancy across countries. Also, individual differences in health or working capabilities become broader with age. Thus, age-discriminatory employment practices become more inefficient and unfair in an aging society. The various policy options to deal with these problems will be discussed below:

A comprehensive approach is needed to deal with aging costs and promote inclusive growth in an era of demographic change<sup>14</sup>. They are improving the design of public pensions, incentivizing private savings, and enhancing the efficiency of health care provision. Also, they expand the coverage of social security systems, promoting employability and skills of older workers and striving for a better labor market inclusion of women, youth, and migrants.

##### 4.1 Labor market policies

Significant policies facilitating the better utilization of the existing labor force can increase the employment of married women and older workers, thereby stimulating their labor supply.

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<sup>14</sup> Rouzet, Caldera, and Roehn, (2019). /

## Married women

The first is encouraging more women in the labor market and providing them with better-quality jobs. The Japanese government provides maternity leaves for a year or more and guarantees more than 50 percent of their previous wages through public employment insurance<sup>15</sup>. Also, after the maternity leave, the nursery schools are expanded to encourage them to stay in the labor markets.

Nevertheless, 30 percent of married women quit the firms when they have their first child. They eventually return to the labor markets after their children grow up, but few full-time employment opportunities exist. Also, most married women need substantial support to afford the Japanese work style of long working hours, but more is needed. This results in a trade-off facing Japan between further declining fertility rates and underutilization of female labor force. The Government set the target of achieving 30 percent of women in a manageable position by 2020 but postponed the target based on the actual 10 percent.

## Older workers

Second, policy action to ensure employment opportunities for old people could mitigate the decline in the labor supply. The conventional old-age dependency ratio assumes that individuals 65 and older will automatically retire from the labor force. However, Japan's labor market participation rate of the aged 65 to 69 was 63 percent for males and 42 percent for females in 2022, which is higher by international standards.

On the other hand, their average wages will likely decline after the mandatory retirement<sup>16</sup>. The compulsory retirement practice is a typical example of “discrimination by age” in many other developed countries. Still, it is a significant obstacle in Japan to better utilization of older people who want to stay longer in the labor markets. The government obliges firms to

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<sup>15</sup> The firms do not have to pay wages during maternity leaves, and the employee receives benefits comparable to unemployment compensations.

<sup>16</sup> In Japan, most firms set the mandatory retirement at age 60, as that below the age of 60 is not allowed by the law.



re-employ the workers after mandatory retirement up to age 65. Still, in most cases, they are employed in a fixed-term contract with wages on average at the 60 percent level.

Abolishing the mandatory retirement practice is difficult for Japanese firms. This is because of the practices of seniority-based wages and employment security for keeping the skilled workers in the firm, and they have to be terminated at some age<sup>17</sup>. Also, mandatory retirement is a rare opportunity for firms to dismiss unproductive workers. The OECD's indicator for employment protection shows that Japan relatively quickly dismisses employees like the United States. But it is misleading as they do not account for the restriction by case laws<sup>18</sup>. Introducing the law for monetary compensation for dismissals would make the procedure more transparent and reduce uncertainty.

Alternatively, if Japanese firms end these age-related practices, they no longer have to depend on mandatory retirement. The government introduced the "equal pay for equal work rule" to revise partly the existing seniority wage practice. Also, it will reduce the favorable tax treatment on considerable lump-sum retirement benefits based on the seniority rule. The retirement benefits are not transferable to other firms and are a means to discourage employees from voluntarily quitting.

### Japanese employment practices

One of the significant factors for Japan's good macroeconomic performance in the past is the functioning of the labor markets, particularly its low unemployment rate and rapid productivity growth. Long-term employment security and the seniority-based wage structure were established when the share of young workers in the labor force was much larger than today. However, the rapid aging of the labor force will significantly impact the labor market's performance. These employment practices used to be

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<sup>17</sup> Edward P. Lazear, "Why is there mandatory retirement?", Journal of Political Economy, Vol. 87, No. 6 (Dec., 1979),

<sup>18</sup> Naohiro Yashiro, "Dismissal Compensation and Labor Mobility in Japan," in Tatsuo Hatta and Shinya Ouchi ed., Severance Payment and Labor Mobility, Springer, 2018.

favorable with an abundant young labor force but became more costly with an increasing share of older workers in the firm.

The projected rapid rise in the ratio of old to young workers will reduce opportunities for promotion based on seniority rules, lowering the flexibility within a firm. The development of labor force participation largely depends on how quickly employment practices change according to demographic shifts.

Japanese employment practices have been essential in “profit-sharing” between large firms and firm-based labor unions. However, they are unsuitable for a declining share of union membership below 20 percent, increasing the labor force of married women and older workers who are usually not union members. They have to change under the declining and aging of the population toward job-based wages and flexible employment style.

#### 4.2 Public pension

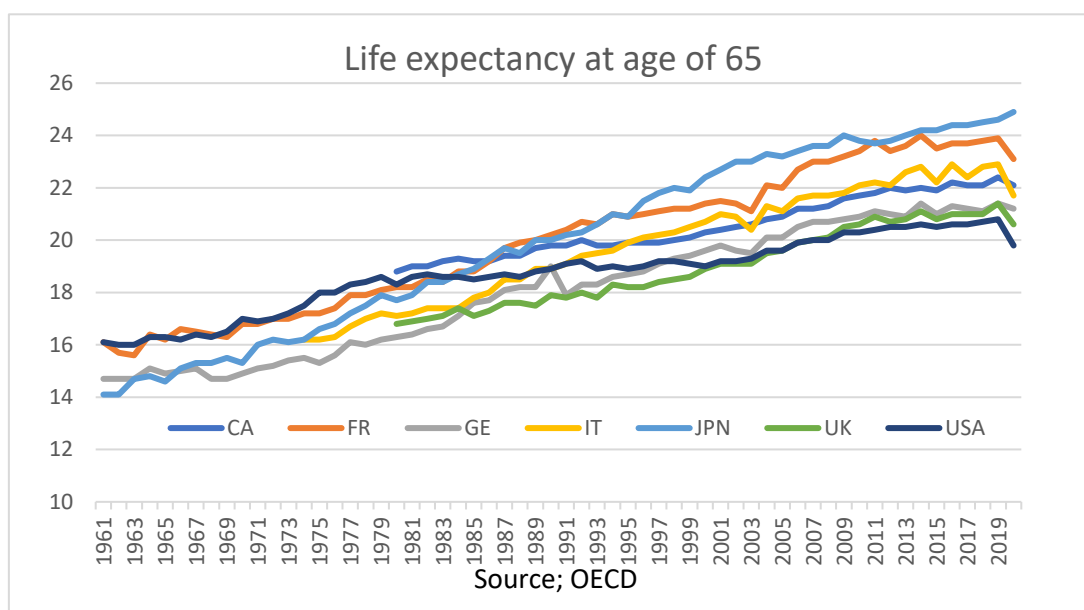
As the share of the elderly in the population increases, any distortions caused by introducing a public pension will become more critical, and the need to minimize such distortions becomes more urgent (Figure 13).

Public pensions should have an automatic adjustment mechanism with an increasing life expectancy. Defined contribution, links of the statutory retirement age or benefit adjustments to changes in life expectancy, and balancing mechanisms. The current upper age boundary of working life – using the age of 65 as a reference – will have to increase substantially to prevent the decline in the relative size of the labor force<sup>19</sup>.

The government tends to avoid raising the retirement age for fear of people’s protest. But it is the most reasonable solution.

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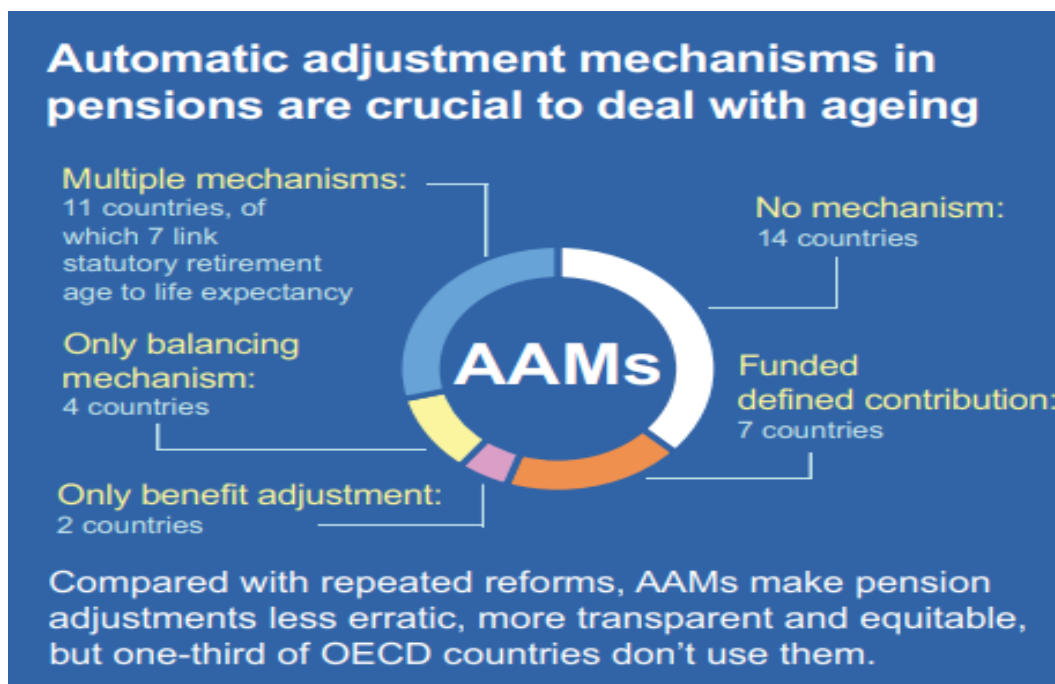
<sup>19</sup> OECD, 2020.



Japan’s public pension was initially established as a funding scheme, or each generation saves for retirement. However, the system gradually moves to a de facto pay-as-you-go scheme by shifting most of the savings for the future to the actual retired people. This brings about inter-generational inequality, with the demographic shifting to a more elderly and less working-age population.

The best way to moderate inter-generational excessive transfers is by raising the statutory age of pension eligibility according to an extension of life expectancy. This raises the “equivalent retirement age,” which is necessary to maintain the financial balances of the pension insurance scheme, given statutory benefits and contributions. (Figure 14). Japan’s statutory age of pension eligibility is fixed at age 65,<sup>20</sup> which is too early compared to 67 in Germany and the United States or 68 in the United Kingdom.

<sup>20</sup> The temporary pension eligibility age has been raised every three years and will reach to age of 65 in 2025.



Source: OECD

### Public healthcare

An expansion of healthcare expenditures will be more significant with the combination of population aging and development in medical technologies. The government can only afford to expand health expenditures for a while. One must set a clear defense line for public healthcare services between infectious or acute diseases and the diseases associated with adult lifestyle habits.

In this respect, the reform of the payment system is crucial. Japan has 12.6 hospital beds per 1,000 population, more than the OECD average of 4.3. The average length of stay in the hospital is 16.0, more than 6.1 in the US and 6.9 in the UK. This is mainly because of the fee for service scheme in the National Health Insurance which is particularly wasteful in an aging society. Also, Japan lacks general practitioners (GPs), and many old patients with multiple diseases go to multiple clinics or hospitals. Without gatekeepers, public health costs have continuously increased.

## Concluding Remarks

There is much uncertainty in the above analysis on the demographic impact on economic growth<sup>21</sup>. The first is the expected fruits of technological innovations on per-capita income and its growth rate, offsetting the adverse effects of population aging. The second is the variation of individual capacity, such as the possibility that an increasing life expectancy does not necessarily account for good health conditions, putting more burden on long-term care. The third is the risk of “Silver Democracy.” A rising number of elderly people can pressure the adequate provision of pensions, healthcare, and long-term care<sup>22</sup>, which might increase taxes and further slow economic growth.

Nevertheless, the policy direction towards the aging of the population is clear. As the aging of the population proceeds in the G7 countries, a growing working-age population, which had been a source of economic growth, turns into declining and discourages economic growth. It means that the former demographic dividend becomes a demographic drag.

However, the aging of the population is different from a disaster. Still, it results from the people’s rational decision to invest in fewer children and have a longer and healthier life. The negative impacts of population aging could be offset by encouraging people to work longer to keep the ratio of the retired to working population constant.

A key is a labor market policy for stimulating and supporting female labor force participation, particularly of the child-raising age. Also, encouraging the labor market attachment of older people is essential to access more “age-friendly jobs” and remove age-discriminatory employment practices. Improving the “quality” of the labor markets by accepting diversified workers with age- and gender-free principles.

The social security system should be reconstructed to a more extended living lifestyle. Moving the statutory pension eligibility age automatically

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<sup>21</sup> Kotschy and Bloom (2023).

<sup>22</sup> Rouzet, Sanchez, Renault, and Roehn (2019)

according to the average life expectancy is desirable. Those who wish to retire earlier can receive the pension benefits on an actuarially-fair principle. The government's provision of healthcare services has to set specific limits against an explosion caused by aging and medical technology developments.

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