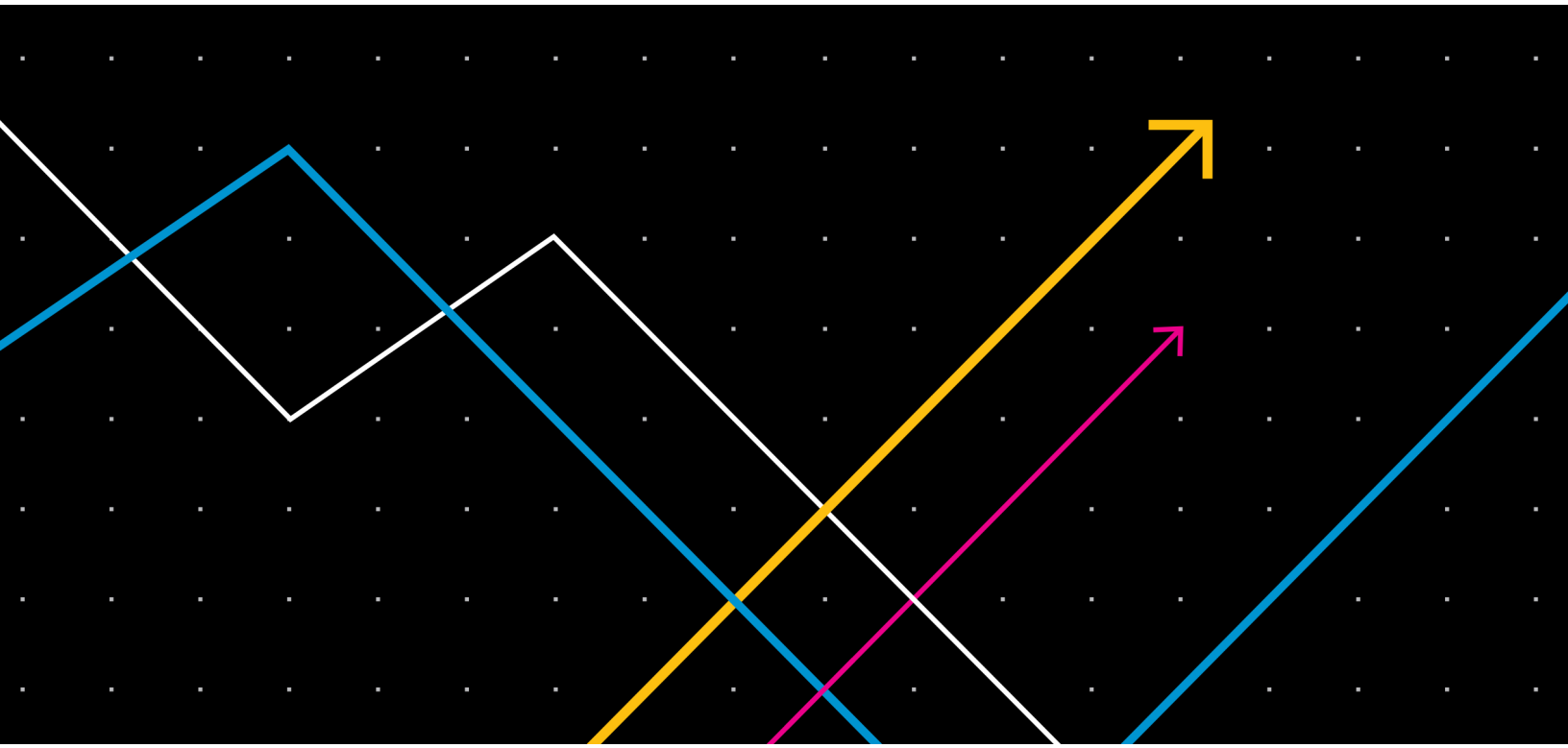


RESEARCH REPORT

Skills-Based Hiring and Older Workers

Barbara A. Butrica *Stipica Mudrazija*

March 2022

URBAN INSTITUTE · ELEVATE · THE · DEBATE

ABOUT THE URBAN INSTITUTE

The nonprofit Urban Institute is a leading research organization dedicated to developing evidence-based insights that improve people's lives and strengthen communities. For 50 years, Urban has been the trusted source for rigorous analysis of complex social and economic issues; strategic advice to policymakers, philanthropists, and practitioners; and new, promising ideas that expand opportunities for all. Our work inspires effective decisions that advance fairness and enhance the well-being of people and places.

Contents

Acknowledgments

This report was funded by the AARP Foundation. We are grateful to them and to all our funders, who make it possible for Urban to advance its mission.

The views expressed are those of the authors and should not be attributed to the Urban Institute, its trustees, or its funders. Funders do not determine research findings or the insights and recommendations of Urban experts. Further information on the Urban Institute's funding principles is available at urban.org/fundingprinciples.

We thank Sarah Knowles for her assistance in reviewing the literature and Daniel Kuehn and Rich Johnson for their comments on the report.

Glossary

Applicant tracking system is a software that facilitates recruiting and hiring by using automated intelligence to help manage job boards, identify potential candidates, screen and filter resumes, track candidates' progress, schedule interviews, perform background checks, and perform other tasks in the recruitment process.

Apprenticeship is a type of paid on-the-job training in which the focus is on employees learning specific skills and achieving the level of competency necessary for successful job performance under the supervision of another employee who already possesses the requisite level of competency and supplemented with classroom work and reading. The prevalence of apprenticeships as well as their design can vary substantially across sectors, professions, and even individual employers.

Career and technical education (CTE, also referred to as **vocational education** or **vocational training**) is training that focuses on job-specific, primarily technical skills and can lead to a certification, a diploma, or a degree.

Certificate is a type of nondegree credential awarded by educational institutions and training providers, such as community colleges, technical schools, and vocational schools, after an individual completes its requirements, including coursework and tests. Certificates attest that a person is trained and has requisite skills for a specific area or a specific, often technical, job.

Certificate programs are nondegree programs focused on mastering specific skills needed to work in particular jobs and industries. They are generally a shorter-term, lower-cost alternative to a traditional four-year degree and can last up to two years, although they typically last anywhere between a few months and one year. They are primarily aimed at students interested in short-term training for immediate employment and are offered at the undergraduate and graduate level, primarily by community colleges and private for-profit nondegree-granting schools.

Community college is a two-year school that provides affordable postsecondary education, primarily to students in its immediate community, that leads to a certificate or an associate degree, and may serve as a pathway to a four-year degree.

Competency-based education (also referred to as **competency education**, **proficiency-based learning**, **mastery-based learning**, and **performance-based learning**, among others) is an

educational model focused on outcomes rather than instructional time. It can achieve time and financial efficiency by providing a personalized approach to instruction that allows students to master skills at their own pace.

Credential is a documented award issued by a body authorized to do so to individuals who can prove that they achieved proficiency consistent with the award. There are many different types of credentials such as degrees, diplomas, certificates, licenses, and badges, among others.

Degree is a type of credential awarded by accredited postsecondary educational institutions after successfully completing multiple years of education and satisfying all degree requirements, such as passing required exams. Broadly, there are four types of degrees, including associate, bachelor's, master's, and doctoral, with the latter two representing graduate degrees.

Employability skills describe a combination of managerial and social skills, including, among others, problem solving, critical thinking, time management, communication, and the ability to work with others, that facilitate effective performance at work.

ICT is information and communications technology.

Industry-based certificate is an independent credential earned based on an assessment administered and validated by established entities, such as professional organizations or individual companies, which verifies that an individual's skills and knowledge meet or surpass a predefined set of criteria. It is typically subject to periodic recertification.

IT is information technology.

Massive open online courses (MOOCs) are online courses with no limitations on attendance. They typically do not charge tuition or award academic credits. Fees are often charged for earning a badge or other form of official certification.

Microcredential is an online way of earning a microcertification, that is, a (digital) badge, by showing mastery in some specific skill, as evaluated by an assessor.

Occupational (i.e., technical) skills are competencies acquired and enhanced through education, training, or practice and include measurable technical skills, such as proficiency using specialized tools or software.

On-the-job training is the key component of work-based learning focused on providing all forms of training aimed at improving workers' ability to perform specific jobs. Unlike the broader work-based learning concept, on-the-job training does not explicitly focus on educational outcomes alongside work outcomes.

Real-time labor-market information (**LMI**) is a type of labor-market information produced using current information on job postings and resumes available online from job boards, recruiters, employers, and other public and private sources. Its emphasis is on timely information regarding current labor-market conditions, including demand and supply trends, as well as specific information on occupations, skills, and credentials in demand. It is complementary to traditional labor-market information that relies on carefully curated information on standardized industries and occupations, which is both comprehensive and reliable but lacks the timeliness of real-time LMI.

Reskilling is the process of employees acquiring new skills that will allow them to assume new job roles. It is often related to the obsolescence of existing skills and the need to transition to a different job or different industry, with the same or different employer.

Self-skilling refers to actions taken by individuals to update and enhance their existing skills or build new ones by, for example, identifying and partaking in relevant education and training programs or pursuing individual learning.

Skills-based (or **competency-based**) **hiring** is a practice that focuses on job candidates' observable and measurable (occupational and employability) skills relevant for the job rather than only educational credentials.

Skills gaps represent the difference between the skills that employers identify as needed for successful job performance and the skills that job applicants have.

Skills-based short courses are intensive courses that focus on preparing students for a particular in-demand job. An example of such an intensive program are coding bootcamps that focus on teaching students software development skills for entry-level positions in technical fields. Their main shortcoming is the lack of standardized and accredited curricula.

Telework is a work arrangement in which an employee performs regular work at an approved alternative worksite, most commonly at the employee's home.

Upskilling is the process of employees acquiring additional, more advanced skills, usually through training, with the primary goal of job advancement with an existing employer.

Work-based learning (also referred to as **work-based training**) provides students with classroom and workplace learning, experience, and mentorship. It includes a variety of forms, such as apprenticeships, internships, mentoring, coaching, teamwork, and computer-based learning. It can be deployed as a part of the initial training of new employees to close possible gaps between their existing knowledge and skills required for their job, as a part of the continued efforts to keep the skills of current employees up to date or as a part of the efforts to train existing workers for new job roles (reskilling) or higher-skilled jobs (upskilling). Work-based learning is focused on both employment and educational outcomes.

Executive Summary

The nature of work has changed dramatically as automation and technology, as well as their effects on job tasks, have increased. The fast pace of technological change, exemplified by the automation of industrial processes and the increased application of artificial intelligence, is eliminating or permanently changing many traditional jobs in manufacturing and the broader economy while creating new jobs that many members of the workforce lack the requisite skills for. The traditional educational system is struggling to quickly prepare workers for this new economy.

These changes have generated concern that an increasing number of workers lack the skills that employers value. Although the skills gap has been widely debated by researchers and policymakers, evidence suggests that employers are increasingly changing their training and hiring practices to emphasize skills over formal qualifications. Skills-based hiring focuses on job candidates' observable and measurable skills that are relevant to a job rather than on educational credentials. Further, employers increasingly emphasize behavioral characteristics alongside relevant skills and knowledge as key competencies that must be considered when evaluating job candidates. This recruiting approach aims to identify and hire the most suitable candidates for performing each job in an organization, thus optimizing long-term results and subsequent cost savings and improving workforce retention and job satisfaction.

Although skills-based hiring is still relatively uncommon, how might older workers fare if such a paradigm were to replace traditional hiring practices? On the one hand, skills-based hiring could screen out millions of older workers if their skills are no longer relevant. On the other hand, older workers could benefit from skills-based hiring if they have acquired desired skills through their experiences but do not have the college degrees that traditional hiring practices typically screen for. Still, even if older workers had the skills that employers are seeking, would age-related stereotypes dissuade employers from hiring them? Conversely, could older workers' acquired skills help them overcome employers' potential age-related bias?

This report, drafted in fall 2020 and finalized in spring 2021, provides information on the landscape of skills-based hiring and the challenges and opportunities a skills-based hiring paradigm offers for older workers, particularly those with low incomes. Its main data sources are academic, government, and industry studies and reports supplemented by insights from a

series of semistructured interviews conducted in May through July 2020 with various stakeholders, including older workers, assessment and training providers, talent consultants, a staffing company, and an employer.

Our review of research studies and the interviews we conducted suggest that a skills-based hiring paradigm could help reduce age-related bias in hiring and in the workplace and help low-income older workers overcome challenges stemming from the lack of a traditional degree or the inability to change careers. To fulfill this promise, however, the new hiring paradigm must undergo a series of changes. These range from larger systemic changes, such as investing in expanding access to real-time labor-market information (LMI) and developing a universally accepted credentials and qualifications framework, to providing appropriate counseling and tailored training options to older workers, especially those with low wages. Also important to a skills-based hiring paradigm is supporting older adults in their job search (especially with using information technology), developing their social media presence, and engaging in other activities to connect them with potential employers and make a strong case for hiring them.

The shortcomings we identify with the skills-based hiring model as currently implemented give rise to a series of recommendations that could improve it. We identify recommendations aimed at employers and policymakers:

Employers

- Increase use of real-time LMI to identify the optimal job skills that job seekers should develop and that companies should look for in their recruits.
- Improve transparency in communicating skills needs to potential employees.
- Prioritize reskilling and upskilling current employees over recruiting new staff.
- Build a culture of lifelong learning.
- Offer short-term paid internships to middle-aged and older workers.
- Provide clear guidance to older employees on the benefits of continued learning.
- Promote a diverse workforce.

Policymakers

- Involve older adults in redesigning existing workforce training initiatives and creating new ones.
- Invest in open real-time LMI, including building capacity for conducting basic LMI analyses at the state level and coordinating effectively between federal and state LMI services.
- Disseminate information to employers about the growing importance of older adults in the labor market.
- Support developing a credentials and qualifications framework that recognizes, compares, and categorizes skills acquired through various pathways.
- Encourage continued expansion of shorter, stackable learning modules and other flexible educational options.
- Provide employer incentives to offer customized training options to older workers.
- Support expanding apprenticeship opportunities for older workers.
- Provide incentives and subsidies for low-income middle-age and older adults to seek training outside of their job to acquire new skills or upgrade existing ones.
- Promote changes to existing workforce initiatives and develop new ones aimed at lower-income older adults to help them search for jobs and present themselves on the labor market.

Introduction

The nature of work has changed dramatically over time as automation and technology, as well as their effect on job tasks, have increased. A recent study estimates that each robot replaces 1.6 manufacturing workers and that by 2030, robots will displace 20 million manufacturing jobs worldwide (Cone and Lambert 2019). The study also finds that workers in lower-income regions are particularly vulnerable to the negative effects of automation because they tend to have lower skill levels. Technological innovation also requires many of today's workers to use computers and to operate computer-controlled machines (Elvery 2019; Hecker and Loprest 2019). These job requirements were considered advanced in the 1970s and were not commonplace. According to a 2016 Pew Research Center survey, between 1980 and 2015, the number of jobs requiring average to above-average skills increased 68 percent, from 49 to 83 million, with those requiring above-average skills increasing 80 percent, from 22 to 39 million. In contrast, the number of jobs requiring below-average skills increased only 31 percent, from 50 to 65 million (Pew Research Center 2016).[1] To put these figures into perspective, the size of the workforce ages 16 to 64 grew 45 percent, from 138 to 201 million, over the same period (Urban Institute 2020).

These changes have sparked concern that an increasing number of workers lack the skills employers value. Rapidly changing technology challenges workers, including older workers, to keep their skills up to date. These challenges may be particularly difficult for workers in low-wage jobs, who generally lack access to and resources for skill-development opportunities. Even young adults entering the labor force with solid educational credentials, including college degrees, may lack the skills or professionalism, critical thinking, lifelong learning, and business acumen that employers value (Burner et al. 2019). Although this skills gap has been widely debated by researchers and policymakers, employers report having difficulty finding employees with the right skills (Burner et al. 2019; Manpower 2018, 2020). Sixty-four percent of human resources leaders recently surveyed believe their company has a skills gap. They also say the skills gap creates recruiting challenges (43 percent) and makes their companies less efficient (42 percent; Wiley Education Services and Future Workplace 2019). And a 2018 Deloitte study projects that 2.4 million jobs will be unfilled between 2018 and 2028 because of the skills gap (Deloitte 2018). A comparison of job ads and resumes revealed that, on average, job ads list more occupational skills (16.7 percent) and employability skills (5.2 percent) than resumes of applicants (9.8 and 3.2 percent, respectively; LiveCareer 2018).

Further, a third of employers in a recent survey said the COVID-19 pandemic widened the skills gap (Monster 2021).

In response to this perceived skills gap, employers are increasingly hiring based on specific skills and competencies instead of education or experience (Arnold 2018; Gallagher 2018). In one survey, nearly a quarter (23 percent) of hiring leaders reported trying to move toward a formal skills-based hiring initiative that prioritizes skills and deemphasizes educational degrees, and 39 percent reported that they were exploring such a transition. Another 22 percent were not engaged in skills-based hiring but reported they might consider it in the future (Gallagher 2018).

The emphasis on demonstrable, job-relevant skills over degrees is not new in hiring. Historically, tradespeople (such as plumbers, construction workers, and electricians) received training through apprenticeships or vocational classes to learn required skills for their jobs. At the end of their training, they received a license or certificate demonstrating their credentials to prospective employers. Although skills-based hiring is still common today for many jobs that do not require a college degree, it is increasingly being used for jobs that have traditionally required such degrees.

Although still relatively uncommon, how might older workers fare if a skills-based hiring paradigm were to replace traditional hiring practices? On the one hand, skills-based hiring could screen out millions of older workers if their skills are no longer considered relevant. On the other hand, older workers could benefit from skills-based hiring if they have acquired desired skills through experience but do not have the educational credentials traditional hiring practices typically screen for. Thirty-six percent of adults ages 25 to 54 have at least a bachelor's degree, compared with only 29 percent of those age 55 and older.[2] Still, even if older workers had the skillset that employers are seeking, would age-related stereotypes dissuade employers from hiring them? Conversely, could skills acquired by older workers throughout their careers help them overcome any potential age-related bias by employers?

This report, drafted in fall 2020 and finalized in spring 2021, provides information on the landscape of skills-based hiring and the challenges and opportunities for older workers in a skills-based hiring paradigm. Its main data sources are academic, government, and industry studies and reports supplemented by insights from a series of semistructured interviews conducted in May through July 2020 with various stakeholders, including older workers, assessment and training providers, talent consultants, a staffing company, and an employer.

(the appendix provides more details on our methods.) We begin by discussing the current and future labor market for older workers and the role that age bias plays in the hiring process and on the job. We then describe what is known about skills-based hiring and what it could mean for older workers. We conclude with recommendations for improving the effectiveness of skills-based hiring in achieving labor-market outcomes that are beneficial to both older workers and employers. To the extent possible, we also discuss how the COVID-19 pandemic has affected the labor market for older workers.

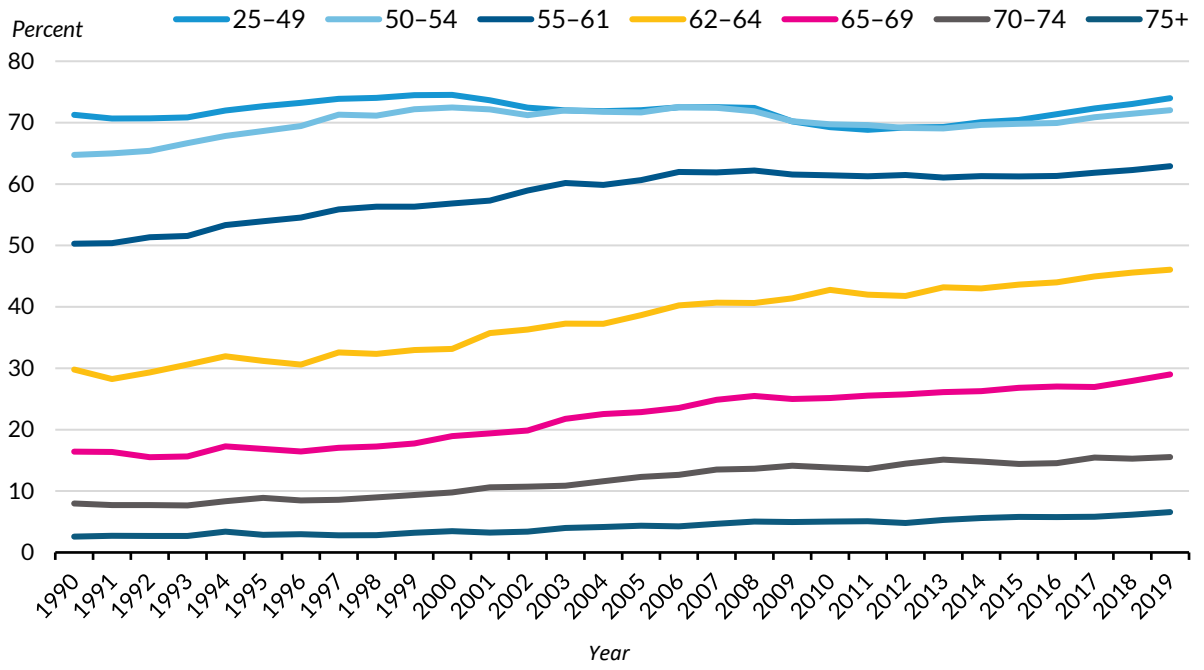
Labor Market for Older Workers

For several reasons, including an increase in life expectancy, improvements in physical health, fewer physically demanding jobs, and increases in the Social Security retirement age, older adults are generally more likely to work today than in the past (particularly those age 62 and older and especially women). Between 1990 and 2019, employment rates increased for all older women, but especially for those age 62 and older, increasing 55 percent for 62- to 64-year-olds, 77 percent for 65- to 69-year-olds, 95 percent for 70- to 74-year-olds, and 155 percent for those age 75 and older (figure 1). Although employment rates for men ages 50 to 61 remained relatively flat over the same period (except for a slight decline during the Great Recession), they increased 27 percent for those ages 62 to 64, 52 percent for those ages 65 to 69, 57 percent for those ages 70 to 74, and 70 percent for those age 75 and older (figure 2). In contrast, employment rates for adults ages 25 to 49 increased slightly for women and declined slightly for men.

These trends bode well for the labor-market prospects of older workers both who want to work and who need to work, but employment rates differ significantly by age, sex, education, and race and ethnicity and are generally lowest for the oldest adults, women, those without a college education, and people of color. As expected, employment rates decline with age for both voluntary reasons (primarily retirement) and involuntary reasons (such as disability and job loss). In 2019, female employment rates were 72 percent for those ages 50 to 54, 46 percent for those ages 62 to 64, and 29 percent for those ages 65 to 69 (figure 1). Male employment rates were 83.6 percent for those ages 50 to 54, 56.8 percent for those ages 62 to 64, and 38.3 percent for those ages 65 to 69 (figure 2). Another 15.5 percent of women and 23.4 percent of men were still working at ages 70 to 74, and 6.6 percent of women and 11.8 percent of men worked at age 75 and older.

FIGURE 1

Female Employment Rates by Age, 1990 to 2019



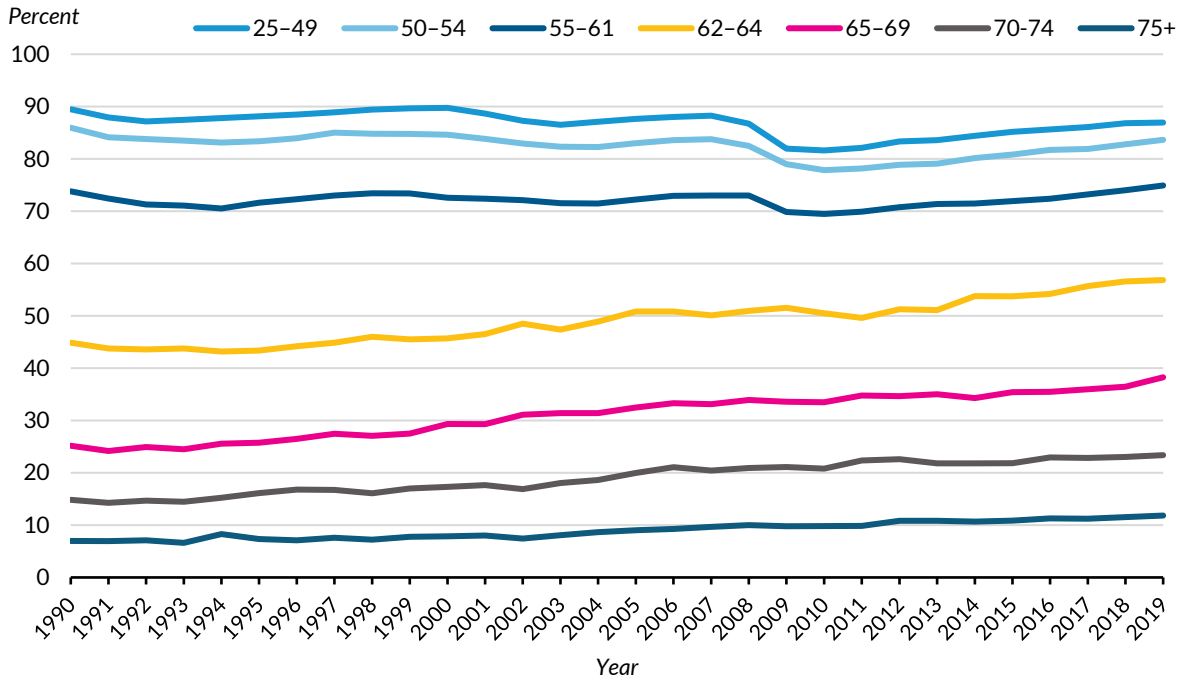
Source: Urban Institute (2020).

Although women's labor-force participation rates have increased dramatically over time, men are still more likely than women to work, especially at older ages (table 1). In 2018, men were about 19 percent more likely than women to be employed at ages 55 to 61 (74.0 versus 62.3 percent) and 64 percent more likely to be employed at age 70 and older (16.2 versus 9.9 percent).

Differences in employment rates by educational attainment also increase with age. Among older women, those with college degrees were 88 percent more likely than those without high school diplomas to work at ages 55 to 61 (73.2 versus 39 percent); the employment advantage for educated women increases to 118 percent at ages 62 to 64, 114 percent at ages 65 to 69, and 246 percent at age 70 and older. The same educational differences in employment rates were significantly smaller for older men: only 39 percent at ages 55 to 61 (84.3 versus 60.9 percent) and 108 percent at age 70 and older.

FIGURE 2

Male Employment Rates by Age, 1990 to 2019



URBAN INSTITUTE

Source: Urban Institute (2020).

TABLE 1

Employment Rates in 2018, by Age, Educational Attainment, and Race and Ethnicity

	Women				Men			
	55–61	62–64	65–69	70+	55–61	62–64	65–69	70+
All	62.3	45.6	27.9	9.9	74.0	56.6	36.4	16.2
Educational attainment								
No high school diploma	39.0	26.1	16.8	4.3	60.9	41.5	24.5	10.4
High school diploma	56.7	40.8	24.7	7.6	69.5	51.8	30.1	13.4
Some college	64.1	47.1	27.9	11.4	73.6	54.7	36.2	17.0
College degree	73.2	56.9	35.8	15.0	84.3	68.3	47.0	21.6
Race and ethnicity								
Non-Hispanic white	64.6	48.2	29.0	9.8	75.8	58.2	38.5	17.1
Non-Hispanic Black	57.4	41.5	26.0	10.1	62.0	45.7	27.9	12.9
Hispanic	55.6	39.8	24.0	8.5	76.3	59.9	35.5	16.6

Source: Urban Institute (2020).

Non-Hispanic white women are significantly more likely than non-Hispanic Black and Hispanic women to work before age 70 but less likely than non-Hispanic Black women to work

beyond that age. At ages 55 to 61, for example, white women were 13 percent more likely than Black women and 16 percent more likely than Hispanic women to be employed. At age 70 and older, however, white women were 3 percent less likely than Black women to work, while differences in employment rates between white and Hispanic women remained the same.

In contrast, non-Hispanic white men are significantly more likely than non-Hispanic Black men to work at older ages, and these differences increase after age 65. Employment rates were 22 percent higher for white men than for Black men at ages 55 to 61, 38 percent higher at ages 65 to 69, and 33 percent higher at age 70 and older. In contrast, non-Hispanic white men are somewhat less likely than Hispanic men to work at younger ages and more likely than Hispanic men to work at the oldest ages. Employment rates were 1 percent lower for white men than for Hispanic men at ages 55 to 61, but 9 percent higher at ages 65 to 69 and 3 percent higher at age 70 and older.

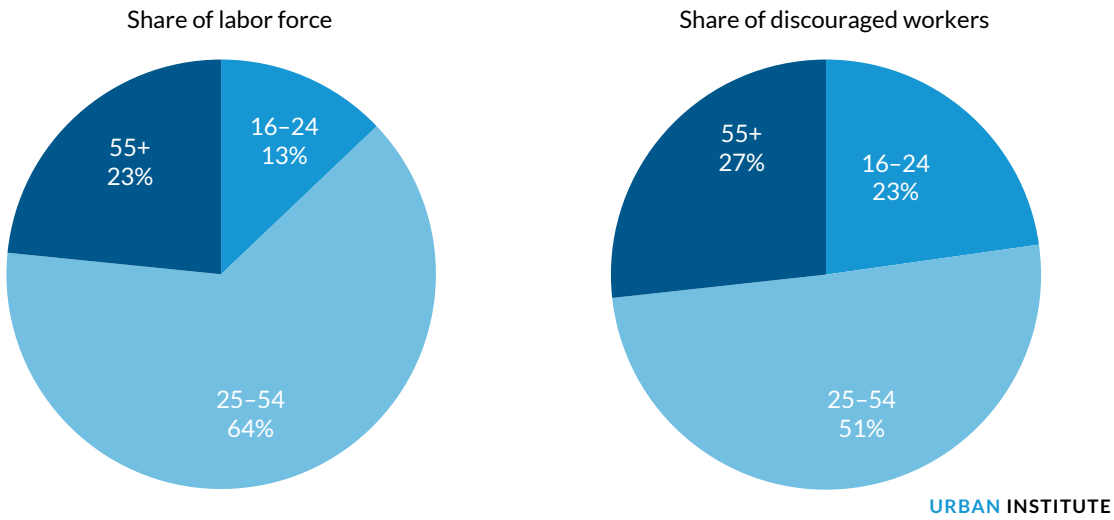
The US Census Bureau (2018) projects that by 2050, about 40 percent of Americans will be age 50 and older, and these adults will account for 56 percent of the US population age 25 and older. As the supply of older workers grows and they constitute a larger share of the workforce, employers will have to increasingly turn to older workers to meet their staffing needs. Yet, their lower employment rates reflect the possibility that employer demand for older workers falls short of the demand for younger workers. Moreover, older adults' employment rates may understate the number of them who want to work. Employment statistics do not provide a complete picture of the labor market because they do not capture those who want to work and cannot find jobs, nor do they capture those who become discouraged and drop out of the labor force. According to the Bureau of Labor Statistics, older adults are overrepresented among discouraged workers (out-of-work adults not actively looking for work because they believe there are no jobs). Those age 55 and older represent 27 percent of discouraged workers but only 23 percent of the labor force. In contrast, younger adults ages 25 to 54 are underrepresented among discouraged workers, representing only 51 percent of discouraged workers but 64 percent of the labor force (figure 3). Recessions may further exacerbate this issue. In the Great Recession, for example, although older workers were less likely than younger workers to lose their jobs, older adults took longer to be reemployed and suffered larger wage losses once they found new jobs (Johnson and Butrica 2012).

Thus, although employment trends among older adults are encouraging, significant challenges remain. Older adults are becoming increasingly diverse and given persistent

differences in employment rates between men and women and between white people and people of color, continued substantial gains in the employment of women and people of color are imperative. Similarly, as those of advanced old age constitute a growing segment of all older adults, increasing their employment rate and labor force participation more broadly is becoming very important. Moreover, helping low-wage older workers get better jobs would help address income inequality. Nearly a quarter of older workers age 62 and older were in unstable and low-wage jobs in 2015, an increase from 14 percent in 2005 (Ghilarducci, Webb, and Papadopoulos 2018). Skills-based hiring has the potential to help achieve this goal as long as age bias (and other biases and stereotypes) does not interfere. In the next section, we discuss and refute common stereotypes about older workers. But first, we briefly discuss the possible impact of the pandemic on older workers.

FIGURE 3

Age Distribution of the Labor Force and Discouraged Workers, 2019



Source: US Bureau of Labor Statistics (2021a, 2021b).

Impact of COVID-19 Pandemic

With many Americans under stay-at-home orders and many businesses forced to shutter, unemployment rates skyrocketed in April 2020 amid the COVID-19 pandemic. The leisure and hospitality sectors lost the most jobs, and workers in the lowest-earning occupations were disproportionately displaced.[3] Teleworking, which increased dramatically, somewhat mitigated the negative effect of the pandemic on employment, but working from home was

not an option for many workers. Dey and colleagues (2020) estimate that more than half of workers—including 89 percent of those without high school diplomas, 71 percent of Hispanic workers, and 61 percent of Black workers—are in jobs where telework probably is not feasible (table 2). In contrast, only 33 percent of college graduates and 51 percent of non-Hispanic white people likely cannot work from home. Although the authors find similar proportions of adults ages 25 to 54 and those age 55 and older who were able to work from home (table 2), they also find that younger workers were much more likely to telework than older workers (28 versus 20 percent; data not shown).

As expected, the authors also find large occupation and industry differences in the ability of workers to telework. They estimate that nearly all workers in farming, fishing, forestry, construction, repair, production, and transportation occupations cannot telework, as well as 92 percent of workers in service occupations. This is in contrast to only 13 percent of workers in management, business, and financial occupations and 36 percent of those in professional occupations. Likewise, workers in agriculture, forestry, fishing, hunting, construction, transportation and utilities, and wholesale and retail trade industries are least likely to be able to telework, while those in financial, information, and professional industries are most likely to be able to telework.

Dey and colleagues (2020) further investigate the effect that telework had on employment during the pandemic. They find that overall employment declined 16 percent between February and April 2020 but ranged from 7 percent for workers in nonexposed industries who were able to telework to 42 percent for workers in exposed industries[4] who were unable to telework (table 3). Among workers in exposed industries who were able to telework, employment rates declined 22 percent. Likewise, workers in exposed industries who were unable to work from home experienced the largest increases in unemployment: nearly six times the increase in unemployment among workers in unexposed industries who were able to telework.

TABLE 2

Share of Workers Unable to Telework

All	56.4
Education	
No high school diploma	89.3
High school diploma	75.5
Some college	63.6
College degree	32.5
Race and ethnicity	
Non-Hispanic white	51.3
Black	60.5
Hispanic	71.1
Age	
15–24 years	76.3
25–54 years	53.2
55 years and older	51.9
Occupation	
Management, business, and financial occupations	13.4
Professional and related occupations	35.6
Service occupations	92.1
Sales and related occupations	68.1
Office and administrative support occupations	40.8
Farming, fishing, and forestry occupations	100.0
Construction and extraction occupations	100.0
Installation, maintenance, and repair occupations	99.0
Production occupations	99.6
Transportation and material moving occupations	99.7
Industry	
Agriculture, forestry, fishing, and hunting	91.7
Mining, quarrying, and oil and gas extraction	44.1
Construction	82.7
Manufacturing	63.6
Wholesale and retail trade	73.1
Transportation and utilities	74.6
Information	28.8
Financial activities	22.1
Professional and business services	30.1
Industry missing	NA

Source: Authors' calculations from table 1 of Dey et al. (2020) that reports telework statistics in the American Time Use Survey.
Note: NA = not available.

Compared with younger workers ages 25 to 54, older workers ages 55 and above were particularly hard hit. Between April 2019 and April 2020, unemployment rates increased 552

percent for older women and 380 percent for older men. Over the same period, they increased 396 percent for younger women and 297 percent for younger men (table 4). Since that time, unemployment rates have declined considerably but have not returned to prepandemic levels, and the recovery has been uneven across different sectors of the economy. Older workers also have been somewhat more likely than their younger counterparts to drop out of the labor market during the pandemic. Between year-end 2019 and 2020, employment rates fell 7.9 percent for older women and 7.5 percent for older men but only 5.5 percent for younger women and 4.9 percent for younger men (table 4). In addition to older women, the pandemic hit Black, Hispanic, and Asian older workers especially hard, with a decline in employment more than twice that of white older workers (Davis et al. 2021). At this point, it remains unclear how long the economic recovery will take and which labor-market changes will be permanent or temporary. However, a recent survey of employers revealed that the majority were optimistic about the 2021 labor market (Monster 2021).

TABLE 3

Change in Employment and Unemployment Between February and April 2020 by Industry Exposure and Ability to Telework

	Percent Change in Employment Rate			Percentage-Point Change in Unemployment Rate		
	All	Exposed industries	Unexposed industries	All	Exposed industries	Unexposed industries
All	-15.9	-38.6	-11.1	11.0	30.1	7.2
Unable to telework	-21.2	-41.5	-14.6	14.3	32.3	8.7
Able to telework	-7.7	-22.1	-6.7	6.2	18.1	5.4

Source: Dey et al. (2020).

TABLE 4

Unemployment and Employment Rates in 2019 and 2020 by Age

	Unemployment Rate			Employment Rate		
	Apr 2019	Apr 2020	Percent change	Dec 2019	Dec 2020	Percent change
Ages 25–54						
Women	2.7	13.4	396	74.9	70.8	-5.5
Men	3.0	11.9	297	86.3	82.1	-4.9
Ages 55+						
Women	2.3	15.0	552	34.3	31.6	-7.9
Men	2.5	12.0	380	45.1	41.7	-7.5

Source: US Bureau of Labor Statistics (2021b).

Age Bias in Hiring and the Workplace

One cannot talk about the labor market for older workers without also discussing the struggles they face in hiring decisions and in the workplace because of age bias. The Age Discrimination in Employment Act of 1967 forbids age discrimination of workers age 40 and older with regard to employment, including in hiring, firing, promotion, layoff, training, compensation, and benefits. The Age Discrimination in Employment Act applies to private employers with 20 or more employees and to local, state, and federal governments. It was amended by the Older Workers Benefit Protection Act of 1990 to specifically prohibit employers from denying benefits, such as health insurance, to older employees.

Despite the Age Discrimination in Employment Act, many studies have documented age discrimination in hiring (Baert et al. 2016; Farber, Silverman, and von Wachter 2017; Lahey 2008; Neumark, Burn, and Button 2019; Neumark 2020; Riach and Rich 2010). Many of these studies are resume experiments in which researchers apply to real jobs using resumes created for sets of fake applicants who are identical except for characteristics that identify or suggest their age, such as the year they graduated from school or their years of experience. The studies generally find that older applicants are less likely to be called back than their equally qualified younger counterparts. A recent study by Neumark (2020), for example, finds that when age is revealed during the application process, older job candidates are less likely than younger job candidates to get interviews. When age is omitted during the application process, older applicants are as likely as younger applicants to get interviews, and only after the interviews are older adults less likely than younger adults to get job offers.

Like research studies using fake resumes to test for discrimination in hiring, those based on survey data also find evidence suggestive of possible age bias. Several studies, for example, find that older workers who lose their jobs take longer than younger workers to become reemployed (Johnson and Butrica 2012; Johnson and Mommaerts 2011). Employer surveys also reveal their age bias. Although employers claim to value older workers' experience, maturity, and work ethic, a quarter of employers surveyed in 2006 said they were reluctant to hire older workers (Pitt-Catsouphes et al. 2007). These findings are echoed in insights from one of the stakeholders we interviewed, who sees a growing perception of ageism among

older job applicants in the surveys he conducts with job candidates to gauge their hiring experiences.

Without employer data on workers' wages and promotions, testing for systemic age discrimination in the workplace is more difficult than testing for age discrimination in hiring. Therefore, most research studies on workplace age bias and discrimination are based on self-reports from older workers through interviews and surveys (Perron 2018, 2021). In one study, 24 percent of older workers report that their employer gives preference to younger employees in promotion decisions (Johnson 2018). Our interviews for this report support this finding. Although most older adults we interviewed did not report age bias on their most recent job, one interviewee noticed getting fewer contracts once he hit his mid-50s, and another interviewee saw her younger colleagues being assigned more tasks than she was. Employer age bias may exist even if employees do not recognize it as such. One interviewee's job was eliminated after the company reorganized. Although she did not attribute her job loss to age, research by Johnson and Gosselin (2018) finds that 56 percent of workers in their early 50s experienced an employer-related involuntary job separation at some point before age 65. The authors attribute this finding to possible age discrimination in the workplace. Similarly, one in four retirees in a MetLife (2020) survey reported retiring because they were offered early retirement incentives, their jobs were eliminated, or they felt forced to retire—actions that can be construed to reflect, at least in part, age discrimination.

One reason age discrimination may be a difficult challenge to tackle is that it appears to intersect with other personal characteristics (and other types of biases), thereby impacting different groups differently. The theory of intersectionality recognizes that people are often disadvantaged by several sources of discrimination, such as their race and sex (Crenshaw 1989). In fact, a recent Equal Opportunity Employment Commission (EEOC) report finds an increase over the past 20 years in the number of age discrimination charges that also allege race, sex, or disability discrimination (Lipnic 2018). Research findings also suggest that workers may be subject to multiple forms of discrimination. Neumark, Burn, and Button (2019) find more age discrimination for older women than for older men. They also find more age discrimination for older adults nearing retirement than for those who are middle age. In our interviews, all but one female interviewee reported having experienced or perceived age-related bias on their most recent job search. To reduce the chances of age discrimination, one woman reported that she no longer includes her entire job history on her resume, which is a strategy recommended by AARP as well as the AARP Foundation's Back to Work 50+

program and other employment programs. The only woman who reported no age discrimination attributes it to looking younger than her age. Indeed, hiring simulations conducted with laypeople and human resources professionals find that job candidates with older facial age appearances receive lower ratings than younger-looking candidates (Kaufmann et al. 2017).

Research studies also find that older professionals have better employment prospects than older support workers (Munnell, Sass, and Soto 2006; Munnell and Wettstein 2020). Somewhat related are findings that suggest differences in age discrimination by education. Johnson (2018) reports that 38 percent of older workers without high school diplomas feel that their employer favors younger workers in promotion decisions. In contrast, only 22 percent of those with at least four years of college feel this way. Notably, the share of workers feeling this way increased dramatically between 2002 and 2014 and by the same share (over 80 percent) for both these groups (Johnson 2018). This is in stark contrast to the increase between 2006 and 2019 in the share of surveyed employers who rate older workers as equally or more employable than younger workers, with notably larger increases for support workers than for professional workers (Munnell and Wettstein 2020). Although employers are increasingly likely to say they value older workers, older workers are increasingly likely to report age bias.

Finally, age discrimination varies by job requirements. The same researchers who conducted the hiring simulations previously described (Kaufmann et al. 2017) also found less facial age discrimination in jobs with less contact with customers. Turek and Henkens (2020) find that certain skills requirements trigger employer age discrimination. For example, the likelihood of employers recruiting someone age 50 and older was 13 percentage points lower if the job required computer skills than if it did not. The authors also found age discrimination among jobs requiring physical, creative, and social skills. The only job requirements that benefited older adults were technical skills (i.e., service, repair, and installation of technical equipment) and managerial skills; however, the effects were small and significant for only some types of jobs. Similarly, participants in an study by Abrams, Swift, and Drury (2016) were asked to assess two equally qualified simulated job applicants. One applicant was profiled as, among other things, being good with information technology (IT), experienced using social media, and interested in learning new skills, which are stereotypically younger traits. The other applicant was profiled as, among other things, being good at understanding others' views, settling arguments, and being careful, which are stereotypically older traits. Not

knowing any other information, including age, the participants were less likely to say they would hire those applicants who exhibited traits associated with older adults. These research findings play out across the IT industry. An Indeed survey of workers in the IT industry found that 43 percent were worried about losing their job because of age, and 18 percent worried about it all the time.[5] Their concern is not surprising given that the median age of employees exceeded 35 in only 6 of 32 technology companies surveyed by PayScale and was younger than 30 in 8 of those companies.[6] Google recently settled an age discrimination class-action lawsuit, and IBM is currently in the middle of such a lawsuit. A recent report estimates that technology industries lost $44.2 billion in GDP because of age discrimination and have the most to gain of all industries in the short and long term by employing and retaining older workers. Without age discrimination, their GDP in 2018 would have been almost 6 percent higher, and their projected GDP in 2050 could be 12 percent higher (AARP and the Economist Intelligence Unit 2020). Finally, van Dalen and Henkens (2017) find that employer age discrimination has declined significantly over time for employability skills, such as managerial skills and social skills, but has remained unchanged for occupational skills, such as physical stamina, flexibility, creativity, technical skills, and willingness to train. Importantly, they find that the older the manager, the more positive they are about older workers.

Despite reports of age-related bias and discrimination by older workers and evidence from research studies, age discrimination is often not officially reported, and when reported, it is difficult to prove. An article published by SHRM on the difficulty of proving workplace age discrimination reports that age discrimination was alleged in nearly a quarter of complaints filed with the EEOC in 2016, but only 2 percent of those cases had enough evidence to pursue a lawsuit (Wilkie 2018).[7] Disentangling the impact of age from other considerations remains exceedingly difficult; these findings suggest that promoting workplace equity and educating employers about the unique value of older workers, rather than pursuing punitive actions, may prove more successful for exerting a lasting impact on the labor-market opportunities for older workers.

Employers' Concerns about Older Workers

Some of the most common workplace age stereotypes suggest that older workers are poor performers, resistant to change, less able or willing to learn, more difficult to train, more likely to leave the company, and costlier than younger workers (Button 2020; Mermin, Johnson, and

Toder 2008; Munnell, Sass, and Soto 2006; Pitt-Catsouphes et al. 2007; Posthuma and Campion 2009; Toomey and Rudolph 2015). Further, some studies report that employers are reluctant to invest in training older workers because they fear they will not recoup their costs before older workers retire (Eyster, Johnson, and Toder 2008; Heidkamp 2012; Martin et al., 2014; Paullin and Whetzel 2012; Toomey and Rudolph 2015). Our interviews with assessment and training providers confirmed the perception among some employers that older adults lack in-demand IT skills and have a more difficult time adopting them than younger people. The interviewees also confirmed certain elements unrelated to older adults' ability to learn, such as the higher cost of employing and training older workers, that presumably make employers less likely to invest in their training.

These stereotypes negatively impact both employers' decisions to hire older workers and their decisions to promote, train, and retain their older employees. One study finds that employers are less likely to offer training to their older employees than they are to their younger employees (Taylor and Urwin 2001). Another study of 3,638 employers in six European countries finds that employers are more likely to use exit strategies (such as early retirement) than development strategies (such as training) with their older workers (van Dalen, Henkens, and Wang 2015). As further evidence, a SHRM Aging Workforce Survey shows that only 4 percent of employers have a formal strategy for retaining older workers, and only a quarter to a third of these organizations report training older workers as one of the ways they recruit or retain older workers. In contrast, these same employers reported ramping up their training programs to train younger workers for the jobs that older workers will retire from (SHRM 2015).

Are Employer Concerns about Older Workers Substantiated?

Compared with previous generations, today's older adults are healthier (National Center for Health Statistics 2016) and less likely to work in physically demanding occupations (Bucknor and Baker 2016; Johnson 2004; Johnson, Mermin, and Resseger 2011). These trends imply, and numerous studies confirm, that many workers are physically and mentally capable of performing job duties well into their older ages.

Börsch-Supan and Weiss (2016) study the production process of a large car manufacturer and find no evidence of workers' productivity decline at least until age 60. Between ages 60 and 65, there are too few observations to measure productivity with precision, so the authors cannot assess with confidence productivity changes after age 60. When age-related declines in physical and mental health prevent older workers from performing their current jobs, they may be able to change jobs, depending on their health limitations and job demands. Findings from Hudomiet and colleagues (2017) suggest this may be possible, at least for those in physically demanding jobs. The authors study the extent to which work at older ages is hindered by a mismatch between workers' skills and abilities and job demands. They find that self-reported cognition, fine motor skills, and large-muscle abilities decline with age and lead to higher reports of work-limiting health problems, more depressive symptoms, lower subjective probabilities of working full-time past age 65, and more transitions from full-time work to retirement. Importantly, declines in large-muscle abilities negatively impact outcomes only for workers in jobs that rely heavily on physical strength, whereas declines in cognition and fine motor skills are important for all occupations.

Drawing on the expertise of some of our interviewees in the science of learning, we were interested in determining whether age plays any role in the ability to adopt new knowledge and skills and, if so, at what age the human capacity to learn new things and acquire new skills declines or stops altogether. The literature on the impact of aging on cognition and learning ability shows that any age-related slowdown is minimal and, from the practical perspective of performing work-related tasks, irrelevant. If any age-related cognitive issues exist, they may involve metacognition, which suggests that any issue is likely to be attitudinal rather than rooted in real physiological limitation. Other than during terminal decline in the final months of life, humans' ability to learn skills needed for a new job does not diminish meaningfully with age. Personal commitment and willingness to learn is the decisive factor in older adults' ability to acquire new skills.

This expert opinion is consistent with the view expressed by some assessment and training providers who emphasize that the idea of older adults as unable to learn is a myth and that many older workers are interested in learning new skills and are motivated to build skills. Such an opinion is also consistent with the lack of any definitive evidence of diminished capacity or motivation of older workers (e.g., Posthuma and Campion 2009). A recent OECD study finds virtually no difference in IT use at work between older and younger Americans (OECD 2018). Similarly, all the older workers we interviewed have used IT regularly in their current or recent

job, and the majority feels comfortable using it. Although most older workers we interviewed report being comfortable using software packages such as Microsoft Office, some have reported expertise in using more specialized software packages and advanced skills such as web design. A worker in his late 60s, for example, reported moderate comfort with technology use but also said that he is using tools such as Cisco's Java and Microsoft Teams regularly in his work. Although a substantial minority of older workers who we interviewed feels less than fully comfortable with the IT requirements of their jobs, all of them have positive attitudes toward learning the computer and other skills needed to perform their jobs. One woman noted that she has been taking free classes at the library to learn basic computer skills. Therefore, based on the older workers that we interviewed, we also fail to find any strong evidence of older workers lacking requisite IT skills for their job performance and absolutely no evidence of their lack of willingness, enthusiasm, or ability to learn.

In addition to these stereotypes, many of the other older worker stereotypes have also been refuted. For example, Posthuma and Campion (2009) find that older workers provide higher returns on employer investment because they are less likely than younger workers to turn over, and they find mixed evidence that older workers are more costly. Berg and colleagues (2016) find that older workers, especially women and lower-earning women, are less likely to retire when employers offer training programs. An important takeaway from these studies is that there is no one age at which older adults can no longer work or learn. Moreover, older adults want and need to work (MetLife 2020), and they want to learn (Center on Aging & Work 2016). When older workers were surveyed about the elements of their ideal job, 84 percent reported the opportunity to learn something new, and 76 percent said on-the-job training (Center on Aging & Work 2016). The older adults in our interviews exhibited not only a substantial level of exposure to training outside of their regular job but also enthusiasm and willingness to acquire further knowledge and skills through various types of trainings.[8]

Not all stereotypes about older workers are negative. Older workers are often perceived as more dependable and trustworthy, as exhibited by less absenteeism and a lower likelihood of committing theft at work (Toomey and Rudolph 2015). They are also generally praised for their wisdom and institutional knowledge, which are attributable to tenure and accrued relevant job experience (Toomey and Rudolph 2015). Some other positive advanced-age-related stereotypes include being careful and having a warm personality, whereas qualities such as work productivity and communication skills can be perceived both positively and negatively with respect to a worker's age (Burn et al. 2019).

Still, negative stereotypes are widespread despite being mostly unfounded, and they often outweigh positive stereotypes when it comes to hiring, retaining, and training older adults. Moreover, constant exposure to negative stereotypes may lead older workers to believe such opinions (i.e., develop metastereotypes), which in turn could negatively affect their performance (Rahn, Martiny, and Nikitin 2021) and cross-age workplace interactions (Finkelstein, King, and Voyles 2015).

Likewise, the reluctance to hire or retain older workers hurts employers and runs counter to their long-term interests. With older workers being the single fastest-growing segment of the labor force (SHRM 2020; Urban Institute 2020), they will feature more prominently in years to come. Indeed, a recent study by AARP and the Economist Intelligence Unit (2020) estimates that age bias cost the US economy $860 billion in GDP in 2020. Moreover, not giving older workers the same training opportunities as younger workers creates age disparities in skills and reinforces employers' misconceptions about older workers. Some employers are taking notice of this trend and trying to support the training needs of this population. For example, after realizing that the adoption of new technologies required hiring at a scale that could not be achieved, AT&T's management decided to rely on a large retraining effort of its current employees with an average on-the-job tenure of 12 years.[9] Other employers, such as UnitedHealth Group or Scripps Health, also have tried not to discriminate against older workers in their training efforts.[10] Skills-based hiring, with its focus on whether workers have necessary skills and can perform the job, could help older workers.

What Is Skills-Based Hiring?

Skills-based hiring refers to a hiring practice that focuses on job candidates' observable and measurable skills that are relevant to a job rather than on educational credentials. Further, employers increasingly emphasize behavioral characteristics alongside relevant skills and knowledge as key competencies that must be considered when evaluating job candidates (Peregrin 2014). This recruiting approach aims to identify and hire the most suitable candidates for performing each job in an organization to optimize long-term results and subsequent cost savings and to improve workforce retention and job satisfaction (McClelland 1998; Peregrin 2014; Singh and Pathak 2018).

Beyond job performance and worker retention, skills-based hiring promises to help address other issues that have plagued the hiring process historically and that are gaining increasing prominence in the context of rethinking the role of businesses as not only economic actors but also important social actors. In this context, de-emphasizing formal degrees in hiring can help promote equity and inclusion in the workplace (Gallagher 2018). Skills-based interviewing during hiring (as well as performance-based evaluation once hired) has been identified as one of the strategies to diminish bias in hiring (and promoting) underrepresented groups in the workplace (Williams and Mihaylo 2019).

The desire and the need to hire individuals well suited for a job is not a novel concept. Indeed, efforts to recruit a competent workforce emerged with society's first large complex organizations, such as professional armies or bureaucracies. A notable example is a Chinese imperial examination aimed at selecting civil servants based on merit (Miyazaki 1981). Although it evolved over time, this examination remained in place until the early 20th century and arguably affected the development of other civil service examination systems in Asia and the West (Teng 1943). The development of the modern recruiting industry, however, is generally traced back to World War II and the need to fill jobs vacated by workers called into military service.[11] Subsequently, professional recruiters and recruitment agencies continued to match job applicants and employers with the goal of identifying the most suitable candidates for each job. The introduction of computers and IT into business processes facilitated the hiring process, and increased data availability and computing capability are enabling employers to make more holistic assessments of job candidates today than ever before.

Employers and Skills-Based Hiring Today

The more recent interest in skills-based hiring has evolved from a growing concern among employers about the mismatch between what they need and the qualifications of job candidates, in large part because of the pace of technological change in the economy. The assessment and training providers we interviewed for this report unanimously said that employers, including their clients, complain about the difficulty in finding employees who can perform the job. Although 96 percent of chief academic officers believed their colleges have prepared students for the workforce (Gallup 2014a), only 11 percent of business leaders strongly agreed that higher-education institutions are graduating students with the skills and competencies that their businesses need (Gallup 2014b).

The assessment and training providers we interviewed reported that this mismatch, or skills gap, is driven by automation and acceleration. Many occupational skills, particularly repetitive skills that are most common in low-wage jobs, are being automated, while others, such as technology skills, are constantly changing. In contrast, employability skills (such as communication, problem solving, critical thinking, and the ability to work with others) cannot be automated and either do not change or change at a much slower pace. Consequently, fewer employers are looking for employees with occupational, nontechnological, skills. Instead, they want employees with a combination of employability skills, technology skills, and the willingness to learn.

Because of the shortage of talent and required competencies that can be quantified more readily than in some other industries, IT has been leading the charge to adopt skills-based hiring practices (Arnold 2018). Prominent examples include companies such as Apple, Google, and IBM, which no longer require college degrees for job applicants.[12] Google does not ask their job candidates information about their GPA because it does not correlate with work performance (SkillSmart 2016). IBM developed a New Collar Jobs project aimed at facilitating the hiring of recruits with the right skills regardless of their formal education. Around 10 to 15 percent of all IBM's US hires do not have a traditional four-year college degree (New Collar Jobs 2020), and in some segments of the company, such as the IBM Rocket Center in West Virginia, about a third of new hires in jobs such as cloud computing, cybersecurity, application development, and help-desk support lack a traditional degree (Arnold 2018).

Although the IT industry has been at the vanguard of adopting skills-based hiring practices, it is not the only to have experienced issues with growing skills mismatch and the

inability to fill vacancies with qualified workers nor is the only to have started changing its hiring practices. Major employers across the financial industry (e.g., Bank of America), food service (e.g., Starbucks), hospitality (e.g., Hilton), retail (e.g., Whole Foods and Costco), and publishing (e.g., Penguin Random House) no longer screen out job candidates who lack a college degree.[13] Partnering with nonprofits focused on skills-based training, the number of smaller employers adopting skills-based hiring practices is also growing (Arnold 2018). A recent survey of 750 HR leaders from employers of all sizes and across all industries suggests that almost one-quarter of all employers have already made efforts to emphasize skills and de-emphasize degrees in their hiring practices, while an additional 4 out of 10 employers are considering such a move (Gallagher 2018). But this does not mean that degrees do not matter. On the contrary, about twice as many HR leaders believe that the value of educational credentials in hiring has been increasing in recent years (Gallagher 2018). Although at first glance these two trends may seem contradictory, they in fact reflect the underlying continuous and ever-increasing need for well-qualified workers; they also reflect a growing realization that an educational credential is only valued by an employer if it reflects the current skills required to be a productive employee.

Although skills-based hiring promises substantial advantages over traditional hiring and it is increasingly being implemented or considered by various employers, how far its adoption has progressed in the economy remains unclear. Although its adoption is on the rise, progress will take time because it requires substantial changes in well-established business processes as well as evidence that such changes yield commensurate returns on investment. Initiatives like the one launched in December 2020 by the Business Round Table "to reform companies' hiring and talent management practices to emphasize the value of skills, rather than just degrees, and to improve equity, diversity and workplace culture," are encouraging and may signal other companies to rethink their own hiring practices.

The Skills-Based Hiring Process

Moving to skills-based hiring requires changing the entire approach to hiring practices. This begins with restructuring job ads to focus on competencies needed to perform successfully in a position, including the necessary experience, skills, knowledge, and behavioral characteristics, rather than on expected duties (Singh and Pathak 2018). Such ads are often more comprehensive and require HR teams to work closely with hiring managers to craft them, but they should allow potential applicants to more realistically evaluate their fit for various positions. In general, they include the following elements:[14]

- Basic job information (e.g., job title, department, supervisor or supervisee title)
- Job summary and scope
- Principal accountabilities (i.e., job tasks and responsibilities, and expected results)
- Minimum qualifications (i.e., experience, education, and certification necessary to perform a job)
- Minimum competencies (i.e., skills, knowledge, and behaviors necessary to perform a job)
- Preferred qualifications
- Preferred competencies

Another element required by skills-based hiring is to evaluate competencies through testing or assessment.[15] The key difference from traditional testing of applicants is that it happens early in the process before any interviews or reference checks (Arnold 2018). This reversal allows for the pool of candidates ultimately considered for the job to include only those applicants who meet objective, quantifiable competency criteria. However, administering tests to a much larger pool of candidates also creates a substantial burden. Advancements in IT make these tests increasingly accessible to a pool of employers that extends beyond IT industry leaders and other large organizations that until recently were the only ones with resources sufficient to pursue such hiring strategies (Wilson, Kurzweil, and Alamuddin 2018). Although challenges related to the validation, standardization, and integration of assessment tools must be addressed before these new testing practices realize their full potential (Wilson, Kurzweil, and Alamuddin 2018), hiring managers perceive such

assessments to be an increasingly important alternative to screening on traditional degrees during hiring (Gallagher 2018).

Furthermore, skills-based hiring relies on interviewing processes that differ from those of traditional job interviews. The goal of these interviews is to focus on highlighting situations that would be relevant for assessing the behavioral fit of candidates to jobs and their required competencies. The origins of this type of interviewing go back to at least the 1970s, when the concept of behavioral-event interviewing (which emphasized prior performance as the key indicator of future behavior) was developed (McClelland 1998; Peregrin 2014). These interviews require hiring managers to prepare questions that allow them to rate applicants' answers relative to competencies required by different jobs, so they are therefore often more deliberate than traditional interviews.

Increasingly, employers also use technology to supplement, enhance, or replace traditional interviews. These solutions range from using online simulations and gamified assessments (i.e., online skills testing through a game-like environment) to digital interviews, either live or recorded, that allow for detailed analysis of verbal and nonverbal aspects of interviewees, such as tone, speech patterns, and facial expressions (Wilson, Kurzweil, and Alamuddin 2018).

Assessing Skills-Based Credentials and Testing for Skills-Based Hiring

To successfully align employer needs with employee qualifications requires a clear framework that allows employers to compare and assess various credentials and understand how they map out to the competencies needed for their jobs. Addressing this issue would improve portability of skills across employers and allow skills-based education to realize its full potential. This is particularly important if skills-based hiring is to be adopted by smaller employers that cannot afford to substantially upgrade their HR departments (or that do not have one) to develop and administer custom-made tests to screen job candidates.

At present, we know that many organizations awarding skills-based credentials lack oversight, and the credentials carry weak quality assurance (Brown and Kurzweil 2017). This makes it difficult for employers to verify which credentials correspond to the skills and competencies necessary for successful job performance. Unlike credentials earned from colleges and universities, nondegree credentials are subject to less scrutiny and

standardization. Several organizations provide third-party quality assurance for such credentials, including the American National Standards Institute, the International Certification Accreditation Council, and the Institute for Credentialing Excellence (Gallagher and Maxwell 2019). However, most alternative credentials are not subject to such quality-assurance practices, and the problem is becoming more acute as various online credentials proliferate. Among possible options to address this growing problem and facilitate skills-based hiring processes, we highlight two complementary solutions: one is grounded in existing proposals, and the second is seeing limited, but growing implementation:

- Develop a universal competency-based framework of credentials and create new learning taxonomy.
- Use third-party, technology-enabled prehire assessment tools.

The first solution focuses on addressing the issue of standardizing various credentials, traditional and alternative alike, in a systematic way. Its goal is to facilitate the portability of degrees and provide students, educators, and employers with a clear metric for comparing individuals with different educational backgrounds. The Lumina Foundation, in particular, has led the way with this goal. It has proposed the Connecting Credentials framework, which is organized around the concept of competencies (including knowledge as well as specialized, personal, and social skills) into eight levels that correspond with learning achievement rather than the subject matter of various credentials (Lumina Foundation 2015). Building on this foundation, Uranis and colleagues (2019) proposed a new learning taxonomy that aims to establish a new standard unit of measurement of student achievement, an index of competencies that would replace the current system of credit hours that does not translate well to education focused on competencies. To facilitate this change, the authors envision partnering with entities such as the American National Standards Institute and other US and international organizations. Another competency-based framework, proposed by Vijay Krishna from the American National Standards Institute, provides a high-level concept of how both traditional and alternative credentials could be integrated with the world of employment (Krishna 2019).

The second solution, the use of third-party assessment tools to facilitate hiring, is already being implemented. This is a fast-growing area enabled by the proliferation of IT solutions to HR needs. Although employer-developed or third-party assessment tools, whether conducted on paper or with computer assistance, have been used for a long time, these new tools are

substantively different because they are trying to address the shift to skills-based hiring and the change in the recruitment process that it entails. Applicant tracking systems and artificial intelligence represent the key technological solutions underpinning the rise of new candidate assessment tools, allowing employers to access big data to analyze candidates and implement algorithms that can automate some elements of candidate selection (Wilson, Kurzweil, and Alamuddin 2018). Examples of recruiting tools implementing these technologies include SAP SuccessFactors, Manatal, and CEIPAL, among others. Although most of these tools are appropriate for employers of various sizes, others target either larger employers (e.g., Oracle Taleo) or smaller employers (e.g., Recruiterbox). Some of the key assessment practices that new technology and big data have enabled include resume filtering, talent analytics (e.g., measuring and evaluating employers' data on employees that can be used to create competency-based profiles for recruiting purposes), online simulations that provide a visual preview of job tasks, "cybervetting" (i.e., assessing information from candidates' social media profile) and social media scraping (i.e., automated capturing of specified information from social medial profiles to assess candidates' match to employers' needs on a well-defined characteristic), digital (video) interviews, and gamified (i.e., online-game-like) assessments (Wilson, Kurzweil, and Alamuddin 2018). The biggest providers of these practices include well-established assessment companies, such as Pearson VUE or PSI, but employers are also using companies such as HireVue or Plum for custom solutions (Wilson, Kurzweil, and Alamuddin 2018).[16] Several assessment and training providers we interviewed believe that automated hiring practices based on skills benefit older job applicants by eliminating age bias. However, recent studies suggest that the algorithms in screening software may systematically discriminate against older adults and other demographic groups, and even if the algorithms are not biased, the underlying data may be (Lee, Resnick, and Barton 2019).[17] Yang (2020) discusses these issues in detail and the importance of ensuring fairness in algorithmic employment decisions.

Although approaches to assessing candidates in a skills-based framework are evolving rapidly, many unresolved issues remain, including employers' limited ability to adopt and integrate these new technologies into their hiring processes, a lack of peer-reviewed evidence supporting these technologies, and insufficient transparency (Wilson, Kurzweil, and Alamuddin 2018). Efforts to foster closer links between employers and educational institutions and training programs by using input from employers to implement a skills-based focus into education and training and by establishing a pipeline for recruiting well-trained talent can facilitate candidate recruitment. An important initiative in this respect is the Talent

Pipeline Management, supported by the US Chamber of Commerce Foundation (Tyszko and Sheets 2019). Talent Pipeline Management aims to help employers provide information to their educational partners about their workforce needs in a format that can be readily translated into their educational practice. It primarily functions through Talent Pipeline Management Academy, a training platform for business associations and employers that improves their capacity to work with their education partners, and as of 2019 includes 230 trained organizations across 28 US states and Canada (Tyszko and Sheets 2019). Currently, the US Chamber of Commerce Foundation is in the process of building Job Data Exchange, an open data tool that will facilitate real-time communication of hiring needs and requirements from employers to their partners (Tyszko and Sheets 2019).

Another example is SkillSmart, a start-up that not only facilitates skills-based hiring for companies but also identifies skills gaps in applicants, steers them to educational opportunities to fill those gaps, and fosters partnerships with local community colleges (SkillSmart 2016). Focusing on working-class adults, on-ramps are short-term programs that provide opportunities for skills-based training and job placement by developing partnerships between nonprofit organizations, for-profit providers, and workforce boards that allocate public funding for workforce development programs. Although they still serve a limited population of around 100,000 learners, initial data suggest that they increase job retention and earnings (Weise and Salm 2019). Other workforce development initiatives focused on streamlining advancement through education and training programs for underprepared workers, such as Accelerating Opportunity, also show promise in improving job readiness (McDonnell and Soricone 2019). Although educational institutions such as community colleges have always engaged with employers (Abel et al. 2018), these and other initiatives show how innovative ways to connect employers and educators can improve the skills necessary for job seekers to thrive in an increasingly skills-focused hiring environment.

Innovative Recruitment Model for Older Adults

As part of our study, we interviewed a representative of a staffing company that brings together older professionals and companies in search of workers with the exact skills these professionals possess. Several unique features of this model make it an example worth highlighting. First, the hiring process is skills-based and blind. The company focuses on matching skills between job candidates and employers in a process that usually takes six

weeks and includes two interviews, an online assessment, and a behavioral assessment. The company creates job applicants' resumes by using information they collect from their application and the screening process, including information collected through their proprietary software. Employers interview candidates over the phone, are unaware of their age, and can only see them once they make an offer. Moreover, older adults are employed to work from home, which allows them to extend their careers with more flexibility than most traditional jobs and is a cost-attractive proposition for employers because they can hire workers more inexpensively if they do not incur expenses for office space, computers, phones, and related items. Because this staffing company focuses on providing preretirement older workers the flexibility they prefer, about 60 percent of workers employed through the company work part-time. The work-at-home aspect of this model positioned it to thrive during the COVID-19 pandemic, which changed how companies conduct business and manage their employees. Moreover, this paradigm shift could remain a prominent feature of the workplace long after the pandemic ends. The staffing company requires at least a six-month employment commitment and most placements are permanent, which provides some security to older workers and their employers. Finally, the staffing company uses relationship managers to manage both older workers and their employers until the relationship ends. This is especially important in the context of their oldest workers (those age 80 and older), who may be at risk of experiencing cognitive decline.

Interviewed employers that use this staffing company report a high degree of satisfaction with the quality of older workers employed through this model. A representative of an insurance company who we interviewed told us they have so far contracted about 20 workers through this model and are very satisfied with their performance and cost effectiveness. Although experienced workers may be more expensive, their subject expertise and work quality, as well as the cost savings associated with remote work and the staffing company's relationship manager (who assumes some HR functions), make this an attractive proposition for employers. The company representative we interviewed indicated that the company plans to recruit more workers through this model.

This model, therefore, has many advantages. It emphasizes skills and competencies over formal credentials, largely removes age bias from recruitment (a problem that is pervasive in the interview and hiring process; Neumark 2020), and promotes flexible work arrangements and phased retirement, which are favored by 80 percent of workers yet offered by relatively few employers (MetLife 2020).

As more employers look to hire or rehire middle-aged and older adults who may have spent some time outside of the labor force (e.g., because of child care) or are changing careers, the demand for services that facilitate this process may grow. Internships, or "returnships" for rehires, now mostly target professionals in fields such as finance or law, but there may be scope to expand them to other seasoned workers. Although the model we described focuses on new hires, some companies pursue similar models focused on rehires. For example, iRelaunch helps employers, including major global companies, develop career reentry programs.[18]

Final Thoughts on the Skills-Based Hiring Paradigm

The tools supporting skills-based hiring, such as third-party prehire assessment tools, should continue developing to facilitate this hiring paradigm across small- and medium-size employers. And although introducing skills-based hiring practices on a small scale may encourage their adoption (Arnold 2018), partial implementation carries its own risks. For example, research has found that many job candidates have started submitting behaviorally focused resumes in response to competency-focused job ads, which may lead to biased resume-screening results and suboptimal hiring decisions if HR staffs are not adequately trained and other elements of the skills-based hiring process are not implemented (Weinstein 2012).

Ultimately, no matter how well skills-based hiring is structured, if there is a shortage of individuals with the necessary skills, no hiring strategy will work at the macroeconomic level; at best, skills-based hiring will help match the most qualified workers with the most productive employers, leaving everybody else behind. Therefore, the key prerequisite for realizing the full potential of a skills-based hiring approach is to provide US workers, including older workers and low-income older workers, with job-market-relevant training opportunities that will help them pursue fulfilling careers while providing a sufficient supply of well-trained labor for the economy. In other words, although skills-based hiring can be a very valuable tool in a larger toolbox necessary to address the needs of employers and employees in the current labor market, it is not a panacea for all labor-market challenges, including those facing older workers.

Preparing Older Workers for Skills-Based Hiring

The assessment and training providers we interviewed emphasized several key strategies to help older workers position themselves in the labor market, especially if skills-based hiring becomes commonplace. These strategies fall into two broad groups: (1) presenting their existing skills in a way that highlights how they meet employer needs, and (2) being willing, agile, and proactive in learning and adopting new skills and updating existing ones. For the first group of strategies, several interviewees emphasized how older workers or job applicants often possess substantial employability (or human) skills, such as communication skills or the ability to work well in teams, that are in high demand and cannot be automated. Empirical evidence suggests these are the skills least likely to lead to employer age discrimination against older workers (van Dalen and Henkens 2017), and in fact, employers report they have a positive impact on older workers' productivity (Munnell et al. 2006). Many older workers have also accumulated substantial technical skills, some of which continue to be valued by employers. Yet, as our interviewees noted, older adults often do not effectively communicate these skills to their potential employers. For example, an interviewee noted that older job applicants should avoid presenting job descriptions and accomplishments typical of traditional resumes and instead highlight the skills required for success in those jobs. In some cases, this effort may also involve tailoring their resumes for specific positions they are applying to rather than listing all work experience. Further, in accordance with changing hiring practices, one interviewee suggested that older workers should set up profiles on online platforms oriented toward employment and hiring. These recommendations are consistent with strategies pursued by most employment programs.

The second set of strategies revolves around learning agility and being open to learning as a lifelong process. This may involve both learning new skills and retraining or recertifying in one's area of expertise because jobs evolve, and successful job performance in prior decades may be less relevant today. Although this is increasingly true for all workers because the accelerated pace of technological change affects jobs in all industries, older workers could be particularly affected because more time has elapsed since they completed their formal education. Older workers should consider a range of options for improving their skills, such as internal training and certification at their current job, "self-skilling" by taking online courses

(e.g., through Coursera or Khan Academy), or getting a degree in a high-demand specialization. At a minimum, older workers should train for basic digital skills that are demanded in most of today's jobs and that they lack compared with younger workers (Hecker and Loprest 2019) and relative to their other skills (Mikelson, Kuehn, and Martin-Caughey 2017). One interviewee also suggested that a deliberate effort to become a specialist rather than a generalist could improve older adults' job-search prospects. However, only affordable short-term training options are likely to benefit low-income older workers because they do not have the financial resources or, because of caregiving responsibilities or multiple jobs, time to get a degree. Notably, less than a third of workers in the lowest-wage jobs are employed in jobs that offer paid leave benefits (including sick leave, vacation, and holidays) that could allow them to be paid while away from work pursuing training opportunities. In contrast, nearly all workers in higher-wage jobs have these benefits (US Bureau of Labor Statistics 2018). Moreover, low-wage workers often work in jobs that are less likely to provide internal training and certification, further narrowing the skill-building options available to them.

Some older workers already have the skills employers are looking for and may only need help marketing those skills or demonstrating them during hiring. Other workers may need to retrain for their current or prospective job because their skills have become outdated or they have lost their skills because of declining physical or cognitive health. Whether older workers have in-demand skills, researchers argue that training and skill development throughout the life course is increasingly important if workers are to succeed in the global economy (Belloni et al. 2015; Belloni and Villosio 2015; Cummins, Taylor, and Kunkel 2015; Mayhew and Rijkers 2004). However, identifying what skills are most beneficial for older adults' labor-market prospects, where and how to acquire them, and being able to adjust nimbly to the changing skill content of jobs remains complex and challenging. In the subsequent sections, we provide a detailed discussion of training as a strategy for preparing older workers for skills-based hiring. We begin by examining the existing training options for improving job-relevant skills.

Training for Skills-Based Hiring

The educational landscape in the United States has undergone substantial changes in recent years, partly driven by the fast-evolving needs of the economy as well as by the increasing costs of obtaining traditional degrees. Although alternatives to traditional postsecondary education have existed for decades, they are now gaining new prominence. Between 2000 and

2013, the number of certificates awarded by institutions eligible for federal financial aid increased almost 50 percent faster than the number of bachelor's degrees awarded, and the number of students enrolled in competency-based education programs approximately quadrupled over the last three decades (Brown and Kurzweil 2017). Moreover, the proliferation of data technology facilitated the emergence of online-based alternative educational programs that are accelerating the growth in training opportunities.

Notwithstanding the proliferation of new alternatives to traditional (university) degrees, community colleges remain the primary source of vocational training for the US workforce. They now provide training in either credit or noncredit courses for about 12 million students, the majority of whom are employed and disproportionately low income (Neumann and Fitzpayne 2020; Osterman 2020). Because of community colleges' scale, existing infrastructure, know-how, and industry relationships, as well as their dual role of offering both traditional degrees and workforce development programs, they are often the early adopters and leaders in implementing skills-based programs (Gallagher and Maxwell 2019). However, they also face challenges with student retention and graduation rates (Osterman 2020). Although this could be at least partly attributed to the types of students community colleges serve (such as students with fewer resources), and the types of programs the students pursue (such as an individual class or a certificate program, which typically have lower retention), it remains an important consideration. Therefore, although community colleges are still a major alternative to traditional colleges and significantly boost alumni earnings, other alternatives have emerged over time, especially in recent years.

Alternative learning options aimed at providing individuals with in-demand skills include the following broad categories:

- Certificate programs
- Skills-based short courses
- Competency-based education programs
- Massive open online courses (MOOCs) and online microcredentials
- Industry-based certificates
- Work-based training

The last category, work-based training, has been developed not with the goal of improving employability but rather to improve productivity and worker retention. However, it provides

workers with valuable skills that can increase their chances of remaining employed, earning promotions, and being hired by other employers. Incumbent workers may receive work-based training (which may or may not lead to a certificate) through apprenticeship and general on-the-job training as well as through retraining efforts that are increasingly common among employers faced with rapid technological change and a lack of qualified candidates in the job market. This is a particularly important source of training for older workers, especially those with low wages, and we therefore review it alongside other alternative educational options.

Certificate programs have a long history tied to industrialization, but they have proliferated significantly over the past four decades and especially in recent years (Brown and Kurzweil 2017). These programs typically last up to two years and offer training for jobs that are in high demand. They are offered by a variety of institutions but primarily by community colleges and private for-profit non-degree-granting schools. Many colleges and universities also grant certificates or degrees through accelerated learning programs. Certificate programs play an important role in the US labor market: the share of workers reporting a certificate as their highest level of education is similar to the share with a graduate degree (Carnevale, Rose, and Hanson 2012). Because certificate programs typically include a relatively long period of classroom instruction, they may be the closest substitute for traditional degree programs. However, about a third of certificate holders also hold a traditional associate, bachelor's, or graduate degree (Carnevale, Rose, and Hanson 2012). The role of certificate programs is also important because they disproportionately train individuals from underrepresented groups and of disadvantaged socioeconomic backgrounds, probably because they cost less than traditional degrees and many programs qualify for federal financial aid. Although the majority of students in these programs are young adults, about a quarter are older than 35 (NCES 2012). Individuals who complete certificate programs have substantially higher earnings than high school graduates, although the earnings premium varies with the field of study and type of certificate, with longer-term certificates in fields such as IT and electronics enjoying the highest returns (Brown and Kurzweil 2017). Their quality, however, appears to vary substantially, ranging from exemplary examples such as the Tennessee Technology Centers (Carnevale, Rose, and Hanson 2012) to poor performers such as ITT Tech, which closed following allegations of mismanagement of federal funds and multiple state and federal investigations and legal actions.[19]

Skills-based short courses share some similarities with short-term certificate programs and can be a part of such programs. These are intensive courses that focus on preparing

students for a particular in-demand job. They share a similar history to certificate programs, with renewed interest spiking in recent years following the emergence of coding bootcamps that prepare students for entry-level positions in various technical fields (Brown and Kurzweil 2017). However, coding bootcamps have had only limited market penetration so far, and they have been primarily used by early- to midcareer professionals who already have a bachelor's or advanced degree (Brown and Kurzweil 2017). Also, their curricula are not standardized or accredited, which leads to uneven quality.[20] Because of the interest from the IT industry and institutions of higher education, these courses will likely continue to expand and evolve in coming years. The Education Quality through Innovative Partnerships program, through which universities partner with non–higher education content providers such as coding bootcamps, may accelerate their development (Thackaberry 2017).

Competency-based education programs represent an educational model focused on outcomes rather than instructional time. Many competency-based education programs focus primarily on assessing students' prior learning and awarding credit for it; others focus on class or online instruction on flexible, often personalized, schedules. These programs initially gained popularity in the 1970s and are growing again with support from the proliferation of online instruction. Competency-based education is particularly popular among older learners with 40 percent being ages 35 to 49, because it offers flexible and personalized instruction and recognizes prior learning (Brown and Kurzweil 2017). Long-established examples of institutions providing competency-based education programs include SUNY's Empire State College, Excelsior College, and Charter Oak State College, whereas more recent examples include the University of Wisconsin's Flexible Option, the Kentucky Community and Technical College's Learn on Demand, Southern New Hampshire University's College for America, Capella University's FlexPath, and Northern Arizona University's Personalized Learning (Thackaberry 2017). Because competency-based education programs are flexible and could help stem the growing cost of higher education and improve completion, both the federal government and major educational foundations (such as Lumina Foundation and the Bill and Melinda Gates Foundation) support research and initiatives backing them (Thackaberry 2017). However, no evidence currently validates the effectiveness of these programs in achieving their stated goals.

MOOCs and online microcredentials are most directly linked with the spread of internet access and the development and ubiquity of communication technology. MOOCs offer free online educational instruction to a large or unlimited student population but often charge for a

badge or other form of official certification. Their popularity is based on the promise of providing an open, self-directed, self-paced, and interactive learning experience at a fraction of the cost of traditional educational institutions. They have grown rapidly in recent years: as of 2016, 35 million students were enrolled in these courses (Brown and Kurzweil 2017). As MOOCs developed, they began offering packages of courses, primarily related to developing specific competencies in high-demand areas and awarding microcredentials.[21] For example, edX's approach to creating their MicroMasters programs includes selecting graduate-level courses from leading universities and repackaging them with a focus on job-relevant competencies (Kazin and Clerkin 2018). An analysis of 450 microcredentials offered by five of the largest MOOC providers (Coursera, edX, Udacity, FutureLearn, and Kadenze) found that their price usually ranges from several hundred to several thousand dollars, but they lack the standardization necessary to compare their value to learners and employers (Resei et al. 2019).

A unique type of microcredential is an **industry-based certificate**, a credential earned based on an assessment administered and validated by entities such as professional organizations or individual companies that are established in a certain industry. These entities usually also provide study materials to prepare for the assessment. Some examples of entities offering industry-based certificates include Adobe, Amazon, Apple, Cisco, Facebook, Google, Hootsuite, HubSpot, LinkedIn, Microsoft, Qualtrics, Salesforce, Twitter, and WordPress (Hartman and Andzulis 2019).[22] Professional organizations such as the American Dental Association, American Culinary Federation, American Society of Clinical Pathology, and American Welding Society, as well as government agencies such as the Federal Aviation Administration, also provide industry-based certificates.[23]

Work-based training is in some sense the original source of alternative postsecondary credentials. Apprenticeships have been the backbone of workforce development, especially for skilled trades, since long before the industrial revolution. They generally involve hands-on learning from experienced mentors (Lerman, Loprest, and Kuehn 2019). Although about half a million individuals participate in apprenticeships in the United States (Brown and Kurzweil 2017), much room remains for improvement and expansion. The number of apprentices relative to the workforce, as well as the likelihood that apprentices will be hired permanently, is substantially lower in the US than in countries such as Australia and the United Kingdom (Wyman 2014). For older workers in particular, apprenticeships are often unavailable. One exception is the Senior Community Service Employment Program, administered by the US

Department of Labor, which provides unemployed, low-income individuals age 55 and older with training in subsidized, part-time community service assignments and then helps them transition to unsubsidized employment (Mikelson 2017).

Beyond apprenticeships, on-the-job training is an important source of potential skills that can improve employees' prospects in their current jobs and increase their employability more generally. In a narrow sense, on-the-job training includes various formalized learning experiences provided by an employer (with or without certificates), and in 2015 they averaged almost 54 hours per learner (Brown and Kurzweil 2017). In a broader sense, it also includes other job-related learning opportunities such as unstructured on-the-job training, opportune mentoring, and self-directed learning (Clardy 2018). The broader definition is particularly important for an aging workforce because it implies that the amount of on-the-job training and related skills is largely a function of experience. Although debate in the literature continues about how much work-based learning occurs informally, it is clearly substantial (Clardy 2018).

Because of its ubiquity, formal on-the-job training has been a source of increasing research interest. Studies find evidence that participating in employer-provided training increases the employability of workers, including older workers (Picchio and van Ours 2013), although the impact on wages is less clear (Albert, García-Serrano, and Hernanz 2010; Barnow and Spaulding 2015; Görlitz 2010; Hill 2001; Regnér 2002). Declining participation in on-the-job training, on the other hand, is an early indicator of future job loss among workers with long job tenures, presumably because their skills are obsolete (Allen and de Grip 2012). Although workers of all ages benefit from on-the-job training, clear trends exist in the type of training people of different ages prefer, with those age 50 and older opting for more targeted programs whereas younger workers prefer programs that provide general skills (Simpson, Greller, and Stroh 2002). From the employer's perspective, on-the-job training is used mostly as an investment in employees' productivity as well as a form of compensation or reward to improve retention, which can affect the extent of training opportunities available to different types of workers (Sim and Huegerich 2018).

With the emergence of new technologies, standard on-the-job training may also be changing, at least in some industries and occupations. For example, the web-based platform GitHub facilitates sharing computer code and version control for team members working on projects. It also connects millions of software developers around the world, many of whom can use the open-source code and improve their task-specific skills beyond what would be possible with traditional on-the-job training (and training more broadly). GitHub even has its

own Learning Lab with a series of online trainings to facilitate the use of the GitHub platform, and some MOOC platforms offer courses aimed at developing GitHub skills (e.g., Coursera offers an introductory course on GitHub as a part of its Google IT Automation with Python Professional Certificate). Less certain, however, is how transferable this particular model is to other occupations and how it may benefit lower-income older adults.

Reskilling (and upskilling) is another type of on-the-job training that has been growing as the pace of technological change accelerates and technical skills become obsolete more quickly. As described, growing numbers of large employers cannot find sufficient new talent and are instead retraining existing staff for these jobs (Farrell 2017). Although these employers are disproportionately in the information and communication technology industry, the same approach can be seen across other industries, such as retailers, that increasingly retrain older workers to replace manual labor with new technological solutions (Bettelley 2020). This trend is also evident among e-commerce companies such as Amazon and more traditional retailers such as Walmart, both of which are making substantial investments in training their employees for new roles and higher-skilled jobs.[24] Examples of similar reskilling and upskilling efforts can also be found in manufacturing (e.g., steel plants), professional services (e.g., staffing companies), and other industries.[25]This trend disproportionately benefits workers with longer tenure on the job who otherwise may not be extended such training opportunities, and this retraining may lengthen their careers (Picchio and van Ours 2013). In recent decades, the percentage of new retirees who report that they were fully or partially forced to retire increased substantially, from about one third in 1998 to over half in 2014 (Johnson and Gosselin 2018), suggesting there may be an increased scope for retraining to keep older workers in the workforce. Further, the need for retraining is likely to increase substantially as the skills requirements (based on time spent in jobs performing certain skills) in the United States and Europe is expected to shift away from physical and manual skills (-27 percent) and basic cognitive (-17 percent) skills toward technological (+58 percent), social and emotional (+33 percent) and higher cognitive (+24 percent) skills between 2016 and 2030.[26]

Closely related in concept to on-the-job training is sector-focused training. These programs, which target low-income adults and aim to enable them to gain industry-wide credentials or licenses, have also been shown to have large, long-term positive impacts on employment and earnings. WorkAdvance is a sector-specific training model that includes intensive applicant screening, pre-employment and career-readiness services, occupational skills training, job development and placement services, and postemployment retention and

advancement services. A randomized controlled trial (considered the gold standard in program evaluation) found that WorkAdvance increased earnings among people with low incomes across all age groups, even older workers (Hendra et al. 2016).

Benefits of Job Training

Not only can job training help unemployed workers find jobs, but it can also help incumbent workers gain skills to advance in their jobs or change careers. Kreisberg (2015) discusses results from an American Institute for Economic Research survey of older workers who attempted career changes. Compared with unsuccessful career changers, those who were successful had more transferrable skills, meaning skills required in their previous jobs that they could use in their new or expected jobs. Successful career changers reported an average of seven skills that they used in both their old and new jobs, while unsuccessful career changers reported an average of only two skills used in both the previous and expected jobs. Further, successful career changers moved into careers that required their existing skills, while those who were unsuccessful attempted to move into careers that required different skills.

Participation in formal and informal adult education is associated with an increased likelihood of future employment and movement up the income ladder (Cummins, Kunkel, and Walker 2015). Controlling for the self-selection of individuals into training programs, Picchio and Van Ours (2013) find similar results in the Netherlands. Unlike some other studies, however, the authors consider that participation in job training might be endogenous—that is, the characteristics that motivate people to work are the same ones that influence participation in job training. To address this potential bias, the authors jointly model labor force participation and, for workers, on-the-job training, controlling for work and on-the-job training in the previous period. They find that employer training increases future employment prospects, even for older workers.

Although most European and US studies find that training programs increase wages for older workers, the size of the effect varies within and across countries and across program types. (See Belloni and Villosio 2015 for a summary.) In their own study, Belloni and Villosio (2015) estimate a 6 percent training wage premium for adults age 50 and older across 11 European countries, although the estimated impact ranges from 19 percent for Austria, Germany, Greece, and Italy; to 9 percent in France and Spain; and to 0 percent for Belgium,

Denmark, the Netherlands, Sweden, and Switzerland. Unfortunately, the authors cannot rule out that attrition, sample selection, and unobserved ability differences across workers bias their estimates.

For the benefits of job training to be fully realized, though, older workers need access to accurate and timely LMI. To this end, the emergence and increasing proliferation of real-time LMI play a critical role. As digitization and the use of the internet in job search and recruitment progressed, real-time LMI became an indispensable tool not only for a more accurate analysis of labor-market trends but also for identifying skills in demand and their transferability between jobs (Dorrer 2016; Vollman 2016). Among the leaders in real-time LMI are Burning Glass Technologies, which can track millions of job listings and their daily changes and extract relevant information, and Economic Modeling Specialists Incorporated, which keep a comprehensive database of labor-market data pooled from a vast range of sources.

Final Thoughts on Job Training

This overview suggests that training options for workers, including older workers, have greatly expanded in recent years. But there are reasons—related to access, participation, and quality—to doubt that these options will meaningfully alter employment prospects for older adults, especially those of lower socioeconomic status (unless resources, programs and supports are expanded for low-income older workers beyond the Senior Community Service Employment Program). As discussed, employers are often reluctant to offer training opportunities to older employees. This may help explain why many studies find that older workers participate in job-training programs less often than younger workers (Carmichael and Ercolani 2014; Cummins, Harootyan, and Kunkel 2015; Eyster, Johnson, and Toder 2008; Lössbroek and Radl 2019; Martin et al. 2014; Pew Research Center 2016; Van Horn, Krepcio, and Heidkamp 2015). A Pew Research Center study found that only 39 percent of workers age 50 and older reported having taken a class or received extra job training in the past year to improve their job skills, compared with 47 percent of workers under age 50 (Pew Research Center 2016).

Another possible explanation for why older adults may not receive the same level of work-related training as their younger peers is that employer-offered trainings (and trainings more generally) are not tailored to the specific needs and unique learning styles of older workers. Participation in different types of training varies systematically by age (Simpson, Greller, and

Stroh 2002), and the effectiveness of training for older adults depends on whether it was designed for them (Picchio 2021; Urick 2017; Zwick 2015). In particular, studies find that older workers are better suited to on-the-job training and mentorship development efforts that are integrated into work and self-paced than they are to more formal training approaches (Picchio 2021; Urick 2017).

Finally, the quality of training shapes its effectiveness. Beyond age and ageism, recent research establishes that training efficacy is affected by gender as well, with older female workers either less likely to receive training than their male peers or more likely to have to pay for it out of pocket (Lössbroek and Radl 2019). Among the older adults we interviewed, some on-the-job training appeared to be the norm, but it mostly focused on basic job-specific training rather than on regular training aimed at continually improving workers' skills. The variation in the types and quality of on-the-job training was exemplified by one worker in her late 50s who throughout several jobs received both job-specific and general training, some of which she found useful but some of which she found "repetitive and a waste of time." Her sentiment highlights the importance of tailored and effective training programs to encourage continued learning and training. A Pew Research Center (2016) survey found that most workers who did not participate in training said it was because it was unnecessary to advance in their jobs.

Another element that may be missing is access to real-time LMI by older workers. Alternative training providers aim to build their offering of courses and credentials based on an analysis of labor-market needs. That information, however, is collected and used to support their business model and is generally not something that (older) workers or other stakeholders can freely access to help them make their training decisions. Therefore, to the extent that older workers, and especially low-income older workers, have more limited access to the workforce system, community colleges, workforce intermediaries, and alternative training providers, they are less likely to be able to access and benefit from this important source of information.

Finally, even if such information was available, it is exceedingly difficult for both workers and employers to navigate the current landscape of alternative credentials. Efforts are under way to fix this and to help older workers navigate the complex learning ecosystem. The Lumina Foundation, for example, has been developing a credentials framework for comparing different credentials based on the underlying knowledge and ability of people who obtained them (Lumina Foundation 2015). Building on it, a learning taxonomy has been proposed with

the goal of facilitating comparing competencies (i.e., knowledge, skills, and attitudes) of learners who hold different types of credentials (Uranis et al. 2019). One nonprofit, Credential Engine, spearheaded another effort to create a centralized up-to-date registry of all available credentials (of which there are close to 1 million in the United States alone, with over a half of them being badges, course completion certificates, licenses, certifications, and apprenticeships granted by nonacademic providers; Credential Engine 2021) with consistent descriptions and other information necessary to compare different credentials. However, given the proliferation of credentials in recent years and the continued lack of full comparability between them, navigating the US secondary and postsecondary educational landscape remains challenging. Serious obstacles remain in training for skills-based hiring to achieve its full potential for workers, and especially older workers. One very useful step would be to provide workers access to short-term affordable training based on real-time LMI and a clear pipeline to employers. A critical prerequisite for this approach to work for low-income workers would be to couple it with high-quality career guidance services that facilitate navigating the complexities of the fast-evolving world of work and work-related training.

Can Skills-Based Hiring Level the Playing Field for Older Adults?

In this section, we assess how skills-based hiring as currently implemented positively or negatively affects older workers, including those with low incomes. Based on this assessment, we identify areas for improving skills-based hiring and the skills-based paradigm more broadly to benefit older individuals. Finally, we discuss what older adults, especially if low income, need to succeed in this paradigm.

As our review and interviews show, a skills-based hiring paradigm could help alleviate the critical issue employers increasingly face (a lack of qualified job candidates, which adversely impacts their bottom line) while simultaneously achieving other goals, such as improving outcomes for workers with requisite skills and diversifying the workforce. But whether a skills-based hiring paradigm can help older workers, especially those with low incomes, is less clear. On the one hand, strong reasons suggest that skills-based hiring could benefit older workers. Although many employers may be reluctant to spend money on training older workers, they are increasingly willing to hire older workers who have the necessary training or experience. The assessment and training providers we interviewed also noted that employability skills, such as critical thinking, management, and problem solving, are important and can only be acquired on the job. These skills are highly transferrable (meaning they can be used in any job) and are unlikely to be automated in the foreseeable future. Furthermore, a significant share of today's low-income older workers does not have the college degrees for which traditional hiring practices typically screen, and even those with college degrees earned them decades ago, which may put them at a disadvantage relative to workers who earned their degrees more recently. This suggests that a paradigm that deemphasizes formal educational requirements and emphasizes years of relevant experience and current related skills should benefit older workers. Indeed, emerging evidence suggests that tens of millions of low-wage workers without a traditional college degree—about half of whom are over the age of 45—possess the skills required for better-paying jobs (Opportunity@Work and Accenture 2020). If skills-based hiring were implemented broadly, many older workers could experience an improvement in their labor-market prospects.

On the other hand, skills-based hiring might hurt older workers. Although many employers claim their hiring process is focused on candidates' skills and avoids biases related to age, sex,

and other characteristics not relevant for job performance, the available evidence suggests that for many employers, the process remains more haphazard and prone to bias than if skills-based hiring was fully and consistently implemented. Also, because of older workers' perceived higher cost, impending retirement, and other related reasons, many employers do not provide older employees with as much on-the-job training as younger employees, putting them at a disadvantage if they want or need to find another job. Moreover, few employers offer training to older adults that is specifically tailored for their needs, resulting in suboptimal training for older workers. These issues are even more acute for low-income older workers. Many of their jobs are disappearing because of automation, making additional training essential to their prospects of avoiding premature exit from the labor force. However, training in a skills-based hiring paradigm often happens outside of workers' jobs. Many low-income older workers cannot afford to participate in off-site training, do not have transportation to travel to training sites, or lack free time outside of work.

Given the shortcomings in the skills-based hiring paradigm as currently implemented, we identify multiple areas for improvement, in particular those areas that are of relevance for older adults. Arguably the most important area for improvement would be in the way skills-based hiring is currently being implemented. Many employers have thus far used only certain aspects of skills-based hiring, such as restructuring their job ads to emphasize skills or changing the way they screen resumes. Although helpful, these changes in isolation do not amount to a paradigm shift and, absent such a shift, the hiring process likely remains subject to many of the biases often associated with the current system, including biases related with age.

However, even if fully implemented, skills-based hiring could benefit from some improvements. Currently, the model emphasizes skills that are now in high demand without much or any differentiation between skills that can quickly become obsolete and those that are likely to be continuously relevant. This may bias the hiring process toward "short-termism," with immediate results outweighing long-term business interests. An example of this would be if the selection process leads an employer to hire a person with knowledge of a particular programming language and inferior employability skills over a candidate who has superior employability skills and shows potential for learning new programming languages but does not have as much expertise as the other candidate in the specific programming language. Given that experienced workers are more likely to have honed employability skills over their careers, and their familiarity with various ways of doing things may make them adaptable learners, short-termism in hiring is likely to hurt older workers disproportionately.

Beyond hiring practices, evidence strongly suggests that the current offering of on-the-job training is more often generic than tailored to the unique learning needs of different types of workers. As younger workers have traditionally been the primary beneficiaries of such training, it generally most closely corresponds to their needs, which differ from those of older workers. In addition to partly inadequate training content, delivery methods that older adults are not comfortable with may also contribute to their lower participation rates and suboptimal training results relative to younger workers.

Another shortcoming of the current skills-based training and hiring paradigm is systemic. Research from countries that were successful in improving labor-market prospects for older adults, such as the Netherlands (e.g., Picchio and van Ours 2013), suggests that training older adults can support their labor-market prospects, but only in the context of a policy framework that provides strong incentives for private businesses to invest in older workers and a broad-based (sectoral or even economy-wide) effort to create a transparent system of signaling skills needs, matching workers who possess certain skills (or have a potential to acquire them) with jobs, and providing relevant and timely training to create a functioning talent pipeline. Part of this effort requires developing an effective system to validate, classify, and compare various credentials. Moreover, older workers need supportive services to facilitate their transition from the old ways of doing things, such as searching for jobs or presenting themselves, to new ways that are more consistent with skills-based hiring. They need career guidance that helps them identify existing opportunities that match their skills and fit their career goals. These critical systemic elements, however, are currently missing, hindering the skills-based hiring paradigm from realizing its full potential.

Regardless of whether and when the shortcomings of skills-based hiring are addressed, older workers have several unique strengths relative to most other workers, but some changes are required for older adults to thrive in this paradigm. One of older workers' greatest strengths is their experience. Although not every job experience is relevant and not all skills are transferrable across jobs, older adults on average have more relevant job experience and transferrable skills than younger adults. This is especially true of employability and people skills that are not technology dependent and are not subject to becoming obsolete. Both the literature and our interviews reveal older workers' high level of professionalism and work ethic as another trait giving them an edge over their younger peers.

However, certain negative perceptions about older adults suggest areas for improvement. A principal concern about older adults is their level of commitment to continued learning

throughout their career. Although our interviews suggest that older adults are mostly enthusiastic about the opportunity to improve their skills, our literature review finds evidence that they are somewhat less likely than younger adults to participate in training, both on and outside the job. Many of the reasons for older adults' lower participation rates are objective and unrelated to any action (or lack thereof) on their part, including the lack of public workforce programs aimed at older workers (Abraham and Houseman 2020; Wandner, Balducchi, and O'Leary 2018), a low likelihood of being offered a training opportunity at work, the inadequacy of training for older adults' needs, and competing time demands (e.g., family caregiving). Nonetheless, older adults may be able to assuage employer concerns by signaling their commitment to keeping their skills up to date. Another frequently cited employer concern is that at least some older adults are resolved to continue doing the same type of job in the same manner as they have done throughout their careers. Although there is no evidence this is a widespread sentiment among older adults (and our interviews suggest that the opposite is at least as likely if not more likely to be true), it is important to find effective ways of educating employers about older workers' willingness and ability to perform new jobs and job tasks.

Recommendations

The shortcomings we identified with the skills-based training and hiring model as currently implemented yield recommendations for employers and policymakers that could improve the current system:

EMPLOYERS

- Increase use of real-time LMI analysis to identify skills gaps and evaluate how different types of skills (e.g., technical versus employability skills) impact new hires' long-term employment prospects and companies' financial performance to identify the optimal job skills that job seekers should develop and that companies should look for in their recruits (or build among their incumbent employees).
- Improve transparency in job announcements and by communicating skill needs to the labor market and potential employees; this will reduce situations in which job seekers have incomplete or inaccurate information about the skills that potential employers are looking for.

- Invest in cost-effective alternatives to recruiting new staff (i.e., reskilling and upskilling), especially for long-term employees whose jobs are at most risk of automation.
- Build a culture of lifelong learning, offering customized and technology-enhanced learning opportunities and promoting both structured and self-directed learning.
- Offer short-term paid internships to middle-aged and older workers (e.g., the "midternships" model; Cirillo 2015) to help identify potential new hires with requisite abilities and motivation, primarily among those with alternative credentials and nonstandard career pathways.
- Provide clear guidance to older employees on how their continued participation and investment in learning translates to real labor-market benefits within a company and beyond.
- Promote diversification of the workforce, including with respect to skills and educational backgrounds, consistent with the growing evidence[27] that workforce diversity increases companies' creativity and improves financial results.

POLICYMAKERS

- Involve older adults in redesigning existing workforce training initiatives and creating new ones so that their unique needs are incorporated into training and placement efforts.
- Invest in open real-time LMI, including data collection and curation, as well as in building capacity for conducting basic LMI analyses at the state level and coordinating effectively between federal and state LMI services.
- Disseminate information to employers through economy-wide and sectoral business networks about the growing importance of older adults in the labor market to dispel any misperceptions about them lacking the skills most in demand in today's economy, and to highlight their unique strengths and qualifications as well as their training and other needs.
- Support developing a credentials and qualifications framework that recognizes skills acquired through various pathways, including nontraditional ones.

- Encourage continued expansion of shorter, stackable learning modules and other flexible educational options, especially those aimed at seasoned and low-income workers, as a critical complement of the traditional educational ecosystem.
- Provide incentives (e.g., subsidies, tax breaks) to companies to offer customized training options to older workers, especially low-income workers, who are least likely to have training options and whose jobs are at the highest risk of being automated.
- Support expansion of apprenticeship programs, inclusive of older workers, by disseminating existing evidence on their effectiveness to employers, coordinating development of universal (e.g., industry- and economy-wide) standards and portable certificates for apprentices, and reallocating necessary funding to facilitate wider adoption of such programs.[28]
- Provide incentives and subsidies for low-income middle-age and older adults to seek training outside of their job (if employed) to acquire new skills or upgrade the existing ones that are most closely associated with jobs currently in demand or are projected to be in the near future.
- Promote changes to existing workforce initiatives and develop new ones aimed at older adults (especially with lower incomes) to help them search for jobs and present themselves on the labor market, including helping to build their online presence on work-focused social media platforms, crafting skills-focused resumes, and supporting networking activities with potential employers.

Further, our literature review and the interviews we conducted shed light on different approaches to training and recruiting workers that can be part of the solution for how to implement skills-based hiring in a more systematic way. By combining certain elements of these models, it is possible to improve both the labor force prospects and outcomes of older workers, including low-income older workers, in a skills-based hiring paradigm. Using examples of organizations identified in interviews, we provide a tentative template of how various elements from the currently fragmented system could be brought together to achieve better outcomes for workers and companies by seizing on synergies of creating a frictionless pipeline linking older job seekers with appropriate jobs. This is achieved by allowing for timely identification of opportunities, targeted upskilling where needed, and implementation of an effective and objective recruitment process.

The first element in this template is to have accurate real-time LMI on employers' needs and job seekers qualifications. A nonprofit organization focused on improving labor-market opportunities for low-income workers conducted an in-depth analysis of occupational roles, skills, wages, and workers to identify whether workers without a four-year college degree could work in a better-paid job with their current skills (Opportunity@Work and Accenture 2020). This enabled the organization to identify tens of millions of such workers, which represents a foundation for an intervention aimed at facilitating their upward mobility. The appealing aspect of this model is that it uses data to pinpoint which lower-income workers already possess the requisite skills to thrive in the labor market and only need help connecting with potential employers versus those who may need more skills and additional education to increase their labor-market prospects. The latter gives rise to the second necessary element in this plan: targeted upskilling.

An ideal partner for the second task would be an educational institution aimed at providing adults with a combination of essential employability skills and in-demand, job-relevant credentials. This exactly fits the description of an educational institution that we interviewed and that is committed to providing their students with skills that are both in demand and not easily automated. The program it offers combines foundational courses covering basic professional skills not subject to automation, including managing oneself at work, working with others, practical problem solving, and effective communication, with credential courses leading to a third-party credential in a sought-after skill (e.g., Salesforce administration, project management). Unlike traditional degrees, completing this program takes months and not years, which makes it feasible for workers who do not have the time to participate in a traditional college program. For this program to work for low-income older adults, it will be critical to add a robust outreach component and to provide subsidies to make it affordable.

The final element needed to ensure lower-income older workers can thrive in the labor market under a skills-based hiring model is to implement an effective and objective skills-based recruitment process that evaluates older workers solely on their merit and the value they can bring to an organization. Although large employers with strong HR departments and the capacity to substantially invest in their recruitment processes may be able to do this on their own, most employers will likely need to rely on outside professional support with ready-made solutions to help them implement skills-based hiring processes. We described one such model developed by a staffing company that screens and connects seasoned professionals

with employers and manages them for the duration of their employer contract. In this model, all older workers are hired to work remotely. What remains unclear is how scalable this model is and whether it will lead to full-time higher-paid jobs for lower-income workers. Currently, this staffing company focuses on a limited number of sectors, including financial services, insurance, accounting, and HR. Although other sectors may be open to hiring mostly higher-skilled older workers to work remotely, many jobs, especially lower-skilled ones, still cannot be done remotely. However, we believe that this model could be easily adjusted to include nonremote workers. Indeed, the representatives of employers that use this model believe it is scalable across industries and across different types of remote and nonremote jobs.

Overall, we believe that the combination of unique elements from these three programs could provide the synergy needed to meaningfully support lower-income older workers in the labor market. Ultimately, a skills-based hiring paradigm is not a panacea for challenges facing lower-income older workers, but it provides a context in which these aforementioned programs can improve outcomes.

Conclusion

Not only is the nature of work changing, but evidence shows that what employers value in employees has also been changing. Today's employers are increasingly interested in job candidates' skills and less interested in solely their educational credentials. In this report, we examine skills-based hiring for older adults by surveying the existing literature and interviewing various stakeholders, including older workers, assessment and training providers, talent consultants, a staffing company, and an employer. Our report begins with an overview of the current labor market for older workers and their future labor-market prospects, including the impact of COVID-19 pandemic. We pay particular attention to the issue of age bias that limits outcomes for older adults in the hiring process and on the job. Next, we examine the characteristics of a skills-based hiring paradigm both as it relates to the hiring process and the training workers need to succeed under such a paradigm. Finally, we assess how the currently implemented skills-based hiring paradigm impacts older workers and what they need to be successful, identify areas for improvement in skills-based hiring, and provide a series of recommendations that would support both employers and older job seekers and help level the playing field for older adults under this new hiring paradigm.

The combination of technological and demographic changes is driving historically large shifts in the labor market. The fast pace of technological change, exemplified by the automation of industrial processes and increased application of artificial intelligence often referred to as the Fourth Industrial Revolution (or Industry 4.0), is automating away many of the traditional jobs in manufacturing and the economy more generally, while creating new jobs for which the current labor force does not have all the requisite skills and for which the traditional educational system struggles to provide adequate training quickly enough. The ongoing COVID-19 pandemic has only accelerated some of the technological changes impacting the way people interact and perform work, with ever-increasing importance of online recruitment and work as well as the growth in app-based service jobs such as food delivery, among others. Although it is possible that not all the changes that occurred during the pandemic will remain permanent, many likely will. To compound the challenges, this systemic shift is happening against the backdrop of a rapidly aging population (and, by extension, workforce), meaning that recruiters' and the industry's usual assumption, of an ample supply of young adults to fill jobs, is increasingly less realistic.

In this context, the industry is trying to find a viable solution to its workforce challenge. One possible solution has been to change training and hiring practices to emphasize skills over formal qualifications, often referred to as skills-based hiring. The aim of training for skills-based hiring has been to provide current workers and job seekers with in-demand skills on a faster timeline than traditional educational institutions that offer standard two- or four-year degrees. The IT (or more broadly IT and communications) sector was arguably an early adopter of skills-based hiring. In addition to a chronic lack of qualified workforce for the fast-growing sector, IT had the advantage of being able to develop various IT-based solutions necessary to implement skills-based training and hiring, such as online tools that train current and potential future employees, or to test candidates' skills before ever considering their resumes. However, over time similar solutions have been increasingly implemented across other sectors, too. In this report, we provided a broad overview of both hiring and training aspects of skills-based approach.

Based on our review of the available evidence, there are reasons to believe that skills-based hiring could benefit older workers. Although employers may be unwilling to invest resources to train older workers, they may be willing to hire older workers who can demonstrate they have current skills. Furthermore, a significant share of today's older workers does not have the college degrees for which traditional hiring practices typically screen. Moreover, most older workers with college degrees earned them more than 30 years ago. What may be more valuable and relevant to employers are the many years of experience and skills that older workers have acquired since then.

However, there are reasons to think that skills-based hiring could hurt both employed and unemployed older adults. Training in a skills-based hiring paradigm often happens outside of workers' jobs. Some older adults may be deterred from participating in off-site training because they cannot afford it, do not have transportation, or lack free time outside of work. Older adults with low incomes, who potentially could benefit the most from training, are most likely to find training unworkable for these reasons. Because of older workers' perceived higher cost, impending retirement, and other related reasons, employers also may not provide them with as much on-the-job training as younger employees. Moreover, employers rarely provide low-wage workers with training opportunities, either because none exist or because employers place more value on training higher-wage, higher-skilled workers. Indeed, studies show that workers with less education and those who are Black or Hispanic (all overrepresented in low-wage jobs; Ross and Bateman 2019) are less likely to receive

employer training than workers with higher education and those who are white (Carnevale, Strohl, and Gulish 2015; Osterman 2020; White House 2015).

To shed further light on this issue, we conducted a series of semistructured interviews with various stakeholders who could provide us with information that is not available in any published source but is critical for understanding the implications of the ascent of a skills-based hiring paradigm for labor-market outcomes of older adults. These interviews revealed that older adults are generally perceived to be very valuable and competitive on the labor market. Although some negative age-related stereotypes still exist, particularly regarding comfort with new technologies and IT more generally, older workers' experience, institutional knowledge, and work ethic, among other qualities, make them increasingly attractive to employers. Although certain skills may become obsolete over time, as long as older adults are willing to continuously learn, their accumulated experience and the skills they have acquired throughout their careers can position them to thrive in the labor market in which skills-based hiring is becoming increasingly important.

Overall, a skills-based hiring paradigm could help reduce age-related bias in hiring and in the workplace and help low-income older workers overcome challenges stemming from the lack of a traditional degree or the inability to change careers. To fulfill this promise, however, employers, training providers, and older workers must change in some ways. These range from larger systemic changes, such as investing in expanding access to real-time LMI and developing a universally accepted credentials and qualifications framework, to providing appropriate counseling and tailored training options to older workers, especially those with low wages. It will also be important to support low-income older adults in their job search, especially with using IT, developing their social media presence, and engaging in other activities to connect them with potential employers and make a strong case for hiring them. We also provide an example of a model that may improve current skills-based hiring practices by allowing for timely identification of job opportunities, targeted upskilling where needed, and an effective and objective recruitment process.

The Long-Term Impact of the COVID-19 Pandemic

Although the ongoing pandemic may be temporary, assessment and training providers that we interviewed generally believe that it will have a lasting impact on the world of work and hiring. In the short run, they expect that it will be harder to find jobs, both for young adults who are

looking for their first job and for older adults hoping to get rehired. The current situation may lead to more early retirements, according to one of our interviewees. Some suggested that employers are using this opportunity to restructure and reorganize their businesses.

Once hiring picks up, some interviewees believe that hiring practices will change, with remote hiring and online assessments likely replacing the traditional model at a rapid pace. Demand for some jobs, especially in the IT sector (e.g., cybersecurity) is likely to increase, possibly permanently. Arguably the largest change will be in the way we all work. Flexible work arrangements and remote work are likely here to stay and, consequently, workers will have more independence in how they work. A representative of an employer whom we interviewed suggested that, based on her company's positive experience with worker productivity under remote work, she expects employers will increasingly start questioning the wisdom of renting expensive office space. This could be particularly beneficial for older workers, who generally have a clearer understanding of what goals need to be achieved in remote work and how to be effective as independent workers. As work becomes more flexible, workers (including older adults) may have more opportunity for project-based work to which they can easily apply their knowledge and skills. This change in workplace practice will also necessitate the development of tools to track and demonstrate productivity in independent, often remote, work environments. It will accelerate the adoption of IT across all types of businesses. In the long run, then, greater use of technology may benefit older workers, including many of the lower-income older workers who did not have the option of working remotely at the onset of the pandemic, but will increasingly be able to do so as new IT solutions proliferate. Ultimately, older adults may benefit from changes in hiring practices and in the labor market more generally that are arising from the COVID-19 pandemic. This period of forced change and adaptation may be the ideal time to educate employers about the well-documented value of older workers, especially in the context of unique qualities that no other group of workers has or can substitute for.

Appendix

The main data sources for this report are academic, government, and industry studies supplemented by insights from a series of semistructured interviews conducted with various stakeholders.

We began by conducting an environmental scan of the literature and examining statistics on labor-market trends to inform the interview questions. We then conducted semistructured phone interviews with assessment providers, training providers, talent consultants, a staffing company, an employer, other relevant stakeholders, and older adults. AARP helped identify older adults through its Back to Work 50+ program. We identified the other interviewees using the environmental scan as well as Google searches. We contacted 22 assessment providers, training providers, and talent consultants, 5 other relevant stakeholders, and 15 older adults. We interviewed 10 assessment providers, training providers, and talent consultants, 3 other stakeholders, and 9 older adults. As part of the study, we also intended to interview employers. Of the 25 employers we contacted, none responded to our request for an interview. In their place, we contacted 6 staffing agencies. We interviewed 1 staffing agency who also connected us with one of its employer clients.

The older adults we interviewed ranged from ages 56 to 67, with the median age being 58. All the older adults had at least some college education. One had an associate degree, five had bachelor's degrees, and two had master's degrees.

Each interview lasted approximately one hour. The interview questions were designed so their answers informed the study's research questions. With participants' permission, we recorded the calls. We also took notes during each call and reviewed and finalized them after the call. We offered and mailed $25 gift cards to older adults for participating in the interview. The interview guides are available from the authors upon request.

Notes

[1] The Pew study analyzed ratings from the Department of Labor's Occupational Information Network (O*NET) database of the skills needed to perform particular jobs and averaged ratings over all occupations to obtain an overall average of the importance of skills in the workplace. It then grouped occupations according to their required skill set relative the overall average.

[2] Estimates are from authors' computations using the 2019 American Community Survey PUMS data. However, Scott and Nightingale (2018) show that nationally, the share of jobs requiring postsecondary education is smaller than the share of college-educated adults, which suggests that educational attainment alone does not generate an adequate set of skills for the current job market.

[3] Kristie M. Engemann, "How Has the COVID-19 Pandemic Affected the US Labor Market?" *Open Vault Blog*, October 14, 2020, https://www.stlouisfed.org/open-vault/2020/october/how-covid19-pandemic-has-affected-labor-market.

[4] Exposed industries include restaurants and bars, travel and transportation, entertainment, personal services, and certain retail and manufacturing industries.

[5] Indeed, "Ageism in the Tech Industry," 2017, https://www.indeed.com/lead/tech-ageism-report.

[6] PayScale, "Tech Workers Are So, So Young," 2013, https://www.payscale.com/career-news/2013/07/tech-workers-are-so-so-young.

[7] Dana Wilkie, "Discrimination against Older Workers May Be Common but Hard to Prove," 2018, https://www.shrm.org/resourcesandtools/hr-topics/employee-relations/pages/age-discrimination-.aspx.

[8] However, as participants in AARP's Back to Work 50+ program, our interviewees are a group of individuals who are actively working to make themselves more attractive to employers by demonstrating their willingness to learn and improve their skills.

[9] Chris Farrell, "Employers Need to Train Their Older Workers, Too," *Forbes*, October 17, 2017, https://www.forbes.com/sites/nextavenue/2017/10/17/employers-need-to-train-their-older-workers-too/?sh=288d59bc6853.

[10] Farrell, "Employers Need to Train Their Older Workers, Too."

[11] Casey Nighbor, "A Brief History of Staffing," 2020, https://www.staffmanagement.com/resourcecenter/blog/a-brief-history-of-staffing.

[12] Courtney Connley, "Google, Apple and 12 Other Companies that No Longer Require Employees to Have a College Degree," CNBC, August 8, 2018, https://www.cnbc.com/2018/08/16/15-companies-that-no-longer-require-employees-to-have-a-college-degree.html.

[13] Connley, "Google, Apple, and 12 Other Companies."

[14] For a more detailed description and examples of skills-based job ads, see Peregrin (2014).

[15] Sean Gallagher, "Talent Analytics, Skills-Based Hiring and the Potential Disruption of the Degree, EdSurge, June 24, 2019, https://www.edsurge.com/news/2019-06-24-talent-analytics-skills-based-hiring-and-the-potential-disruption-of-the-degree.

[16] For a list of the most relevant third-party assessment companies, compiled by Wilson, Kurzweil, and Alamuddin (2018), see http://sr.ithaka.org/technology-facilitated-assessment-providers/.

[17] Annie Brown, 2020, "Biased Algorithms Learn from Biased Data: 3 Kinds Biases Found in AI Datasets." *Forbes*, February 7, 2020, https://www.forbes.com/sites/cognitiveworld/2020/02/07/biased-algorithms/?sh=5469debb76fc.

[18] Kerry Hannon, "8 Ways to Get Job Training on the Cheap," *Forbes*, October 15, 2015, https://www.forbes.com/sites/nextavenue/2015/10/15/8-ways-to-get-job-training-on-the-cheap/?sh=7f88de4e18e1.

[19] Ashley A. Smith, "ITT Tech Shuts Down All Campuses," Inside Higher Ed, 2016, https://www.insidehighered.com/news/2016/09/07/itt-tech-shuts-down-all-campuses.

[20] Aswin Pranam, "The Case against AI, UX and Coding Bootcamps," *Forbes*, 2020, https://www.forbes.com/sites/aswinpranam/2020/02/22/the-case-against-ai-ux-and-coding-bootcamps/#1e31385b4bad.

[21] Also referred to as microdegrees, nanodegrees, digital badges, and alternative digital credentials (Resei et al. 2019).

[22] Texas Education Agency, "Industry-Based Certification Resources," 2020, https://tea.texas.gov/academics/college-career-and-military-prep/career-and-technical-education/industry-based.

[23] A more comprehensive list of examples of industry-based certificates spanning various industries can be found at "Industry-Based Certification Resources," Texas Education Agency, accessed April 27, 2021, https://tea.texas.gov/academics/college-career-and-military-prep/career-and-technical-education/industry-based.

[24] Kweilin Ellingrud, Rahul Gupta, and Julian Salguero, "Building the Vital Skills for the Future of Work in Operations," 2020, https://www.mckinsey.com/business-functions/operations/our-insights/building-the-vital-skills-for-the-future-of-work-in-operations.

[25] Ellingrud, Gupta, and Salguero, "Building the Vital Skills."

[26] Ellingrud, Gupta, and Salguero, "Building the Vital Skills."

[27] Oxford, "When Retraining and Upskilling Aren't Enough to Bridget the Skills Gap," 2020, https://www.oxfordcorp.com/en-us/insights/blog/when-retraining-and-upskilling-arent-enough-to-bridge-the-skills-gap.

[28] A detailed description of proposals to enhance apprenticeships in the United States can be found in Lerman, Loprest, and Kuehn (2019).

References

AARP and the Economist Intelligence Unit. 2020. "The Economic Impact of Age Discrimination." Washington, DC: AARP.

Abel, Jaison R., Tony Davis, Richard Deitz, and Edison Reyes. 2018. "Employer Engagement by Community Colleges in New York State." New York: Federal Reserve Bank of New York.

Abraham, Katharine G., and Susan N. Houseman. 2020. "Policies to Improve Workforce Services for Older Americans." *Economic Studies at Brookings*. Washington, DC: The Brookings Institution.

Abrams, Dominic, Hannah J. Swift, and Lisbeth Drury. 2016. "Old and Unemployable? How Age-Based Stereotypes Affect Willingness to Hire Job Candidates." *Journal of Social Issues* 72 (1): 105–121. https://doi.org/10.1111/josi.12158.

Albert, Cecilia, Carlos García-Serrano, and Virginia Hernanz. 2010. "On-the-Job Training in Europe: Determinants and Wage Returns." *International Labour Review* 149 (3): 315–341. https://doi.org/10.1111/j.1564-913X.2010.00089.x.

Allen, Jim, and Andries de Grip. 2012. "Does Skill Obsolescence Increase the Risk of Employment Loss?" *Applied Economics* 44 (25): 3237–45. https://doi.org/10.1080/00036846.2011.570727

Arnold, Jennifer. 2018. "How to Adopt Skills-Based Hiring Practices." *HR Magazine*, March 2018.

Baert, Stijn, Jennifer Norga, Yannick Thuy, and Marieke Van Hecke. 2016. "Getting Grey Hairs in the Labour Market: An Alternative Experiment on Age Discrimination." *Journal of Economic Psychology* 57 (C): 86–101. https://doi.org/10.1016/j.joep.2016.10.002.

Barnow, Burt S., and Shayne Spaulding. 2015. "Employer Involvement in Workforce Programs: What Do We Know?" In *Transforming US Workforce Development Policies for the 21st Century*, edited by Carl Van Horn, Tammy Edwards, and Todd Greene, 315–24. Kalamazoo, MI: W. E. Upjohn Institute for Employment Research.

Belloni, Michele, Agar Brugiavini, Elena Meschi, and Giacomo Pasini. 2015. "Does Training Help Retaining Older Workers into Employment? Evidence from the SHARE Survey." In *Aging in Europe—Supporting Policies for an Inclusive Society*, edited by Axel Börsch-Supan, Thorsten Kneip, Howard Litwin, Michal Myck, and Guglielmo Weber, 257–65. Berlin: de Gruyter.

Belloni, Michele, and Claudia Villosio. 2015. "Training and Wages of Older Workers in Europe." *European Journal of Ageing* 12: 7–16. https://doi.org/10.1007/s10433-014-0327-7.

Berg, Peter B., Mary K. Hamman, Matthew M. Piszczek, and Christopher J. Ruhm. 2016. "The Relationship between Employer-Provided Training and the Retention of Older Workers: Evidence from Germany." *International Labour Review* 156 (3–4): 495–523. https://doi.org/10.1111/ilr.12031.

Bettelley, Clare. 2020. "Upskilling the Ageing Workforce for Industry 4.0." *Raconteur*.

Brown, Jessie, and Martin Kurzweil. 2017. "The Complex Universe of Alternative Postsecondary Credentials and Pathways." *American Academy of Arts and Sciences*: 1–56.

Bucknor, Cherrie, and Dean Baker. 2016. "Still Working Hard: An Update on the Share of Older Workers in Physically Demanding Jobs." Washington, DC: Center for Economic and Policy Research.

Burn, Ian, Patrick Button, Luis Felipe Munguia Corella, and David Neumark. 2019. "Older Workers Need Not Apply? Ageist Language in Job Ads and Age Discrimination in Hiring." Working Paper No. 26552. Cambridge, MA: National Bureau of Economic Research. https://doi.org/10.3386/w26552

Burner, Ted, Liz Supinski, Susan Zhu, Samuel Robinson, and Cate Supinski. 2019. "The Global Skills Shortage: Bridging the Talent Gap with Education, Training, and Sourcing." Alexandria, VA: SHRM.

Button, Patrick. 2020. "Population Aging, Age Discrimination, and Age Discrimination Protections at the 50th Anniversary of the Age Discrimination in Employment Act." In *Current and Emerging Trends in Aging and Work*, edited by Sara J. Czaja, Joseph Sharit, and Jacquelyn B. James, 163–188. Cham, CH: Springer.

Börsch-Supan, Axel, and Matthias Weiss. 2016. "Productivity and Age: Evidence from Work Teams at the Assembly Line." *The Journal of Economics of Ageing* 7: 30–42. https://doi.org/10.1016/j.jeoa.2015.12.001.

Carmichael, Fiona, and Marco G. Ercolani. 2014. "Age-Training Gaps in the European Union." *Ageing & Society* 34 (1): 129–156. https://doi.org/10.1017/S0144686X12000852.

Carnevale, Anthony P., Stephen J. Rose, and Andrew R. Hanson. 2012. "Certificates: Gateway to Gainful Employment and College Degrees." Washington, DC: Georgetown University Center on Education and the Workforce.

Carnevale, Anthony, Jeff Strohl, and Artem Gulish. 2015. "College is Just the Beginning: Employer's Role in the $1.1 Trillion Postsecondary Education and Training System." Washington, DC: Georgetown University Center on Education and the Workforce.

Center on Aging and Work. 2016. "Three Things Employers Need to Know About: Training and Development for Workers 50+." Chestnut Hill, MA: The Center on Aging and Work at Boston College.

Cirillo, Joan. 2015. "An Effective Strategy for Getting the Long-Term Unemployed Back to Work." Washington, DC: AARP Public Policy Institute.

Clardy, Alan. 2018. "70-20-10 and the Dominance of Informal Learning: A Fact in Search of Evidence." *Human Resource Development Review* 17 (2): 153–178. https://doi.org/10.1177/1534484318759399.

Cone, Edward, and James Lambert. 2019. "How Robots Change the World: What Automation Really Means for Jobs and Productivity." London: Oxford Economics.

Credential Engine. 2021. "Counting US Postsecondary and Secondary Credentials." Washington, DC: Credential Engine.

Crenshaw, Kimberlé. 1989. "Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory and Antiracist Politics." *University of Chicago Legal Forum* 1989 (1): Article 8.

Cummins, Phyllis, Bob Harootyan, and Suzanne Kunkel. 2015. "Workforce Development in the United States: Facilitating Opportunities to Work at Older Ages." *Public Policy & Aging Report* 25 (4): 150–54. https://doi.org/10.1093/ppar/prv023.

Cummins, Phyllis A., Suzanne R. Kunkel, and Ryan Michael Walker. 2015. "Adult Education and Training Programs for Older Adults in the US: National Results and Cross-National Comparisons Using PIAAC Data." Arlington, VA: American Institutes for Research.

Cummins, Phyllis, Philip Taylor, and Suzanne Kunkel 2015. "Working Longer, Learning Longer." *Public Policy & Aging Report* 25 (4): 120–24. https://doi.org/10.1093/ppar/prv025

Davis, Owen, Bridget Fisher, Teresa Ghilarducci, and Siavash Radpour. 2021. "The Stalled Jobs Recovery Pushed 1.1 Million Older Workers out of the Labor Force." New York: Schwartz Center for Economic Policy Analysis at the New School for Social Research.

Deloitte. 2018. "2018 Deloitte the Manufacturing Institute Skills Gap and Future of Work Study." Stamford, CT: Deloitte Development LLC.

Dey, Matthew, Harley Frazis, Mark A. Loewenstein, and Hugette Sun. 2020. "Ability to Work from Home: Evidence from Two Surveys and Implications for the Labor Market in the COVID-19 Pandemic." *Monthly Labor Review*, June 2020. Washington, DC: US Bureau of Labor Statistics. https://doi.org/10.21916/mlr.2020.14.

Dorrer, John. 2016. "Using Real-Time Labor Market Information to Achieve Better Labor Market Outcomes." Indianapolis: Lumina Foundation.

Elvery, Joel A. 2019. "Changes in the Occupational Structure of the United States: 1860 to 2015." *Economic Commentary* 2019-09. https://doi.org/10.26509/frbc-ec-201909.

Eyster, Lauren, Richard W. Johnson, and Eric Toder. 2008. "Current Strategies to Employ and Retain Older Workers." Washington, DC: Urban Institute.

Finkelstein, Lisa M., Eden B. King, and Elora C. Voyles. 2015. "Age Metastereotyping and Cross-Age Workplace Interactions: A Meta View of Age Stereotypes at Work." *Work, Aging and Retirement* 1 (1): 26–40. https://doi.org/10.1093/workar/wau002.

Gallagher, Sean R. 2018. "Educational Credentials Come of Age: A Survey on the Use and Value of Educational Credentials in Hiring." Boston: Northeastern Center for the Future of Higher Education & Talent Strategy.

Gallagher, Sean, and Nan L. Maxwell. 2019. "Community Colleges and the New Era of Work and Learning." Working paper 66. Princeton, NJ: Mathematica Policy Research.

Gallup. 2014a. "The 2014 Inside Higher Ed Survey of College & University Chief Academic Officers." Edited by Scott Jaschik and Doug Lederman. Inside Higher Ed.

Gallup. 2014b. "The 2013 Lumina Study of the American Public's Opinion on Higher Education and US Business Leaders Poll on Higher Education: What America Needs to Know About Higher Education Redesign." Inside Higher Ed.

Ghilarducci, Teresa, Anthony Webb, and Michael Papadopoulos. 2018. "The Growth of Unstable and Low-Wage Work among Older Workers." *Policy Notes Series*. New York: Schwartz Center for Economic Policy Analysis and Department of Economics, The New School for Social Research.

Görlitz, Katja. 2010. "The Effect of Subsidizing Continuous Training Investments—Evidence from German Establishment Data." *Labour Economics* 17 (5): 789–798. https://doi.org/10.1016/j.labeco.2010.04.007

Hartman, Katherine B., and James Andzulis. 2019. "Industry-Based Certificates: Student Perceptions of Benefits." *Research in Higher Education Journal* 36: 1–10.

Hecker, Ian, and Pamela Loprest. 2019. "Foundational Digital Skills for Career Progress." Washington, DC: Urban Institute.

Heidkamp, Maria. 2012. "Older Workers, Rising Skill Requirements, and the Need for a Re-envisioning of the Public Workforce System." *A Tapping Mature Talent Publication*. Council for Adult and Experiential Learning.

Hendra, Richard, David H. Greenberg, Gayle Hamilton, Ari Oppenheim, Alexandra Pennington, Kelsey Schaberg, and Betsy L. Tessler. 2016. "Encouraging Evidence on a Sector-Focused Advancement Strategy: Two-Year Impacts from the WorkAdvance Demonstration." New York: MDRC.

Hill, Elizabeth T. 2001. "Post-School-Age Training Among Women: Training Methods and Labor Market Outcomes at Older Ages." *Economics of Education Review* 20 (2): 181–191. https://doi.org/10.1.1.1052.3820.

Hudomiet, Péter, Michael D. Hurd, Susann Rohwedder, and Robert J. Willis. 2017. "The Effect of Physical and Cognitive Decline at Older Ages on Work and Retirement: Evidence from Occupational

Job Demands and Job Mismatch." MRRC Working Paper WP 2017–372. Ann Arbor, MI: University of Michigan Retirement Research Center. http://dx.doi.org/10.2139/ssrn.3120678.

Johnson, Richard W. 2018. "Is It Time to Raise the Social Security Retirement Age?" Washington, DC: Urban Institute.

Johnson, Richard W. 2004. "Trends in Job Demands Among Older Workers, 1992–2002." *Monthly Labor Review* 127(7): 48–56.

Johnson, Richard W., and Barbara A. Butrica. 2012. "Age Disparities in Unemployment and Reemployment during the Great Recession and Recovery." Unemployment and Recovery Project Brief No. 3. Washington, DC: Urban Institute.

Johnson, Richard W., and Peter Gosselin. 2018. "How Secure is Employment at Older Ages." Washington, DC: Urban Institute.

Johnson, Richard W., and Corinna Mommaerts. 2011. "Age Differences in Job Loss, Job Search, and Reemployment." Washington, DC: Urban Institute.

Johnson, Richard W., Gordon B. T. Mermin, and Matthew Resseger. 2011. "Job Demands and Work Ability at Older Ages." *Journal of Aging and Social Policy* 23 (2): 101–18. https://doi.org/10.1080/08959420.2011.551465.

Kaufmann, Michèle C., Franciska Krings, Leslie A. Zebrowitz, and Sabine Sczesny. 2017. "Age Bias in Selection Decisions: The Role of Facial Appearance and Fitness Impressions." *Frontiers in Psychology* 8: 2065. https://doi.org/10.3389/fpsyg.2017.02065.

Kazin, Cathrael, and Kristine M. Clerkin. 2018. "The Potential and Limitations of Microcredentials." Servicemembers Opportunity Colleges.

Kreisberg, Nicole. 2015. "New Careers for Older Workers." Great Barrington, MA: American Institute for Economic Research.

Krishna, Vijay. 2019. "Developing a Competency-Based Credentialing Framework for National Human Resource Development." *International Journal of HRD Practice, Policy and Research* 4(1): 41–58. https://doi.org/10.22324/ijhrdppr.4.102.

Lahey, Joanna N. 2008. "Age, Women, and Hiring: An Experimental Study." *Journal of Human Resources* 43 (1): 30–56.

Lee, Nicol Turner, Paul Resnick, and Genie Barton. 2019. "Algorithmic Bias Detection and Mitigation: Best Practices and Policies to Reduce Consumer Harms." Washington, DC: The Brookings Institution.

Lerman, Robert, Pamela Loprest, and Daniel Kuehn. 2019. "Training for Jobs of the Future: Improving Access, Certifying Skills, and Expanding Apprenticeship." Washington, DC: Urban Institute.

Lipnic, Victoria A. 2018. "The State of Age Discrimination and Older Workers in the US 50 Years After the Age Discrimination in Employment Act (ADEA)." Washington, DC: US Equal Employment Opportunity Commission.

LiveCareer. 2018. "Bridging the Skills Gap: An Analysis of Job Ads and Resumes and How They Contribute to Employer-Jobseeker Friction." New York: LiveCareer.

Lössbroek, Jelle, and Jonas Radl. 2019. "Teaching Older Workers New Tricks: Workplace Practices and Gender Training Differences in Nine European Countries." *Ageing & Society* 39 (10): 2170–93. https://doi.org/10.1017/S0144686X1800079X.

Lumina Foundation. 2015. "Connecting Credentials: A Beta Credentials Framework." Indianapolis, IN: Lumina Foundation.

ManpowerGroup. 2018. "Solving the Talent Shortage: Build, Buy, Borrow." Milwaukee, WI: ManpowerGroup.

———. 2020. "Closing the Skills Gap: What Workers Want." Milwaukee, WI: ManpowerGroup.

Martin, Gregory, Darryl Dymock, Stephen Billett, and Greer Johnson. 2014. "In the Name of Meritocracy: Managers' Perceptions of Policies and Practices for Training Older Workers." *Ageing & Society* 34 (6): 992–1018. https//doi.org/10.1017/S0144686X12001432.

Mayhew, Ken, and Bob Rijkers. 2004. "How to Improve the Human Capital of Older Workers or the Sad Tale of the Magic Bullet." Paper prepared for the joint EC-OECD Seminar on Human Capital and Labour Market Performance.

McClelland, David C. 1998. "Identifying Competencies with Behavioral-Event Interviews." *Psychological Science* 9 (5): 331–39. https://doi.org/10.1111/1467-9280.00065.

McDonnell, Rachel Pleasants, and Lisa Soricone. 2019. "Integrated Career Pathways: Lessons from Accelerating Opportunity." *COABE Journal* (special edition), 52–62.

Mermin, Gordon B. T., Richard W. Johnson, and Eric J. Toder. 2008. "Will Employers Want Aging Boomers?" The Retirement Policy Program Discussion Paper No. 08-04. Washington, DC: Urban Institute.

MetLife. 2020. "Evolving Retirement Model Study." New York: MetLife.

Mikelson, Kelly S. 2017. "The Role of SCSEP in Workforce Training for Low-Income Workers." Washington, DC: Urban Institute.

Mikelson, Kelly S., Daniel Kuehn, and Ananda Martin-Caughey. 2017. "Occupational Projections for Low-Income Older Workers: Assessing the Skill Gap for Workers Ages 50 and Older." Washington, DC: Urban Institute.

Miyazaki, Ichisada. 1981. *China's Examination Hell: The Civil Service Examinations of Imperial China*. New Haven, CT: Yale University Press.

Monster. 2021. "The Future of Work: 2021 Global Outlook." Weston, MA: Monster.

Munnell, Alicia H., and Gal Wettstein. 2020. "Employer Perceptions of Older Workers: 2019 Survey Results." *Issue Brief* No. 20-8. Chestnut Hill, MA: Center for Retirement Research at Boston College.

Munnell, Alicia H., Steven A. Sass, and Mauricio Soto. 2006. "Employer Attitudes Towards Older Workers: Survey Results." Work Opportunities for Older Americans Series 3. Chestnut Hill, MA: Center for Retirement Research at Boston College.

NCES (National Center for Education Statistics). 2012. "Percentage Distribution of Credential-Seeking Undergraduates within Each Credential Goal and Curriculum Area, by Sex and Age: 2011–12." Washington, DC: NCES.

National Center for Health Statistics. 2016. "Health, United States, 2015: With Special Feature on Racial and Ethnic Health Disparities." Hyattsville, MD: National Center for Health Statistics.

Neumann, Zach, and Alastair Fitzpayne. 2020. "Building a Lifelong Learning System: A Roadmap for Cities." Future of Work Initiative. Washington, DC: The Aspen Institute.

Neumark, David. 2020. "Age Discrimination in Hiring: Evidence from Age-Blind vs. Non-Age-Blind Hiring Procedures." Working Paper No. W26623. Cambridge: National Bureau of Economic Research. https://doi.org/10.3386/w26623.

Neumark, David, Ian Burn, and Patrick Button. 2019. "Is It Harder for Older Workers to Find Jobs? New and Improved Evidence from a Field Experiment." *Journal of Political Economy* 127(2): 922–970. https://doi.org/10.3386/w21669.

New Collar Jobs. 2020. "What Is New Collar?" Armonk, NY: IBM.

OECD. 2018. *Ageing and Employment Policies: United States 2018: Working Better with Age and Fighting Unequal Ageing*. Paris: OECD Publishing.

Opportunity@Work and Accenture. 2020. "Reach for the STARs: The Potential of America's Hidden Talent Pool." Washington, DC: Opportunity@Work, and Dublin, Ireland: Accenture.

Osterman, Paul. 2020. "Skill Training for Adults." Cambridge, MA: MIT Work of the Future.

Paullin, Cheryl, and Deborah L. Whetzel. 2012. "Retention Strategies and Older Workers." In *The Oxford Handbook of Work and Aging*, edited by Walter C. Borman and Jerry W. Hedge, 392–418. Oxford: Oxford University Press.

Peregrin, Tony. 2014. "Competency-Based Hiring: The Key to Recruiting and Retaining Successful Employees." *Journal of the Academy of Nutrition and Dietetics* 114 (9): 1332–35. https://doi.org/10.1016/j.jand.2014.07.016.

Perron, Rebecca. 2021. "Ageism Could Hurt Job Prospects, Say Job-Insecure Older Workers." Washington, DC: AARP Research.

Perron, Rebecca. 2018. "The Value of Experience: Age Discrimination against Older Workers Persists." Washington, DC: AARP Research. https://doi.org/10.26419/res.00177.002.

Pew Research Center. 2016. "The State of American Jobs: How the Shifting Economic Landscape is Reshaping Work and Society and Affecting the Way People Think about the Skills and Training They Need to Get Ahead." Washington, DC: Pew Research Center.

Picchio, Matteo. 2021. "Is Training Effective for Older Workers?" *IZA World of Labor*. 121v2: 1–11. https://doi.org/10.15185/izawol.121.v2.

Picchio, Matteo, and Jan C. van Ours. 2013. "Retaining through Training: Even for Older Workers." *Economics of Education Review* 32 (1): 29–48.

Pitt-Catsouphes, Marcie, Michael A. Smyer, Christina Matz-Costa, and Katherine Kane. 2007. "The National Study Report: Phase II of the National Study of Business Strategy and Workforce Development." Chestnut Hill, MA: Center on Aging and Work at Boston College.

Posthuma, Richard A., and Michael A. Campion. 2009. "Age Stereotypes in the Workplace: Common Stereotypes, Moderators, and Future Research Directions." *Journal of Management* 35 (1): 158–188. https://doi.org/10.1177/0149206308318617.

Rahn, Georg, Sarah E. Martiny, and Jana Nikitin. 2021. "Feeling Out of Place: Internalized Age Stereotypes Are Associated with Older Employees' Sense of Belonging and Social Motivation." *Work, Aging and Retirement* 7 (1): 61–77. https://doi.org/10.1093/workar/waaa005.

Regnér, Håkan. 2002. "The Effects of On-the-Job Training on Wages in Sweden." *International Journal of Manpower* 23 (4): 326–344. https://doi.org/10.1108/01437720210439665.

Resei, Christoph, Christian Friedl, Thomas Staubitz, and Tobias Rohloff. 2019. "Micro-Credentials in EU and Global." Graz, Austria: Corship.

Riach, Peter A., and Judith Rich. 2010. "An Experimental Investigation of Age Discrimination in the English Labor Market." *Annals of Economics and Statistics* 99–100: 169–185. https://doi.org/10.2307/41219164.

Ross, Martha, and Nicole Bateman. 2019. "Meet the Low-Wage Workforce." Metropolitan Policy Program. Washington, DC: The Brookings Institution.

Scott, Molly M., and Demetra Nightingale. 2018. "The Education-Jobs 'Mix-Match': How Much Opportunity Is There for the College-Educated Workforce in America's Metropolitan Areas?" Washington, DC: Urban Institute.

Sim, Seung-Gyu, and Tim Huegerich. 2018. "Employer Incentives for Providing Informal On-the-Job Training in the Presence of On-the-Job Search." *Journal of Labor Research* 39 (1): 22–40. http://dx.doi.org/10.2139/ssrn.2359440.

Simpson, Patricia A., Martin M. Greller, and Linda K. Stroh. 2002. "Variations in Human Capital Investment Activity by Age." *Journal of Vocational Behavior* 61(1): 109–138. https://doi.org/10.1006/jvbe.2001.1847.

Singh, Anjana, and V. Pathak. 2018. "Competency Based Recruitment and Selection: A Key to Retain Employees." *CPJ Global Review* X (1): 1–4. https://doi.org/10.1016/j.jand.2014.07.016.

Skillsmart. 2016. "Middle Skills for the Middle Class: How Skills-Based Hiring Can Reverse Middle Class Decline." Germantown, MD: Skillsmart.

SHRM (Society for Human Resource Management). 2015. "Preparing for an Aging Workforce: A Gap Analysis Report Comparing the SHRM Foundation's the Aging Workforce Effective Practice Guidelines Report with SHRM's Aging Workforce Survey Findings." Alexandria, VA: Society for Human Resource Management.

Taylor, Philip, and Peter Urwin. 2001. "Age and Participation in Vocational Education and Training." *Work, Employment & Society* 15 (4): 763–779. https://doi.org/10.1177/095001701400438198.

Teng, Ssu-yu, 1943. "Chinese Influence on the Western Examination System." *Harvard Journal of Asiatic Studies* 7: 267–312. https://doi.org/10.2307/2717830.

Thackaberry, Alexandera. 2017. "Competency-Based Education Models: An Emerging Taxonomy." PhD dissertation, Kent State University.

Toomey, Eileen C., and Cort W. Rudolph. 2015. "Age Stereotypes in the Workplace." In *Encyclopedia of Geropsychology*, edited by Nancy Pachana, 89–95. Singapore: Springer Science.

Turek, Konrad, and Kène Henkens. 2020. "How Skill Requirements Affect the Likelihood of Recruitment of Older Workers in Poland: The Indirect Role of Age Stereotypes." *Work, Employment and Society* 34 (4): 550–570. https://doi.org/10.1177/0950017019847943.

Tyszko, Jason A., and Robert G. Sheets. 2019. "Co-Designing Assessment and Learning: Rethinking Employer Engagement in a Changing World." Urbana, IL: University of Illinois and Indiana University, National Institute for Learning Outcomes Assessment.

Uranis, Julie, Michael Erskine, Ashley Cullum, and Rita DeBate. 2019. "Moving from the Legacy Student Hour Toward a Comprehensive Measure of Student Learning: Examining Benefits of a Competency-Based Taxonomy of Learning." Indianapolis, IN: Lumina Foundation.

Urick, Michael. 2017. "Adapting Training to Meet the Preferred Learning Styles of Different Generations." *International Journal of Training and Development* 21 (1): 53–9. https://doi.org/10.1111/ijtd.12093.

Urban Institute. 2020. "Program on Retirement Policy Calculations from Bureau of Labor Statistics 2020." Washington, DC: Urban Institute.

US Bureau of Labor Statistics. 2018. "Higher Wage Workers More Likely than Lower Wage Workers to Have Paid Leave Benefits in 2018." Washington, DC: US Bureau of Labor Statistics.

US Bureau of Labor Statistics. 2021a. "Labor Force Statistics from the Current Population Survey: Persons Not in the Labor Force by Desire and Availability for Work, Age, and Sex." Washington, DC: US Bureau of Labor Statistics.

US Bureau of Labor Statistics. 2021b. "Labor Force Statistics from the Current Population Survey." Washington, DC: US Bureau of Labor Statistics.

US Bureau of Labor Statistics. 2021c. "Characteristics of Minimum Wage Workers, 2020." Washington, DC: US Bureau of Labor Statistics.

US Census Bureau. 2018. "Projected 5-Year Age Groups and Sex Composition: Main Projections Series for the United States, 2017-2060." Washington, DC. US Census Bureau.

van Dalen, Hendrik P. and Kène Henkens. 2017. "Do Stereotypes about Older Workers Change? Evidence from a Panel Study among Employers." CentER discussion paper 2017–028. Netherlands: CentER. https://doi.org/10.13140/RG.2.2.30090.16322.

van Dalen, Hendrik P., Kène Henkens, and Mo Wang. 2015. "Recharging or Retiring Older Workers? Uncovering the Age-Based Strategies of European Employers." *The Gerontologist* 55 (5): 814–24. https://doi.org/10.1093/geront/gnu048.

Van Horn, Carl E., Kathy Krepcio, and Maria Heidkamp. 2015. "Improving Education and Training for Older Workers." Washington, DC: AARP Public Policy Institute.

Vollman, James, 2016. "Real Time Labor Market Information." Brookings Institution LMI Forum. Washington, DC: The Brookings Institution.

Wandner, Stephen A., David E. Balducchi, and Christopher J. O'Leary. 2018. "Public Employment Policy for an Aging Workforce." *Gerontology & Geriatric Medicine* 4: 1–13. https://doi.org/10.1177/2333721418800064.

Weinstein, Dianne. 2012. "The Psychology of Behaviorally-Focused Resumes on Applicant Selection: Are Your Hiring Managers Really Hiring the 'Right' People for the 'Right' Jobs?" *Business Horizons* 55 (1): 53–63. https://doi.org/10.1016/j.bushor.2011.09.003.

Weise, Michelle R., & Salm, Janet. 2019. "On-Ramps to Good Jobs: The Benefits for Employers." Indianapolis, IN: Strada Institute for the Future of Work.

White House. 2015. "White House Report: President Obama's Upskill Initiative." Washington, DC: White House.

Williams, Joan C., and Sky Mihaylo. 2019. "How the Best Bosses Interrupt Bias on Their Teams." *Harvard Business Review* 97 (6): 151–155.

Wiley Education Services and Future Workplace. 2019. *Closing the Skills Gap 2019*. Louisville, KY: Wiley Edu, LLC.

Wilson, Meagan, Martin Kurzweil, and Rayane Alamuddin. 2018. "Mapping the Wild West of Pre-Hire Assessment a Landscape View of the Uncharted Technology-Facilitated Ecosystem." New York: Ithaka S+R. https://doi.org/10.18665/sr.310761.

Wyman, Nicholas. 2014. "How Apprenticeships Build and Sustain Skills-Based Careers." *Innovations* 9 (1): 1–11. https://doi.org/10.1162/inov_a_00205.

Yang, Jenny. 2020. "Ensuring a Future That Advances Equity in Algorithmic Employment Decisions." Testimony before the Civil Rights and Human Services Subcommittee, Committee on Education and Labor, US House of Representatives. Washington, DC: Urban Institute.

Zwick, Thomas. 2015. "Training Older Employees: What is Effective?" *International Journal of Manpower* 36 (2): 136–150. https://doi.org/10.1108/IJM-09-2012-0138.

About the Authors

Barbara Butrica is a senior fellow in the Income and Benefits Policy Center at the Urban Institute where she conducts research on the economics of aging, including older workers, pensions and retirement plans, Social Security, and retirement security.

Her recent studies have examined the role of debt on labor force participation and Social Security benefit claiming, the retirement prospects of workers in alternative work arrangements, how caregiving affects work and retirement savings, the impact of the Social Security, pension, and tax systems on work incentives at older ages, the effect of the Great Recession on 401(k) participation and contributions, and strategies for improving the employment prospects of low-income incumbent older workers. Her research has been published in reports, books, and peer-reviewed journals and cited in leading media outlets. She testified before the DOL's ERISA Advisory Council about ethnic and gender differences in employer-sponsored pensions.

Before joining Urban, she worked at William M. Mercer and at the Social Security Administration. She has a BA from Wellesley College and a PhD from Syracuse University, both in economics.

Stipica Mudrazija is a senior research associate in the Income and Benefits Policy Center at the Urban Institute, where he studies issues related to population, aging, retirement, intergenerational support, and long-term services and supports for older adults.

Prior to joining the Urban Institute, Dr. Mudrazija was a postdoctoral scholar at the Edward R. Roybal Institute on Aging at the University of Southern California. Previously, Dr. Mudrazija worked as a junior analyst in the research department of the Croatian National Bank. He was also a trainee in the Social Protection unit of the European Commission's Directorate-General for Employment, Social Affairs and Inclusion as well as a graduate research intern in the Center on Budget and Policy Priorities. His research on intergenerational support, retirement security, long-term services and supports, economic and health disparities, and immigration has been published in peer-reviewed journals and edited volumes.

Mudrazija holds a bachelor's degree in economics from the University of Zagreb, a master's degree in public policy from Georgetown University, and a doctorate in public policy from The University of Texas at Austin.

Statement of Independence

The Urban Institute strives to meet the highest standards of integrity and quality in its research and analyses and in the evidence-based policy recommendations offered by its researchers and experts. We believe that operating consistent with the values of independence, rigor, and transparency is essential to maintaining those standards. As an organization, the Urban Institute does not take positions on issues, but it does empower and support its experts in sharing their own evidence-based views and policy recommendations that have been shaped by scholarship. Funders do not determine our research findings or the insights and recommendations of our experts. Urban scholars and experts are expected to be objective and follow the evidence wherever it may lead.

500 L'Enfant Plaza SW
Washington, DC 20024

www.urban.org