Policy Research Working Paper 10636

Productive Longevity

What Can Work in Low- and Middle-Income Countries?

Sara Johansson de Silva
Indhira Santos

WORLD BANK GROUP
Social Protection and Jobs Global Practice &
Health, Nutrition and Population Global Practice
December 2023

Policy Research Working Paper 10636

Abstract

The world's population is aging at dramatic speed. By 2050, most of the world's seniors (aged 65+) will be living in what are currently low- and middle-income countries. Aging will require low- and middle-income countries to develop comprehensive policy solutions to sustain welfare levels and ensure that welfare is equitably distributed across generations and socioeconomic groups. Given higher informality and lower human capital levels in low- and middle-income countries than more advanced economies, the balance and composition of the policy package in these contexts may differ, but there will be a common need for labor market policies to increase "productive longevity"—that is, to foster higher labor force participation and productivity among mature workers. This paper presents a framework identifying market, institutional, and behavioral failures that create constraints to productive longevity, and policies that may overcome these constraints. Drawing, to the extent possible, on the experience of low- and middle-income countries, the paper reviews evidence on supply-side and demand-side interventions to improve incentives, remove barriers to work, and invest in skills, as well as policies to improve matching of mature workers in labor markets. The paper ends with a discussion of meta-lessons for low- and middle-income countries.

This paper is a product of the Social Protection and Jobs Global Practice and the Health, Nutrition and Population Global Practice. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://www.worldbank.org/prwp. The authors may be contacted at sjohansson@worldbank.org or isantos@worldbank.org.

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JEL: J08, J14, J24, J26, J71

Topics: Aging, Labor Productivity, Employment Incentives and Labor Supply, Skills

1. Productive longevity in an aging world[1]

Old age is like everything else. To make a success of it, you've got to start young.

Theodore Roosevelt

The world's population is aging at a dramatic speed, raising concerns about how to maintain income and productivity growth, improve the welfare of older people, and help them contribute to society. By 2050, one in six members of the world's population will be at least 65 years of age, compared to fewer than one in 10 today. Nearly four out of five of these seniors will be living in what are currently low- and middle-income countries (L/MICs).[2] Aging will imply shrinking working populations relative to dependents, which will reduce economic growth if other factors—particularly productivity and employment rates—do not change. Aging is also likely to require higher public and private expenditures for health and long-term care (LTC) services. These demographic tides prompt a need for policies that can sustain welfare levels and ensure that welfare is equitably distributed across generations and socioeconomic groups. Labor market policies that help extend productive working lives and increase the labor force participation and productivity of older workers – "productive longevity" – are part of this important agenda. This paper identifies a set of labor market-related policies that can address key constraints to productive longevity in L/MICs and provides some preliminary evidence on their effectiveness.

Policies supporting aging populations in remaining healthy, skilled, and economically active have positive impacts across generations. Seniors who are in good physical and mental health and remain in the labor force help maintain the size of the workforce and prevent labor dependency ratios – the ratio of the population not working to that of the population working – from increasing. Harnessing the productivity of these mature workers boosts the pool of human capital, that is, the health and skills that ensure productive work. The gains can be substantial: estimates suggest that Greece could increase GDP by a staggering 23 percent by increasing employment levels of the 55+ age group to those of New Zealand.[3] And productive longevity does not appear to crowd out younger workers from labor markets, what economists refer to as the "lump of labor fallacy." Looking at Organisation for Economic Cooperation and Development (OECD) countries, higher employment rates for seniors in fact coincide with higher employment rates for youth,[4] and there is some evidence from the United States and Japan that higher senior employment is correlated with higher wages for younger workers.[5] At the firm level, mixed-age teams have been shown to have higher productivity than age-homogeneous teams, supporting the notion that older and younger workers are, on average, complements rather than substitutes.[6] Conversely, if seniors leaving employment deplete the market

[1] The authors are grateful to Victoria Strokova and George A.O. Alleyne for comments and suggestions on a draft version of the paper and to Gustavo Demarco, Elena Glinskaya, and Victoria Levin for very helpful comments and suggestions on an early version. An earlier version of this paper was prepared as a background paper for the Healthy Longevity Initiative.

[2] United Nations 2019.

[3] PWC 2018.

[4] Böheim and Nice 2019, Gruber et al. 2009, and Munnell and Wu 2013.

[5] Kalwij et al. 2010.

[6] Göbel and Zwick 2013.

of relevant skills, skill shortages may lead firms to automate production processes to a higher degree, which could instead lead to job destruction across generations.[7]

Supporting productive longevity can also help individuals increase their healthy years of living. At the individual level, there is substantial evidence that working in older age, in the right circumstances, can create a virtuous circle of healthy living and productive work. Research focused on high-income countries (HICs) shows that opportunities for voluntary part-time paid work, as well as volunteering activities, can contribute to strengthening physical and mental health at older age, including for people over 80 years of age.[8] The Gallup World Poll shows that working full-time or voluntarily part-time in older age, as opposed to being retired, is correlated with higher levels of reported happiness.[9]

Policies focusing on productive longevity are part of a broad policy agenda addressing aging and welfare challenges. First, actions across many different policy areas will be needed to boost growth, inclusive job opportunities, and social protection, while managing macroeconomic and fiscal conditions. These include policies relating to education and life-long learning, health and care systems, labor migration and labor market regulations, social protection systems, taxation policy, innovation policy, and more. Second, policies also need to target all generations: promote longer working lives for those able to work productively, invest in younger generations to raise productivity over entire working lives, and enhance social protection for those who can no longer work. This is particularly the case in L/MICs, where human capital levels are lower and intergenerational human capital gaps across generations larger, compared to HICs. Investing at scale in low-productivity mature workers would likely be very costly compared to investing in children and youth. Today's adults are tomorrow's elderly, and early investment in skills development is associated with a strong positive impact on health, which in turn contributes to later retirement.[10]

While recognizing the need for broad policy packages, the paper is focused on policies that enable and incentivize older workers in L/MICs to remain active, and that can raise the productivity of their work further. As will be discussed in more detail below, in L/MICs, many older people, often even the majority, work for themselves or their families in the informal sector, in low-productivity employment and without social security. Raising their productivity and providing protection are critical challenges. Given largely underdeveloped social protection systems in low-income countries (LICs) and many middle-income countries (MICs), policies relating to taxation, labor regulations, and formal social protection programs have limited reach. For the group of relatively better-off workers, often in the formal sector, different labor market policies and social security system incentives and barriers can matter, however. A focus on this group is likely to yield greater results for this set of policies, as it is arguably less expensive and easier to extend working lives than renew or start working lives at mature ages, particularly after a long period of absence from the labor market. In what follows, we will refer to "mature workers" approaching retirement as the target age group.

There are specific growth and employment opportunities associated with aging. Low aggregate labor demand in the formal sector, including for older workers, is often a critical problem to productive employment growth in many L/MICs. Aggregate demand-side constraints limit the reach of supply-side policies aiming at incentivizing productive employment, for older workers and others. This said,

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[7] Acemoglu and Restrepo 2022.

[8] Staudinger et al. 2016.

[9] https://www.brookings.edu/blog/up-front/2014/03/28/why-aging-and-working-makes-us-happy-in-4-charts/

[10] Allel et al. (2021) show that, in Mexico, more access to formal education during childhood and adolescence is associated with a long-term positive effect on health and later retirement.

the nature of labor demand is changing globally, affecting demand for mature workers, and will also impact labor markets in L/MICs, albeit to a varying degree. Aging can itself generate demand for products and services, thus generating jobs in the so-called "silver economy."

The paper provides a review of key data and relevant literature on productive longevity. The policy review summarizes evidence based primarily on search based on policy areas (social security, lifelong learning, etc.) coupled with keywords including "old*" or "old age", "senior*", and "elder*", and snowballing from identified studies. The policy agenda focusing on productive longevity is relatively recent and the evidence on policy effectiveness limited, especially for L/MICs. In identifying relevant literature, we have given priority to studies based on rigorous experimental approaches, but the review includes other quantitative and qualitative research, from academic journals as well as gray literature, including reports and studies from international organizations such as the World Bank or the OECD. Where evidence for mature workers in L/MICS is scarce, we focus on the impact of relevant interventions for other groups that face similar constraints (e.g. youth, or women), or for HICs. The paper does not use a precise age cut-off to identify mature workers. Typically, the interventions we look at would be relevant for age group 55+ and above, but may differ depending on the age group involved.

The remainder of the paper is organized as follows: Section 2 describes the labor policy agenda for aging, highlighting the commonalities and diversity of policy needs and options between HICs and L/MICs as well as within L/MICs. Section 3 presents some stylized facts regarding the nature of work for older adults. Section 4 presents a conceptual framework around the main constraints to longer productive working lives. Based on this framework, section 5 looks at the available evidence on what works, drawing where possible on evidence from LICs and MICs. The final section concludes with some meta-lessons and points to the important research agenda that lies ahead.

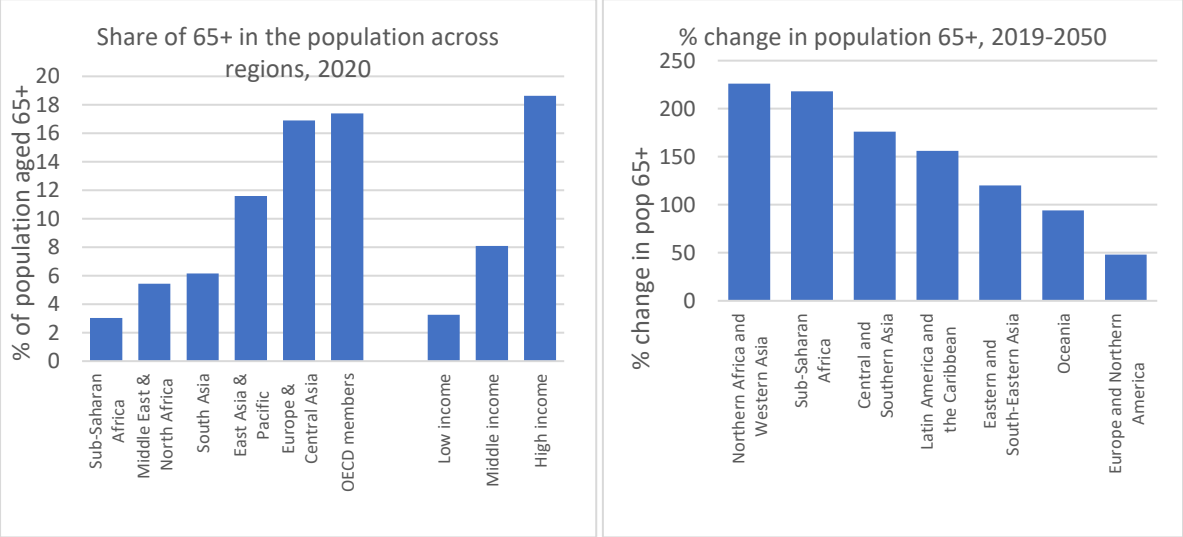
2. A global policy agenda for aging

Aging is a global phenomenon, and all countries will need to consider how to optimize policy to address the impact of older populations. Old-age dependency ratios are already high in many L/MICs (particularly in East Asia and Eastern and Central Europe) and increasing rapidly in others (Latin America and the Middle East and North Africa). The share of persons above 65 years of age reaches 18 percent both in rich East Asian countries and in the OECD but is below 5 percent in Sub-Saharan Africa, the Middle East and North Africa, and South Asia. (Figure 1). In most of Latin America and Eastern Europe and Central Asia, fertility rates have already dropped below replacement levels, which means that the population will also be shrinking. Whereas most countries in South Asia and Sub-Saharan Africa still have relatively young populations, old-age populations are increasing rapidly in absolute numbers, and many Southeast Asian countries have already undergone a significant demographic transition in a very short period. Based on current trends, fertility rates will be below replacement levels in almost all Asian countries within 20 years.[11] Many of these countries risk experiencing a slowdown in growth and thus "getting old before getting rich." As the demographic window of opportunity is closing, sustaining welfare levels will require significant reforms, also in countries where social protection and skills-development systems are still developing.

[11] https://www.csis.org/analysis/will-many-developing-countries-get-old-they-get-rich

Globally, women's life expectancy at birth exceeds that of men by nearly five years, and the gap persists into older ages. The gender longevity gap is highest in Latin America, Europe, and Eastern and South-Eastern Asia. This gender gap suggests that productive aging policies need to pay specific attention to skills and labor market constraints for women, and health constraints for men.

Figure 1: Demographic changes differ across regions, but aging is coming everywhere



Source: World Development Indicators (left), UN 2019 (right).

The priorities and space for reforms will differ between less and more advanced economies, reflecting different contexts of aging and productive work. Most analysis and evidence on aging societies and the relationship with longer working lives is based on HICs. Much can be learned from these experiences, but there are important differences between less and more advanced economies that affect priorities as well as the available and desirable set of policy instruments that can support longer and more productive working lives. These include, *inter alia*, labor market structure, access to social protection, human capital levels across generations, norms, and the technical capacity and political space for reform. Nevertheless, countries that are now building up their education, labor, and social protection systems can also learn not to repeat errors made by more advanced economies. The experience from HICs and some MICs shows that the cost of putting in place inadequate solutions can be substantial. Unsustainable pension systems or insufficient attention to skills development for older generations have long-term repercussions that can be very difficult (politically and technically) to undo. Poorer countries need to avoid costly mistakes, such as entrenching costly future pension payment contingencies in social protection design, or ignoring human capital investments, the effects of which will manifest themselves in the decades to come.

The dual labor market structure of most L/MICs presents a particular dilemma for policy makers. The International Labor Organization (ILO) estimates that, on average, about 70 percent of the employed workforce is informally employed in developing countries.[12] On the one hand, high informality and low-productivity work mean that policies focusing on formal workers and formal firms will be less effective in changing aggregate outcomes, despite promising evidence in some areas that policy can affect old-age productivity and employment decisions. On the other hand, many workers in

[12] Based on statistics for 61 developing countries, from Elgin et al. 2021.

the informal sector—given the lack of access to social protection and overall low levels of private savings—arguably already work too late in life, caught in a vicious circle of ill-health and low productivity and straining work, leading to even worse physical and mental health.

Increasing the productivity of low-productivity mature workers in L/MICs would likely be difficult, given health and education gaps and lower life expectancy. As access to education and health has expanded over the past decades, inter-generational gaps in education and health are also significant. In a country like Vietnam, which has undergone a remarkable upskilling effort in past decades, over 60 percent of those over age 60 have only completed primary education, whereas the vast majority of young people have at least higher secondary education.[13] In many L/MICs, human capital levels in the younger generations, while increasing, remain insufficient and need to increase substantially, however, raising the urgency of investing in children and youth who make up the future workforce.

Despite these caveats, there are strong reasons to form productive longevity policies for workers who have higher human capital levels and resources to retire. This group always exists: in many LICs, likely represented by public sector workers; in MICs, a larger share is likely to come from the formal private sector. For this group, the policy agenda could more closely follow that of advanced economies and focus on extending working lives. Although early investment is critical, fostering skills development throughout working lives may be more efficient than has previously been considered, not least because a person over her lifetime generally spends much more time at work than in school. Research shows that returns to work experience may explain as much of the income gap between HICs and L/MICs as gaps in education: workers in L/MICs develop less human capital on the job than do workers in HICs.[14] In addition, the hiring rate of mature workers may in fact be higher in L/MICs than in HICs.[15] This higher dynamism suggests significant pay-offs to investing in human capital and adequate employment transition.

L/MICs hence face a more comprehensive policy agenda than HICs, with both opportunities and risks. A significant part of the challenge of productive aging in L/MICs is clearly about investing in children and youth and increasing productivity and boosting social protection and health support among older workers, often in informal, low-productivity employment. But there are also opportunities for developing policies addressed to mature workers. In this paper, we discuss the evidence for measures that aim to extend working lives though policy instruments that apply mostly to formal work as well as for measures that can support more productive employment in both the formal and informal sectors. In doing so, we recognize that the profile and context for mature workers today are different from those of the past and certainly likely to differ from those of tomorrow. The policy evidence reported should be considered in this light.

3. Work in old age – Some stylized facts

This section presents some stylized facts regarding the nature of work among mature workers, looking at participation patterns and trends and the development of human capital - in the form of access to

[13] World Bank 2021a.

[14] Jedwab et al. 2021.

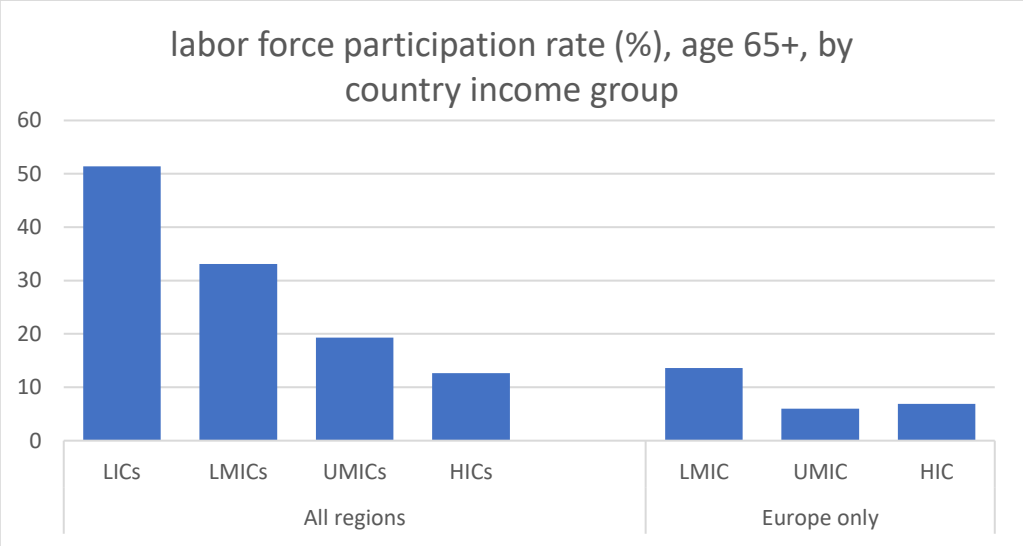
[15] Annex Table 1 shows that in several middle-income countries (Brazil, Colombia), the hiring rate of 55-64 year olds is much higher (34 and 24 percent respectively) than in EU27 or OECD countries (6 and 8 percent).

good health and the means to adapt to a labor market with rapidly changing skills needs – elements that determine the ability to work into old age and influence worker productivity.[16]

The nature of work among older adults

Old-age labor force participation is generally lower, the higher a country's average income level. In the average LIC, more than half of the 65+ population is active in the labor market (Figure 2). Moving up through country income groups, participation rates fall systematically. In lower middle-income countries (LMICs), 33 percent of the 65+ population is active, and in upper middle-income countries (UMICs) and HICs, this rate falls to 19 and 13 percent, respectively. Across income groups, European countries are outliers, with significantly lower participation rates than other regions. High labor force participation in poor countries largely reflects a need to work. In Thailand, for example, 31 percent of people above age 60 report that labor income is their main source of income, which is much higher than the share reporting pensions (5 percent) or elderly allowance (17 percent).[17]

Figure 2: Labor force participation for older workers falls with a country's income



Source: Estimates based on Staudinger et al. 2016. Refers to 2013 data.

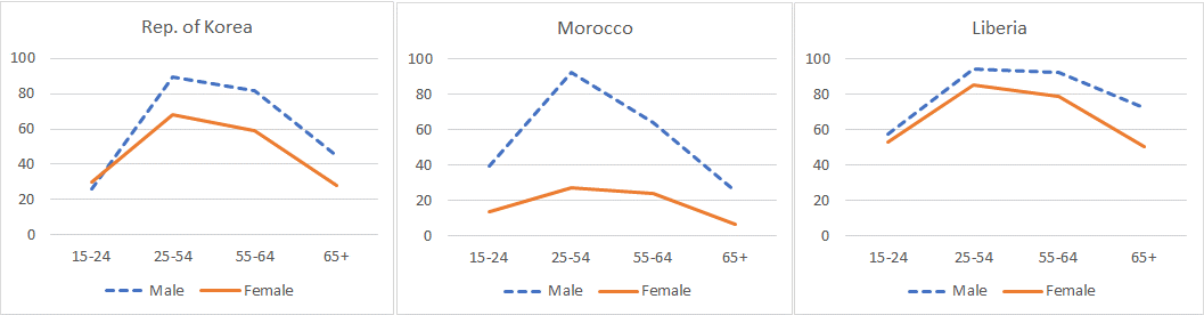
The pattern of participation over the life cycle is similar across country income levels, despite very different levels of participation. Figure 3 presents three cases as an illustration: low-income Liberia, middle-income Morocco, and the high-income Republic of Korea. Across these very different countries, labor force participation falls after age 55, for both women and men. In Morocco, where female labor force participation is very low, the pattern for male participation is nonetheless similar to that of both richer and poorer countries, and even among women, there is an inverse u-shape

[16] A complete assessment of labor market conditions for mature workers is outside of the scope of this paper. However, several World Bank country-level or regional studies provide more comprehensive overviews of labor market conditions for older workers including sector and occupations analysis, for example for Thailand (World Bank 2021b), Vietnam (World Bank 2021a), East Asia and the Pacific (World Bank 2016), Malaysia (World Bank 2020), and the Russian Federation (Levin 2015).

[17] World Bank 2021b.

between participation and age. Globally, patterns of age-related change in the balance between paid work, unpaid work (including care for others), personal care (for oneself), and leisure is surprisingly consistent across countries.[18]

Figure 3: Labor force participation patterns are similar over the life cycle across richer and poorer countries



Source: Estimates based on ILO data. Refers to 2019 data.

Gender-gaps among mature workers appear more important in MICs than in HICs. Based on a comparison of a set of middle-income countries with the European Union (EU) and OECD, mature workers in the developing world (i) have higher gender employment gaps and (ii) exit the labor force later, but (iii) with earlier exit for women relative to men (Annex 1). The gender gap in labor force participation rates for workers aged 65+ is below 10 percentage points in Canada, Germany, and the United Kingdom, but above 30 for Chile, Malaysia, Mexico, and Türkiye.[19] For LICs, the gender gaps are not likely to be quite as dramatic. The poorer the country, the higher the chances that women also must work as they age.

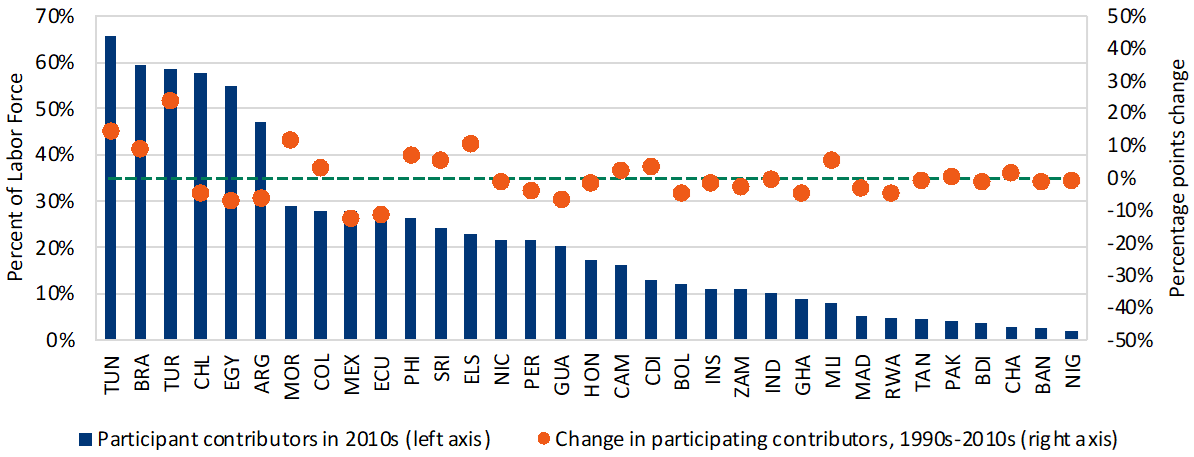
Lacking social protection, many mature workers in L/MICs continue working to secure their livelihoods. Data on social insurance in LICs are scarce, but what is available suggests that only a few percent of the population are covered. In MICs, rates of coverage are in double digits but rarely exceed 30 percent (Figure 4). In some countries, particularly in rapidly transforming economies such as Vietnam, informality is significantly more prevalent among mature workers than among younger adults.[20] Even for those covered, adequacy of pension benefits is often low, raising incentives to continue to work informally. Consider Georgia, where the universal pension amounts to 17 percent of the average wage and is projected to fall to as little as 6 percent by 2050.[21] In a study of mature workers in Argentina, 70 percent of persons receiving a benefit and working reported doing so because their pensions were insufficient to cover needs.[22] In Malaysia, 40 percent of the population are not covered by pensions, and among those covered, many continue to work in old age as their contribution history is insufficient to ensure adequate pensions.[23] In a set of Latin American countries, 18 percent of those who receive a pension still work, and their working hours approach full-time and

[18] Ferranna et al. 2022.
[19] World Bank 2020.
[20] Lam and Elsayed 2021.
[21] World Bank 2022a.
[22] Barrientos 2011.
[23] World Bank 2020.

are only marginally lower than those of persons who do not receive a pension.[24] In a global study involving consultations with older persons in L/MICs, one-third of participants reported working for pay. What is more, twice as many were willing to work for pay if given the opportunity.[25]

Better-off workers are also considering continuing working later in life, whether to top up retirement income or for other benefits, such as social connections. According to a 2012 Eurobarometer Survey focused on Active Aging, one-third of Europeans would like to continue working after retirement age and two-thirds would welcome opportunities for partial retirement.[26] Labor supply elasticities seem to increase significantly over the lifecycle (based on data from the United States),[27] showing that incentives can matter greatly for participation.

Figure 4: In MICs, pension coverage remains low



Source: Rutkowski 2018, reproduced in World Bank 2022b. Note: The figure shows participation rates in contributory pension schemes from the 1990s to the 2010s. The dashed horizontal line represents no change in rates of contribution over time.

Old-age labor force participation and education interact differently across countries. For HICs, levels of education are a strong determinant for labor force participation at older ages, likely reflecting that education gives access to fulfilling work opportunities and is not associated with physically straining labor.[28] In poorer countries, however, more highly educated persons are more likely to have access to pensions and/or accumulated private savings that make retirement possible, whereas less-educated persons are more likely to be obliged to work in older age.

Globally, self-employment is more common among older workers than other age groups. Across countries, the 55-64 age group often has the highest rate of self-employment in the working age population (15-64). Compared to EU and OECD countries, mature workers in MICs are more likely to be self-employed.[29] In East and Southeast Asian countries, self-employment rates are nearing 90 percent for older rural men and women; even in urban areas, the share of the self-employed increases

[24] Eclac/ILO 2018.
[25] UNFPA 2012.
[26] European Commission 2012.
[27] French and Jones 2012.
[28] Boissonneault et al. 2020.
[29] See table, Annex 1.

as of age 60, reflecting that the self-employed are more likely to stay in the labor market, whereas employees, at least from the formal sector, retire.[30] In HICs, self-employment can represent "opportunity" entrepreneurship, a desire to use experience to run a business or lead a more flexible working life. In the United States, the rate of new entrepreneurs is significantly higher in the age group 55-64 than in the age group 20-34 (0.37 vs 0.23 percent). The share of older adults among new entrepreneurs also increased from 15 percent in 1996 to 26 percent in 2018, and older adults are more likely than other age groups to be opportunity driven.[31] However, higher rates of self-employment among older workers in L/MICs often signal "push factors," such as lack of wage-work opportunities, with higher informality and overall more precarious employment. In Thailand, for example, informality rates are below 50 percent for workers aged 35-44, but they are nearly 80 percent for those aged 55-64 and over 90 percent for workers aged 65 or more.[32]

Earnings generally increase with age, all else equal, but patterns vary and may depend on age cohort characteristics. A recent global study finds that returns to work experience are significant, at around 2 percent globally, and that education cannot easily substitute for experience. There is significant variation across countries, however. First, as mentioned above, there are higher returns to experience for workers in HICs compared to L/MICs. The authors hypothesize that this gap occurs as workers in HICs are more likely to be able to accumulate human capital over time; however, the higher returns could also reflect more access to formal and regulated employment with automatic wage increases that are unrelated to human capital or productivity, or to a higher likelihood of working in firms that are richer in physical capital which can also boost productivity among complementary factors of production. Second, in economies transitioning out of state-led economic systems (former communist economies), skill sets have become obsolete more rapidly than in other countries, and so returns to experience have been lower for specific older cohorts.[33]

In advanced economies, the labor market participation of older workers has increased in the past few decades. In 1996, the average worker in an OECD country could expect to exit the labor force at approximately 62 years of age; in 2016, the age of exit had increased by two years, to 64.[34] Between 2002 and 2017, the participation rate for workers between 55 and 74 years increased by 9 percentage points across OECD countries, reversing a decline that had taken place since the 1970s.[35] These trends have occurred across OECD countries, across genders, and across socioeconomic groups.

In contrast to trends over the past 20 years, the COVID-19 pandemic has resulted in a significant withdrawal of older workers from the labor market, however. Data from Australia, Austria, China, and the United Kingdom show that older workers were worse hit in the labor market than younger workers by the COVID-19 pandemic, both in terms of quality of work, and in loss of work.[36] In the United Kingdom and the United States, the largest cuts in total employment were due to older workers (55 and over) who dropped out of the labor market during the height of the pandemic. Many of these workers have not (yet) returned to work and may never do so - once out of the labor force, older

[30] World Bank 2016.

[31] Farlie et al. 2019.

[32] World Bank 2021b.

[33] Jedwab et al. 2021. Chernina and Gimpelson (2022) show, for the Russian Federation, that when time, cohort and experience effects are separated, the cohort and experience factors work in opposite directions, reflecting the massive depreciation of skills.

[34] Boissonneault et al. 2020.

[35] Geppert et al. 2019.

[36] Pit et al. 2021.

workers are more likely to remain inactive than their younger counterparts.[37] A study of interstate informal sector migrant workers in India showed a strong and positive correlation between age and income losses during the COVID-19 pandemic.[38] These outcomes stand in contrast to the Global Financial Crisis, which did not result in a sustained reduction in older workers' participation in labor markets.[39]

The changing nature of work may be contributing to more age-friendly jobs. Technology is enabling automation of many tasks, but also raises demand for skills that are (still) complementary to technology, such as creativity, problem solving, and socio-emotional competencies.[40] Globally, fast-aging countries are seeing higher rates of automation, driven by skills gaps related to specific cohorts (manual production skills).[41] At the same time, in the United States, in parallel to the automation process, jobs have become more "age-friendly": less physically demanding, more flexible, or involving autonomous and team work, for example. These jobs are not necessarily taken by mature workers, however, although they are more adapted to their needs and preferences.[42]

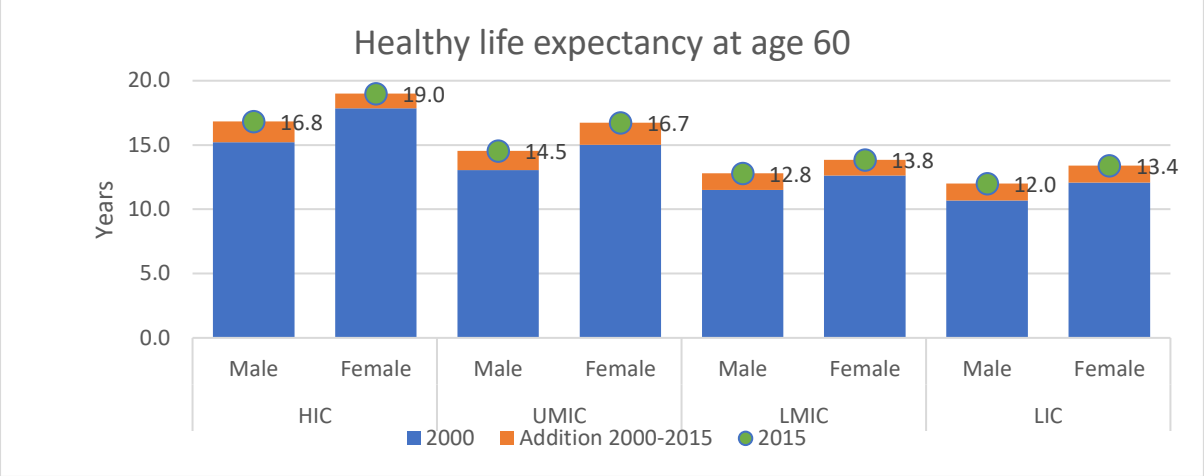
Human capital and productive longevity

Health and skills – human capital – are central to productive longevity. The increase in labor force participation observed in OECD countries in the past decades can largely be attributed to higher life expectancy and educational attainment, whereas changes to statutory retirement age accounted for less than 10 percent of changes.[43]

Before the COVID-19 pandemic, healthy life expectancy had been increasing globally, prolonging the physical and mental ability to work. A strong relationship can be found between health and work in old age.[44] In the past two decades, healthy life expectancy (HALE)[45] has increased by 5.4 years, from 58.3 in 2000 to 63.7 in 2019 (Figure 5). Healthy additional life years have increased across all country income groups, although there are still gaps between advanced and developing countries. By 2015, a woman aged 60 living in an UMIC, could expect to live nearly 17 additional years in good health, all else equal, an increase by 21 months compared to 2000. LMICs and LICs have also seen increases in HALE, albeit somewhat smaller, and women aged 60 can now expect to live in good health for another 14 years. There are significant gender gaps, however: men can expect two fewer years of healthy life than women in HICs and UMICs. These statistics point to a gendered work, life, and health challenge: whereas women are more likely to live longer than men, especially in HICs and MICs, they are less likely to participate in work, especially in MICs.

[37] Pizzinelli and Shibata 2022.
[38] Guha et al. 2020.
[39] OECD 2013.
[40] World Bank 2019.
[41] Acemoglu and Restrepo 2022.
[42] Acemoglu et al. 2022.
[43] Geppert et al. 2019.
[44] E.g. Giles et al. 2012.
[45] HALE is the average number of years that a person can expect to live in "full health" by taking into account years lived in less than full health due to disease and/or injury. https://www.who.int/data/gho/indicator-metadata-registry/imr-details/66

Figure 5: Healthy life expectancy has been increasing across the globe



Source: Estimates based on WHO statistics.

Working longer can in fact create a virtuous circle of health and work at older age, but the outcome likely depends on the nature of work and employment conditions. Age-related physical and psychological changes can be moderated with physical and intellectual activity and other lifestyle factors.[46] Work can bring cognitive stimulation and social interaction, which contribute to continued mental and physical agility. Social interactions at work, which are likely to demand constant adaptation, have been shown to be particularly important to maintain brain capacity.[47] However, prolonging work in (predominantly low-skill) jobs that provide limited stimulation, jobs that cause undue stress, and jobs that are physically straining with high risk of occupational disorders, is bad for healthy longevity.[48] The overall employment situation also matters, as job insecurity in old age can in fact lead to deteriorating mental health.[49]

Beyond health, skills investments are also critical as demographic patterns shift, since the nature of jobs is also changing, raising the importance of continuous skills development. Across the globe, there is substantial evidence that jobs are becoming more intense in cognitive, analytical tasks. Technological change is resulting in higher demand for technology-complementary skills, both higher-order cognitive skills as well as socio-emotional skills.[50] Accessing productive work, hence, increasingly requires a more complex set of skills and adaptive capacity. Evidence from the EU shows that the productivity decline often observed among older workers is more likely due to skills obsolescence than to age itself; in Mexico, wages of college-educated workers have fallen due to a fall in wages of mature rather than young workers, pointing to a similar potential effect.[51]

The aging process need not prevent older people from working productively and learning new things; depending on the task, aging may even be helpful. Aging inevitably involves some cognitive decline. However, both the timing and extent of decline vary significantly across individuals, and the

[46] Crawford et al. 2009.
[47] Staudinger et al. 2016.
[48] Staudinger et al. 2016, Prinz et al. 2018.
[49] Gutierrez and Michaud 2019.
[50] World Bank 2019.
[51] Mayhew and Rijkers 2004.

overall rate of decline can, as mentioned, be moderated. Moreover, not all cognitive abilities necessarily decline during aging, at least not before 80 years of age, and some even improve at older ages. For example, the ability to receive information declines relatively early, but the capacity to direct information and act on the information (orienting and executive functions) can in fact increase, well into the 70s. Whereas some skills such as verbal memory and perceptual speed peak relatively early in adulthood, other skills such as verbal ability or auditory comprehension, which draw on orienting and executive functions, peak much later, often after 50 years of age. As a result, the aging brain may in fact retain a high degree of functionality.[52]

The ability to develop new skills is critical to retaining productivity, however. Whereas improved health is increasing the potential years of work, the shelf-life of skills is falling.[53] The evidence on capacity to learn at older age suggests that older adults' learning process is different from that among younger people, but not necessarily less efficient.[54] In fact, workers can continue to contribute significantly to workplace productivity at older ages, drawing on experience and capacity for judgement. Whereas they may be somewhat slower to complete some tasks, they compensate for lack of speed by executing them better.[55]

Mature workers may also have stronger socio-emotional skills that are in increasing demand. Contrary to common perceptions, mature workers score higher than younger colleagues on broad concepts of job performance, including on reducing counterproductive work behaviors, workplace aggression, and tardiness, all of which are important factors affecting overall productivity. Moreover, mature workers are not necessarily less innovative in the workplace than younger workers.[56] A meta-study found that mature workers generally function equally well or even slightly better than young workers on emotional competencies, which are specifically important for the growing services sector (and arguably for the broader economy, as well).[57] A study of German workers in the services sector showed that older workers were more engaged with their work, more confident in their abilities to do the job, and less prone to burnout than younger employees.[58]

4. What holds back productive longevity?

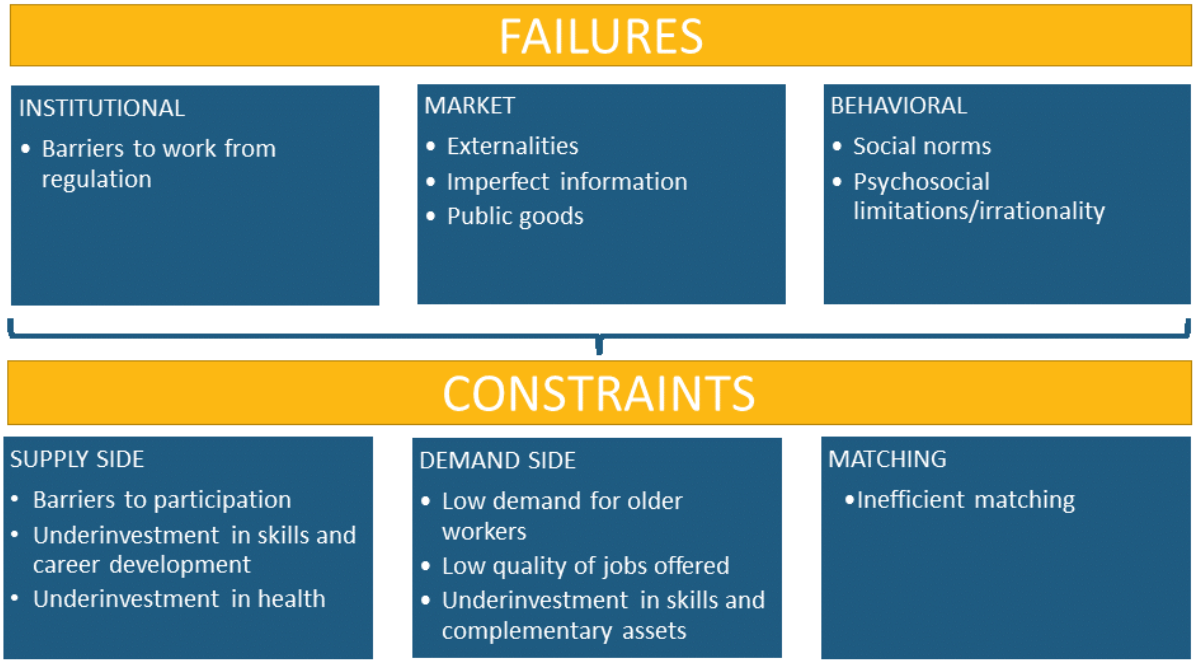
What can be done to promote longer and more productive working lives? Several factors can constrain mature workers' participation in the labor market and their productivity at work. This section presents a framework highlighting constraints that can affect mature workers' incentives and ability to work and do so productively, employers' incentives to hire or retain them and invest in their human capital, and matching between demand and supply (Figure 6). Throughout the remainder of the report, we try to identify L/MIC dimensions where possible.

Institutional, market, and behavioral failures create constraints for mature workers and the firms that may employ them. *Institutions* and *policy and regulatory frameworks* affect incentives and opportunities for workers to engage, and for firms to hire them. Examples include labor regulations

[52] Veríssimo et al. 2022, Desjardins and Warnke 2012.
[53] https://www.weforum.org/agenda/2017/07/skill-reskill-prepare-for-future-of-work/
[54] Picchio 2021; Thomas et al. 2020.
[55] Backes-Gellner et al. 2011.
[56] Ng and Feldman 2008.
[57] Doerwald et al. 2016.
[58] Johnson et al. 2017.

and social protection, including pensions. *Market failures* include missed-out externalities from more skills development or better public services (including care services), imperfect information about workers' ability, or the public-good nature of some investments in health or education. Finally, *behavioral constraints* include social norms around who works, or internalized ageism – prejudice or discrimination on the grounds of a person's age.

Figure 6: A policy framework for longer and more productive working lives



Source: Authors.

Supply-side constraints – Incentives and ability to work productively

To extend working lives with productive employment, workers need to (i) have the incentives to work, with institutions and regulatory frameworks that allow for it and do not discourage it, including in ways that accommodate changing preferences; and (ii) the skills and health necessary to be employable, particularly in the context of a rapidly changing world of work. We discuss these two areas in turn.

Labor regulations, tax systems, and social welfare systems can significantly influence or outright dictate opportunities for work beyond retirement, with both positive and negative effects. Mandatory retirement ages, legal impediments to partial retirement, or unfavorable regulations for part-time work or flexible work arrangements or pay may outright prohibit or make it less attractive for workers to continue. China's retirement rules still oblige men to retire at 60 and women at 55, or 50 for specific, physically more burdensome jobs.[59] Almost half of the world's countries, the vast majority L/MICs, have limits on the use of fixed-term contracts.[60] On the other hand, employment protection legislation favoring tenure may allow workers to stay on the job and retain their wages.

[59] OECD 2019a.

[60] Data from World Bank Employing Workers Database. The median limit is three years (36 months) for cumulative contracts.

Taxation of earned income in addition to pensions and second-earner taxation tend to rapidly increase the implicit tax rate on work with age.[61] Taxation appears particularly important for groups with higher inactivity rates (and thus a larger labor supply reserve), including women and low-skilled workers, and for populations with highly elastic labor supply, which includes many older workers. [62]

Social welfare systems, including the level and structure of pension benefits as well as unemployment or disability pensions, can further affect incentives to work. In many countries, formal sector workers enjoy relatively generous early retirement rules, creating incentives to retire early.[63] In East Asia and Pacific countries, retirement ages in national pension schemes are relatively low compared with life expectancy at age of retirement.[64] The design of other social welfare programs also matters. If mature workers are eligible for prolonged unemployment benefits, or if the requirements for job search in unemployment or disability-benefit programs are waived for them, are too lax, or are weakly enforced, alternative pathways to leaving the labor force without jeopardizing retirement benefits open.[65] Such loopholes can hence reduce the impact of pension reforms aimed at increasing retirement ages.[66]

Pension income, whether through contributory or noncontributory systems, can be an important factor in determining workers' participation choices in middle-income countries. Analysis of the impact of the early retirement age in Central Europe and the Western Balkans shows that pension receipts are significantly and negatively associated with labor force participation.[67] In Argentina, widening the eligibility for noncontributory pensions lowered labor force participation rates by 5 percentage points and increased informal work.[68] The South African social pension program has been shown to reduce employment among the elderly.[69] These experiences appear consistent with historical evidence from more advanced economies. The introduction of a social pension from age 70 in the United Kingdom, some 100 years ago, lowered labor force participation rates by 6 percent, even with a very low adequacy of benefits.[70] As systems expand, it is important to make sure that programs remain incentive-compatible.

Information gaps due to limited financial literacy can also impact retirement choices for those covered by pension systems. Understanding the expected level of benefits and how that will impact welfare in older age is a prerequisite for making rational labor market decisions. Surveys in Sweden and Ireland show that knowledge of future pension benefits is at best limited, and that the most economically vulnerable groups know the least about their future benefits.[71]

In addition to rethinking pension systems, flexible work arrangements may be needed to accommodate work preferences that change with age. There is evidence that mature workers need

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[61] Butrica et al. 2006.

[62] Meghir and Phillips 2010.

[63] Bussolo et al. 2015, World Bank 2016.

[64] World Bank 2016.

[65] Ahlqvist and Boren 2017 and Kyyrä and Ollikainen 2008.

[66] Pension reform during recession in Germany resulted in alternative pathways pushed by employers - unemployment and partial retirement (Lorenz et al. 2020).

[67] Bussolo et al. 2015, Gragnolati et al. 2011.

[68] Bosch and Guajardo 2012.

[69] Baird et al. 2018. The paper shows that cash transfers in general do not lower aggregate labor force participation, however.

[70] Gisecke and Jäger 2021.

[71] Elinder et al. 2020, Barrett et al. 2015.

and value flexible work arrangements, including both those related to flexible time schedules and changes in work roles and assigned tasks, and that providing such arrangements serves to delay retirement.[72] Particularly in HICs but also in some middle-income countries, COVID-19 has given rise to structural changes in the organization of work, with a rapid move towards more home-based and flexible solutions for many white-collar jobs, as well as a shift to independent work, that over the long run may benefit working conditions for mature workers.[73]

Family and the availability of care services also matter for labor market participation, especially for women. Grandmothers all over the world hold a central responsibility for the care of their grandchildren, and hence support the labor market participation of the parents of these children. Towards the end of working life, many are also caring for elderly parents or even their spouse. In Europe, one-third of grandparents provide regular care and women who do are also less likely to be working.[74] Care obligations are even more prevalent in L/MICs, where three in four elderly people live in the same household with members of younger cohorts, compared to one in four in HICs, and where formal care services are often lacking in supply and quality.[75] A study of time use allocation in a set of OECD countries, China, and India, showed that the time share allocated to paid work fell successively as of age 45-50 across the sample, whereas unpaid work was highest when people were in the their late 30s (likely related to child bearing and rearing), and again increased after age 60.[76] In countries with significant outmigration, whether international or intranational, grandparents may be the main caregivers in so-called "skipped-generation" households consisting of only older people and children.[77] Studies from Brazil, Mexico, and Thailand show that grandmothers' care obligations affect both their participation and hours worked negatively.[78] Since families are often formed relatively early in life, many of these grandmothers in L/MICs often have significant potential working years ahead when they leave the workforce, reduce hours, or move to less-demanding activities. Spouse employment is also generally positively correlated: to retire is a joint decision, made with a view to spending time together.[79] A study from the Russian Federation showed that having a working wife is associated with a 13 percentage point increase in the probability that a pension-age husband will still be employed.[80] In urban China, a working spouse is associated with as much as 40 percent and 58 percent increases in the probability of men and women working, respectively.[81]

Lack of safe and reliable transportation systems affects mature workers' access to productive opportunities. More care responsibilities, lower stamina and physical strength, and related vulnerability to crime means that mature workers depend heavily on quality transportation services. A survey of senior workers in the United States suggested that lack of reliable transportation was a

[72] Atkinson and Sandiford 2016.
[73] McKinsey Global Institute 2021.
[74] Backhaus and Barslund 2021.
[75] UN 2007.
[76] Ferranna et al. 2022.
[77] UNFPA 2012.
[78] Attanasio et al 2022, Paweenawat and Liao 2021. A study from Mexico also showed that female labor participation of a mother was not negatively correlated with more children, but that co-habitation with grandmothers increased in response to more children (Schmieder 2021).
[79] Giles et al. 2012.
[80] Levin 2015.
[81] World Bank 2016.

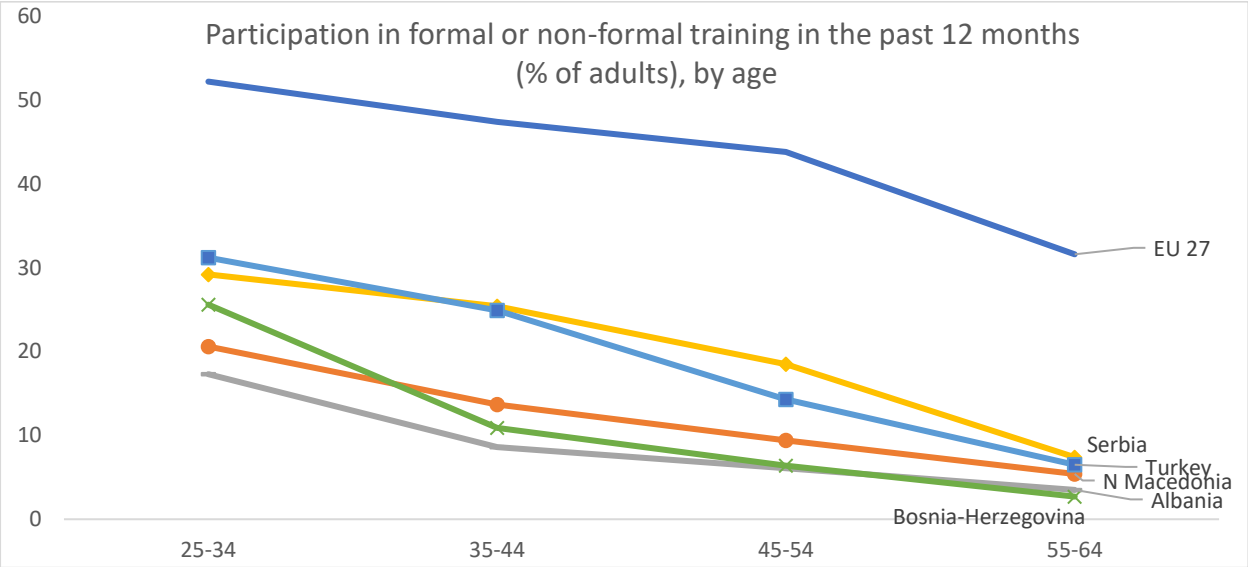
somewhat serious or very serious obstacle to working for 82 percent of respondents.[82] Research on the impact of safe, affordable, reliable, and effective transport systems for elderly is lacking. However, limited access to safe transportation is estimated to be a major constraint for women's participation in labor markets, reducing their participation probability by 17 percent.[83] Underdeveloped transport systems in L/MICs are likely to similarly reduce access to work for the older population.

Psychosocial factors may generate additional disincentives for work. If individuals internalize social norms and stereotypes around age versus capabilities, responsibilities, and work, their incentives and even capacity to work may be reduced. Individuals who self-identify as being older risk considering that they are too old for certain jobs, for changing jobs, for promotion, or for developing their skills further, and that they should not crowd out the younger generation.[84] There is evidence, for example, that "health pessimistic" individuals prefer exiting the labor force earlier than others, even when actual health levels are not different from other workers. Unsurprisingly, those with higher education and income appear to have more positive self-perceptions of aging than people with lower incomes and education.[85] Gender and social class also influence own perceptions of optimal exit age. [86]

Beyond issues of regulations, incentives, and other barriers, mature workers often underinvest in skills development in ways that hamper their labor market prospects and lower the opportunity cost of retiring. Although skills upgrading is essential to remaining relevant in labor markets, participation in adult learning is low overall, especially for mature workers and in L/MICs. Figure 7 shows, for EU member countries as well as five European MICs, that (i) training is lower in the European MICs than in the EU HICs, but (ii) the incidence of training monotonically falls with age across all countries. Low incidence of training is partly due to underdeveloped labor market and career guidance information systems and services and limited and fragmented markets for training (including for firm-provided training, discussed below). However, even where subsidized adult training programs are provided, take-up is often low,[87] and there is some evidence that the mature workers who would be most in need of upskilling – those with lower levels of education and lower wages – may also be the least interested in or able to participate in training.[88] Workers may lack information on the value of training, what skills to acquire, or what training opportunities are available. Retraining at older ages may also seem more challenging, discouraging take-up. Workers may choose to not invest in training if they will not receive fair remuneration for their higher productivity.[89] Lack of training is arguably particularly problematic in L/MICs, where human capital among workers is lower overall and intergenerational human capital gaps are high. Since skills development is often cumulative and skills demand can change quickly, the skills gap is likely to compound over time.

[82] NCST 2011.
[83] ILO 2017.
[84] Vickerstaff and Van der Horst 2021.
[85] WHO 2021.
[86] van der Horst 2019.
[87] World Bank 2019.
[88] Generation 21 2021.
[89] Almeida et al. 2012.

Figure 7: Participation in formal or non-formal training, by age



Source: Estimates based on Eurostat data. Refers to 2016 data.

Poor health is also reducing both participation and productivity among mature workers. Good health is a critical asset for productive work and a central component of human capital. Healthy older people are more likely to participate in the labor market, although again, in poorer countries, those in poor health may still be obliged to work to the extent they can. Health is not the focus of this paper and is not reviewed in detail here. It is worth noting, however, that health interventions may be included among low-hanging fruit for addressing productivity constraints in low- and middle-income settings. One area is nutritional deficiencies occurring as seniors need fewer calories but more nutrient-rich meals with age; other areas are broader lifestyle choices that influence later development of non-communicable diseases (NCDs). The compression of morbidity and the extension of good health into later years permits longer returns to continuous investment in education.

Demand-side constraints – Incentives and ability to hire and invest in mature workers

This section looks at employers' incentives to retain or hire mature workers and adapt working situations to increase their productivity. Factors that constrain relevant opportunities include informal and formal institutions governing employment and wages, market failures that restrict the quantity and quality of training, and psychosocial and normative barriers to employers' recognizing the potential of older workers.

Regulations and informal institutions around wage setting may raise labor costs for mature workers above productivity and hence lower their attractiveness to employers. There is significant evidence that job tenure or seniority leads to higher wages in ways that may be disconnected from productivity increases. In OECD countries, 10 additional years spent in a job with the same employer increase wages by nearly 6 percent on average, all else equal.[90] Wages appear to rise even more sharply with tenure in at least some L/MICs, compared to HICs.[91] A study of seniority wage setting and firm-level

[90] OECD 2019b.

[91] Donovan et al. 2020.

productivity among Brazilian firms showed that wages were in fact unrelated to productivity; a study in the Netherlands found a similar disconnect between wage levels and performance.[92] In many East Asian countries, the seniority wage-setting practice is strong, and performance-based pay practices are not implemented.[93] Wages that rise above productivity levels risk lowering the competitiveness of mature workers. Analysis of firm-level data in East Asian countries shows that seniority wage practices indeed are strongly and negatively correlated with hiring workers in the age group 50-64.[94]

Formal regulations also matter for labor costs and may shift these above mature workers' productivity levels. First, social contributions increase with wages. This can contribute significantly to raising labor costs, as in some countries social insurance contributions are very high – e.g., 45 and 36 percent of wages in Argentina and Brazil, respectively.[95] Especially in the presence of asymmetric information, the cost of hiring older workers may therefore be higher.[96] If productivity does not increase in parallel with social contributions, unit labor costs for mature workers increase. A survey of UK employers suggested that pension costs were the main deterrent to hiring mature workers – more important than the limited time frame for return on investments in skills, or any perceived lack of skills.[97] Similarly, employment protection legislation (EPL) can increase the costs of labor adjustments, as many regulations imply higher costs with longer job tenure. Globally, the average number of weeks' pay required as severance in the case of dismissal increases from three for workers with one year of tenure, to 21 for workers with 10 years of tenure. In Indonesia, a worker with 10 years of service receives an average severance payment equal to 22 *months* of wages.[98] Strict EPL may be one of the reasons for not hiring mature workers.[99]

"Ageism" and social norms, including those reinforcing age stereotypes, also make the hiring of older workers more difficult. The assumptions that mature workers are frail, stubborn, less capable of learning, and technologically challenged can result in age-stereotyped hiring practices and workforce management practices that reduce the productivity of mature workers—for example, if mature workers feel insecure about their jobs and thus invest less in skills.[100] There is significant evidence of biased perceptions and management practices with respect to older workers within firms. A survey by Generation 21 across Brazil, India, Italy, Singapore, Spain, the United Kingdom, and the United States showed that 38 percent of managers considered mature workers unwilling to take up new technology, 27 percent considered them unable to learn new skills, and 21 percent answered that mature workers did not work well with other generations. Yet, when hiring workers, the same managers valued experience above all.[101] In countries lacking age discrimination legislation, practices such as defining upper age limits for job vacancies – and to some extent mandatory retirement ages

[92] Rocha 2017, Dohmen 2003.

[93] World Bank 2016.

[94] At the same time, seniority wages may have other underlying rationales, as firms may purposely set wages below productivity levels for younger workers and above productivity levels for older workers, to foster firm fidelity (Zwick 2009).

[95] https://iuslaboris.com/insights/comparing-social-security-contributions-rates-across-latin-america/

[96] OECD 2019b.

[97] Auer and Fortenu 2000.

[98] Estimates based on Employing Workers Database, https://www.worldbank.org/en/research/employing-workers

[99] Bussolo et al. 2015.

[100] Jin and Baumgartner 2019.

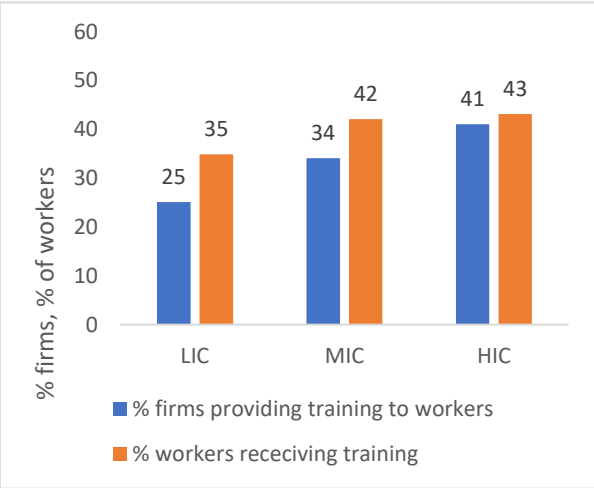
[101] Generation 2021.

– outright discriminate against mature workers.[102] A survey in EU countries found that a majority of respondents thought that being over 55 years of age put job applicants at a disadvantage.[103] An experimental study in Sweden showed significant and independent negative correlation between being older and the chances of being called for an interview, and callback rates began to decline for workers already in their early 40s.[104] A similar approach for the United States provided robust evidence of age discrimination against older women, but not against older men.[105] In Deloitte's 2018 Global Human Capital Trends report, 20 percent of business leaders viewed older workers as a competitive disadvantage, and in countries such as the Netherlands, Russia, and Singapore, this percentage was far higher; some 15 percent also felt the older employees to be blocking rising (young) talent.[106]

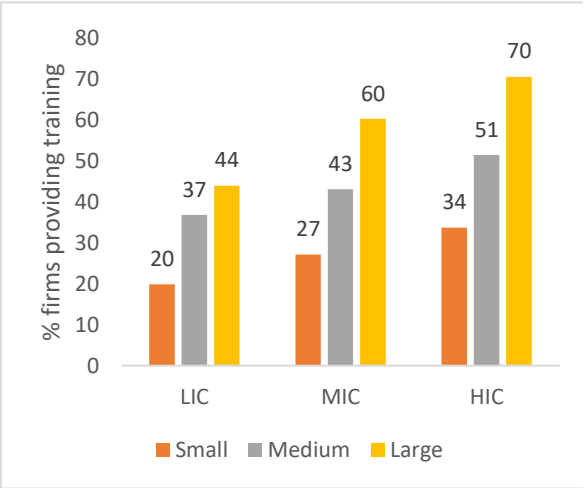
Firms—particularly small and microenterprises— generally invest little in skills development for their workforces, despite the importance of skills for firm productivity. Individuals' low investment in their skills development is thus mirrored in underinvestment by employers. The World Bank's enterprise surveys show that only one-third of firms offer training to their workforce, and those that do, invest in a minority of their workers (Figure 8a and b). Across country income groups, small and micro-firms are the least likely to offer training, and firms in L/MICs are less likely to offer training compared to firms in HICs, for each size class of firms.

Figure 8: Access to training through employers is limited, especially in L/MICs

a. Average share of firms providing training and share of workers receiving training (in firms where offered), by income group



b. Average share of firms providing training, by firm size and income group



Source: Estimates based on World Bank Enterprise Surveys.

Several market failures may help explain firms' underinvestment in skills beyond formal education.[107] Firms may underinvest because training to some extent is a public good, and they risk

[102] OECD 2019b.
[103] European Commission 2015.
[104] Carlsson and Eriksson 2019.
[105] Neumark et al. 2015.
[106] Deloitte 2018.
[107] See the framework presented in Almeida et al. 2012.

losing the returns to investment if other firms "poach" the skilled workers, and more generally due to high worker turnover. Managers may lack accurate information about what skills will be needed, the value of training for productivity, earnings, and employability, or what training opportunities are available.[108] Financial institutions that likewise lack understanding about training and the impact on productivity can restrict credit for training purposes. Coordination failures arise when firms cannot find productive workers and therefore cannot increase pay, whereas workers underinvest in skills because they will not be rewarded, and the training offer remains underdeveloped. In principle, the time horizon for reaping the benefits of skills investments by firms is shorter for mature workers, which may also create disincentives to invest in their skills.

Firms may also underinvest in other complementary strategies that are valuable to increase the productivity of older workers. Relevant technology tools, more ergonomic working conditions, health literacy, and other health interventions, as well as organizational changes such as multi-age teams or flexible working arrangements may be needed. As in the case of skills, firms may lack the knowledge or resources for such investments.[109]

Intermediation – Effective matching services for mature workers

Even when mature workers have the necessary skills and health, and firms are prepared to hire them, the search and matching process between jobs and workers in the labor market may be costly and lengthy, particularly for older workers.

Public and private employment services may have limited capacity to serve older workers. Public employment services exist in most developing countries (nearly 80 percent in 2020), and a majority provide both job placement, counseling, and training services.[110] However, official retirement age is often set as the upper age limit for program eligibility, excluding older workers. Moreover, services such as job search support or training may be poorly adapted to older workers. Caseloads for employment service case workers often exceed the levels recommended by the ILO (1:100), suggesting limited capacity to provide tailored services to a group with specific training and other needs. The increase in e-government services in high- and middle-income countries needs careful design and outreach efforts to reach mature workers. A study of employment services' self-service tools in the United States found that these features were least used by mature workers precisely because of lower digital skills.[111] The risk of exclusion may be even higher in L/MIC settings, given lower levels of education and skills. Digital gaps are likely to have worsened the impact of COVID-19 on mature workers' employability as employment support often moved online.

Lack of job and career search skills among mature workers may also be holding back matching opportunities. Digital skills are increasingly important in identifying and applying for job opportunities (as well as increasingly important for the job itself). However, globally, digital literacy is lower in the older generation[112] and the gaps are likely to be higher in L/MICs, where age-related gaps in literacy and education are also higher.

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[108] Almeida et al. 2012.

[109] Söderbacka et al. 2020, EU-OSHA 2016.

[110] Estimates based on World Bank Unemployment Protection and Employment Services Database.

[111] D'Amico et al. 2009.

[112] ITU 2021.

5. Productive longevity: What could work in L/MICs?

This section presents evidence for interventions directed at individuals and families (supply side), at firms (demand side), and at employment services in charge of labor market intermediation. Across these dimensions, we identify policies that could raise incentives and remove barriers to accessing work, and those that could foster productivity by raising human capital and especially skills (there is limited evidence on health). Policies aimed at increasing labor force participation are largely focused on formal sector workers, for whom regulatory reform is relevant. Formal sector workers are more likely to have resources (and thus incentives) to retire, but at the same time are more able to continue working and with higher productivity, than workers in informal, low-productivity jobs. Human capital policies, by contrast, are also relevant for the informal sector.

In identifying relevant literature, we have given priority to studies that present results for LICs or MICs and to rigorous evaluations, to the extent possible. However, the policy agenda focusing on productive longevity is relatively recent and the evidence on policy effectiveness limited, especially for L/MICs. Where evidence for mature workers in L/MICS is scarce, we focus on the impact of similar interventions for other groups, or for HICs, and discuss potential differences that would need to be considered when drawing lessons from these experiences.

Supply-side interventions: Improve incentives and remove barriers to work while investing in skills development

This section discusses evidence on regulatory reforms to improve work incentives and make work pay for mature workers, along with improvements in services and skills development aimed at increasing the ability and capacity of mature workers to work longer and more productively.

Reforming social insurance and labor taxation

Reforms to social insurance focused on increasing retirement age and reducing work disincentives in the design of pension schemes can play a role in extending working lives for formal sector workers. Across OECD countries, comprehensive social security reforms of contributions, benefits, and retirement ages are planned or have already been implemented.[113] Raising retirement ages has resulted in postponed retirement and higher employment rates among mature workers. Raising retirement ages in Austria and Germany, for example, resulted in increases in employment by nearly 10 percentage points for the affected groups.[114] Many middle-income countries in East Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, and the Middle East and North Africa have also reformed their pension systems. The objective has primarily been to increase financial sustainability, and labor market impacts have not been systematically studied, however.

Pension reforms require careful attention to the entire social insurance system. As discussed above, increasing retirement age may also result in a more intensive use of alternative pathways into inactivity, such as unemployment, disability support, or partial retirement – especially for low-wage and less healthy workers, and especially during recessions. In the studies of Germany and Austria cited above, for example, some mature workers transitioned into other forms of social insurance support. Countries have consequently embarked on a parallel set of reforms to close loopholes, including

[113] Boissonneault et al. 2020.

[114] Riphahn and Schrader 2021 and Staubli and Zweimuller 2013.

abolishing the right of older unemployed persons to waive job search requirements when accessing unemployment benefits.[115] [116]

Relaxing partial retirement rules is a commonly proposed reform to retain workers, but when designing and implementing such policies, it is also important to consider potential negative impacts. Studies show that flexible working arrangements giving workers choice and control are linked to better health and wellbeing.[117] When surveyed, workers report favoring arrangements that would allow them to adjust the timing and speed of labor market exit according to their preferences.[118] However, partial retirement options in OECD countries do not appear to increase total working hours, largely because they also afford the opportunity to retire earlier than planned.[119] There is also some evidence that partial retirement regulations can have a negative effect on hiring older workers or be used as an alternative pathway for retrenchment.[120] Partial retirement may be incompatible with job and task bundling, especially for high-skill jobs, and may raise the cost of mature workers, which in turn reduces incentives for hiring.[121]

Pension reforms carry high political costs, pointing to the importance of getting the design right from the outset. In Europe, several countries have reversed earlier reforms by postponing, limiting, or outright reversing existing or planned increases in early or normal retirement ages.[122] More generally, the experience of both advanced and developing economies shows that design flaws in social protection systems can take many years to untangle and may carry very high fiscal *and* political costs. Countries seeking to expand social protection systems therefore should incorporate lessons learned to ensure sustainability from the outset and avoid painful reforms later.

Incentives to work increase as people receive information on future pension income. Evidence from the United States shows that the framing of public messages regarding pensions matters for when benefits are claimed. Low-cost interventions (informational brochures, invitation to a short web-tutorial) informing older workers about expected pension benefits increased labor force participation one year later by 4 percentage points relative to the control group.[123] Pension reforms have routinely been accompanied by financial education information campaigns in the OECD.[124] No equivalent research is yet available for L/MICs, but there is evidence that information campaigns geared towards changing jobs and career decisions, for example financial education or career guidance, can impact individual and family choices.[125]

Labor regulations can also allow for greater flexibility in work arrangements to accommodate varying and changing needs among mature workers. For example, allowing for more part-time work, temporary work, or fixed-term contracts, can in fact serve mature workers looking to adapt their

[115] Lorenz et al. 2020.
[116] Staubli and Zweimuller 2013, Ardito 2021.
[117] Graham 2014.
[118] OECD 2017, Henkens et al. 2021, Munnell and Walters 2019.
[119] OECD 2017.
[120] Busch et al. 2021.
[121] Lorenz et al. 2020, Munnell and Walters 2019.
[122] Fouejieu et al. 2021.
[123] Liebman and Luttmer 2015.
[124] OECD 2008.
[125] E.g. Jensen 2010, 2012, Alzúa et al. 2021, OECD 2021. Information on trade-specific earnings, for example, can have substantial effects on women's choices to enter comparatively high-earning trades traditionally reserved for men (Gassier et al. 2022).

working schedules. Between 2007 and 2019, over 100 countries undertook significant reform of employment regulations, including on fixed-term contracts, severance payments, annual leave, and working-time arrangements, but there is no evidence regarding the impact on employment for mature workers.[126]

Tax reform can reduce disincentives to work. This is especially the case for workers with a larger reserve labor supply, typically women, less-educated workers, and mature workers.[127] OECD countries (Australia, Denmark, the Netherlands, Sweden, and the United Kingdom, among others) have introduced tax credits, in some cases with the credit increasing with the age of the worker. Tax credit reform linked to pension reform increased participation among mature workers in Sweden, except for self-employed and higher-earning workers, among whom the "slack" may be smaller.[128]

Improving access to quality services

Subsidizing child- or other forms of care for family members can improve labor market participation and earnings outcomes. Affordable childcare or long-term care for sick and elderly persons can relieve mature workers from informal care burdens and help them manage personal and professional commitments. In Rio de Janeiro, Brazil, a lottery was used to allocate public center-based daycare to households. Access to daycare centers was associated with sustainable increases in household income, due to grandparents' increased labor income. Grandparents' earnings, likelihood of employment, hours worked, and social security contributions increased measurably.[129] This positive association between care services and participation is consistent with research on the impact on women's labor market outcomes of different forms of childcare provision in Latin America, Russia, and the EU, where studies have found strong effects on activation, employment, and hours worked.[130] A quasi-experimental study in Spain focused on the implementation of successive care-subsidy reforms, involving cash subsides as well as care services. It concluded that changes in care subsidies had a stronger effect on early retirement decisions than reforms tightening options for early retirement.[131]

Safer transportation helps vulnerable groups access jobs. In Lima, Peru, an improved urban transport system led to significant gains in employment and earnings for women (but not for men). This demonstrates that infrastructure investments that make it more convenient and safer to use public transport can generate important labor market impacts for groups that are more vulnerable to personal safety threats during travel, that have care obligations that compel them to work closer to home, and that rely heavily on efficient transport modes.[132] Better transportation is similarly likely to improve mobility for mature workers who depend on public transportation but who may also be vulnerable when commuting.

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[126] Kuddo 2018 and World Bank 2019.

[127] Meghir and Phillips 2010.

[128] Laun 2017.

[129] Attanasio et al. 2017.

[130] Mateo Diaz and Rodriguez-Chamussy 2016, Del Boca and Locatelli 2006, World Bank 2017.

[131] Costa-Font and Vilaplana-Prieto 2022. Cash subsidies can have both positive and negative effects on caregivers' labor force participation, as income effects may reduce participation.

[132] Martinez et al. 2019.

Strengthening human capital

Subsidizing skills training, and addressing skills-information asymmetries, is a common strategy for increasing workers' employability, but requires careful design. With the right training methods, adults and mature workers can learn new skills to good effect.[133] Tailoring programs to serve the needs of older workers will be essential. First, the design of training interventions needs to consider training modalities (see below), motivation among individuals and employers for taking up training offers, and the need to build capacity in the training sector.[134] Second, the deadweight and substitution losses associated with training can be high[135] and, on average, many training programs fail to have any impact. However, results vary tremendously, and impacts can grow over time, suggesting that design and targeting are key.[136]

Training that is not adapted to older workers' needs could reduce the value of training. Some studies have found that the training of older workers has lower impacts on key dimensions such as learning, career development, earnings, or job security, and that older employees can be less ambitious in their training participation.[137] The generally low uptake of adult training programs is at least partial evidence that many current programs do not fulfill needs. A likely reason is that many training programs are not adapted to older workers' capabilities and learning styles: notably, they do not provide informal and self-paced learning and work-integrated approaches or make use of older workers' cognitive strengths, such as the capacity to direct and act on information received.[138] In countries with high informality, training programs that do not factor in the opportunity cost of attending training for workers' earnings are likely to be less effective, as are programs that fail to acknowledge how high-stress life circumstances may affect workers' mental capabilities.[139]

Countries are using different instruments to increase individual access to, and incentives for, lifelong learning, including voucher schemes and training subsidies. With individual learning schemes (including vouchers, individual learning accounts, and training savings accounts), individuals choose their own options for skills development. To deliver higher skills accumulation, these accounts need to be embedded in a broader framework addressing other skills constraints, including the availability of high-quality and relevant training opportunities, information and guidance services, paid training leave, and skills recognition frameworks.[140] Voucher-based systems can help stimulate training, especially for workers in non-traditional or less stable forms of employment. Voucher systems have had mixed success, however, especially for hard-to-serve groups such as low-skilled workers. Experience shows that simple design, adequate and predictable funding, effective information and guidance, and a focus on supporting high-quality training matter significantly.[141] Specific outreach efforts are needed to target low-skill groups, as well as employers, and encourage them to co-invest in skills development.[142] For example, an information campaign on a training program in Germany

[133] Knowland and Thomas 2014.
[134] Glick et al. 2015.
[135] McKenzie 2017a.
[136] Card et al. 2018.
[137] Zwick 2011.
[138] Picchio 2021, Thomas et al. 2020, Knowland and Thomas 2014.
[139] Saraf et al. 2018.
[140] European Union Council 2022 and OECD 2019d.
[141] OECD 2019c.
[142] OECD 2019c, Vodopivec et al. 2019.

succeeded in stimulating uptake only for workers below age 45, suggesting that older workers were considered less interesting due to limited pay-off time (tenure) or lower ability.[143]

Mature workers' motivation and aspirations can be strengthened with targeted training and organizational approaches. Experience from entrepreneurship and employment programs in L/MICs shows that trainings focused on psychosocial, or "mindset," components have contributed to successful labor market (or business) outcomes, sometimes more so than technical training.[144] These trainings focus on, *inter alia*, future-oriented and proactive thinking and a "can-do" attitude. This type of training, when delivered adequately, could be helpful to mature workers who may need or want change in their work in order to stay engaged longer. Training programs including relatable role models have been successful, for example in Chile and Kenya. The exposure to a role model was, in fact, more important than the information or training the role model provided.[145] There is evidence that older people continue to identify role models in their working life just as younger people do; that these role models could be significantly younger than the workers themselves; and that being able to identify role models played a significant part in worker commitment and satisfaction.[146] Giving mature workers the opportunity to participate in teams comprising people with varied backgrounds and skills could help provide such role models and thus raise motivation and aspirations, and would also support higher overall productivity.[147]

Given that mature older adults learn better on the job, encouraging mature apprenticeship programs could also be considered. The evidence on the impact of apprenticeships and internships suggests that classroom training combined with on-the-job training may have stronger impact on labor market outcomes than skills training or on-the-job training alone.[148] When coupled with high-quality trainers, apprenticeships can be effective in raising employment.[149] However, the majority of programs and evidence are focused on youth with limited relevance for mature workers.

Demand-side interventions: Raise incentives and remove barriers to hiring and investing in mature workers

Policies directed to potential employers focus on increasing incentives to hire mature workers by addressing regulatory constraints that raise labor costs, and on initiatives to foster firm-provided training to increase skills and thereby productivity levels.

Closing the gap between labor costs and productivity

Regulatory reform, information, and incentives can help reduce gaps between mature workers' earnings and their productivity. Japan, the Republic of Korea, and Singapore offer examples of countries that have implemented policies to reduce seniority wage practices. Korea has actively promoted, disseminated, and subsidized performance-based compensation models. As part of a broader effort to foster the hiring of senior workers, Japan and Singapore have introduced financial

[143] Van den Berg et al. 2018

[144] See for example Anderson-MacDonald et al. 2016, Bloom et al. 2018, 2010, Campos et al. 2017, Glaub et al. 2014, McKenzie and Puerto 2017.

[145] Lafortune et al. 2018, Brooks et al. 2018.

[146] Gibson and Barron 2003.

[147] Göbel and Zwick 2013.

[148] J-PAL 2023.

[149] Crépon and Premand 2018, Hardy et al. 2019.

grants to incentivize firms to incorporate worker performance into their wage and personnel system.[150] Public sector reform can lead the way by softening seniority wage practices, fully or partially moving towards performance-based pay.

Similarly, governments can reform social contributions and employment protection legislation to lower costs while ensuring adequate social protection support. This can include reforming systems for severance pay and different entitlements that often increase automatically with tenure. Labor regulations in several countries have undergone reform in the past decades, as policymakers attempt to balance the need to protect workers with the need to allow for flexible solutions that do not unduly limit labor demand. The evidence on such reforms and employment effects is generally mixed, however. A broad conclusion is that when extreme forms are avoided, the impact on employment is modest.[151] The evidence of payroll tax cuts on employment is likewise varied. Some cross-country studies point to substantial increases in employment (Latin America) and reductions in informality (Central and Eastern Europe and Latin America). Other country-level studies of payroll tax cuts, however, show both low to no employment effects (Argentina, Chile), and significant employment effects (Colombia, Türkiye).[152] As a guideline, policy makers could strive for a "flexicurity" approach which combines broader reforms to severance pay and other benefits with permanent contracts that reduce labor costs while increasing effective protection of workers in case of employment shocks.[153] For example, reforms need to be combined with policies that strengthen unemployment benefit systems, which remain underdeveloped in many L/MICs.[154] Reduction in social contributions needs to be paired with increased financing of social protection through general taxation.[155]

Wage subsidies are intended to help address both high labor costs and information asymmetries about worker competence but require strong targeting and timing to deliver benefits. Wage subsidies reduce the cost of labor for some time (compensating for the fact that a worker may be more unproductive in the beginning of employment) and help employers reduce hiring risks by providing them with the opportunity to evaluate skill levels more comprehensively than is possible in the hiring process. Evidence from North Macedonia on wage subsidies (not age-specific) suggests that, when well designed and targeted, such subsidies can help disadvantaged groups overcome information constraints or externalities.[156] Yet they often suffer from low uptake and low sustainability over the long run.[157] Experience from Finland and Belgium suggests that wage subsidies specifically targeted to older workers may delay early retirement but carry such deadweight losses that they are not cost effective. Subsidized work appears simply to displace unsubsidized work, with little net gain in employment of older workers. [158]

Addressing ageism

Age anti-discrimination laws (ADL) exist in many developing countries, but weak enforcement may render them less effective. An overview from 2008 showed that laws that prohibit discrimination in

[150] OECD 2019b.
[151] Betcherman 2015, World Bank 2022b.
[152] Pagés 2017.
[153] OECD 2019b.
[154] ILO 2021.
[155] Packard et al. 2019.
[156] Armand et al. 2020.
[157] McKenzie 2017a.
[158] Vodopevic et al. 2019, Boockmann 2015.

the workplace due to age were in place in about 50 countries,[159] many of them developing countries. High informality or weak enforcement reduces the impact of these regulations, however. The general evidence on labor law enforcement in developing countries is not conclusive, largely due to the lack of studies addressing this issue.[160]

Social campaigns to provide information and raise awareness have proved successful in influencing stakeholders toward employing older workers. In Germany, a relatively low-cost local marketing campaign used banners, interviews, job fairs, and information brochures to debunk myths and inform employers (and others) about the value of mature workers. The intervention helped increase retention of mature workers.[161] More generally, raising awareness about implicit stereotypes can have significant payoffs: an intervention addressing implicit stereotypes about immigrants among Italian schoolteachers raised school grades for immigrant children.[162] Research undertaken by the World Bank shows that social media campaigns can be highly effective in influencing norms and can allow for very granular targeting.[163] Similarly, "edutainment" approaches that use entertainment media to convey educational narratives, aspirational role models, and "new" norms to a large population may work: evidence from TV series seeking to improve sexual health and attitudes toward gender-based violence (GBV) in Sub-Saharan Africa showed strong impacts on norms and practices.[164]

Promoting firm investment in workers' human capital

Firms can help extend productive working lives by providing mature workers with access to continuous skills development, complementary technology, and working environments adapted to their needs, along with targeted support that reduces health risks in old age.

It is critical but difficult to increase firms' investment in updating and upgrading workers' skills, including among mature workers. Leveraging private sector support is important to increase available resources for training, to increase private sector ownership of the skills agenda, and to garner the specific knowledge and insights of firms regarding their current and future skill needs.[165] Governments in many L/MICs have implemented different incentives, including private sector-financed approaches (e.g., training funds) and budget-funded financial incentives, but with mixed results.

Training funds have been a common approach to provide resources to invest in training, especially for small and medium enterprises (SMEs), but such funds require strong governance, transparency, and solid links to the private sector to work well. In about half of the world's developing countries, there is a national training skills or training fund in place, most of them financed through a payroll levy on employers.[166] These training funds have received criticism on several grounds, however. They tend to mainly benefit large firms and may represent large deadweight loss (subsidizing training that would have taken place without support) at the price of higher tax rates. Training funds have also sometimes been used to support the general budget, or for cross-subsidizing training in informal, non-contributing firms. Finally, training has often been delivered through public institutions that are less connected with the demand side. Many training funds are now being reformed to align contributions

[159] Ghosheh 2008.
[160] Ronconi 2019.
[161] Homrighausen and Lang 2019.
[162] Alesina et al. 2018.
[163] https://blogs.worldbank.org/voices/using-social-media-change-norms-and-behaviors-scale.
[164] Banerjee et 2019a, 2019b.
[165] UNESCO 2022.
[166] Estimates based on World Bank Employing Workers 2020.

better with benefits, for example by including government/donors as contributors, or strengthening governance, transparency, and private sector voice in the use of funds.[167]

Financial incentives to foster training have so far had limited impact on older workers' employment in HICs. In Germany, a firm-level subsidy program targeting workers ages 45 and above in SMEs was found to have improved job stability and employment by prolonging working life; programs with long duration had a stronger effect on both jobs and earnings.[168] For tax incentives, both substitution and deadweight losses appear to be significant, however. Direct subsidies, often structured as co-financing arrangements, may be more effective insofar as they facilitate the targeting of specific groups of firms and employees.[169]

Low-cost information campaigns (within companies, and to companies) may go some way towards raising awareness and increasing firms' own training initiatives or uptake of public skills programs, especially among SMEs. In many OECD countries, governments run campaigns and provide employers with toolkits and guidance material on how to best address skills and health issues.[170]

Complementary investments in organizational change or infrastructure can also have significant productivity payoffs. Adapted technology, ergonomic office equipment, mixed-age teams, and other adjustments can help workers stay healthy and engaged. A much-cited example of the significant potential payoffs of such policies is the auto manufacturer BMW's Dingolfing plant in Germany, where a small investment in ergonomics and work organization (workstation rotation) resulted in a 7 percent productivity increase, exceeded quality targets, and reduced absenteeism.[171]

Interventions focusing on workplace health should help increase worker retention and increase mature workers' productivity; however, there is little evidence as to what works to encourage these. The United Kingdom targets SMEs with a specific national occupational health service to this effect.[172] Occupational health and safety programs have been shown to improve risk factors for injuries and chronic illnesses, many of which increase with age.[173] This can include both access to health care and support for healthy lifestyles – diet, exercise, and social interaction, which also affects labor market participation as well as productivity.[174] However, there is no conclusive evidence of positive impacts of such interventions on productivity or labor force participation, largely due to lack of quality studies.[175] Some positive examples on which to build do exist, however. In the United States, an occupational health intervention involving access to physicians was associated with a significant reduction in both sickness absence and early retirement.[176] Interventions could also be adapted to the informal sector context. A study of informal sector workers in Thailand showed that safe working practices improved older workers' work ability, suggesting that targeted information/promotion programs could help increase their productivity.[177]

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[167] UNESCO 2022.
[168] Singer and Toomet 2013.
[169] Picchio 2021.
[170] OECD 2019b.
[171] EBRD 2020, Loch et al. 2010.
[172] OECD 2019b.
[173] Anger et al. 2015.
[174] Prinz et al. 2018.
[175] Poscia et al. 2016.
[176] Crawford et al. 2009.
[177] Thanapop and Thanapop 2021.

Fostering senior entrepreneurship

Government or NGO-based programs targeting senior entrepreneurship (start-up as well as existing entrepreneurs) are emerging across HICs, but there is little evidence on impacts. Evidence from the United States suggests that high-growth entrepreneurs, even in tech-intensive industries, are middle-aged rather than young and, in many contexts, entrepreneurship programs appear to work best for participants with more experience.[178] Yet, despite the importance of senior entrepreneurship, there is little evidence on what interventions work to encourage senior-led business start-up and growth, especially not from L/MICs, where most entrepreneurship programs target youth. There is, however, significant evidence on entrepreneurship programs in L/MICs that have successfully provided financial support, business advice, training and market access – often in combination – to microentrepreneurs.[179] Many entrepreneurs face a multitude of constraints (aspirations, skills, information, finance, networks) and are best served by comprehensive programs, although some potential high-growth firms may mostly be limited by credit constraints.[180] Given seniors' specific needs, interventions could focus on removing constraints including (often) lower technical skills, reduced tolerance for financial risk, and shorter time horizon; interventions might also provide support to foster entrepreneurial mind-sets.[181] Programs in HICs have focused on digital skills, connect seniors with younger co-investors, provide targeted counseling and entrepreneurship training, and target micro-finance programs to this group, much as is done for women or other groups with special needs and constraints.[182] Role models may again prove useful for inspiration and knowledge transfer.[183]

Intermediation interventions – Strengthen the capacity of employment services to improve matching

Public and private intermediation services can be strengthened to improve the matching of older workers to jobs. Most European public employment services have no specific policies for older workers.[184] A first step is to change the age criteria for program eligibility, often capped at retirement age, so that older workers are not automatically excluded from different forms of active labor market support. A second step would be to fully capacitate the employment service workforce in assisting older workers. This will require information to rectify ageist views among staff, identifying specific constraints among mature workers (mobility, digital literacy, training needs and modalities, ageist norms, and others), and stronger capacity within employment services to reach out to employers for the benefit of mature workers. Strengthened employment services could provide tailored information on job opportunities and reskilling opportunities for older workers, as well as training in job search skills, including in digital skills that are often lacking but increasingly essential for the job search.

Comprehensive approaches involving employers are needed to improve job matching. In Germany, "regional employment pacts" under the "Initiative 50plus" were created with employment services and the private sector. These successfully included targeted efforts to reactivate and reintegrate

[178] Azoulay et al. 2020.
[179] Jayachandran 2020.
[180] McKenzie 2017b
[181] Isele and Rogoff 2014.
[182] Isele and Rogoff 2014.
[183] Omrani amd Ludivine 2019.
[184] European Network of Public Employment Services 2019.

mature workers with more and better jobs. The pacts have reached out to firms and other stakeholders and have included targeted profiling, assessments, specific training measures, internships, and information campaigns. These programs have primarily benefitted younger seniors (average age 54), however.[185]

Employment services could also help workers move out of arduous occupations to support longer working lives, although the evidence suggests this is a challenging task.[186] Belgium, for example, provides a subsidy to workers who transition into a less arduous occupation with the same employer and lose income as a result.[187] Retraining and job search assistance can also be specifically targeted to groups particularly likely to exit the workforce early due to working conditions.[188]

6. Conclusions: Some meta-lessons for productive longevity

The world's population is aging rapidly in both poor and rich countries, calling for broad policy reform to maintain welfare levels across generations. This paper has focused on the set of policies that may help increase "productive longevity" by maintaining mature workers in the active labor force and increasing their productivity. These objectives can be considered "low-hanging fruit": it is likely considerably easier to assist and convince active workers to stay in the labor market, with incremental efforts to strengthen human capital and tweak incentives, than to activate and train people out of long-term unemployment or inactivity towards the end of the potential working life. As our review shows, the research agenda is only beginning to develop, especially for low- and middle-income countries, and the evidence is still thin in many areas. With this important caveat in mind, a few concluding observations follow.

All countries, rich and poor, will need to put productive longevity on the policy agenda. Many MICs are already dealing with aging, even shrinking, populations; both LICs and MICs will face rapidly growing numbers of elderly in the future, and the shift from young to older populations can happen quickly. A wide range of policy instruments are needed to protect welfare levels in an aging world. Prolonging working lives (for a particular set of workers) and increasing the productivity of mature workers (across the board) is part of this agenda.

The optimal policy mix will differ depending on the country context. Mature workers, especially in poorer countries, are a heterogeneous group, with many workers, often the majority, working informally and in low-productivity occupations. Given high informality and weak enforcement, regulatory reform to social insurance, labor regulations, and taxation will only affect a smaller segment of workers, as will initiatives directed only at formal firms. In this dual labor market, however, it is this (relatively small) group of formal sector workers that can reasonably be expected to work longer. For the remainder of the mature workforce, policy needs to focus on how to avert old-age poverty by providing social protection and raising the productivity of their work.

Poorer countries can learn from richer countries' past mistakes and design social protection and regulatory frameworks adequately for an aging population. Many L/MICs are now developing their social insurance systems and putting in place taxation and employment regulatory frameworks. Even

[185] OECD 2019b.
[186] OECD 2019b.
[187] OECD 2018.
[188] OECD 2019c.

with low coverage rates, poorly designed systems can be extremely costly. By acting preemptively, countries can avoid repeating mistakes that have taken HICs decades to unravel with reforms that are proving difficult and politically costly.

The impact and cost effectiveness of productive longevity policies need to be weighed against the payoff to investing in raising human capital across the entire population. Poorer countries face different and perhaps starker intergenerational policy tradeoffs than do richer countries. Many lower-income countries' older populations are characterized by low levels of human capital and large gaps relative to younger generations. Significantly raising productivity levels of the mature workforce through skills investments may be very costly, especially in countries with limited resources for investment. Some countries thus may focus on investing heavily in the human capital of children and youth (early childhood development, schooling) as well as younger adults (life-long learning). For the older population, policy will center on strengthening human capital with health interventions and strategic, demand-led skills development, supporting the businesses operated by mature workers, and providing social safety nets.

Even with these constraints, countries can work to identify "win-win" policies that benefit all generations. For example, providing childcare and long-term care for the elderly, thus alleviating the care burden, can stimulate labor market participation and the move to more productive work in both older and younger workers, in particular women. Facilitating access to work, for example with safer transportation systems, will have benefits for vulnerable groups in general.

Productive longevity does not affect all groups similarly, and more nuanced analysis is also needed. This paper is a first attempt at raising policy areas and mapping out the associated evidence at an aggregate level. Even so, the need for a differentiated approach shines through, perhaps especially from a gender perspective. Women live longer than men but generally have lower pensions. They are less likely to be in paid work, have lower average salaries, and face more obligations to provide informal care. There is even some evidence that women are worse affected by ageism. At the same time, there is some evidence from the United States that, although age-friendly jobs in the country have increased, lower-skilled male workers have been left out of employment gains.[189] Looking in detail at how gender, skills, location and other factors affect productive longevity will be essential to develop adequate policies.

More evidence is needed as to what works for productive longevity. As this review shows, most evidence for what works in terms of prolonging working lives is based on HICs, which have faced aging pressures for a longer time. Even in these countries, the knowledge base is still very much under development. Where available, the evidence is often mixed, pointing to the challenges associated with this policy agenda. Much less is known about what works for a developing-country context characterized by, *inter alia*, higher informality and less-developed social protection systems, higher shares of self-employment, lower skill and productivity levels, smaller firms, and different norms around co-habitation and care responsibilities. To identify the best responses to the aging challenge, a comprehensive research agenda will need to be developed, and soon.

[189] Acemoglu et al. 2022.

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ANNEX TABLE 1. LABOR MARKET DATA FOR OLDER ADULTS

	Brazil	Chile	Colom-bia	Costa Rica	Mexico	Russian Federation	South Africa	EU27	OECD
Demographic situation									
-- Old-age dependency ratio	14%	18%	13%	13%	11%	23%	9%	31%	64%
-- Effective labour force exit age (years) Men	65	68	70	70	70	63	62	64	66
Women	62	63	63	64	66	61	57	63	64
-- Gender gap in exit (years)	3	5	7	6	4	2	5	1	2
Employment									
-- Employment rate, 50-74 (% of the age group)	36	49	51	45	50	38	31	48	51
of which 50-54	62	66	66	66	66	85	57	81	79
55-64	44	56	54	50	52	51	37	60	61
65-69	22	30	35	22	35	7	10	15	23
70-74	10	18	23	15	25	..	..	7	11
-- Gender gap in employment, 55-64 (% point gap)	26	32	34	36	36	18	13	12	13
Job characteristics									
-- Incidence of part-time work, 55-64 (% of total employment)	-	19	17	35	28	13	17	15	19
of which involuntary 55-64 (% of part-time work)	-	45	36	-	-	27	-	23	20
-- Incidence of temporary work, 55-64 (% of employees)	-	19	18	6	-	6	-	5	8
-- Incidence of self-employment, 55-64 (% of total employment)	46	29	63	44	47	8	24	18	22
-- Full-time earnings, 55-64 relative to 25-54 (ratio)	-	0.96	1.19	1.26	1.0	-	-	-	1.06
Dynamics									
-- Retention rate for workers currently aged 60-64 (% of employees t-5)	28	43	-	37	46	-	-	53	52
-- Hiring rate 55-64 (% of employees)	34	16	24	14	13	-	-	6	8
Joblessness									

	Brazil	Chile	Colom-bia	Costa Rica	Mexico	Russian Federation	South Africa	EU27	OECD
-- Unemployment rate, 55-64 (% of the labour force)	7.9	6.9	10.5	12.0	2.6	3.6	11.2	5.2	5.2
-- Incidence of long-term unemployment, 55-64 (% of total unemployment)	-	-	7.9	7.1	2.6	26.0	68.6	47.9	38.7
Employability									
-- Share of 55-64 with tertiary education (% of the age group)	15	16	16	21	15	50	15	26	29
Absolute (% of all employed in the age group)	-	33	-	-	17	-	-	40	41
Relative to employed persons aged 25-54 (ratio)	-	0.67	-	-	0.50	-	-	0.81	0.79

Source: OECD older worker scoreboard, https://www.oecd.org/employment/ageingandemploymentpolicies.htm