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Abstract

Japan is one of the clearest developed-economy cases for examining how population aging affects labour productivity. The country combines a very high share of older persons, a shrinking working-age population, long life expectancy, low fertility, and persistent labour shortages. This paper examines the effect of aging population on labour productivity in Japan using a literature-based and secondary-data approach. It draws mainly on recent evidence from the OECD, International Monetary Fund, World Bank, Statistics Bureau of Japan, Cabinet Office of Japan, and peer-reviewed studies published from 2020 onward. The analysis shows that aging affects labour productivity through four main channels: reduction in labour supply, change in the age composition of workers, pressure on firms to reorganize work, and the need for stronger technology adoption. Aging may reduce productivity where firms rely on labour-intensive routines, weak training systems, mandatory retirement, or low labour mobility. However, the effect is not automatically negative. Older workers can support productivity when their experience is retained, when tasks are redesigned, and when firms invest in ICT, automation, artificial intelligence, and continuous training. The paper concludes that Japan's productivity challenge is not simply that the population is older; it is that many labour-market and firm-level systems have not adjusted fast enough to an older workforce. Policy should therefore focus on lifelong learning, flexible retirement, stronger ICT use, improved labour mobility, productivity upgrading in small and medium-sized enterprises, and better inclusion of women, older workers, and skilled foreign workers.

Keywords: *Aging population; labour productivity; Japan; older workers; ICT; automation; labour shortages.*

1.0 Introduction

Population aging has become one of the most important economic questions in developed economies. It affects the size of the workforce, the structure of household demand, public spending, saving behaviour, technology use, and the capacity of firms to sustain output. Among developed countries, Japan is a particularly important case because it reached an advanced stage of aging earlier than most other economies. The country has experienced persistent low fertility, rising life expectancy, and a long decline in its working-age population. According to the Statistics Bureau of Japan, as of October 1, 2024, people aged 65 years and above numbered 36.243 million, representing 29.3 percent of the population, while the population aged 15 to 64 stood at 73.728 million, or 59.6 percent of the population (Statistics Bureau of Japan, 2024). These figures show that almost one in three Japanese residents is already aged 65 or above.

The economic meaning of this demographic pattern is serious. Labour productivity is generally defined as output per worker or output per hour worked. The OECD defines GDP per hour worked as the amount of gross domestic product generated per hour of labour input, while also noting that the measure reflects not only worker effort but also capital, technology, intermediate inputs, and organizational efficiency (OECD, 2026a). Therefore, when examining the effect of aging on labour productivity, it is not enough to look only at the age of individual workers. A proper analysis must also consider technology, capital intensity, firm organization, skills, health, labour mobility, and sectoral structure.

Japan's aging population affects productivity in two direct ways. First, it reduces the number of people available for work, especially in occupations that require physical presence, continuous service delivery, or local labour. OECD evidence shows that Japan's working-age population has been declining since the mid-1990s and fell from a peak of 87.3 million in 1995 to 73.7 million in 2024 (OECD, 2025a). Second, aging changes the composition of the labour force. A larger share of workers are in older age groups, and more people continue working after the traditional retirement age. This creates both risks and opportunities. Older workers may face health limitations, shorter working hours, or weaker digital skills. Yet they may also carry firm-specific knowledge, professional experience, reliability, and mentoring capacity that can raise productivity when properly used.

The problem is that Japan's institutions and business practices have not always adjusted quickly enough to these demographic realities. The OECD notes that traditional Japanese labour practices, including seniority-based wages and mandatory retirement, are increasingly unsuitable in the context of rapid aging (OECD, 2024a). In 2022, 70 percent of Japanese firms still set a mandatory retirement age of 60, even though many people are healthy and able to work beyond that age (OECD, 2024a). Such systems may separate workers from career jobs too early, weaken incentives for firms to train older workers, and push older employees into lower-paid non-regular work. The result is that Japan may retain older people in employment but still fail to use their skills at full productive capacity.

This paper is guided by the following objective: to examine the effect of aging population on labour productivity in Japan. The specific concerns are to describe Japan's aging trend, explain the channels through which aging affects labour productivity, review recent empirical evidence on older workers and productivity, and identify policies that can help Japan sustain productivity despite demographic decline. The paper argues that population aging can reduce labour

productivity when it is treated mainly as a shortage problem, but it can become a source of productivity adaptation when firms and policymakers invest in technology, training, better work design, flexible retirement, and labour mobility.

The significance of the topic extends beyond Japan. Many developed economies, including Germany, Italy, South Korea, France, the United Kingdom, Canada, and the United States, are also aging. However, Japan's experience is more advanced and therefore provides useful lessons. If Japan can maintain productivity under severe demographic pressure, other developed economies may learn how to redesign work, reform retirement, modernize training, and integrate technology into an aging labour market. If Japan fails to adjust, it will demonstrate the economic cost of delaying reform until labour shortages become severe.

2.0 Literature Review and Theoretical Perspective

The literature on aging and productivity is mixed because aging works through several channels at the same time. At the macroeconomic level, aging tends to reduce the share of the population in prime working age. This can reduce total hours worked and raise the old-age dependency ratio. At the firm level, aging can influence productivity through the skills, health, adaptability, and task allocation of workers. At the economy-wide level, aging may either slow growth through labour scarcity or encourage investment in labour-saving technology. Therefore, the expected relationship between aging and labour productivity is not a simple one-direction effect.

A human capital perspective is useful for this paper. Labour productivity depends heavily on workers' knowledge, education, training, experience, and ability to use modern tools. Older workers are not automatically less productive; rather, their productivity depends on whether their skills remain relevant to the tasks they perform. In Japan, older workers may possess deep firm-specific knowledge and sectoral experience, but this value can be weakened if firms do not provide retraining or if older workers are moved into low-productivity non-regular roles after retirement-age rules. This means the productivity effect of aging depends partly on whether Japan treats older workers as a labour reserve or as a skilled human-capital asset.

Endogenous growth thinking also helps explain the Japanese case. Long-term productivity growth depends on technology, innovation, research and development, organizational learning, and the capacity of firms to adopt better production methods. Japan has long been associated with manufacturing capability, robotics, process improvement, and advanced technology. However, productivity gains are uneven across sectors. The OECD notes that Japan faces low labour productivity and sluggish productivity growth, especially in an environment where the shrinking working-age population requires stronger productivity gains to sustain living standards (OECD, 2026b). This implies that aging strengthens the importance of productivity policy because output growth cannot rely mainly on a growing labour force.

Recent evidence supports the view that technology can moderate the aging-productivity relationship. Lee, Song, and Kwak (2020) examined Japan and Korea using industry-level data and found that aging has positive effects on labour productivity when older workers are employed in industries with a large share of ICT in the capital stock. The study is important because it challenges a narrow assumption that older workers necessarily reduce productivity. Instead, it shows that the productivity effect of older workers depends on their interaction with technology.

Where ICT capital is available and work tasks are compatible with older workers' abilities, aging can be managed more productively.

Further evidence from Lee, Kwak, and Song (2022) strengthens this interpretation. Their study on older workers and ICT skills found that ICT skills and job-related training can help older workers remain productive. Although the paper uses Korean individual-level data, the finding is relevant to Japan because both economies face aging and digital transformation. The general lesson is clear: productivity decline associated with aging is not unavoidable. It can be reduced through targeted training, digital skill development, and work environments that help older employees use technology effectively.

The Japanese retirement system also appears repeatedly in the literature. Moriyama (2025) explains that although Japan classifies those aged 65 and above as older persons, many companies have historically set retirement around age 60; this makes workers aged 60 and above a practical focus for labour-market analysis. Moriyama further shows that older-worker employment has grown and that workers aged 70 and above have become a visible part of the workforce. This matters for productivity because Japan's response to aging has partly involved keeping older workers active. However, continued employment alone is not enough if older workers are placed in jobs with low wages, weak training, limited authority, and reduced hours.

The OECD's work on Japan places the productivity problem within a broader labour-market structure. Japan's labour market contains strong dualism between regular and non-regular workers. Non-regular workers often receive lower wages and less training, which can weaken productivity growth (OECD, 2024a). Older workers, women, and younger workers can be affected by this dualism. In an aging society, such labour-market segmentation creates a problem: the economy needs all available workers to contribute at higher productivity, but institutional arrangements may channel many of them into lower-productivity positions.

The old-age dependency ratio is another key concept. It measures the ratio of older persons to the working-age population. As this ratio rises, fewer working-age people support more retired or semi-retired people. OECD Employment Outlook data show that Japan's old-age dependency ratio more than doubled from 21 percent to 49 percent between 1995 and 2024, and it is projected to rise to 74 percent by 2060 (OECD, 2025a). This demographic pressure can reduce economic dynamism, increase fiscal costs, and force firms to operate under labour scarcity. However, if labour scarcity leads to automation, better training, and more efficient business processes, it can also push firms toward productivity-enhancing reforms.

The IMF's recent analysis also supports the view that aging affects both labour shortages and productivity. Asao, Seitani, Stepanyan, and Xu (2025) find that Japan's aging workforce contributes to labour shortages and may weigh on labour productivity. Their study also connects aging with artificial intelligence by examining AI exposure, complementarity, substitution, and skill transferability across occupations. A key implication is that AI can help address labour shortages, but the benefit depends on whether workers can move into occupations where AI complements rather than simply replaces tasks. This makes reskilling and labour mobility central to Japan's productivity response.

Overall, the literature suggests that aging affects labour productivity through three main mechanisms. The first is the labour-supply channel: fewer working-age people and shorter working

hours among some older workers may reduce total labour input. The second is the composition channel: the age, skills, health, and job placement of workers influence output per worker. The third is the adaptation channel: firms and governments may respond to aging by using automation, ICT, AI, training, immigration, female labour participation, and better work design. This paper uses these mechanisms to interpret Japan's current productivity challenge.

3.0 Methodology

This paper adopts a qualitative, literature-based research design supported by secondary data. The design is appropriate because the aim is to explain the relationship between aging population and labour productivity in Japan rather than to conduct primary fieldwork. The paper uses evidence from policy reports, statistical databases, and peer-reviewed articles published mainly from 2020 onward. The main sources include the OECD Economic Survey of Japan, OECD Employment Outlook, OECD productivity indicators, IMF Article IV reports, IMF working papers, World Bank World Development Indicators, Statistics Bureau of Japan population estimates, the Cabinet Office Annual Report on the Ageing Society, and recent academic journal articles on aging, ICT, training, and productivity.

The dependent variable in the study is labour productivity. It is understood as GDP per hour worked, GDP per employed person, or output per worker depending on the source used. GDP per hour worked is preferred because it captures output relative to labour time and is widely used in international productivity comparisons (OECD, 2026a). The independent variable is population aging, measured using the share of people aged 65 and above, the old-age dependency ratio, and the share of older workers in employment. The study also considers several mediating and moderating factors, including ICT investment, automation, AI, human capital, labour mobility, retirement policy, female participation, foreign worker policy, and the structure of regular and non-regular employment.

The analysis proceeds in three steps. First, it describes Japan's demographic trend and labour-productivity context using official data and recent reports. Second, it interprets the direct and indirect effects of aging on labour productivity based on recent empirical and policy literature. Third, it develops policy recommendations by comparing the main channels through which Japan can reduce the negative productivity effects of aging. The approach is analytical rather than econometric, but it follows an explanatory logic: aging is treated as the demographic pressure, productivity is treated as the economic outcome, and labour-market institutions, technology, and skills are treated as channels that shape the final effect.

The main limitation is that the paper relies on secondary evidence and does not estimate a new regression model using original data. This means the findings should be understood as a synthesized interpretation of recent evidence rather than as a new statistical test. However, the approach is useful for a journal-style conceptual and policy paper because the Japanese case already has rich and recent data from credible institutions. The use of multiple sources also reduces dependence on one dataset and allows the paper to connect demographic evidence with labour-market and productivity evidence.

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Table 1: Key variables used to examine aging population and labour productivity in Japan

Variable Type	Variable	Measurement	Expected Link to Productivity
Dependent	Labour productivity	GDP per hour worked; GDP per employed person; sectoral output per worker	Captures efficiency of labour input
Independent	Aging population	Population aged 65+ as a share of total population	May reduce labour supply but may also retain experience
Independent	Old-age dependency	Population aged 65+ relative to working-age population	Raises pressure on working-age workers and public finances
Moderator	ICT, automation, and AI	ICT capital, robot adoption, AI exposure, digital tools	Can offset labour scarcity and support older-worker productivity
Moderator	Human capital and training	Digital skills, reskilling, job-related training	Improves adaptability of older workers
Institutional factor	Retirement and labour mobility	Mandatory retirement, re-employment, job switching	Determines whether older workers are fully utilized

4.0 Findings and Discussion

The first finding is that Japan's aging population is already large enough to shape the country's labour-productivity path. The Statistics Bureau of Japan reports that the population aged 65 and over reached 36.243 million in 2024, equal to 29.3 percent of the total population (Statistics Bureau of Japan, 2024). The Cabinet Office's Annual Report on the Ageing Society similarly reports that the share of elderly persons reached 29.1 percent in 2023, with the population aged 75 and over already larger than the population aged 65 to 74 (Cabinet Office, 2024). These figures matter because the labour market is not only losing younger workers; it is also becoming more dependent on people working beyond traditional retirement ages.

The second finding is that Japan's working-age population decline creates direct labour shortages. The OECD reports that Japan has faced labour shortages for many years because the working-age population has been declining since 1995. Before the COVID-19 pandemic, the job-offer-to-applicant ratio averaged 1.4 between 2014 and 2019, and in March 2023 close to two-thirds of small and medium-sized enterprises reported labour shortages (OECD, 2024b). This is a serious productivity issue because labour scarcity can limit firms' ability to accept orders, extend operating

hours, provide services, or expand production. In some sectors, especially care, transport, construction, accommodation, retail, agriculture, and local services, shortages may directly reduce output.

However, a smaller labour force does not automatically mean lower labour productivity. Productivity is output per unit of labour, not total output alone. In theory, if firms respond to labour scarcity by investing in better machinery, software, robotics, AI, and process improvement, output per worker can rise. This is one reason Japan's case is complex. Aging may reduce the number of available workers, but it can also push firms to improve efficiency. The core question is whether the response is strong enough. OECD analysis suggests that Japan's labour productivity remains below the OECD average and that stronger productivity growth is needed to sustain living standards in the context of a shrinking working-age population (OECD, 2026b). This means Japan has not yet fully converted demographic pressure into adequate productivity gains.

A third finding is that older workers are increasingly important to Japan's labour supply, but the productivity gains from older-worker participation depend on job quality. Moriyama (2025) notes that workers aged 60 and above are a practical focus in Japan because many firms set retirement age around 60, despite the formal classification of older persons beginning at age 65. In 2024, employment rates among older men and women remained meaningful, and workers aged 70 and above had become a visible part of total employment (Moriyama, 2025). Continued employment helps reduce labour shortages, but it can also conceal underemployment if older workers are rehired on lower wages, fewer hours, or less responsible tasks after mandatory retirement.

This point is important because labour productivity is affected by the match between worker skills and job tasks. Older workers who remain in their career jobs may preserve firm-specific knowledge and client relationships. They may train younger workers, prevent operational mistakes, and stabilize production. By contrast, older workers who are pushed into peripheral roles may contribute fewer hours and receive fewer training opportunities. OECD policy advice for Japan has therefore emphasized raising or abolishing mandatory retirement, reducing seniority-based wage distortions, and ensuring equal pay for equal work (OECD, 2024a). The paper therefore finds that older-worker employment is beneficial only when it is linked to effective skill use.

A fourth finding is that technology is one of the strongest channels for reducing the negative productivity effects of aging. Lee et al. (2020) found that aging can have positive effects on labour productivity in Japan and Korea when older workers are employed in industries with high ICT capital. This suggests that technology does not simply replace workers; it can also make older workers more productive by reducing physical strain, improving information access, enabling better coordination, and supporting decision-making. In manufacturing, robotics and automation can allow fewer workers to produce more output. In services, digital scheduling, electronic payments, AI-assisted administration, telework, and customer-management systems can reduce repetitive tasks.

Japan has several strengths in this area, particularly in manufacturing and robotics. The OECD's report on recruiting immigrant workers notes that Japanese companies are world leaders in robotics and that Japan had one of the world's highest manufacturing robot densities in 2020 (OECD, 2024c). However, the same report explains that automation has been more effective in manufacturing than in many non-manufacturing industries because many service tasks are harder to automate (OECD, 2024c). This creates a sectoral productivity problem. Japan's manufacturing

industries may adapt better to labour shortage through automation, while services, care, hospitality, retail, and local small firms may remain more exposed to demographic decline.

The fifth finding is that small and medium-sized enterprises are central to the aging-productivity challenge. Labour shortages are particularly severe for SMEs, and many SMEs have limited resources to adopt advanced technology, redesign work, or raise wages enough to attract workers. The OECD reports that many SMEs facing labour shortages try to counteract them by increasing productivity through training, automation, and business-process improvement (OECD, 2024c). This is the right direction, but it also shows that aging pressure is forcing firms to become more productive. The challenge is uneven implementation. Large firms may have enough capital to invest in digital systems and human-resource reforms, while smaller firms may struggle.

A sixth finding is that Japan's traditional labour-market practices may slow productivity adaptation. Seniority-based wages can make older regular workers expensive relative to their current tasks, while mandatory retirement can remove experienced workers too early. Re-employment after retirement may keep older workers active but often under different conditions. Labour-market dualism also discourages investment in training for non-regular workers, many of whom are women, older people, or younger workers. The OECD argues that expanding training and social insurance coverage for non-regular workers would help reduce this problem (OECD, 2024a). From a productivity perspective, this is essential because an aging economy cannot afford to leave large groups of workers undertrained.

The seventh finding is that AI and digital transformation offer opportunities but also require labour mobility. Asao et al. (2025) find that aging contributes to labour shortages and may weigh on productivity, while AI can help address some shortages depending on occupational exposure and complementarity. However, they also show that Japanese workers have lower exposure to AI than workers in some other advanced economies, and that skill differences between occupations make labour mobility difficult (Asao et al., 2025). This means that Japan cannot rely on AI alone. Productivity gains from AI require workers who can use AI tools, firms that can reorganize tasks, and training systems that help workers move from declining occupations to growing ones.

The eighth finding is that female labour-force participation and skilled foreign workers are part of the productivity response. OECD evidence shows that Japan's female employment rate rose to a record level in 2025, but labour-market dualism and low wages in non-regular employment continue to limit the full use of female talent (OECD, 2025a; OECD, 2024a). Increasing women's employment matters not only for labour quantity but also for productivity because a broader talent pool can improve matching between skills and jobs. Similarly, foreign workers are increasingly discussed as part of the response to shortages. Yet the OECD stresses that immigration is not a substitute for productivity improvement; rather, productivity, training, activation, and migration must be considered together (OECD, 2024c).

The ninth finding is that aging affects fiscal pressure, which indirectly influences productivity. The IMF's 2025 Article IV report notes that Japan faces high public debt and that expenditure pressures related to health and long-term care for an aging population are expected to rise from 2030 (IMF, 2025). If public resources are increasingly directed toward age-related spending, there may be less fiscal space for productivity-enhancing investment unless reforms are carefully designed. At the same time, healthier and longer working lives can reduce fiscal pressure by increasing tax revenue

and lowering dependence on benefits. This again supports the policy logic of keeping older people productively employed, not merely formally attached to the labour force.

The tenth finding is that labour productivity in Japan is affected by business dynamism and sectoral allocation, not only by worker age. The IMF argues that structural reforms, including improved labour mobility, would help Japan's allocative efficiency and boost productivity (IMF, 2025). Allocative efficiency means that labour and capital move toward more productive firms and sectors. In an aging economy, this becomes more important because scarce labour should not remain trapped in low-productivity uses. If old firms survive mainly because workers and capital cannot move easily, overall productivity suffers. If weaker firms exit or restructure and workers can move into more productive jobs, aging pressure can lead to economic renewal.

The discussion therefore suggests a balanced conclusion: Japan's aging population creates a negative pressure on labour productivity, but the final effect depends on adaptation. Aging reduces labour supply and increases dependency, but it also encourages firms to automate, improve processes, retain older workers, and rethink employment systems. The strongest positive outcomes occur when older workers are matched with ICT, training, flexible work, and productive tasks. The weakest outcomes occur when older workers are retained only in low-wage, low-training, non-regular jobs, while firms delay technology adoption and labour-market mobility remains low.

This interpretation is consistent with the Japanese experience. Japan has managed to maintain high employment and increase participation among older persons and women, but it still faces weaker productivity performance than many other developed economies. The challenge is therefore not merely how many people work. It is whether each hour of work is supported by adequate capital, technology, skill, and organization. A country can have high employment and still have weak output per hour if workers are concentrated in low-productivity sectors or if firms do not reorganize around digital tools and better management practices.

The most important practical implication is that aging should be treated as a productivity reform agenda. Many discussions treat aging mainly as a social-security or health-care issue. Those issues are real, but they are not enough. For Japan, aging is also a firm-level and labour-market productivity issue. It requires better use of older workers, stronger training for workers of all ages, wider use of ICT and automation, reform of mandatory retirement, improved employment conditions for non-regular workers, and better labour mobility across sectors. Without these reforms, Japan may experience a prolonged period of labour shortages, slow productivity growth, and rising fiscal pressure.

There is also a broader lesson for developed economies. The Japanese case shows that aging does not need to be viewed only as decline. Longer healthy lives can extend productive working years. Older workers can mentor younger workers and preserve institutional knowledge. Technology can reduce physical burdens and help workers remain productive for longer. However, these benefits are not automatic. They require deliberate policy and firm-level changes. The central challenge is not chronological age itself but whether the economy has institutions that help people remain skilled, mobile, healthy, and effectively employed across a longer working life.

5.0 Conclusion and Recommendations

This paper examined the effect of aging population on labour productivity in Japan. The analysis shows that Japan's demographic structure is already deeply aged, with almost one-third of the

population aged 65 and above. The working-age population has declined substantially since the mid-1990s, and the old-age dependency ratio is projected to rise further. These demographic changes create labour shortages, increase fiscal pressure, and make productivity growth more important for sustaining living standards. Aging therefore has a clear negative pressure on Japan's economy when viewed through labour supply and dependency channels.

However, the paper also finds that the effect of aging on labour productivity is conditional rather than purely negative. Older workers can remain productive when they are healthy, trained, digitally capable, and placed in roles that use their experience. Evidence from Lee et al. (2020) shows that ICT capital can turn aging into a more positive productivity factor in Japan and Korea. Evidence from Lee et al. (2022) further suggests that ICT skills and job-related training can help older workers remain productive. This means Japan's real productivity challenge is not simply demographic aging, but insufficient adaptation to demographic aging.

The first recommendation is to strengthen lifelong learning and digital reskilling. Japan should expand training programs for older workers, non-regular workers, women returning to work, and workers in occupations exposed to AI. Training should not be generic. It should target practical digital skills, workplace technology use, AI-supported tasks, care technology, logistics systems, and service-sector productivity tools. Firms should be encouraged to train older workers instead of assuming that training investment should focus only on younger employees.

The second recommendation is to reform retirement and re-employment systems. Mandatory retirement at 60 is increasingly inconsistent with longer life expectancy and labour shortages. Japan should continue raising retirement ages, encourage phased retirement, and reduce practices that push older workers into lower-quality jobs after retirement. Workers who are able and willing to remain in their career jobs should be allowed to do so under fair wage and performance arrangements. This would help preserve skills and improve incentives for firms to invest in older-worker productivity.

The third recommendation is to accelerate ICT, automation, and AI adoption, especially among SMEs and service firms. Manufacturing has benefited more from automation than many service industries. Since Japan's aging-related shortages are severe in local services, health care, transport, hospitality, and small firms, technology support should be designed for these sectors. Policy tools may include tax incentives, digital advisory services, subsidized automation for SMEs, shared digital platforms, and practical support for business-process improvement.

The fourth recommendation is to improve labour mobility and reduce labour-market dualism. Japan needs workers to move more easily from declining sectors to expanding sectors and from low-productivity firms to high-productivity firms. This requires better job-matching systems, portable training records, stronger social insurance coverage, and less extreme differences between regular and non-regular employment. Labour mobility is especially important in the age of AI because workers may need to shift into occupations where technology complements their tasks.

The fifth recommendation is to broaden the labour force through better inclusion of women, older persons, and skilled foreign workers. Japan cannot solve its demographic challenge through one group alone. Policies should support childcare, flexible working arrangements, equal pay, pension rules that do not discourage work, and a clearer pathway for skilled foreign workers. However,

additional labour supply should complement, not replace, productivity improvement. The long-term goal should be a more productive, inclusive, and technologically capable labour market.

In conclusion, aging population affects labour productivity in Japan by shrinking the working-age population, increasing labour shortages, changing the age composition of workers, and increasing the urgency of productivity reform. Yet aging can be managed if Japan uses older workers effectively and invests in technology, skills, and labour-market reform. The future of Japan's productivity will depend less on demographics alone and more on how well institutions, firms, and workers adapt to a longer working life.

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